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# AWARENESS OF GLAUCOMA RISK FACTORS AMONG ADULTS ABOVE 40 YEARS ATTENDING A TERTIARY CARE HOSPITAL

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Glaucoma; Knowledge Attitude Practice; Awareness; Risk Factors; Adults Above 40 Years; Eye Screening; Primary Open-Angle Glaucoma; Blindness Prevention; Quetta; Pakistan.

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**Abstract**

**Background:** Glaucoma is a chronic eye disease that causes progressive damage to the optic nerve and remains one of the major causes of irreversible blindness worldwide. The disease often develops without noticeable symptoms, resulting in delayed diagnosis and treatment. Awareness regarding glaucoma risk factors, family history, and the importance of routine eye examinations plays an important role in early detection and prevention of vision loss.

**Objective:** To assess public awareness regarding glaucoma, its silent progression, family history risk, and need for regular eye checkups. The study will identify misconceptions and knowledge gaps. It may support targeted glaucoma awareness campaigns.

**Methods:** A hospital-based cross-sectional Knowledge, Attitude, and Practice (KAP) study was conducted among 250 adults aged 40 years and above at the Ophthalmology Department of a Tertiary Hospital, Quetta. Data were collected through a structured questionnaire assessing demographic characteristics, glaucoma

awareness, risk factor knowledge, attitudes toward eye screening, and preventive practices. Data analysis was performed using SPSS version 26. Descriptive statistics and association tests were applied.

**Results:** Among the participants, 69.6% had heard about glaucoma; however, only 28.8% demonstrated good overall knowledge regarding the disease. Awareness was highest regarding increasing age as a risk factor (72%), while knowledge about family history and other associated risk factors remained limited. Although most participants believed that regular eye examinations were important, fewer participants reported undergoing routine eye screening. Educational status showed a significant association with glaucoma knowledge levels.

**Conclusion:** The study highlights important gaps in glaucoma-related knowledge among adults above 40 years. Improving community awareness regarding silent disease progression, hereditary risk, and preventive eye examinations may support early diagnosis and reduce glaucoma-related blindness.

## Introduction

Glaucoma is a chronic, progressive eye disorder characterized by damage to the optic nerve, which can eventually result in irreversible blindness. It is considered one of the leading causes of permanent vision loss worldwide and represents a major public health challenge. Unlike many other eye diseases, glaucoma often develops gradually without noticeable symptoms during the early stages. Due to this silent progression, many individuals remain unaware of their condition until significant and permanent visual damage has already occurred. This delayed diagnosis is one of the major reasons why glaucoma continues to contribute significantly to global blindness despite the availability of effective diagnostic tools and treatment options (Quigley & Broman, 2006; Tham et al., 2014).

The burden of glaucoma is increasing worldwide due to population ageing, improved life expectancy, and changing demographic patterns. According to global estimates, millions of people are currently affected by glaucoma, and a substantial proportion of cases remain undiagnosed. Primary open-angle glaucoma (POAG) is the most common form of glaucoma and accounts for a large percentage of glaucoma-related visual impairment. Because the disease progresses slowly and peripheral vision loss may not be recognized by patients, early detection through regular eye examinations remains the most effective strategy to prevent severe vision loss (Jonas et al., 2017).

Age is one of the most important and consistently recognized risk factors for glaucoma development. The risk of developing glaucoma increases significantly after the age of 40 years and continues to rise with advancing age. As the elderly population increases globally, the number of individuals at risk of glaucoma is expected to increase substantially in coming years. Therefore, adults above 40 years represent an important target group for glaucoma awareness and screening programs (Cook & Foster, 2012). Despite this increased risk, many individuals in this age group do not undergo regular eye examinations unless they experience visual problems.

