

Tackling the Silent Thief of Sight: Assessing Glaucoma Awareness, Knowledge, and Risk of Prevalence in Karachi



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Abstract

Background: The objective of the study was to assess understanding of glaucoma awareness and knowledge, alongside the prevalence of glaucoma and associated risk factors among the general population of Karachi, Pakistan.

Methodology: This cross-sectional survey-based study determined a sample size of 384 using a z-test score at a 95% confidence interval with a margin of error of 0.05. Data were collected via questionnaire over approximately six months. Basic statistical techniques, including frequency and percentage calculations using MS Excel version 2016, were employed for data analysis.

Results: Five hundred individuals participated in the survey. Glaucoma awareness was noted in 56% of respondents, with 9.6% having a confirmed diagnosis of glaucoma. Higher education, positive family history of glaucoma, and previous eye tests were significantly associated with glaucoma awareness. Media served as the primary source of glaucoma information. Higher education correlated with better glaucoma understanding, while increasing age, exposure to high-intensity light, and associated disorders were linked to a higher glaucoma prevalence.

Conclusion: Glaucoma, a common eye ailment, can lead to blindness. Training medical personnel to identify symptoms and expanding public knowledge and treatment options are crucial to reducing its occurrence. Raising awareness and providing free medical care to the underprivileged can significantly enhance quality of life.

Keywords: Glaucoma; awareness; glaucoma risk; Karachi population

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Introduction

Glaucoma is a silent thief of vision that affects millions of people worldwide. This long-term condition that damages the optic nerve slowly and deteriorates vision. Glaucoma often goes undiagnosed until the worse occurs (1). Glaucoma is a dangerous disease that can deprive people of their vital ability to see, navigate, and interact with their surroundings because of its insidious nature (2).

Glaucoma affects an estimated 76 million people worldwide, a startlingly high number of people. This figure is expected to rise to 111.8 million by 2025, which is a sobering illustration of the disease's unrelenting advance (3, 4). The prevalence of glaucoma is highest in poorer nations because there is still a lack of access to high-quality eye care. For example, glaucoma causes almost 20% of blindness in Pakistan and leaves a path of destruction in its wake (4, 5).

The prevalence of glaucoma is caused by a complicated web of interrelated causes. 1. Genetic predisposition is important; 2. some people are

born with an inherited vulnerability to the illness; 3. Furthermore, getting older becomes a significant risk factor as the chance of getting glaucoma rises dramatically beyond the age of 60; and 4 (5, 6). The overuse of corticosteroids, diabetes, and hypertension are other contributing factors.

Glaucoma is a hidden disease because of the way it progresses. Symptoms frequently appear gradually and are easily missed until permanent harm has been done (7). This delayed presentation emphasizes how crucial routine eye exams are, especially for those who are more vulnerable. Early identification is crucial because it provides a window of time for treatments and vision preservation (5, 7).

In the US population, the total prevalence of glaucoma was found to be 2.1% (95% confidence interval [CI], 1.7%–2.6%) in the uninteresting population aged 40 and above (7, 8).

Global reports from all over the world have predicted that a growing percentage of people will either have glaucoma or be affected by it. As an example, in China, the prevalence of glaucoma has increased by approximately 3.6% when compared to

data from the Caucasian population (6). Numerous Australian research have demonstrated that ignorance of this disease is causing us to be exposed to late representations and is driving us toward a painless decline in our vision. Glaucoma prevalence in the senior population has increased globally to 3.54%; when comparing Africa and Asia, both regions have shown a marked rise in instances as the years have gone by (8, 9).

The study's rationale is, first, glaucoma of any kind is certain to become more common; second, our lifestyle plays a role in this as well; the increased use of smartphones, laptops, televisions, and other related devices negatively impacts on eye health (9). Since most individuals don't feel any discomfort when they lose their vision, they choose to ignore it and believe that becoming older is a problem. However, they are unaware of the specific causes and contributing factors.

According to data, the high frequency of glaucoma in Pakistan among people of all ages is mostly brought on by excessive steroid usage, poorly managed conditions including diabetes and uveitis, and cataracts that present later than expected (10-12).

To combat glaucoma, we need to use a multimodal approach that includes policy changes, public education campaigns, and medical improvements. By bringing these components together, we can pave the way for a time when glaucoma is eradicated and everyone is able to maintain their sight (13-15).

The purpose of this study is to determine the general public's awareness of glaucoma in Karachi, Pakistan, as well as the awareness of certain age groups, such as only teenagers, young adults, and older individuals, regardless of gender, and to determine the risk of prevalence of glaucoma among Karachi inhabitants in light of the concerning global trend in glaucoma prevalence. As it is recognized that insufficient knowledge leads to the rising incidence of glaucoma (4), the study will also evaluate glaucoma awareness and propose methods to improve it

Methodology

Study Design: The developed methodology represents a cross-sectional survey, implemented to get opinion general public regarding awareness of Glaucoma and evaluating prevalence of glaucoma. The data collected through questionnaire using multiple platforms (online forms through social media, collection of data from different clinics, eye hospitals, and general student population from different schools, colleges and universities) for a period of 6 months, from general population belonging to Karachi (including all zones: North, South, East, West, and Central).

