

**A CROSS-SECTIONAL STUDY ON AWARENESS OF GLAUCOMAS AMONG
PATIENTS WITH SYSTEMIC DISEASES ATTENDING OPHTHALMOLOGY OPD
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ABSTRACT

Glaucoma, a leading cause of irreversible blindness globally, remains a significant public health concern, particularly in resource-limited settings. This cross-sectional study aimed to evaluate glaucoma awareness and knowledge among patients with systemic diseases attending an ophthalmology outpatient department. Conducted over six months, the study included 100 participants aged 40 years and above, with systemic conditions such as diabetes and hypertension. Data collection utilized structured questionnaires and clinical evaluations, including optic disc assessment, intraocular pressure measurement, and visual field testing. The results revealed that while 62% of participants had heard of glaucoma, only 41% demonstrated an understanding of its causes, risk factors, and complications. Awareness was higher among patients with systemic diseases (72%) compared to those without (45%). Despite this, knowledge gaps persisted, with misconceptions about glaucoma's similarity to cataracts and a limited understanding of its risk factors, including age, family history, and systemic conditions. Encouragingly, 81% recognized the importance of annual ophthalmic screenings, particularly for those with systemic diseases. The findings underscore the need for targeted educational initiatives to improve public understanding of glaucoma, emphasizing early detection, preventive measures, and management strategies. By bridging these knowledge gaps, healthcare systems can enhance glaucoma prevention and reduce the burden of blindness in at-risk populations.

KEYWORDS: Glaucoma; Ophthalmology; Awareness; Knowledge; Ophthalmic screening.

INTRODUCTION

Glaucoma is the second leading cause of irreversible visual impairment worldwide.^[1] Former population-based studies have reported varying glaucoma prevalence, ranging from 0.4% to 8.8%, depending on study design and the ethnicities of the participants.^[2,3] Glaucoma prevalence is estimated to affect more than 67 million individuals globally and lead to blindness in 4.5 million individuals.^[1] It is estimated that this number will rise to 79.6 million by 2020, and glaucoma will lead to bilateral blindness in 5.9 million individuals.^[4] Glaucoma associated blindness accounts to 12.8% in India.^[5]

Glaucoma is defined as progressive optic neuropathy with characteristic optic disc cupping and corresponding visual deficit. The condition has as its basis gradual loss of retinal ganglion cells and axons traversing the retina and the optic nerve to the brain.^[6]

The two most common forms of the disease are primary open-angle glaucoma (POAG) and primary angle-closure

glaucoma (PACG), with different patterns of disease occurrence.^[7] Secondary glaucoma can result from trauma and certain medications such as corticosteroids, inflammation, tumor, or conditions such as pigment dispersion or pseudo-exfoliation.^[8] Older age, family history of glaucoma, black race, use of systemic or topical corticosteroids, and high intraocular pressure are some of the risk factors that require prompt assessment by eye care practitioners for evaluation of glaucoma.^[9]

People with glaucoma may show the following clinical manifestations; blurred vision, eye pain, headache, and hyperemia with or without systemic disease and medication in case of secondary glaucoma.^[10] Early diagnosis of glaucoma can be challenging because there is no single perfect reference standard for establishing the diagnosis. The presence of characteristic visual field defects can confirm the diagnosis, but as much as 30 to 50% of retinal ganglion cells may be lost before defects are detectable by standard visual field testing.^[11]

Glaucoma can be diagnosed based on the clinical presentation of the patient, examination with Slit-lamp microscopy, tonometric measurement of IOP, evaluating the structural effect of IOP with optic disc imaging.^[12]

Glaucoma has been termed as the “silent thief of sight” since the loss of vision often occurs gradually over a long period, and symptoms only occur when the disease is quite advanced.^[13] It is a preventable cause of blindness. Late diagnosis and inadequate treatment have been attributed as the major causes of blindness in glaucoma. Blindness in glaucoma cannot be cured, but if the disease is detected in its early stages, its progress can be arrested and in most cases, the sight can be saved. As evidence shows, late diagnosis of glaucoma is an important risk factor for subsequent blindness.^[14]

The successful management of glaucoma is still a challenge, especially in low-resource countries, where treatment options are limited. Awareness about glaucoma is often low in the general population and even amongst patients with glaucoma themselves.

