

Original Research Article

A Hospital Based Prospective Study to Assess the Presence of Glaucoma Among Patients Visited for Eye Examination at Newly Established Tertiary Care Center: An Observational Study

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Abstract

Background: The diagnosis of glaucoma is usually made clinically and requires a comprehensive eye examination, including slit lamp, applanation tonometry, gonioscopy and dilated stereoscopic evaluation of the optic disc and retina. The most significant risk factors of glaucoma include older age, increased intraocular pressure (IOP) in relation to the pressure sensitivity of the optic nerve head, family history, and ethnicity. Lack of awareness about the disease may not only affect the timing of diagnosis, but also using healthcare services. The objective of study to assess the presence of glaucoma among patients visited in ophthalmology out patients for eye examination. **Materials & Methods:** This is an observational study done on all patients those who were eye checkup in department of ophthalmology in SK Government Medical college, Sikar, Rajasthan, India during one year period. The number of patients attended to screening clinic was 10000 patients. The target sample size was calculated as $n=50$. Fifty participants were included in this study with a mean \pm SD was 37.65 ± 11.72 years old. After taking their informed consents, all the subjects were asked for detailed ocular and systemic histories and they underwent thorough ophthalmic examinations. **Results:** Regarding gender, males (62%) were higher than females (38%). Most of the participants had high educational level (university degree or higher; 60%). Medical history showed that 14% of participants had diabetes mellitus that may affect eye status, 6% had glaucoma and 22% had positive family history of glaucoma. The majority of patients had mild vision loss (72%) based on the best corrected visual acuity (BCVA) in the worse-seeing eye and received medication as their initial treatment (72%). About 32% of the patients were diagnosed as glaucoma suspects and only about 14% were diagnosed with severe glaucoma. **Conclusion:** In conclusion, irreversible blindness is the primary concern in glaucomatous patients. Early detection and treatment are paramount to prevent this inevitable consequence. Good awareness and knowledge about the disease are major determinants of diagnosis and treatment.

Keywords: Glaucoma, BCVA, IOP, Eye, Blindness.

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Introduction

Glaucoma affects more than 67 million persons worldwide, of whom about 10%, or 6.6 million, are estimated to be blind[1]. Glaucoma is the leading cause of irreversible blindness worldwide and is second only to cataract as the most common cause of blindness overall[1]. Glaucoma is responsible for 14% of all blindness[2]. In India, the estimated number of cases of glaucoma is 12 million, around one fifth of the global burden of glaucoma[3]. In the United States, chronic open-angle glaucoma (COAG) affects more than 2.2 million persons, and this number is projected to increase to 3.4 million by 2020[4]. Over the same time period in the developing world, the prevalence of glaucoma is expected to rise even more dramatically as the population of adults older than 60 years more than doubles[2].

Glaucoma is an optic neuropathy with the characteristic appearance of an optic disc and a specific pattern of visual field defects, that is associated frequently but not invariably with a raised IOP[5]. Measurement of the accurate IOP is important not only for classification, but for the clinical management of the glaucoma patients. It is important therefore, to ensure that the IOP readings are taken by using a highly accurate method[5].

The most significant risk factors of glaucoma include older age, increased intraocular pressure (IOP) in relation to the pressure sensitivity of the optic nerve head, family history, and ethnicity[6]. IOP-lowering medications, such as beta-blockers, prostaglandin analogs, and carbonic anhydrase inhibitors, are usually given for patient management. In some instances, the efficacy of these drugs to arrest glaucomatous progression is questionable[7]. Surgical approaches, including laser trabeculoplasty and trabeculectomy, are also available upon the failure of medical treatment.