Questionnaire Design: The survey form is based on the questionnaire which was divided into three sections:

- Appendix 1: Individual demographics, comprising participant qualifications, age, and gender.

- Appendix 2: Awareness of participants regarding disease, the opinion of person about glaucoma. For instance, what is glaucoma, causes, symptoms, and treatment of glaucoma, as well as whether or not it poses a risk to life.
- Appendix 3: This section identified specific lifestyle factors of chosen individuals, such as: the duration of time the individual is exposed to electromagnetic radiations through laptop, mobile phone, or television; whether the individual has any disease that may increase the risk of developing glaucoma, such as diabetes, hypertension, or thyroid gland disorders, the section can help in identifying the risk of development of Glaucoma among individuals, can also help in defining proper protocols for prevention of the disease.

The aforementioned data collection contributed to determining the extent to which the general public is aware of glaucoma and assessed how many people fell into the risk category for developing glaucoma.

Inclusion criteria: The criteria for the inclusion of the survey are quite flexible, as it was distributed to the entire population of Karachi, with the age range being restricted to older adults and teenagers (12- 75 years). Additionally, the survey was not restricted based on gender, working status, caste, health factors, or residential area.

Exclusion criteria: Despite the survey's flexibility, as was already indicated, children were not included in the study.

Sample Size: Considering 25 million population of Karachi and estimated prevalence of glaucoma is general population of Pakistan (1.5 million), sample size was identified using z-score at confidence interval of 95% with margin of error 0.05. The outcome of the sample size was 384.

$$n = Z^2 * p(1-p) / d^2$$

To avoid any error, higher number of participants (n=500) were included in study and only complete and authenticated responses were included for evaluation of outcomes of the study.

Analysis of data: To analyze the data, we used statistical tools to create graphs and charts as well as descriptive analytical statistics.

Ethical approval: The study was carried out in compliance with the declaration's guiding principles. Ref No. JUW/Pharm/ EA/2020/001 reference issued by IRB of Jinnah University for Women.

Results

The 500 responses were authentic and complete responses were collected by circulating Survey forms through different platforms. The responses were subjected to statistical analysis applied to identify awareness of glaucoma among general population, their perception and knowledge and estimation of prevalence basis on their lifestyle.

Table 1: Sociodemographic characteristics of individual participants

Sociodemographic Features		Freq.	%
Gender	Male	280	56%
	Female	220	44.00%
Age	12-17 years	84	16.80%
	18-40 years	300	60.00%
	41-75 years	116	23.20%
Qualification	Illiterate	30	6.00%
	Matriculation	58	11.80%
	Intermediate	164	32.80%
	Graduation	184	36.80%
	Post-graduation	64	12.80%
Glaucoma patient	Yes	48	9.60%
	No	452	90.40%
Have other disease (HTN, Diabetes, Thyroid)		108	21.60%
In contact with high intensity of light (UV lights, Visible range 400-450nm range)		24	4.80%
Have positive glaucoma family history		94	18.80%
Which side of family	Maternal	44	46.81%
	Paternal	50	53.19%

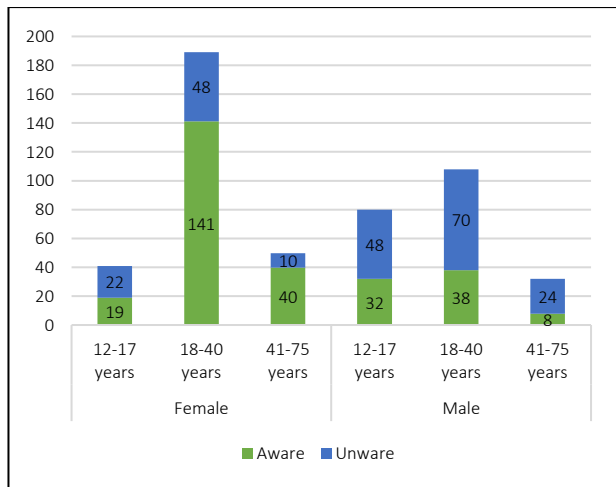


Figure 1: The Knowledge regarding Glaucoma its complications and risk factors among participants focusing on both gender and different age group

Table 2: Evaluated information about the awareness of glaucoma among participants

Features		Aware N (%)	Unaware N (%)	Total N (%)
Gender	Female	200(71.42%)	80(28.57%)	280(100%)
	Male	80(36.36%)	140(63.63%)	220(100%)
Age	12-17 years	48(57.15%)	36(42.85%)	84(100%)
	18-40 years	180(60%)	120(40%)	300(100%)
	41-75 years	50(43.11%)	66(56.89%)	116(100%)

