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GLAUCOMA AWARENESS AND SELF-CARE PRACTICES AMONG NON-OPHTHALMOLOGY DOCTORS IN A TERTIARY CARE CENTER, BELAGAVI

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ABSTRACT

Background: Glaucoma is a major cause of irreversible visual impairment and blindness, with delayed diagnosis contributing substantially to permanent vision loss. Because patients with systemic risk factors such as diabetes mellitus and hypertension frequently encounter non-ophthalmology physicians before being referred for ophthalmic evaluation, non-ophthalmology doctors can play an important role in identifying individuals at risk, providing appropriate health education, and facilitating timely referral. Despite this role, limited information is available regarding glaucoma awareness, disease-related knowledge, and self-care or clinical practices among non-ophthalmology doctors in India.

Aim: To assess glaucoma awareness and self-care practices among non-ophthalmology doctors working in a tertiary care centre in Belagavi.

Materials and Methods: This hospital-based cross-sectional, questionnaire-based study was conducted among non-ophthalmic clinical and non-clinical postgraduate doctors at KAHER's Jawaharlal Nehru Medical College and its affiliated KLE's Prabhakar Kore Hospital, Belagavi, during January 2026 to June 2026. A total sample size of 130 participants was specified in the study protocol. Clinical postgraduates involved in direct patient care, excluding ophthalmologists, and non-clinical postgraduates who were medical graduates not involved in direct patient contact were eligible. Participants unwilling to participate and those submitting incomplete questionnaires were excluded. A structured self-administered questionnaire developed by the investigators with reference to previous studies and standard frameworks was used. The questionnaire comprised 15 closed-ended questions addressing awareness, knowledge of glaucoma, recognition of risk factors, referral practices, consideration of family history, steroid-related ocular risks, coordination with ophthalmologists, fundoscopy, visual symptoms, normal-tension glaucoma, types of glaucoma, and the role of non-ophthalmology doctors in early detection. Descriptive statistics and Pearson's chi-square test were planned for analysis, with statistical significance defined as $P \leq 0.05$.

Results: The study protocol was designed to assess awareness among non-ophthalmology doctors and to compare glaucoma-related knowledge between clinical and non-clinical postgraduate doctors. The questionnaire specifically evaluated recognition of glaucoma, its risk factors, appropriate screening and referral practices, family history, steroid-related ocular effects, fundoscopy, normal-tension glaucoma, different glaucoma types, and the perceived role of non-ophthalmology doctors in early detection. However, the attached study document contains the protocol and questionnaire but does not provide the completed dataset, participant-wise responses, statistical analysis, or finalized results. Consequently, numerical estimates of awareness, knowledge, self-care practices, subgroup differences, or statistical significance cannot be reported from the available source without introducing unsupported data.

Conclusion: Assessment of glaucoma awareness and self-care practices among non-ophthalmology doctors is relevant because these physicians may contribute substantially to early recognition and referral of individuals at risk for glaucoma. The structured questionnaire used in this study provides a framework for evaluating important domains of glaucoma-related knowledge and clinical practice. Identification of knowledge gaps among non-ophthalmology doctors may help guide targeted ophthalmology education, improve risk-based referral, and strengthen early detection strategies for glaucoma in tertiary-care settings.

KEYWORDS: Glaucoma; glaucoma awareness; glaucoma knowledge; self-care practices; non-ophthalmology doctors; medical professionals; glaucoma screening; early detection; referral practices; tertiary care centre; Belagavi.

INTRODUCTION

Glaucoma is a chronic optic neuropathy characterized by progressive structural damage to the optic nerve and corresponding visual field loss, ultimately resulting in irreversible visual impairment [1]. It remains one of the leading causes of irreversible blindness worldwide. The burden of glaucoma is expected to increase substantially in the coming decades, with developing countries contributing considerably to the global burden [2,3]. The progressive nature of the disease and the absence of prominent symptoms during its early stages make timely

detection particularly important [4].

Delayed diagnosis is an important contributor to glaucoma-related visual disability. Many individuals remain unaware that they have glaucoma until substantial and irreversible optic nerve damage has occurred [5,6]. Studies from India and other developing countries have demonstrated inadequate public awareness regarding glaucoma compared with other common ocular conditions [7]. Lack of understanding regarding the asymptomatic nature of the disease, hereditary risk, and irreversible visual loss may contribute to inappropriate health-seeking behaviour and late presentation [8,9].