Individual awareness and knowledge of glaucoma has important role in screening, diagnosis, treatment compliance, and prevention. Eye health education that influences people to participate in regular ophthalmologic care is an important step to detect glaucoma early, thereby preventing blindness. Studies have indicated that patients, knowledge (or lack of knowledge) concerning eye care may play significant role in seeking timely care and treatment.^[15,16]

Health education is essential to enhance public awareness and knowledge of common eye diseases. Increased awareness can foster a better understanding of the importance of routine eye examinations, enabling early detection and treatment of eye conditions and reducing the prevalence of visual impairment in the population.

Hence, this study was therefore designed to evaluate the awareness of glaucoma among patients with systemic diseases attending the ophthalmology outpatient department and to examine the relationship between glaucoma awareness and selected demographic variables.

AIM AND OBJECTIVES

Aim

To assess the knowledge and create awareness about glaucoma among patients with systemic diseases.

OBJECTIVE

- 1) To study about prevalence of awareness and knowledge of glaucoma among patients above 40 years
- 2) To study about various risk factors associated with glaucoma among patients with systemic diseases.

METHODOLOGY

This cross sectional study was conducted on diagnosed patients with various systemic diseases mainly diabetes and hypertension attending Ophthalmology Out-Patient Department, RIMS, Raichur evaluated for glaucoma over a period of 6 Months.

Inclusion Criteria

- Adults aged ≥ 40 years
- Patients with diagnosed case of systemic diseases i.e Diabetes, Hypertension, combined Diabetes and Hypertension, Cardiovascular diseases -Ischemic heart diseases and stroke
- Patients consenting for the study
- Individuals willing to participate in the study and complete the questionnaire

Exclusion Criteria

- Previous history of ocular trauma
- Congenital anomalies of optic disc

Sample Size Calculation

The sample size was calculated by using, $n = Z^2 \times p \times (1-p) / E^2$

Considering, 50% prevalence rate ($p = 0.5$) for a condition in a population, with a 95% confidence level ($Z = 1.96$) and a margin of error of 10% ($E = 0.1$), the sample size obtained was 100 patients.

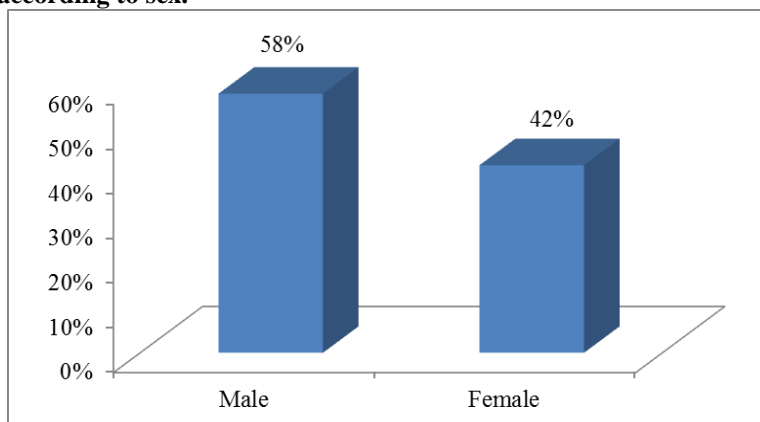
The study was conducted after of obtaining clearance from Institutional Review Board of Ethical Committee. The data for this study was collected directly from participants using a structured questionnaire. Participants' responses to a set of 10 questions about glaucoma was used to assess their awareness and knowledge of the disease. Participants who have heard of glaucoma will be classified as aware, while those demonstrating an understanding of its causes and complications were considered knowledgeable. Correct responses were assigned a score of one, while incorrect responses were scored zero. Participants' knowledge was categorized into three levels based on their questionnaire results, and the scores was analyzed quantitatively using tables. Variables such as age, gender, family history of glaucoma, and socio-economic status (based on the "Updated Modified Kuppuswamy SES" scale) were examined. Additionally, patients underwent clinical evaluations for glaucoma, including assessments of optic disc morphology, intraocular pressure (IOP) measurement, and visual field testing. Diagnosed glaucoma patients were provided with education and counseling regarding risk factors, disease progression, potential complications, and the importance of timely management and treatment adherence. The data collection was collected in Microsoft Excel and was analyzed using SPSS software version 21.0. The results was depicted in the form of percentage, bar graph, histogram and graphs whenever required.