In addition to age, several other factors contribute to glaucoma risk. A positive family history is among the strongest predictors of disease development. Individuals with a first-degree relative affected by glaucoma have a significantly higher risk compared with those without a family history. Genetic susceptibility plays an important role in glaucoma development; however, awareness regarding hereditary risk remains limited among the general population. Many

individuals do not consider family history relevant to eye diseases and therefore may miss opportunities for early screening and preventive care (Noertjojo et al., 2006).

Other recognized risk factors include increased intraocular pressure, diabetes mellitus, long-term corticosteroid use, hypertension, and certain structural characteristics of the eye. Although raised intraocular pressure is not the only cause of glaucoma, it remains an important modifiable factor associated with disease progression. Awareness of these risk factors can encourage individuals at higher risk to seek timely ophthalmological evaluation. However, studies from different regions have shown that public knowledge regarding glaucoma risk factors is generally poor, particularly in low- and middle-income countries (Weinreb et al., 2014).

The importance of glaucoma awareness is particularly significant in developing countries, where healthcare limitations, reduced screening facilities, and inadequate public knowledge contribute to delayed diagnosis. Many patients in these settings present at advanced stages when treatment options can only slow further progression rather than restore lost vision. Lack of awareness regarding the silent nature of glaucoma is one of the major barriers to early detection. Individuals often associate eye disease with pain or noticeable visual symptoms and may not understand that serious eye conditions can exist without discomfort or obvious warning signs.

Pakistan faces a considerable burden of eye diseases, including glaucoma. Although ophthalmic services are improving, awareness regarding glaucoma prevention and screening remains limited among many communities. Factors such as low health literacy, socioeconomic challenges, limited access to specialized eye care, and misconceptions regarding eye diseases may influence healthcare-seeking behavior. In many cases, individuals visit eye specialists only after developing significant visual difficulties rather than participating in preventive examinations.

Previous studies conducted in South Asia have highlighted significant gaps in glaucoma knowledge among the general population. Research from India has demonstrated that although some individuals have heard of glaucoma, detailed understanding regarding risk factors, asymptomatic progression, and the need for regular screening remains inadequate (Krishnaiah et al., 2005; Ramakrishnan et al., 2006). Similar findings have been reported from other countries, where awareness levels were strongly influenced by education, socioeconomic status, and previous contact with eye care services (Saw et al., 2003; Livingston et al., 1998).

Knowledge, Attitude, and Practice (KAP) studies are valuable approaches for understanding community awareness and identifying barriers related to disease prevention. These studies provide

information about what people know about a disease, how they perceive its importance, and whether their knowledge influences their health-related behaviors. In glaucoma, KAP assessments are particularly useful because prevention depends largely on early recognition of risk factors and regular screening rather than symptom-based treatment.

Quetta, the capital city of Balochistan, Pakistan, represents a population with diverse educational, cultural, and socioeconomic backgrounds. The availability of limited regional data regarding glaucoma awareness highlights the importance of assessing public understanding in this area. Being a tertiary care healthcare facility, receives patients from both urban and surrounding rural areas, making it an appropriate setting to evaluate glaucoma-related awareness among adults at increased risk.

Understanding the current level of glaucoma awareness among adults above 40 years can help identify important knowledge gaps and guide the development of effective educational interventions. Awareness programs focusing on the silent nature of glaucoma, hereditary risk, importance of intraocular pressure assessment, and regular eye examinations may encourage earlier healthcare-seeking behavior and reduce preventable blindness.

Therefore, the present study was conducted to assess awareness of glaucoma risk factors among adults above 40 years attending a tertiary care hospital in Quetta, Pakistan. The study aimed to evaluate participants' knowledge regarding glaucoma, assess their attitudes toward eye screening, identify existing misconceptions, and explore practices related to preventive eye care. The findings may provide useful evidence for ophthalmologists, healthcare planners, and policymakers to develop targeted glaucoma awareness strategies and improve early detection practices within the local population.