Features		Aware N (%)	Unaware N (%)	Total N (%)
Qualification	Uneducated	2(6.67%)	28(93.33%)	30(100%)
	Matriculation	24(41.38%)	34(58.62%)	58(100%)
	Intermediate	102(62.20%)	62(37.80%)	164(100%)
	Graduation	122(66.31%)	62(33.69%)	184(100%)
	Post-graduation	30(46.88%)	34(53.12%)	64(100%)
Regular Eye Check Up	Yes	184(49.46%)	188(50.53%)	372(100%)
	No	66(51.56%)	62(48.43%)	128(100%)
Family History	Yes	62(60.78%)	40(39.215%)	102(100%)
	No	214(53.7%)	184(46.3%)	398(100%)

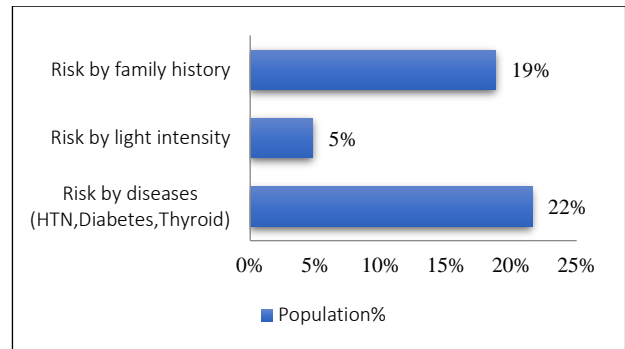


Figure 2: Evaluating the risk of Glaucoma in general population due to certain factors

Discussion

Glaucoma is a major global health concern, affecting millions of people worldwide. It is a complex disease with multiple contributing factors, including genetics and environmental influences. Considering its potential to cause blindness, a study was conducted in Karachi, Pakistan, to assess awareness levels, risk factors, and prevalence of glaucoma among the local population (11, 16).

To determine an appropriate sample size, the Z-score method was applied to Karachi's total population of approximately 20 million, with a 95% confidence interval. This resulted in a sample size of 384, which was subsequently expanded to slightly over 500 to account for potential sampling errors. The study participants included 280 males and 220 females.

The study revealed that 48 out of 500 participants (9.6%) had a confirmed diagnosis of glaucoma. Numerous factors, like as age, pre-existing medical disorders, family history, and work situations which increase the risk of developing glaucoma, may be responsible for this prevalence. Global statistics indicate that the risk of glaucoma prevalence is still alarming, even though educated people and those with a family history of eye illnesses are somewhat aware of it. In the study population, glaucoma was shown to be prevalent due to a number of factors:

Light exposure at high intensities: 4.8% of people who worked in areas where high-intensity light from laptops, PCs, cell phones, and other sources was constantly present were more likely to develop glaucoma.

Family history: A hereditary predisposition to glaucoma was indicated by the 18.8% of participants who

reported a positive family history of the condition.

Inadequate treatment practices: Treating eye infections with over-the-counter medications is additionally common, indicating a lack of knowledge and education about appropriate medical intervention.

Co-morbidities: 15.06% of participants reported having diabetes, hypertension, or thyroid disease, but failed to take appropriate precautions to protect their vision. These co-morbidities can increase the risk of glaucoma development and progression.

There are currently 64.3 million glaucoma patients in the world. This number is expected to rise, reaching 76.0 million in 2020 and 111.8 million in 2040 (17). In the National Health Survey of 2003, the blinding prevalence was 1 million, according to general reported statistics about Pakistan. However, according to the most recent data, in 2017, an estimated 21.78 million people out of Pakistan's total population of 207.7 million were estimated to be blind or visually impaired. This corresponds to a crude prevalence of 10.48% overall, with 57% of individuals affected being female. The incidence rises to 15.38% when age is taken into consideration (18, 19).

The study's findings highlight the need for increased awareness and education about glaucoma among the general population. Regular eye checkups, particularly for individuals at high risk, are crucial for early detection and timely intervention. Additionally, addressing modifiable risk factors, such as exposure to high-intensity light and managing co-morbidities, can play a significant role in preventing glaucoma or slowing its progression

Conclusion

Glaucoma is a prevalent eye disease that can lead to blindness. Public awareness along availability of treatment facilities should be made accessible regarding the disease, they also need to enhance medical professionals' ability to recognize the symptoms of glaucoma to lower its prevalence. To guarantee everyone access to care, we should treat the impoverished and needy for free. Basic information about this illness should be disseminated; while not life-threatening, it can affect the quality of life. To encourage everyone to have a higher quality of life, action should be taken to raise awareness of the illness, as low awareness is largely to blame for its rising prevalence.

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Ethical Approval:

This study was approved by IRB of Jinnah University for Women.

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Authors' Contribution:

AN: Contributed to data collection and writing Manuscript.

JS: Writing Manuscript, Result analysis and verification.

SA: Writing Manuscript.

BK: Data Collection

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