RESULTS

The study included 100 participants above 40 years of age attending the Ophthalmology Outpatient Department. The mean age was 52.4 years (± 7.6), with

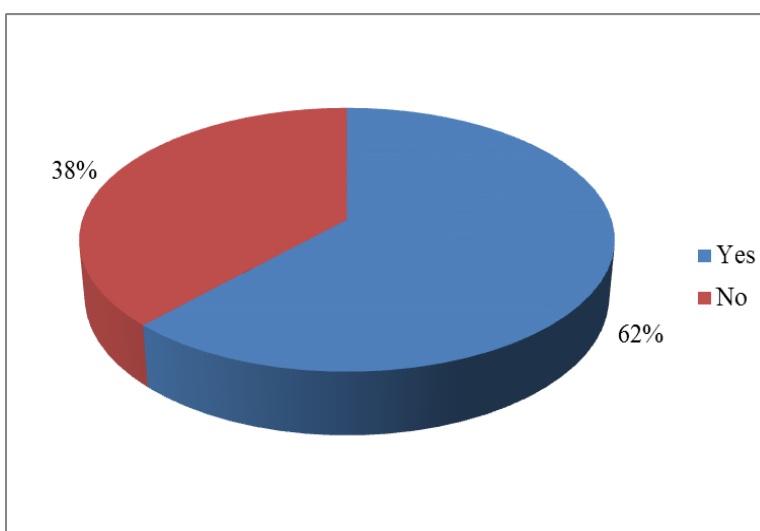
58% being male and 42% female. The majority (67%) of participants had systemic diseases, including diabetes mellitus (42%), hypertension (48%), and both conditions (23%).

Table 1: Distribution according to sex.



Out of 100 participants, 62% had heard of glaucoma, but only 41% demonstrated knowledge about its causes, risk

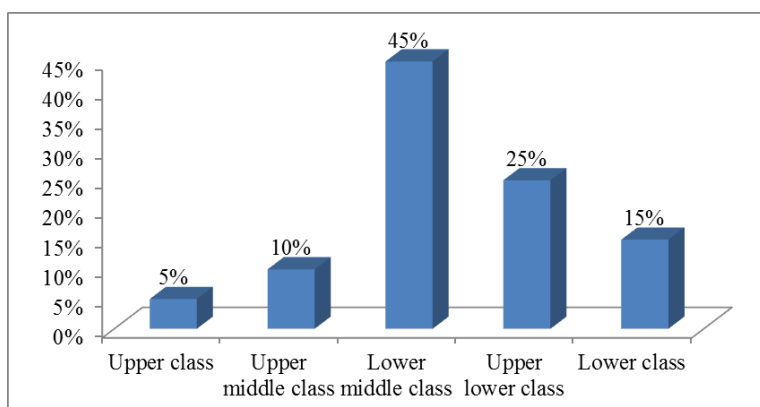
factors, and complications. Responses to the questionnaire revealed the following:



Graph 1: Distribution according to awareness of Glaucoma.

Regarding education, 17 participants (14%) had completed elementary school, 23 (19%) had a high

school education, and 60 (67%) were graduates.



Graph 2: Distribution according to socio-economic status.

Detailed questionnaire data for the study group are presented in Table 2.

Table 2: Numbers of participants that replied correctly to questions related to glaucoma awareness and knowledge.

SL.No	Question	Yes	No	Don't Know
1	Is glaucoma the same as cataract?	28	54	18
2	Can glaucoma occur in normal individuals?	43	38	19
3	Can glaucoma occur at any age?	31	50	19
4	Does glaucoma cause slow diminution of vision?	57	23	20
5	Does increasing age increase the risk of glaucoma?	65	21	14
6	Does a family history of glaucoma increase the risk?	48	30	22
7	Can long-term use of over-the-counter eyedrops cause glaucoma?	36	29	35
8	Do all glaucoma patients need surgical management?	26	39	35
9	Can proper treatment and timely follow-up prevent glaucoma blindness?	72	15	13
10	Is annual ophthalmic screening important for patients with systemic diseases?	81	10	9