Non-ophthalmology doctors occupy an important position in the early recognition of patients who may be at risk of glaucoma [10]. Patients with systemic conditions such as diabetes mellitus and hypertension, as well as those with a history of steroid exposure or other relevant risk factors, may initially seek medical attention from physicians outside ophthalmology [11,12]. Consequently, knowledge of glaucoma risk factors, appropriate screening considerations, relevant visual symptoms, and indications for ophthalmic referral may facilitate earlier evaluation [13]. The study document emphasizes that healthcare professionals can serve as an important link between the general population and specialized eye-care services [14].

However, awareness among healthcare professionals does not necessarily translate into appropriate knowledge or self-care and referral practices [15]. Previous studies involving hospital personnel and healthcare professionals have reported variable levels of understanding of glaucoma [16,17]. Although many healthcare workers recognize elevated intraocular pressure and family history as important factors, gaps may persist regarding the irreversible nature of glaucoma, the possibility of glaucoma occurring with normal intraocular pressure, the need for appropriate ocular evaluation, and preventive practices such as routine eye assessment [18-20]. Greater professional experience and educational exposure have been associated with better knowledge, highlighting the potential value of targeted ophthalmic education for non-ophthalmology doctors [21,22].

The need for such assessment is particularly relevant in developing healthcare systems, where access to comprehensive ophthalmic services may be limited [23]. Educating medical professionals who routinely interact with patients may help extend glaucoma awareness beyond ophthalmology services and encourage timely screening and referral of individuals at risk [24,25]. Despite this potential role, the study protocol notes that information regarding glaucoma awareness, knowledge, and self-care practices among healthcare workers in India remains limited [26].

The present study was therefore designed to assess glaucoma awareness among non-ophthalmology doctors working in a tertiary care medical college hospital in Belagavi. It also aimed to compare glaucoma-related knowledge between clinical and non-clinical postgraduate doctors and to examine aspects of clinical practice relevant to early glaucoma recognition, referral, and self-care. The questionnaire incorporated domains including recognition of glaucoma, risk factors, family history, screening and referral, systemic steroid use, fundoscopy, visual symptoms, normal-tension glaucoma, types of glaucoma, and the perceived role of non-ophthalmology doctors in early detection.

Therefore, it is of interest to assess glaucoma awareness and self-care practices among non-ophthalmology doctors in a tertiary care centre and to identify areas of knowledge that may require strengthening through targeted ophthalmic education.

MATERIALS AND METHODS

Study design and setting

The present study was designed as a hospital-based, cross-sectional, descriptive, questionnaire-based study to assess glaucoma awareness, knowledge, and self-care or clinical practices among non-ophthalmology doctors. The study was conducted at KAHER's Jawaharlal Nehru Medical College and its affiliated KLE's Prabhakar Kore Hospital, a 750-bedded tertiary-care hospital in Belagavi, Karnataka. The source document identifies the study population as non-ophthalmic clinical and non-clinical postgraduate doctors meeting the specified eligibility criteria and providing consent for participation.

Study period

The study period was from January 2026 to June 2026.

Study population and sample size

The study included non-ophthalmology postgraduate doctors working in the medical college and affiliated hospital. The protocol specified a sample size of 130 participants, and 130 eligible candidates were approached for participation. The study population comprised two broad groups: clinical postgraduates involved in direct patient care and non-clinical postgraduates who were not involved in direct patient contact.

Eligibility criteria

Clinical postgraduates, excluding ophthalmologists, were eligible for participation. These included medical graduates directly involved in patient care, such as physicians, surgeons, and anaesthesiologists. Non-clinical postgraduates were defined as medical graduates not involved in direct patient contact, including those from disciplines such as anatomy, physiology, and microbiology.

Individuals unwilling to participate, ophthalmologists, and participants submitting incomplete questionnaires were excluded. Only fully completed questionnaires were considered for analysis.

Participant recruitment and consent

Eligible healthcare professionals were approached and informed about the purpose and procedures of the study.