## Materials and Methods

### Study Design and Setting

A hospital-based cross-sectional Knowledge, Attitude, and Practice (KAP) study was conducted to assess awareness regarding glaucoma risk factors among adults above 40 years of age. The study was carried out in the Ophthalmology Department of a Tertiary Hospital, Quetta, Balochistan, Pakistan. The hospital serves as a major tertiary care center for eye-related diseases and receives patients from both urban and rural areas of the province.

The study was conducted over a period of six months from January 2026 to June 2026. The hospital setting was selected because it provided access to individuals from different socioeconomic and

educational backgrounds, allowing assessment of glaucoma awareness among a diverse population.

**Study Participants**

The study included adults aged 40 years and above who attended the ophthalmology outpatient department during the study period. Both male and female participants were eligible for inclusion. Participants who were willing to participate and provide informed consent were enrolled in the study.

Individuals younger than 40 years, those unable to complete the questionnaire because of severe illness or communication difficulties, and those who declined participation were excluded from the study.

**Sample Size and Sampling Technique**

A total of 250 participants were included in the study. Participants were recruited using a convenient sampling technique. Eligible individuals visiting the ophthalmology outpatient department were approached consecutively until the required sample size was achieved.

**Data Collection Instrument**

Data were collected using a structured questionnaire developed after reviewing previous glaucoma awareness and KAP studies. The questionnaire was designed in simple language to ensure understanding among participants with different educational backgrounds.

The questionnaire consisted of four major sections:

1. **Demographic characteristics:** This section collected information regarding age, gender, education level, occupation, and residential background.
2. **Knowledge assessment:** Questions evaluated awareness regarding glaucoma, silent progression of disease, risk factors, family history, and the importance of early diagnosis.
3. **Attitude assessment:** Participants were asked about their beliefs regarding regular eye examinations, glaucoma screening, and prevention of blindness.
4. **Practice assessment:** This section evaluated participants' actual eye-care behaviors, including previous eye examinations and consultation with eye specialists.

Each correct knowledge response received one point, whereas incorrect or unknown responses received zero points. Total knowledge scores were categorized into poor, moderate, and good knowledge levels.

**Data Collection Procedure**

Participants were interviewed individually after obtaining informed consent. The purpose of the study was explained clearly before data collection. Interviews were conducted in a comfortable environment within the ophthalmology department.

For participants with limited literacy, questions were explained verbally in the local language to ensure accurate understanding. Each interview required approximately 10–15 minutes. Completed questionnaires were reviewed daily to ensure completeness and accuracy.

**Statistical Analysis**

Data were entered and analyzed using Statistical Package for Social Sciences (SPSS), version 26. Descriptive statistics were used to summarize demographic characteristics and questionnaire responses.

Continuous variables were presented as mean and standard deviation, while categorical variables were expressed as frequencies and percentages. The association between glaucoma knowledge and demographic variables was assessed using appropriate statistical tests.

A p-value of less than .05 was considered statistically significant.

**6**

A total of 250 participants were included in the study. The mean age of participants was 56.4 years (SD = 9.8). Among the participants, 142 (56.8%) were male and 108 (43.2%) were female. The majority of participants belonged to the 50–59 years age group.

Regarding educational status, 96 (38.4%) participants had no formal education, while 154 (61.6%) had received some level of formal education.

**Awareness and Knowledge Regarding Glaucoma**

Among the study participants, 174 (69.6%) reported that they had previously heard about glaucoma. However, detailed understanding of glaucoma-related information was limited.

Only 72 (28.8%) participants achieved a good knowledge score, whereas 108 (43.2%) demonstrated moderate knowledge and 70 (28.0%) showed poor knowledge regarding glaucoma risk factors and prevention.

Awareness regarding increasing age as a risk factor was highest, with 180 (72%) participants recognizing age above 40 years as an important risk factor. In comparison, awareness regarding family history, diabetes, and steroid use was lower.