A majority (54%) correctly recognized that glaucoma and cataracts are different, but 28% mistakenly thought they were the same, and 18% were unsure. While 43% were aware that glaucoma can develop in healthy individuals, 38% believed it couldn't, and 19% were uncertain. Only 31% knew glaucoma could occur at any age, while 50% believed it was age-restricted, and 19% were unsure. Over half (57%) understood that glaucoma leads to slow vision loss, but 23% disagreed, and 20% were uncertain. A significant majority (65%) recognized aging as a risk factor for glaucoma, although 21% disagreed, and 14% didn't know. Nearly half (48%) were aware that a family history increases glaucoma risk, while 30% disagreed, and 22% were unsure. Awareness about the risk from prolonged OTC eyedrop use was limited, with only 36% agreeing, 29% disagreeing, and 35% uncertain. A minority (26%) believed surgery is necessary for all glaucoma patients, while 39% disagreed, and 35% were unsure. Most respondents (72%) recognized the importance of proper treatment and follow-up in preventing blindness, though 15% disagreed, and 13% were uncertain. A large majority (81%) agreed on the importance of annual screenings for systemic disease patients, while only 10% disagreed, and 9% were uncertain.

The study revealed a notable prevalence of known glaucoma risk factors among the participants. A significant portion, 42%, were aged 60 years or older, highlighting the increased vulnerability of the aging population to glaucoma. Additionally, 17% of participants reported a family history of glaucoma, emphasizing the role of genetic predisposition in the disease's development. Long-term corticosteroid use, another well-documented risk factor, was observed in 8% of the study population, reflecting the potential adverse effects of prolonged medication use on ocular health. Furthermore, 36% of participants had co-existing systemic conditions such as diabetes and hypertension, both of which are recognized contributors to the pathogenesis of glaucoma. These findings underscore the

importance of targeted screening and educational programs for individuals with these risk factors to facilitate early detection and management of glaucoma.

Participants with systemic diseases exhibited a significantly higher level of awareness about glaucoma, with 72% acknowledging familiarity with the condition, compared to only 45% among those without systemic diseases.

DISCUSSION

The results of this study shed light on the awareness and knowledge gaps about glaucoma among patients attending an Ophthalmology Outpatient Department, particularly those with systemic diseases. Glaucoma is a leading cause of irreversible blindness worldwide, yet it remains underdiagnosed and undertreated, largely due to insufficient public awareness. This study aimed to evaluate the level of awareness, examine knowledge about the disease, and assess the impact of systemic conditions like diabetes and hypertension on glaucoma understanding.

The prevalence of glaucoma in India is estimated to range from 2.6% to 4.1%.^[17] Despite this, awareness about glaucoma remains low, particularly in urban areas and even more so in rural regions. The lack of adequate medical and diagnostic facilities in rural areas likely contributes to the limited knowledge and understanding of the condition.

In the present study, the mean age was 52.4 years (± 7.6), with 58% being male and 42% female. A study by Alemu DS et al^[18] reported, 48.5% respondents had heard of glaucoma and 35.1% of them were aware of glaucoma. The mean age for respondents was 51.73 ± 14.34 years. Higher proportions (43.52%) of adults without formal education were not aware of glaucoma. In a study by Neelima Sarkar et al^[19], involving 924 participants (mean age 52 ± 24 , range 28–76 years), 54.3% were male, 45.6% were female, and the

majority (59.5%) were aged 41–60 years.

While 62% of participants had heard of glaucoma, only 41% demonstrated accurate knowledge of the disease. In a study by Neelima Sarkar *et al*^[19], overall awareness was found to be quite unsatisfactory; i.e. 12.98% ranging from 0% to 44.44% in different literacy groups. Higher awareness of 60.6% was noted in a previous hospital based study conducted at Eastern Nepal.^[20] In a study by Ashwini KG *et al*^[21], among 150 students, 125 (83.3%) were aware of glaucoma where as in a study done by Maiya AS *et al*^[22] in Davangere it was only 63% and Nageeb N *et al*^[23] in Mangaluru it was 92% which was done among health professionals.

This finding aligns with similar studies, which indicate that awareness does not always translate to understanding. Many participants confused glaucoma with cataract, a condition that is better understood due to its higher prevalence and curative treatment options. The misconception that cataract and glaucoma are synonymous highlights the need for more effective public health education campaigns to distinguish between the two conditions.