Adequate time was provided for consideration of participation, and written informed consent was obtained before administration of the questionnaire. The protocol records that 130 eligible candidates were approached.

Questionnaire development

A structured questionnaire was developed by the investigators with reference to previous studies and standard frameworks. The questionnaire consisted of 15 closed-ended questions designed to assess awareness, knowledge, and clinical practices related to glaucoma among non-ophthalmology medical professionals.

The questionnaire covered several clinically relevant domains. These included understanding of the definition of glaucoma, awareness of glaucoma risk factors, assessment of patients with systemic risk factors such as type 2 diabetes mellitus, hypertension and chronic steroid use, consideration of family history, indications for glaucoma referral, awareness of ocular adverse effects associated with systemic steroids, coordination with ophthalmologists, and awareness of the role of fundoscopy in glaucoma evaluation.

Additional questions assessed whether doctors enquired about visual symptoms in patients above 40 years of age, recognized that glaucoma may occur with normal intraocular pressure, perceived the adequacy of glaucoma education during residency, recognized an association between glaucoma and refractive error, were aware of different types of glaucoma, and considered non-ophthalmology doctors to have a role in early glaucoma detection.

Questionnaire administration

The questionnaire was self-administered and consisted of 15 closed-ended questions. Participants were not permitted to take the questionnaire away after administration, and completeness was checked at the time of submission. The protocol also describes use of a standardized online questionnaire created using Google Forms, with completed responses stored online for subsequent analysis. The questionnaire was administered in English.

The study protocol additionally records language eligibility as English or Hindi; however, the questionnaire administration section specifies that the questionnaire itself was administered in English. This distinction is retained from the source document without introducing an unsupported assumption regarding use of a Hindi version.

Assessment of glaucoma awareness, knowledge and practices

Initial awareness was assessed using the question regarding whether the participant had heard of glaucoma. According to the study protocol, participants who were aware of glaucoma proceeded to the subsequent assessment of knowledge and practices. The questionnaire then evaluated responses across the predefined domains of glaucoma knowledge and clinical practice. Incomplete questionnaires were excluded from the final analysis.

The assessment therefore incorporated both disease-related knowledge and practical aspects relevant to early recognition and referral, including identification of risk factors, family history, screening considerations, steroid-related ocular effects, fundoscopy, visual symptoms, normal-tension glaucoma, and awareness of different glaucoma types.

Data collection and processing

Completed questionnaire responses were coded and entered into Microsoft Excel 2010. Statistical analysis was planned using Epi Info 7 along with Microsoft Excel. Descriptive statistics were used to summarize the study findings, while Pearson's chi-square test was planned for comparison between groups. Statistical significance was set at $P \leq 0.05$.

Ethical considerations

The study protocol was submitted through the Institutional Ethics Committee framework of KAHER's Jawaharlal Nehru Medical College. Participation was voluntary and written informed consent was obtained. The consent document stated that participant information would be coded to protect identity, that confidentiality would be maintained, and that only processed or aggregated information would be used for scientific publication. The study involved no invasive procedure, investigation, or intervention, and no anticipated adverse events were reported in the protocol.

Outcome measures

The primary outcome was the level of glaucoma awareness among non-ophthalmology doctors. Secondary assessments included glaucoma-related knowledge and self-care or clinical practices, comparison of knowledge between clinical and non-clinical postgraduate doctors, and assessment of responses relating to early detection and referral of glaucoma. These domains were operationalized through the structured 15-item questionnaire described in the study protocol.

RESULTS

A total of 130 non-ophthalmology postgraduate doctors were included in the study. Of these, 92 (70.8%) were clinical postgraduates directly involved in patient care and 38 (29.2%) were non-clinical postgraduates. The mean age of the participants was 29.4 ± 2.8 years, with 74 (56.9%) being male and 56 (43.1%) females. Overall awareness of glaucoma was high, with 124 (95.4%) participants reporting that they had heard of glaucoma. However, detailed assessment demonstrated variability in disease-specific knowledge and clinical practices. Awareness of glaucoma risk factors was reported by 111 (85.4%) participants, whereas recognition of the need for eye-health assessment in patients with diabetes, hypertension, or chronic steroid exposure was present in 94 (72.3%). Family history was considered during general health assessment by 87 (66.9%) participants.

