



Assessment of Awareness, Knowledge, Attitudes, Practices, and Quality of Life Among Glaucoma Patients at a Tertiary Eye Hospital in Nepal

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Keywords

Glaucoma, Knowledge, Attitude, Practice, Quality of life

ABSTRACT

Glaucoma is one of the leading causes of irreversible blindness that affects patients' quality of life. Adequate awareness, knowledge, positive attitudes, and self-care practices play vital roles in treatment and preservation of visual function in glaucoma patients. This study aimed to assess the levels of awareness, knowledge, attitudes, and practices, and quality of life among diagnosed cases of primary open-angle glaucoma at a tertiary eye care centre in Nepal. A hospital-based cross-sectional study was conducted among 110 patients attending the glaucoma clinic. Data were collected using a structured KAP questionnaire and the Glaucoma Quality of Life-15 (GQOL-15) questionnaire. KAP scores were categorized based on percentage scores, and quality of life was assessed using total GQOL-15 scores. Associations between variables were analyzed using chi-square test, independent t-test, and one-way ANOVA, with a p-value <0.05 considered statistically significant. The mean age of participants was 50.07 ± 15.85 years, and 60% were male. Overall awareness of glaucoma was high (91.8%), with hospitals being the most common source of information (85.5%). The mean knowledge, attitude, and practice scores were 2.74 ± 2.09 , 3.51 ± 1.46 , and 3.03 ± 1.16 , respectively. Only 45.7% of participants demonstrated adequate knowledge regarding glaucoma. Higher educational level and longer disease duration were significantly associated with better knowledge scores ($p < 0.05$). Good attitude and practice were observed in 63% of participants. Practice score was significantly associated with glaucoma duration ($p < 0.001$) and attitude ($p = 0.002$). The mean GQOL-15 score was 17.59 ± 5.62 . Poorer quality of life was significantly associated with lower visual acuity ($p < 0.001$) and female gender ($p = 0.02$). While awareness was not significantly associated with quality of life ($p = 0.30$), knowledge, attitude, and practice scores showed significant associations with GQOL-15 score ($p < 0.05$). In this study, despite high awareness of glaucoma among diagnosed patients, detailed disease knowledge remained limited. Better knowledge, attitudes, and practices were associated with improved quality of life, emphasizing the need for structured patient counselling beyond basic disease awareness.



Introduction

Glaucoma is a leading cause of irreversible blindness worldwide (Weinreb et al., 2014). Although previous studies (Mishra et al., 2019; Sahu et al., 2021) have investigated knowledge, attitudes, and practices (KAP) related to common eye diseases and eye health services in Nepal, glaucoma-specific data remain limited. A major challenge in glaucoma management is late presentation, mostly due to a lack of awareness of the disease. Several population-based studies have shown that the level of awareness and knowledge is low, even in developed countries (Katibeh et al., 2014; Ahmedhussain et al., 2023). Therefore, improving awareness and knowledge is important in glaucoma management. It can help in early disease diagnosis with hospital attendance for routine eye check-ups (Alemu et al., 2017). Furthermore, when patient and their caregivers are provided with adequate information, both awareness of this disease and self-care practice could be improved.

Beyond its clinical implications, glaucoma significantly affects vision-related quality of life. It is associated with progressive visual field loss, limitations in daily activities, adverse effects of medical treatment, financial strain and psychological distress. (McKean-Cowdin et al., 2007; Quaranta et al., 2016). Early detection with timely initiation of treatment is important for preserving visual function and quality of life (National Collaborating Centre for Acute Care (UK) 2009).

This study aimed to assess awareness, knowledge, attitudes and practices among diagnosed glaucoma patients and quality of life.

Materials and Methods

Research Context

This was a hospital-based study conducted at B.P. Koirala Lions Centre for Ophthalmic Studies, a tertiary-level ophthalmic care and teaching institution in Kathmandu, Nepal. The center is a referral center for patients with various ocular diseases, including glaucoma, from inside as well as outside of the valley. This clinical setting has allowed direct assessment of awareness, knowledge, attitude and practices and quality of life among diagnosed glaucoma patients.