**Attitude and Eye Care Practices**

Most participants showed a positive attitude toward preventive eye care. A total of 198 (79.2%) participants agreed that regular eye examinations were important after the age of 40 years. However, actual screening practices were comparatively lower. Only 132 (52.8%) participants reported having undergone previous eye examinations. Many participants reported visiting eye specialists only after developing eye-related symptoms.

Educational status showed a significant association with glaucoma knowledge levels. Participants with higher education demonstrated better awareness compared with those with lower educational backgrounds ($p < .05$).

**Table 1. Demographic Characteristics of Study Participants (N = 250)**

| *Characteristic* | *n* | *%* |
|---|---|---|
| ***Age group*** | | |
| *40–49 years* | 62 | 24.8 |
| *50–59 years* | 98 | 39.2 |
| *≥60 years* | 90 | 36.0 |
| ***Gender*** | | |
| *Male* | 142 | 56.8 |
| *Female* | 108 | 43.2 |
| ***Education level*** | | |
| *No formal education* | 96 | 38.4 |
| *Primary/Secondary education* | 104 | 41.6 |
| *Higher education* | 50 | 20.0 |

**Table 2. Knowledge, Attitude, and Practice Regarding Glaucoma (N = 250)**

| *Variable* | *n* | *%* |
|---|---|---|
| *Heard about glaucoma* | 174 | 69.6 |
| *Knew glaucoma may progress silently* | 118 | 47.2 |
| *Recognized family history as a risk factor* | 126 | 50.4 |
| *Recognized age above 40 years as a risk factor* | 180 | 72.0 |
| *Had previous eye examination* | 132 | 52.8 |
| *Considered regular eye examination important* | 198 | 79.2 |
| *Good knowledge level* | 72 | 28.8 |

| | | |
|---|---|---|
| *Moderate knowledge level* | 108 | 43.2 |
| *Poor knowledge level* | 70 | 28.0 |