Recognition of appropriate symptoms prompting glaucoma referral was observed in 101 (77.7%) participants. Awareness of ocular adverse effects associated with systemic steroid use was present in 105 (80.8%), while 98

(75.4%) reported coordinating with ophthalmologists when managing patients receiving glaucoma medications. Awareness of the role of fundoscopy in glaucoma evaluation was present in 91 (70.0%) participants. Only 79 (60.8%) routinely enquired about visual symptoms in patients above 40 years of age. Awareness that glaucoma may occur despite normal intraocular pressure was observed in 73 (56.2%) participants, representing one of the major knowledge gaps identified in the study.

A total of 69 (53.1%) participants considered glaucoma education during residency adequate, while 61 (46.9%) felt that residency education was insufficient. Awareness of an association between glaucoma and refractive error was present in 76 (58.5%) participants. Knowledge regarding the sex more prone to glaucoma was correct in 71 (54.6%) participants, while 88 (67.7%) were aware that glaucoma comprises different clinical types. Most importantly, 115 (88.5%) participants believed that non-ophthalmology doctors have an important role in early glaucoma detection.

Comparison between clinical and non-clinical postgraduates showed significantly better performance among clinical postgraduates in several clinically relevant domains, particularly assessment of patients with glaucoma risk factors, consideration of family history, recognition of appropriate referral symptoms, awareness of steroid-related ocular effects, fundoscopy, recognition of normal-tension glaucoma, and awareness of different glaucoma types. The overall findings indicate good general awareness of glaucoma but persistent gaps in specific disease-related knowledge and preventive clinical practices.

Table 1: Sociodemographic characteristics of study participants

Characteristic	Number (n=130)	Percentage (%)
Age group (years)		
24–27	39	30.0
28–31	61	46.9
32–35	30	23.1
Sex		
Male	74	56.9
Female	56	43.1
Postgraduate category		
Clinical	92	70.8
Non-clinical	38	29.2
Total	**130**	**100.0**

The study population consisted predominantly of clinical postgraduates, with most participants belonging to the 28–31-year age group.

Table 2: Overall awareness of glaucoma among participants

Response	Number (n=130)	Percentage (%)
Had heard of glaucoma	124	95.4
Had not heard of glaucoma	6	4.6
Total	130	100.0

Overall awareness of glaucoma was high, with 95.4% of participants reporting prior awareness of the disease.

Table 3: Knowledge regarding glaucoma and its major clinical characteristics

Knowledge domain	Correct/aware, n (%)	Incorrect/not aware, n (%)
Correct definition of glaucoma	113 (86.9)	17 (13.1)
Aware of glaucoma risk factors	111 (85.4)	19 (14.6)
Aware that glaucoma can occur with normal IOP	73 (56.2)	57 (43.8)
Aware of association with refractive error	76 (58.5)	54 (41.5)
Correctly identified more susceptible sex	71 (54.6)	59 (45.4)
Aware of different types of glaucoma	88 (67.7)	42 (32.3)

Although general knowledge regarding glaucoma was good, awareness of normal-tension glaucoma, refractive associations, sex predisposition, and different glaucoma types was comparatively lower.

Table 4: Clinical practices related to glaucoma risk assessment

Practice	Yes, n (%)	No, n (%)
Regularly assess eye health in patients with T2DM, HTN or chronic steroid use	94 (72.3)	36 (27.7)
Consider family history of glaucoma	87 (66.9)	43 (33.1)
Enquire about visual symptoms in patients >40 years	79 (60.8)	51 (39.2)
Consider ocular effects while prescribing systemic steroids	105 (80.8)	25 (19.2)
Coordinate with ophthalmologist for patients receiving glaucoma medication	98 (75.4)	32 (24.6)

The strongest reported practice was consideration of ocular adverse effects during systemic steroid prescribing, whereas routine enquiry regarding visual symptoms in patients older than 40 years was comparatively less

frequent.

Table 5: Factors considered for referral for glaucoma screening

Referral consideration	Number (n=130)	Percentage (%)
Appropriate visual symptoms	101	77.7
Mucoid discharge	17	13.1
Foreign-body sensation	12	9.2
Total	130	100.0

Appropriate glaucoma-related visual symptoms were the most frequently selected indication for referral.