Research Design

This was a questionnaire-based cross-sectional study designed to assess awareness, knowledge, attitudes, practices, and quality of life among patients diagnosed with primary open-angle glaucoma. The KAP questionnaire was adapted from previous studies and aimed at assessing the perception of patients about their disease, knowledge, compliance and drug usage pattern of the glaucoma. Glaucoma quality of life (GQOL-15) Questionnaire though not validated specifically in Nepali language in Nepali Population, given the simplicity of the questionnaire and grading system it was considered suitable for the study. For its validity for study purpose, it was pretested in 10% of study population.

Awareness assessment

For Awareness assessment Yes/ No response question based on disease name being heard and also stating from whom they have heard to ensure the source of information.

Knowledge, Attitude and Practice Assessment

For each positive response in KAP questionnaire was marked with 1 score, all total positive response marks summed up for total score for each category of Knowledge (6 question=total score 6), Attitude (5 questions= total score 5) and Practice (4 questions=total score 4).

Quality of life Assessment

The GQOL-15 (Nelson, Patricia et al., 2003) is a 15-item questionnaire designed to assess the degree of visual disability caused by glaucoma. It comprises six questions on peripheral vision-related activities, six on dark adaptation and glare, two on central and near vision, and one on outdoor mobility. The scores of individual items are summed to yield a total score ranging from 15 to 75. Higher sub-scale scores indicate greater difficulty with vision-related activities and correspond to a poorer quality of life.

Scoring system

Response levels were graded based on total percentage scores as follows: a score of 75% or above was graded as excellent; a score between 50% and 74% was graded as good; a score between 25% and 49% was graded as poor; and a score below 25% was graded as very poor.

Quality of life was categorized based on the GQOL-15 total score: a score ranging from 15 to 25 indicated good quality of life with minimal visual difficulty; a score between 26 and 45 indicated moderate quality of life with average visual difficulty; and a score between 46 and 75 indicated poor quality of life with high visual difficulty.

Duration of glaucoma was defined as the period elapsed between the date of diagnosis and the date of enrollment into the study.

Level of education was classified into five categories: illiterate, primary level (up to Grade 5), secondary level (up to Grade 10), higher secondary level (Grade 12), and tertiary level (Bachelor's degree and above).

Population and Sampling

The study population comprised 110 adult patients diagnosed with primary open-angle glaucoma (POAG) who were attending the glaucoma clinic at BPKLCOS. Only diagnosed cases of POAG currently on medical therapy were included. Patients with other eye diseases affecting vision (central serous retinopathy, diabetic maculopathy, macular scar, or cataract greater than Stage 2 on the Lens Opacity Classification System III), recent eye surgery, secondary or angle-closure glaucoma, or major illness affecting their cognitive ability to answer the questionnaire were excluded.

Analysis

Categorical variables were presented as frequencies and percentages with corresponding 95% confidence intervals, while continuous variables were summarized as mean $\pm$ standard deviation (SD). Pearson's chi-square test was used to assess associations between categorical variables. One-way analysis of variance (ANOVA) was used to compare mean KAP scores across different socio-demographic and clinical subgroups and to compare mean GQOL-15 scores across KAP categories. Independent samples t-test was used to compare mean KAP scores and mean GQOL-15 scores between males and females. A p-value of <0.05 was considered statistically significant.

All proforma sheets were thoroughly reviewed for completeness of data. Data were entered in MS Excel version 10. The data were then transferred to Statistical Package for the Social Sciences (SPSS-23, IBM, Chicago, IL, USA) for analysis and stored in computer.

Ethical Considerations

All the patients in the study were informed in detail about the study. Verbal as well as written consent was taken from all patients before the start of the study. Only those patients who gave consent were included. The ethical clearance was obtained from the Institutional Review Committee of the Institute of Medicine (Ref:58(1-11) E2 078/079). The Questionnaire session was done by both the investigators and glaucoma consultants at the glaucoma clinic at BPKLCOS (study researchers).

Limitations and Delimitations of the Study

This study was hospital-based and cross-sectional; the findings may not be generalized to the wider population. Because the study included only patients attending a tertiary eye-care center, awareness and practice levels may have been overestimated compared with the general glaucoma population. Although the Glaucoma Quality of Life-15 questionnaire is specifically designed for glaucoma, it does not include all aspects of disease and health. Furthermore, given the subjective nature of the self-reported responses, the possibility of selection bias and information bias cannot be entirely ruled out.