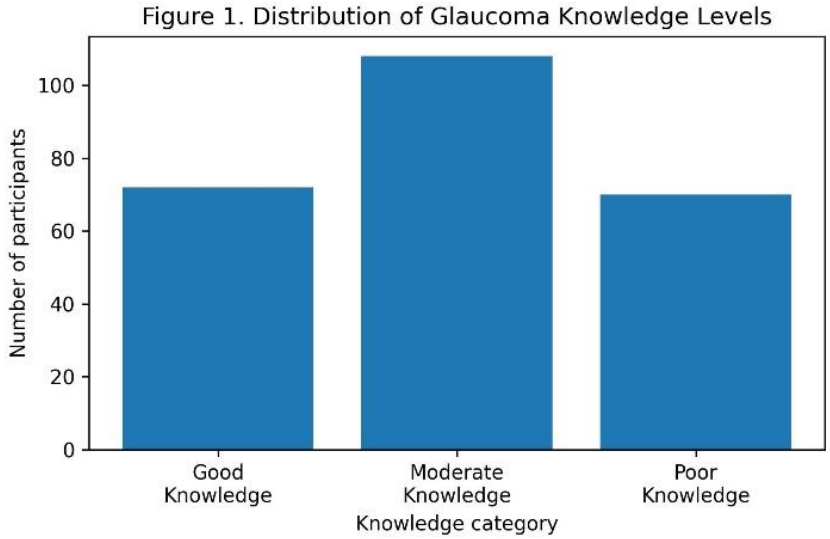



**Figure 1**. ***Distribution of participants according to glaucoma knowledge level.***

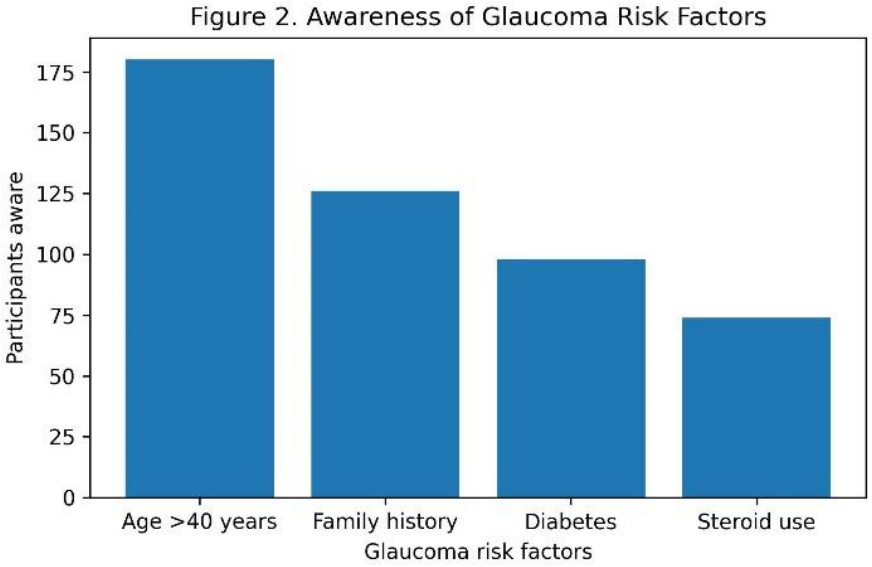



**Figure 2**. ***Awareness of different glaucoma risk factors among study participants.***

## DISCUSSION

Glaucoma remains a major cause of irreversible blindness, mainly because the disease often progresses unnoticed until significant optic nerve damage has occurred. The present study was conducted to evaluate awareness, knowledge, attitudes, and practices related to glaucoma risk factors among adults above 40 years attending a tertiary care hospital in Quetta, Pakistan. The

findings revealed that although a considerable proportion of participants had heard about glaucoma, their detailed understanding of disease characteristics, risk factors, and preventive measures was inadequate. This difference between basic awareness and meaningful knowledge highlights an important challenge in glaucoma prevention.

In the current study, 69.6% of participants reported that they had heard about glaucoma; however, only 28.8% achieved a good knowledge score. This indicates that recognition of the disease name does not necessarily reflect adequate understanding of its clinical importance. Similar observations have been reported in several international studies where participants demonstrated limited knowledge despite having previous exposure to the term glaucoma. Quigley and Broman (2006) emphasized that a large number of glaucoma cases remain undetected worldwide because individuals are unaware of the disease until visual impairment becomes noticeable. Likewise, Tham et al. (2014) reported that increasing glaucoma prevalence requires stronger public awareness strategies to improve early identification.

Age was the most commonly recognized risk factor among participants in this study. Approximately 72% of respondents correctly identified increasing age as a factor associated with glaucoma development. This finding is consistent with previous epidemiological evidence showing that glaucoma prevalence increases significantly after 40 years of age and continues to rise with advancing age (Cook & Foster, 2012). The relatively better recognition of age-related risk may be explained by the common perception that eye problems increase with ageing. However, awareness of age alone is not sufficient because many individuals may fail to recognize other important risk factors that require attention.

One of the important findings of this study was the limited awareness regarding family history of glaucoma. Only half of the participants recognized hereditary risk as an important factor. This finding is concerning because family history is one of the strongest predictors of glaucoma development. Individuals with affected first-degree relatives have a significantly higher risk and may benefit from earlier screening. Previous studies have also demonstrated poor understanding of hereditary glaucoma risk among the general population. Noertjojo et al. (2006) reported that many individuals were unaware of the relationship between family history and glaucoma, which reduced their likelihood of undergoing preventive eye examinations. Improving patient education regarding familial risk may encourage earlier evaluation among high-risk groups.

Another important observation was the limited awareness regarding the silent progression of glaucoma. Less than half of participants understood that glaucoma can develop without obvious symptoms. This lack of knowledge may contribute to delayed diagnosis because many individuals associate serious eye diseases with pain or visible changes in vision. However, glaucoma commonly causes gradual peripheral visual loss that may remain unnoticed for a long period. Weinreb et al. (2014) highlighted that the asymptomatic nature of glaucoma is one of the major reasons why many patients present after substantial optic nerve damage has already occurred. Therefore, public education should emphasize that normal vision does not always indicate normal eye health.