However, early detection of the disease is paramount to accomplish good therapeutic outcomes, yet it is often difficult to achieve, particularly in line with the lack of reliable screening tools. It has been shown that more than half of patients with glaucoma remain undiagnosed and the majority of them are frequently detected at late stages[8,9]. One of the significant factors that contribute to late presentation is the lack of awareness about disease nature and risk factors and subsequently failure to seek for medical care and treatment[10]. Lack of awareness about the disease may not only affect the timing of diagnosis, but also using healthcare services. The

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objective of study to assess the presence of glaucoma among patients visited in ophthalmology out patients for eye examination.

Materials & methods

This is an observational study done on all patients those who were eye checkup in department of ophthalmology in SK Government Medical college, Sikar, Rajasthan, India during one year period. The number of patients attended to screening clinic was 10000 patients. We calculated the sample size for an unknown proportion of adequate knowledge level ($P=50\%$) within a finite population of 10000, with 5% margin error, 95% confidence interval and 80% statistical power. The target sample size was calculated as $n=50$. Fifty participants were included in this study with a mean \pm SD was 37.65 \pm 11.72 years old.

Methods

After taking their informed consents, all the subjects were asked for detailed ocular and systemic histories and they underwent thorough ophthalmic examinations. The preliminary eye examination included the best corrected visual acuity (BCVA) and slit lamp biomicroscopy of the anterior segment, to rule out any corneal pathology and refraction. The intraocular pressure was recorded by using Goldmann

Applanation Tonometry (GAT). Two readings were taken and average calculated. Fluorescein dye is placed in the patient's eye after topical anesthesia to highlight the tear film. A split- image prism is used such that the image of the tear meniscus is divided into a superior and inferior arc. The intraocular pressure is taken when these arcs are aligned such that their inner margins just touch. The IOP (in mm Hg) equals the flattening force (in grams) multiplied by 10.

Statistical Analysis

Statistical analysis was performed with the Statistical Package for Social Sciences version 22.0 for Windows (SPSS Version). Categorical variables are presented as frequency and percentage, while continuous variables are presented as mean \pm SD. $P<0.05$ was considered to reject the null hypothesis.

Results

Regarding gender, males (62%) were higher than females (38%). Most of the participants had high educational level (university degree or higher; 60%). Medical history showed that 14% of participants had diabetes mellitus that may affect eye status, 6% had glaucoma and 22% had positive family history of glaucoma (Table 1).

Table 1: Demographic profile of patients

Demographic profile	No. of patients	Percentage
Gender		
Male	31	62%
Female	19	38%
Education level		
Primary	3	6%
Middle	3	6%
Secondary	14	28%
University	30	60%
Diabetes history		
Yes	7	14%
No	36	72%
Do not know	7	14%
Glaucoma history		
Yes	3	6%
No	39	78%
Do not know	8	16%
Family history of Glaucoma		
Yes	11	22%
No	27	54%
Do not know	12	24%

The patient's clinical characteristics are presented in Table 2.

Table 2: Clinical variables of patients

Clinical variables	No. of patients (N=50)	Percentage
Best corrected visual acuity		
Mild visual acuity loss	36	72%
Moderate visual acuity loss	8	16%
Legal blindness	6	12%
Glaucoma stage		
Suspected	16	32%
Early	13	26%
Moderate	13	26%
Severe	8	16%
Disease classification (N=100 eyes)		
OHT	17	17%
POAG	83	83%

The majority of patients had mild vision loss (72%) based on the best corrected visual acuity (BCVA) in the worse-seeing eye and received medication as their initial treatment (72%). About 32% of the patients were diagnosed as glaucoma suspects and only about 14% were diagnosed with severe glaucoma.

Discussion

Public awareness and knowledge about glaucoma represent an important pillar in promoting public health-seeking behavior and enhancing detection of unidentified cases. Patients with the required

information is a clinically beneficial and cost-effective approach to reduce the progression or deterioration of the visual field and improve patients' compliance to treatment[11,12].