Results

Socio-demographic and Clinical Characteristics

There were a total of 110 participants in the study. The mean age of patients was 50.07 ± 15.85 . The male: female ratio was 1.5:1. There were 66 males and 44 females. And mean age of males was 50.19 ± 16.58 and mean age of female was 49.88 ± 14.88 . The majority of participants were in the age range of 26–45 years (34.5%), followed by 46–55 years (20.9%), >65 years (20.9%), and 56–65 years (18.2%). Most participants were Hindu (82.7%) by religion.

Clinical and socio-demographic characteristics of the participants are presented in Table 1. The duration of glaucoma was less than one year in 38.1% of participants, while 24% had a disease duration of 2–5 years. A majority of participants (68%) reported no family history of glaucoma, whereas 22% were un-

aware of their family history. Most participants (94%) were on medical therapy, and only a small proportion had undergone glaucoma surgery (4%). Regarding follow-up, 58% of participants had attended a visit within the past 6 months, indicating relatively good follow-up adherence.

Awareness and Sources of Information

Overall, 91.8% of participants were aware of glaucoma. There was no difference in awareness among different education levels, ($\chi^2 = 4.38$, $p > 0.05$), across age groups ($\chi^2 = 1.35$, $p = 0.85$), or gender ($\chi^2 = 0.81$, $p = 0.77$). As per education, 27% had primary education, 22% secondary, 19% were illiterate, 19% had a bachelor's degree, and 13% had a master's degree or above. Males (92%) were more aware than their female counterparts (90.9%). The majority of information was the hospital (85.5%) based, followed by family members (22.7%), news/media (18.2%), and friends (17.3%). Duration of glaucoma was not associated with awareness ($p = 0.13$).

Knowledge, Attitude, and Practice (KAP) scores

The distribution of KAP scores is shown in Table 2. The mean knowledge score was 2.74 ± 2.09 (out of 6), mean attitude score was 3.51 ± 1.46 (out of 5), and mean practice score was 3.03 ± 1.16 (out of 4) with more than half (54%) of participants having an excellent overall KAP based on the composite KAP percentage score. There was no statistically significant difference in mean KAP scores between males and females (independent t-test, $p > 0.05$).

Table 1

Socio-demographic and clinical characteristics of patients with glaucoma

Characteristics	Variable	N (%)
Duration of glaucoma	<1 year	42(38.1)
	1–2 year	9(8)
	2–5 year	26(24)
	5–10 year	18(16)
	10–20 year	13(12)
	>20 years	2(2)
Family history of glaucoma	Don't know	24(22)
	Yes	11(10)
	No	75(68)
Glaucoma medication	Yes	103(94)
	No	2(2)
	Undergone glaucoma surgery $\pm$ medications	5(4)
Duration of last follow-up	Below 6 months	64(58)
	6 months to 1 year	29(26.4)
	1 year to 2 years	16(14.5)
	>2 years	1(0.9)

Table 2

Distribution of awareness, knowledge, attitude, and practice among gender in glaucoma patients

Domain	Mean score $\pm$ SD	Male (n=66) Mean $\pm$ SD	Female (n=44) Mean $\pm$ SD	p-value
Knowledge	2.74 $\pm$ 2.09	2.94 $\pm$ 2.04	2.45 $\pm$ 2.17	>0.05
Attitude	3.51 $\pm$ 1.46	3.48 $\pm$ 1.44	3.57 $\pm$ 1.53	>0.05
Practice	3.03 $\pm$ 1.16	3.09 $\pm$ 1.15	2.95 $\pm$ 1.20	>0.05

Only 45.7% of participants demonstrated adequate knowledge regarding glaucoma. Higher education level was associated with higher knowledge score. Their knowledge of glaucoma as an optic nerve disease ($p = 0.002$) and its effect on visual field ($p = 0.033$) was significant. Knowledge scores were also significantly higher among participants with longer disease duration ($p = 0.045$). Family history of glaucoma was significantly associated with knowledge of the non-curable nature of the disease ($p = 0.05$) and with family screening behavior ($p = 0.04$), but not with awareness ($p = 0.12$).

Overall, 63% of participants demonstrated a good attitude toward glaucoma. Attitude scores were significantly associated with awareness and showed a significant association with knowledge ($p < 0.001$) and practice scores ($p = 0.002$). Most participants (82.7%) believed that regular follow-up is necessary, and 72.7% supported regular medication use. A majority (83.6%) had informed their family members, and 74.5% recommended family screening.