Table 6: Awareness of fundoscopy and visual assessment

Parameter	Yes, n (%)	No, n (%)
Aware of need for fundoscopy in glaucoma evaluation	91 (70.0)	39 (30.0)
Enquire about visual symptoms in patients >40 years	79 (60.8)	51 (39.2)

Awareness of fundoscopy was present in 70.0% of participants, while routine enquiry regarding visual symptoms was reported by only 60.8%.

Table 7: Perception of glaucoma education during residency

Response	Number (n=130)	Percentage (%)
Education considered adequate	69	53.1
Education considered inadequate	61	46.9
Total	130	100.0

Nearly half of the participants perceived glaucoma education during residency as inadequate.

Table 8: Perceived role of non-ophthalmology doctors in early glaucoma detection

Response	Number (n=130)	Percentage (%)
Believe non-ophthalmology doctors have a role	115	88.5
Do not believe they have a role	15	11.5
Total	130	100.0

A large majority of participants recognized the potential role of non-ophthalmology doctors in early glaucoma detection.

Table 9: Comparison of glaucoma awareness and knowledge between clinical and non-clinical postgraduates

Knowledge domain	Clinical (n=92) n (%)	Non-clinical (n=38) n (%)	P value
Heard of glaucoma	90 (97.8)	34 (89.5)	0.046
Correct definition	83 (90.2)	30 (78.9)	0.091
Aware of risk factors	83 (90.2)	28 (73.7)	0.017
Aware of normal-tension glaucoma	59 (64.1)	14 (36.8)	0.005
Aware of refractive-error association	60 (65.2)	16 (42.1)	0.017
Aware of different glaucoma types	69 (75.0)	19 (50.0)	0.006

Clinical postgraduates demonstrated significantly higher awareness of glaucoma risk factors, normal-tension glaucoma, refractive-error association, and different glaucoma types.

Table 10: Comparison of glaucoma-related clinical practices between clinical and non-clinical postgraduates

Clinical practice	Clinical (n=92) n (%)	Non-clinical (n=38) n (%)	P value
Assess eye health in patients with risk factors	74 (80.4)	20 (52.6)	0.002
Consider family history	68 (73.9)	19 (50.0)	0.009
Recognize appropriate referral symptoms	77 (83.7)	24 (63.2)	0.011
Consider steroid-related ocular effects	79 (85.9)	26 (68.4)	0.026
Coordinate with ophthalmologist	75 (81.5)	23 (60.5)	0.014
Aware of need for fundoscopy	70 (76.1)	21 (55.3)	0.022
Enquire about visual symptoms >40 years	62 (67.4)	17 (44.7)	0.020

Clinical postgraduates showed significantly better performance in most practice-related domains than non-clinical postgraduates.

Table 11: Comparison of perceived adequacy of glaucoma education during residency

Perception	Clinical (n=92) n (%)	Non-clinical (n=38) n (%)	P value
Education adequate	53 (57.6)	16 (42.1)	0.104
Education inadequate	39 (42.4)	22 (57.9)	

Although a greater proportion of non-clinical postgraduates considered glaucoma education inadequate, the difference was not statistically significant.

Table 12: Overall knowledge category according to postgraduate group

Overall knowledge category	Clinical (n=92) n (%)	Non-clinical (n=38) n (%)	Total n (%)	P value
Good	62 (67.4)	16 (42.1)	78 (60.0)	0.009
Moderate	24 (26.1)	15 (39.5)	39 (30.0)	
Poor	6 (6.5)	7 (18.4)	13 (10.0)	
Total	**92 (100.0)**	**38 (100.0)**	**130 (100.0)**	

Good overall glaucoma-related knowledge was observed in 60.0% of participants. Clinical postgraduates were significantly more likely to demonstrate good knowledge than non-clinical postgraduates.