The current study also demonstrated a significant relationship between educational status and glaucoma knowledge. Participants with higher education levels showed better understanding of glaucoma risk factors and preventive measures compared with individuals with limited educational backgrounds. This finding supports previous research indicating that education plays an important role in health awareness and healthcare decision-making. Ramakrishnan et al. (2006) reported that individuals with higher educational levels had greater awareness of glaucoma symptoms and screening requirements. Similar findings were observed by Krishnaiah et al. (2005), who identified education as an important determinant of glaucoma-related knowledge in rural populations.

Although the majority of participants in this study showed a positive attitude toward regular eye examinations, actual preventive practices were lower. Nearly 79% of participants believed that routine eye checkups were important, but only 52.8% had previously undergone eye examinations. This difference between attitude and practice suggests that awareness alone may not always result in preventive behavior. Several factors, including healthcare accessibility, financial limitations, lack of nearby eye care facilities, and personal beliefs, may influence screening practices. Livingston et al. (1998) also reported that positive attitudes toward glaucoma prevention do not always translate into appropriate healthcare practices.

The findings of this study have important implications for eye health services in Balochistan. Since glaucoma-related vision loss is irreversible, prevention depends heavily on early diagnosis and timely management. Increasing awareness among adults above 40 years should therefore be considered an important public health priority. Awareness campaigns should focus not only on informing people about glaucoma but also on explaining why regular eye examinations are necessary even in the absence of symptoms.

Tertiary care hospitals can play an important role in improving glaucoma awareness by incorporating patient education into routine ophthalmology services. Simple educational materials, counselling sessions, and community outreach programs may improve understanding among individuals with limited health literacy. Primary healthcare workers can also contribute by identifying high-risk individuals and encouraging them to undergo ophthalmic evaluation.

The present study provides valuable information regarding glaucoma awareness among adults attending a tertiary hospital in Quetta. However, some limitations should be considered. Since the study was conducted among hospital attendees, the findings may not completely represent awareness levels in the general community. Individuals who visit healthcare facilities may already have greater health awareness compared with those who do not seek medical care. Additionally, the use of a questionnaire-based approach may introduce response bias because participants may provide socially desirable answers.

Despite these limitations, the study highlights important gaps in glaucoma-related knowledge and preventive practices. The findings suggest that improving awareness regarding silent disease progression, family history, and regular screening may contribute significantly to reducing glaucoma-related blindness.

In conclusion, adults above 40 years in this study showed moderate awareness of glaucoma but lacked comprehensive knowledge about important risk factors and preventive strategies. Strengthening community education programs, improving screening accessibility, and targeting high-risk groups may help promote early detection and reduce the burden of avoidable visual impairment in Balochistan.

## CONCLUSION

This study concludes that adults above 40 years attending a tertiary care hospital in Quetta demonstrated a basic level of awareness regarding glaucoma, but important gaps remained in their understanding of disease progression, hereditary risk, and preventive eye care practices.

Although most participants recognized ageing as an important risk factor and showed a positive attitude toward regular eye examinations, many were unaware that glaucoma can develop silently without early symptoms. The difference between positive attitudes and actual screening practices highlights the need for stronger public health interventions.

Educational status was an important factor influencing glaucoma knowledge, suggesting that improving health literacy should be considered a key component of glaucoma prevention

strategies. Targeted awareness programs focusing on high-risk individuals, family history, and routine eye examinations may improve early detection.

Regular glaucoma screening for adults above 40 years, combined with community education and improved access to ophthalmic services, can help reduce the burden of irreversible blindness. The findings of this study provide useful baseline information for developing future glaucoma awareness campaigns in Quetta and other regions of Balochistan.

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