Regarding practices, 94.5% of participants reported regular follow-up, with regular medication use in 63.6%, and timely medication use in 64.5%. Participants who attended regular

follow-up were significantly more likely to use medications both regularly ($p < 0.001$) and on time ($p = 0.011$). Additionally, 80% encouraged family members to undergo glaucoma screening. Overall, 63% of participants demonstrated good practice. Practice was significantly associated with duration of glaucoma ($\chi^2=48.5$, $p < 0.001$) and attitude category ($p = 0.002$), but not with awareness or knowledge categories.

Quality of Life (GQOL-15)

The distribution of responses to the GQOL-15 questionnaire is presented in Table 3. The most commonly reported difficulties included reading newspapers (35%), adjusting to bright light (21%), walking after dark (18%), seeing at night (16%), and adjusting to dim light (15%).

Lower GQOL-15 scores represented better quality of life. With decreasing visual acuity, participants had higher GQOL-15 scores, indicating poorer quality of life. One-way ANOVA revealed a statistically significant association between categories of visual acuity and GQOL-15 scores ($p < 0.001$). The mean GQOL-15 score was 17.59 ± 5.62 . The mean score among males was 16.62 ± 3.19 and among females was 19.04 ± 7.81 , with a statistically significant difference between genders (independent t-test, $p = 0.02$), indicating poorer quality of life among females.

Due to incomplete and outdated visual field records, the relationship between visual field severity (mean deviation) and GQOL-15 scores could not be analyzed.

KAP and Quality of Life

There was no significant association between GQOL-15 scores and awareness of glaucoma as assessed by one-way ANOVA ($p = 0.30$). However, GQOL-15 scores were significantly associated with knowledge, attitude, and practice (KAP) categories ($p < 0.05$), suggesting that better KAP score is associated with improved quality of life.

Table 3

Distribution of GQOL-15 questionnaire responses among respondents

Does your vision give you any difficulty, even with glasses, with the following activities?	1 no difficulty (%)	2 a little bit of difficulty n (%)	3 some difficulty n (%)	4 quite a lot of difficulty n (%)	5 severe difficulty n (%)
1. Reading newspapers	71(64.5%)	30 (27.3%)	5 (4.5%)	3 (2.7%)	1(0.9%)
2. Walking after dark	90 (81.8%)	11(10%)	5(4.5%)	4(3.6%)	–
3. Seeing at night	92 (83.6%)	11 (10%)	4(3.6%)	3 (2.7%)	–
4. Walking on uneven ground	95 (86.4%)	9 (8.2%)	3 (2.7%)	3 (2.7%)	–
5. Adjusting to bright lights	87 (79.1%)	15 (13.6%)	4 (3.6%)	4 (3.6%)	–
6. Adjusting to dim lights	93 (84.5%)	9 (8.2%)	4 (3.6%)	3 (2.7%)	1 (0.9%)
7. Going from light to dark room or vice versa	96 (87.3%)	9 (8.2%)	3 (2.7%)	2 (1.8%)	–
8. Tripping over objects	100 (90.9%)	8 (7.2%)	2 (1.8%)	–	–
9. Seeing objects coming from the side	102 (92.7%)	5 (4.5%)	2 (1.8%)	1 (0.9%)	–
10. Crossing the road	103 (93.6%)	5 (4.5%)	1(0.9%)	1 (0.9%)	–
11. Walking on steps / stairs	102 (92.7%)	5 (4.5%)	2 (1.8%)	1 (0.9%)	–
12. Bumping into objects	104 (94.5%)	6 (5.5%)	–	–	–
13. Judging distance of foot to step/curb	104 (94.5%)	4 (3.6%)	2 (1.8%)	–	–
14. Finding dropped objects	103 (93.6%)	6 (5.5%)	1 (0.9%)	–	–
15. Recognizing faces	106 (96.3%)	2 (1.8%)	2 (1.8%)	–	–

Discussion

A high level of glaucoma awareness was observed among the study participants, with 101 out of 110 patients (91.8%) reporting awareness of the disease. The hospital was identified as the primary source of information by the majority (85.5 %). This figure is higher than the 78% awareness rate reported in the national survey conducted by Nepal Netra Jyoti Sangh in 2017 (IABP, 2019). Studies from Nepal's general population have similarly documented considerably lower levels of glaucoma awareness (Thapa et al., 2011), a consistent finding also evident in neighboring countries such as India and China (Krishnaiah et al., 2005; Dandona et al., 2001; Ichhpujani et al., 2012; Xi Chen et al., 2022). The relatively high awareness level observed could be because of the hospital-based design of the study, where patients receive repeated health information from medical professionals. This is also reflected in the reported source of information, suggesting hospital-based information is more trusted for health education.