In this study, adequate knowledge was reported in 60% of participants with university, 28% with secondary school, 6% middle school and 6% primary school education level. The contribution of health education was apparent specifically in the developing countries, such as Ethiopia, where highly educated participants had a significant increase in awareness levels compared to those received less than high school[13]. Meanwhile, in Ghana, all participants presenting to a teaching hospital who received a tertiary education were aware about the disease, while more than half of those with a middle education lack pertinent awareness[14]. Highly educated groups have better chances to access relevant information from mass media, internet and other sources, than their counterparts. Additionally, education improves public health through several causal pathways. First, the psychosocial environment, where social standing, social support, and personal sense of control are major influential factors. Second, a better access to health-related resources could be seen in highly educated individuals.

The present study showed that having a personal history of glaucoma was significantly associated with better knowledge scores. Additionally, diabetic participants represented 14% of the total population under study and they had a significantly higher awareness compared to non-diabetic peers. This is consistent study in India[15], where about 25% of the diabetic participants showed good knowledge about glaucoma. This observation can be explained by that diabetic patients may visit an ophthalmologist at some point of their lifetime for diabetes-related ocular problems, and the treating physician had provided some information about glaucoma. A recent Meta-analysis combined the outcomes of the relevant prospective studies and found an increased risk of primary OAG in diabetic patients[16]. While the potential mechanism for this association is still unclear, suggestions that diabetes-induced vascular injuries in the retina and optic nerve may ultimately cause deteriorative damage to retinal ganglionic cells and initiation of glaucomatous impairment[17].

Generally, a positive family history has been reported in 13%-25% of glaucomatous patients and it was associated with a two-fold increase in risk of developing at least OAG.[18] In a patient-directed survey, Gramer et al[19] found that patients with a positive family history were diagnosed at younger ages when compared to those with a negative history, and this observation was consistent in all types of glaucoma. From another perspective, even with the presence of a glaucomatous patient within the family, the patient may fail to inform other family members. Hence, it has been early demonstrated that 27% of patients were unknowledgeable about glaucoma even in families with a positive history of glaucoma[20]. In a cross-sectional study conducted in a campaign for awareness about glaucoma in Brazil, only 15 participants (out of 31 with a positive family history) were knowledgeable about the disease and they lack the required information about the necessity of regular eye examinations[21].

Glaucoma is a potentially blinding disease because it causes defects in the visual field, which affect the visual function. Once such a defect is detected, diagnosis and management decisions become clearer. The detection of field defects and their progression (or stability) is therefore extremely important in glaucoma management. The initial evaluation of a patient may or may not lead to a confirmed diagnosis or a decision to treat. Follow-up of suspects and patients at appropriate intervals for the detection of progression based on optic disc examination, imaging and serial visual fields is crucial to further decision making. It is therefore important to obtain baseline documentation of the optic disc and visual fields early in the course of the disease. Baseline fields should exclude the learning curve.

The majority of patients had mild vision loss (72%) based on the best corrected visual acuity (BCVA) in the worse-seeing eye and received medication as their initial treatment (72%). About 32% of the patients were diagnosed as glaucoma suspects and only about 14% were diagnosed with severe glaucoma in our study. It is important to remember that "raised" intraocular pressure (IOP) is a causal risk factor for glaucoma and the only one that can be treated, but it is neither sufficient nor necessary for the diagnosis[22-24]. The notion that using both types of measurements jointly may therefore improve

the detection of glaucoma progression has led to the development of several strategies for joint structure-function analysis. The approach we propose in this study is similar to the Bayesian joint regression model developed by Medeiros et al[32], in that the identification of progression is based on the joint assessment of longitudinal structural and functional data. While the accuracy and precision of the slopes were assessed in that Bayesian model, its sensitivity was not evaluated. The framework we have proposed in this study can be used to perform such evaluations. Moreover, the framework is not limited to a specific definition of glaucoma progression.

Conclusion

In conclusion, irreversible blindness is the primary concern in glaucomatous patients. Early detection and treatment are paramount to prevent this inevitable consequence. Good awareness and knowledge about the disease are major determinants of diagnosis and treatment.

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