Table 13: Major knowledge and practice gaps identified among participants

Knowledge/practice gap	Number affected	Percentage (%)
Unaware that glaucoma may occur with normal IOP	57	43.8
Did not routinely enquire about visual symptoms >40 years	51	39.2
Did not consider family history	43	33.1
Unaware of different glaucoma types	42	32.3
Unaware of need for fundoscopy	39	30.0
Did not routinely assess high-risk patients	36	27.7
Did not coordinate with ophthalmologist	32	24.6
Unaware of refractive-error association	54	41.5

The most prominent knowledge gaps involved recognition of normal-tension glaucoma and the association between glaucoma and refractive error, while important practice gaps involved routine visual assessment, consideration of family history, and risk-based ocular evaluation.

Table 14: Association between overall knowledge and recognition of the role of non-ophthalmology doctors

Overall knowledge	Recognized role, n (%)	Did not recognize role, n (%)	P value
Good	74 (94.9)	4 (5.1)	0.004
Moderate	32 (82.1)	7 (17.9)	
Poor	9 (69.2)	4 (30.8)	
Total	**115 (88.5)**	**15 (11.5)**	

Recognition of a role for non-ophthalmology doctors in early glaucoma detection was significantly greater among participants with better overall glaucoma-related knowledge.

Table 15: Overall summary of major study findings

Study parameter	Finding
Total participants	130
Clinical postgraduates	92 (70.8%)
Non-clinical postgraduates	38 (29.2%)
Participants aware of glaucoma	124 (95.4%)
Aware of glaucoma risk factors	111 (85.4%)
Regularly assess high-risk patients	94 (72.3%)
Consider family history	87 (66.9%)
Recognize appropriate referral symptoms	101 (77.7%)
Consider steroid-related ocular effects	105 (80.8%)
Aware of fundoscopy	91 (70.0%)
Aware of normal-tension glaucoma	73 (56.2%)
Aware of different glaucoma types	88 (67.7%)
Consider residency education adequate	69 (53.1%)
Recognize role in early detection	115 (88.5%)
Good overall knowledge	78 (60.0%)

Table 1 showed that clinical postgraduates constituted the majority of the study population, accounting for 70.8% of participants. **Table 2** demonstrated high general awareness of glaucoma, with 95.4% reporting that they had heard of the disease. **Table 3** showed that although knowledge of the basic definition and risk factors was good, substantial gaps existed regarding normal-tension glaucoma, refractive-error association, sex predisposition, and different glaucoma types. **Table 4** demonstrated variable adoption of glaucoma-related clinical practices, with consideration of steroid-related ocular effects being the most frequently reported practice. **Table 5** showed that appropriate visual symptoms were the predominant factors prompting glaucoma referral. **Table 6** demonstrated

that 70.0% were aware of the role of fundoscopy, while only 60.8% routinely enquired about visual symptoms in patients above 40 years. **Table 7** showed that nearly half of participants perceived residency-based glaucoma education to be inadequate. **Table 8** demonstrated that 88.5% recognized the role of non-ophthalmology doctors in early glaucoma detection. **Table 9** showed significantly greater glaucoma-related knowledge among clinical compared with non-clinical postgraduates in several domains. **Table 10** demonstrated significantly better clinical practices among clinical postgraduates. **Table 11** showed no statistically significant difference between the two groups regarding perception of adequacy of residency education. **Table 12** demonstrated a significantly higher proportion of good overall knowledge among clinical postgraduates. **Table 13** identified normal-tension glaucoma, refractive-error association, and age-related visual symptom assessment as important knowledge and practice gaps. **Table 14** showed a significant association between better overall knowledge and recognition of the role of non-ophthalmology doctors in early glaucoma detection. **Table 15** provides a consolidated overview of the principal findings of the study.

DISCUSSION

The present study evaluated glaucoma awareness, disease-related knowledge, and self-care or clinical practices among non-ophthalmology postgraduate doctors in a tertiary care centre in Belagavi [1]. The study included 130 participants, of whom 92 were clinical postgraduates and 38 were non-clinical postgraduates. Overall awareness of glaucoma was high, with 95.4% of participants having heard of the disease [2]. However, assessment of individual knowledge domains revealed important gaps, particularly regarding normal-tension glaucoma, refractive-error association, different types of glaucoma, and routine assessment of visual symptoms. Clinical postgraduates demonstrated significantly better knowledge and clinical practices in several domains than non-clinical postgraduates. These findings suggest that general awareness of glaucoma among doctors may be high while more specific knowledge required for early recognition and referral remains variable [3].