Knowledge about specific glaucoma risk factors, such as increasing age, family history, and systemic diseases, was limited among participants. Although 65% correctly identified aging as a risk factor, only 48% recognized the role of family history. Furthermore, less than half of the participants were aware that glaucoma can occur in individuals without any predisposing factors (43%) or that it can develop at any age (31%). These gaps in knowledge are concerning, as they may prevent at-risk individuals from seeking timely screening and treatment. A study by Ashwini KG *et al*^[21], reported good awareness about most common risk factors which were raised IOP, age more than 40 years, family history of glaucoma and diabetes. These findings were similar to a study done in Davangere by Maiya AS *et al*^[22] and in Haryana by Rewri P *et al*.^[24] Nageeb N *et al*^[23] in Mangaluru 96.4% believed that glaucoma is treatable and 42.9% believed that blindness due to glaucoma is reversible whereas in our study it was 56.8% and 60% respectively.

The role of systemic diseases in glaucoma risk was partially understood. While most participants recognized the importance of annual ophthalmic screenings for systemic disease patients (81%), they underestimated the role of hypertension and diabetes in increasing glaucoma risk. This suggests that health education programs need to emphasize the link between systemic diseases and glaucoma to improve early detection in high-risk groups.

Participants with systemic diseases demonstrated higher levels of awareness (72%) than those without systemic conditions (45%), likely due to increased interaction with healthcare providers. However, their detailed knowledge remained insufficient, indicating that routine medical

visits may not adequately address glaucoma education. Patients with systemic diseases, such as diabetes and hypertension, represent an important target group for glaucoma awareness campaigns due to their increased vulnerability to the disease.

Participants with systemic diseases exhibited a significantly higher level of awareness about glaucoma. This disparity highlights the potential role of increased medical interactions in raising awareness among individuals managing chronic illnesses. However, despite this higher awareness, the study found that detailed knowledge about specific glaucoma risk factors and preventive measures remained limited across the group. For instance, many participants were unaware of the impact of age, family history, or long-term corticosteroid use on glaucoma risk. Additionally, misconceptions about the necessity of regular ophthalmic screening and the effectiveness of timely treatment in preventing glaucoma-related blindness were common. These findings suggest that while awareness campaigns may have improved recognition of the disease, there is a pressing need for more comprehensive educational efforts to deepen understanding of glaucoma's risk factors, early signs, and preventive strategies, especially among high-risk populations.

A significant portion of participants (26%) incorrectly believed that all glaucoma patients require surgical treatment, reflecting a lack of understanding of glaucoma management. Glaucoma treatment typically begins with medical therapy and may progress to surgical intervention in advanced cases. This misconception may contribute to fear and hesitation in seeking care, as surgery is often perceived as invasive and risky. Additionally, only 72% recognized that timely treatment and follow-up can prevent blindness, underscoring the need to promote the benefits of early detection and consistent management.

Encouragingly, 81% of participants agreed on the importance of annual ophthalmic screening for individuals with systemic diseases, suggesting a willingness to engage in preventive care. However, the low levels of detailed knowledge about glaucoma's progression and risk factors indicate that the population may not act on this understanding without proper guidance. Regular eye screenings are critical, especially for patients with systemic diseases, as they allow for early detection of glaucoma and timely intervention.

The findings highlight the pressing need for targeted public health strategies to improve awareness and knowledge of glaucoma. Educational initiatives should focus on distinguishing glaucoma from cataracts, explaining the disease's asymptomatic nature in its early stages, and emphasizing the importance of routine eye exams, particularly for high-risk individuals. Community outreach programs, workshops, and collaboration with primary care providers could bridge the knowledge gap

and promote proactive eye care behavior.

Limitations and Future Directions

This study was limited to patients attending a single Ophthalmology OPD, which may not fully represent the broader population. Future research could explore awareness levels across diverse settings and evaluate the effectiveness of targeted educational interventions. Additionally, assessing healthcare provider perspectives on glaucoma education could offer insights into optimizing patient communication.

CONCLUSION

In conclusion, while the study demonstrates moderate levels of awareness, there is a critical need for improving public knowledge about glaucoma's risk factors, prevention, and treatment to reduce the disease burden and associated blindness. Overall, this study highlights moderate levels of glaucoma awareness but significant knowledge deficits among patients attending the Ophthalmology OPD. Targeted educational initiatives, particularly for individuals with systemic diseases, are essential to improving glaucoma detection, management, and prevention of blindness. By addressing these gaps, healthcare systems can significantly reduce the disease burden and improve the quality of life for at-risk populations.

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