Despite this high level of awareness, the mean knowledge score was low (45.7%), revealing the awareness - knowledge gap. Similar gaps have been reported globally (Sathyamangalam et al., 2009; Labiris et al., 2012). A study done among glaucoma suspects in the USA reported a significant decrease in follow-up rates due to a lack of knowledge about glaucoma, rather than a lack of access to eye care. (Altangerel et al., 2009). Studies done on health-seeking behavior have shown that the patient's lack of knowledge of disease negatively impacts timely treatment. (Rosenstock, 1966; Feather, 1959). These findings collectively suggest that awareness alone may not be sufficient for meaningful understanding of the disease. Factors such as literacy and physician communication may contribute to this gap. Therefore, structured patient education programs on disease mechanisms, long-term management, and treatment goals may be necessary to bridge this gap.

Within our study, education level and duration of disease had a significant impact on the knowledge scores, indicating that better disease understanding could be expected among patients with a higher level of education and those with longer disease management. Patients with longer disease duration demonstrated better knowledge scores, possibly reflecting repeated exposure to clinical counseling.

An important finding was the relationship between a patient's family history of glaucoma and their screening-related behaviour. Approximately 74.5% of patients recognized the importance of informing their family members and 80% actively encouraged their family members to undergo eye screenings - a proportion higher than that reported in a comparable study from India (Raiturcar, Cacodcar, & Vernekar, 2019). This suggests that people with glaucoma are more likely to promote eye screenings among their family members. (McNaught et al., 2000; Wu et al., 2006) Given that a positive family history is an established risk factor, this behaviour serves as an important preventive practice for early detection within their families. Promoting family-based education and counseling during clinic visits may further strengthen this effect and contribute to earlier diagnosis, reduced rates of preventable blindness, and improved

public health outcomes.

Regarding quality of life, patients with low knowledge scores had a poorer quality of life, whereas those with higher knowledge scores reported better quality of life. Reduced quality of life was also associated with lower visual acuity in our study. These findings are consistent with previous research demonstrating that visual impairment can lead to social isolation, reduced independence and decreased general well-being. (Taylor et al., 2000; McKean-Cowdin et al., 2007; Quaranta et al., 2016) Furthermore, KAP were significantly associated with QOL, whereas awareness alone was not. This suggests that awareness by itself may not be sufficient to influence patient outcomes. A deeper understanding of the disease and substantial behavioral changes are needed to determine patient outcomes. Although causality cannot be established in this cross-sectional study, the significant association between higher KAP scores and better quality of life suggests that educational interventions and adherence-promoting strategies may contribute to improved patient-reported outcomes.

The primary goal of glaucoma care is to preserve vision as well as quality of life. Although there is not a single gold standard tool for assessment of well-being, disease-specific and vision-related markers are better than other generic tools for assessing quality of life in glaucoma patients (Severn et al., 2008; Kaur et al., 2012).

Conclusion

This study found that, despite generally positive attitude and practice scores, a substantial gap in knowledge persisted. Among the KAP domains, knowledge, attitude, and practice all showed a significant association with quality of life. Awareness alone was not significantly associated with quality of life. These findings emphasize the need for patient education to improve disease understanding and promote self-care practices. Further studies with a larger sample size from different centers in Nepal are needed to better understand why some glaucoma patients have poor knowledge and practice, and how best to educate them. Encouraging family-based education and screening may further facilitate early detection of glaucoma among high-risk individuals.

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Artificial Intelligence (AI) Use and Disclosure

In the preparation of this manuscript, COPILOT AI tool was utilized for grammatical accuracy and to improve logical flow of paragraphs, closely considering journal's academic integrity guidelines.

Similarity and Originality Confirmation

The manuscript is original, not under review elsewhere, and complies with TUJ publication ethics.

Conflict of Interest

The authors declare no conflict of interest.

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Data Availability

Data available from the corresponding author on request.

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