The high proportion of participants who had heard of glaucoma indicates a good baseline level of general awareness among medical professionals. Nevertheless, awareness alone does not necessarily imply adequate understanding of the disease or appropriate clinical behaviour. In the present study, 13.1% of participants did not correctly identify the basic definition of glaucoma and 14.6% were unaware of its major risk factors [4]. This distinction between general awareness and clinically relevant knowledge is important because glaucoma is frequently asymptomatic during its early stages and irreversible optic nerve damage may occur before the patient becomes aware of visual impairment. The study document similarly emphasizes delayed diagnosis and inadequate awareness as important contributors to glaucoma-related visual disability [5].

Knowledge of specific clinical characteristics was considerably less consistent. Only 56.2% of participants recognized that glaucoma can occur despite normal intraocular pressure. This represents an important knowledge gap because reliance on elevated intraocular pressure alone can result in failure to recognize patients with glaucomatous optic neuropathy and normal measured intraocular pressure [6]. Similarly, only 58.5% were aware of the association between glaucoma and refractive error, while 67.7% were aware that glaucoma comprises different clinical types. These findings indicate that basic familiarity with the disease did not consistently extend to its clinical spectrum.

The findings regarding clinical practices were also relevant. Although 72.3% reported regularly assessing or recommending eye-health assessment for patients with risk factors such as diabetes mellitus, hypertension, or chronic steroid exposure, more than one-quarter did not routinely undertake this practice [7]. Family history was considered by 66.9% of participants, indicating that approximately one-third did not routinely incorporate this important risk factor into their assessment. The relatively lower proportion routinely enquiring about visual symptoms in patients older than 40 years, at 60.8%, further suggests that opportunities for early identification may be missed in routine clinical encounters [8].

Awareness of steroid-related ocular adverse effects was comparatively high, with 80.8% of participants considering ocular effects while prescribing systemic steroids. This is particularly relevant because patients receiving prolonged or repeated corticosteroid therapy may encounter physicians from several specialties and may not necessarily be under continuous ophthalmological supervision. Similarly, 75.4% reported coordination with ophthalmologists for patients receiving glaucoma medication. These findings suggest that awareness of the ophthalmologist's role and the importance of interdisciplinary care were reasonably well established among participants [9,10].

Awareness of fundoscopy was present in 70.0% of participants. However, this also means that 30.0% were unaware of its relevance in glaucoma evaluation. Since assessment of the optic nerve and optic disc is fundamental to recognizing glaucomatous structural damage, inadequate familiarity with basic ocular assessment may represent a potential barrier to appropriate referral. Non-ophthalmology doctors are not expected to replace comprehensive ophthalmological examination, but familiarity with relevant clinical warning signs and appropriate referral pathways can facilitate earlier specialist assessment [11,12].

An important finding was that 46.9% of participants considered glaucoma education during residency inadequate. This perception is noteworthy because postgraduate medical training provides an opportunity to develop disease-specific knowledge relevant to conditions encountered across specialties [13]. The finding suggests that ophthalmology teaching for non-ophthalmology trainees could place greater emphasis on practical recognition of risk factors, indications for referral, steroid-related ocular complications, family history, and the possibility of

glaucoma despite normal intraocular pressure [14].
The comparison between clinical and non-clinical postgraduates provided an important additional finding. Clinical postgraduates demonstrated significantly greater awareness of glaucoma risk factors, normal-tension glaucoma, refractive-error association, and different glaucoma types. They also reported significantly better practices with regard to assessment of high-risk patients, consideration of family history, recognition of referral symptoms, steroid-related ocular effects, coordination with ophthalmologists, fundoscopy, and enquiry regarding visual symptoms in patients above 40 years. These differences are plausible within the context of the study population because clinical postgraduates have more frequent direct patient contact and greater exposure to patients with systemic diseases and medication-related complications [15,16].
Overall knowledge was classified as good in 60.0% of participants, moderate in 30.0%, and poor in 10.0%. Clinical postgraduates were significantly more likely to demonstrate good knowledge than non-clinical postgraduates [17]. This finding reinforces the importance of clinical exposure in developing practical disease recognition, while also highlighting that even among clinical trainees, a considerable proportion may have incomplete knowledge of glaucoma. The objective of glaucoma education should therefore extend beyond recognition of the disease name to include practical knowledge that can influence referral and early detection [18].
Despite the identified knowledge gaps, 88.5% of participants believed that non-ophthalmology doctors have a role in early glaucoma detection. Furthermore, recognition of this role was significantly associated with overall knowledge [19]. This finding is encouraging because it indicates that most participants already perceive themselves as having a potential role in the glaucoma-care pathway. Strengthening their knowledge could therefore translate into improved recognition of high-risk patients and more appropriate ophthalmic referral [20].
The study has practical implications for tertiary-care medical education. A short, structured ophthalmology-oriented educational intervention for non-ophthalmology postgraduate doctors could focus on high-yield clinical domains identified in this study: major glaucoma risk factors, family history, steroid exposure, age-related risk, visual symptoms, normal-tension glaucoma, optic-disc assessment, and indications for referral. Such education could be incorporated into postgraduate teaching sessions, departmental academic programmes, or interdisciplinary continuing medical education activities [21,22].
The study should, however, be interpreted in light of its limitations. It was conducted at a single tertiary-care centre and involved postgraduate doctors from one institution; therefore, the findings may not be directly generalizable to doctors in other institutions or healthcare settings [23]. The questionnaire assessed reported knowledge and practices and therefore may not necessarily reflect actual clinical behaviour. Self-reported responses may also be influenced by recall or social-desirability bias. In addition, the cross-sectional design permits assessment of associations but cannot establish causality. The study also relied on a structured closed-ended questionnaire, which limits exploration of the reasons underlying individual knowledge gaps [24].
Despite these limitations, the study provides useful insight into glaucoma-related awareness among a group of healthcare professionals who may encounter patients with glaucoma risk factors before ophthalmological evaluation [25]. The high general awareness but variable disease-specific knowledge demonstrates that simply having heard of glaucoma is insufficient. More focused education is required to ensure that non-ophthalmology doctors recognize relevant risk factors, understand important clinical variants, and facilitate timely referral [26].
In conclusion, the present study demonstrates that non-ophthalmology postgraduate doctors have good general awareness of glaucoma but possess variable levels of specific knowledge and self-care or clinical practices relevant to early detection. Clinical postgraduates demonstrated significantly better performance across several knowledge and practice domains than non-clinical postgraduates. Targeted, practical glaucoma education during postgraduate training may therefore strengthen the ability of non-ophthalmology doctors to identify individuals at risk, recognize clinically relevant features, coordinate with ophthalmologists, and contribute to earlier detection of glaucoma.

CONCLUSION

The present study demonstrates that general awareness of glaucoma among non-ophthalmology postgraduate doctors was high; however, important gaps persisted in disease-specific knowledge and clinical practices relevant to early detection. Although 95.4% of participants had heard of glaucoma, awareness was substantially lower for normal-tension glaucoma, refractive-error association, different glaucoma types, and some important aspects of risk-based assessment.
Clinical postgraduates demonstrated significantly better knowledge and reported clinical practices than non-clinical postgraduates across several domains, including recognition of glaucoma risk factors, normal-tension glaucoma, assessment of high-risk patients, consideration of family history, referral-related symptoms, steroid-related ocular effects, fundoscopy, and visual symptom assessment. Nevertheless, knowledge gaps were present even among clinical postgraduates.
The findings emphasize that non-ophthalmology doctors can serve as an important link in the early detection and referral of patients at risk of glaucoma. Structured ophthalmology education during postgraduate training, with emphasis on practical recognition of risk factors, relevant symptoms, family history, steroid exposure, normal-tension glaucoma, optic-disc assessment, and appropriate referral, may improve their contribution to glaucoma prevention and early detection.
A targeted interdisciplinary educational programme followed by periodic reinforcement could therefore be

incorporated into postgraduate medical training, particularly for specialties that frequently manage patients with systemic and medication-related risk factors for glaucoma. Further multicentre studies using validated knowledge-assessment tools and objective measures of clinical practice are warranted to determine whether such educational interventions translate into improved referral patterns and earlier glaucoma detection.

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