Advances in Medical Education and Practice Dovepress

Open Access Full Text Article ORIGINAL RESEARCH

Family Physicians' Knowledge and Perceived Confidence with Clinical Ophthalmology

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Purpose: Ophthalmology poses challenges for general practitioners, who have been identified globally as receiving inadequate training. Family medicine (FM) trainees often lack sufficient ophthalmology training; however, this issue is not unique to Saudi Arabia. Studies from Australia, the United States of America, New Zealand, and the United Kingdom have revealed the same concerns. Patient consultations offer opportunities for applying skills gained through structured education, yet the extent of FM trainees' clinical exposure to ophthalmology remains unclear. Effective workshops designed to enhance primary healthcare providers' ophthalmic skills exist internationally, but similar initiatives are lacking in Saudi Arabia.

Patients and Methods: This one-year, cross-sectional study distributed a self-administered online questionnaire among family physicians and residents in a university hospital and the hospital's medical services center in Jeddah, Saudi Arabia. Data were inspected and cleaned in Excel and analyzed using IBM SPSS 29.

Results: The ophthalmology knowledge of family physicians averaged 5.1 on a scale of 1–10, suggesting moderate proficiency. Exposure to ophthalmology cases varied, indicating potential knowledge gaps and necessitating targeted educational interventions. Notably, 82.5% of the physicians believed that family physicians should lead the primary eye care by assuming responsibility for ensuring high levels of training and practice. Our study identified predictors influencing knowledge and confidence, including the effects of experience, training duration, and recognition of the necessity of continuous professional development courses. However, none of these associations were found to be statistically significant.

Conclusion: The physicians in our study exhibited a moderate level of ophthalmology knowledge (mean score = 5.1), revealing potential knowledge gaps. Despite their varied exposure to ophthalmology, 82.5% of the family physicians in this study advocated leading the medical profession in primary eye care. Experience and training duration were found to be non-significant predictors of knowledge and confidence.

Keywords: eye care, online questionnaire, training, Saudi Arabia

Introduction

Ophthalmology is a challenging clinical area for general practitioners who function as primary care providers (PCPs) and keep their ophthalmology knowledge and skills up-to-date.[1] Inadequate training in ophthalmology for medical students and residents has been observed globally.[1–3] Family medicine (FM) residents often have minimal training and exposure to ophthalmology cases, unlike other clinical areas.[4] The problem of insufficient training and education of primary care providers in ophthalmology and suboptimal eye care is not unique to Saudi Arabia. Studies from Australia, the United States of America (USA), New Zealand, and the United Kingdom (UK) have reported similar findings.[1–6]

Similar to other clinical areas, ophthalmic consultations provide PCPs with opportunities to apply the knowledge and skills they have acquired from educational and practical sessions, as well as independent study.[7] Without exploring and understanding the clinical exposure of FM residents to ophthalmology, it is impossible to plan and select the best practices that meet their needs in training programs and real-life situations.[7]

Received: 23 July 2024
Accepted: 14 November 2024
Published: 28 November 2024

Structured educational sessions to improve family physicians' knowledge in the area of ophthalmology have been found to be useful in improving their diagnostic skills and patient care.[8,9] However, we are not aware of any national or formally structured courses in Saudi Arabia that function to improve the ophthalmology knowledge and skills of PCPs. To the best of our knowledge, few studies have evaluated the ophthalmology knowledge of family physicians in Saudi Arabia.

Study Rational and Aim

The rationale for this study was the need to address the widespread documentation of inadequate training in ophthalmology and the suboptimal eye care of family physicians. We aimed to assess the knowledge and perceived confidence of family physicians in managing ophthalmic conditions at King Abdulaziz University Hospital and Medical Services Center in Jeddah, Saudi Arabia. Structured educational sessions to improve family physicians' knowledge of ophthalmology have been found to be useful for improving their diagnostic skills and patient care.[8,9] Structuring such programs for family physicians requires assessments of their knowledge and knowledge gaps.

Materials and Methods

Study Characteristics

This cross-sectional study was conducted from March 2022 to February 2023 at King Abdulaziz University Hospital (KAUH) and the King Abdulaziz University Medical Services Center (UMSC) in Jeddah, Saudi Arabia.

Participants

A self-administered questionnaire was distributed among all family physicians and FM residents (based or rotating during the study period) at KAUH or the UMSC, through social media platforms. The number of responses received represented almost the entire study population, employing a near-census approach.

Data Collection Tool

A questionnaire was used with permission from the researchers of a previously published study that was conducted in Cape Town.[10] The questionnaire consisted of two parts. The first part included 10 multiple-choice questions that assessed participants' knowledge and skills related to primary eye care. These questions covered clinically relevant topics that undergraduate students are expected to know, including clinical scenarios likely to present in a general practitioner setting. Each question had four possible answers, with only one correct option. Participants received one point for each correct answer, resulting in a total possible score of 10. The second part of the questionnaire collected participants' sociodemographic information and their history of training and practice, which were analyzed to investigate their associations with participants' level of knowledge.

Inclusion and Exclusion Criteria

The family physicians and FM residents who were working at the KAUH or completing rotations at the UMSC during the study period were included in the study. Individuals who did not wish to participate in the study were excluded.

Procedures for Obtaining Informed Consent

The first page of the questionnaire consisted of a written consent form to be completed to participate in the study. The study's aim and target population (eligibility to participate) were stated. Participants were assured that all of their answers would remain anonymous and confidential. The informed consent form provided two options: "yes" for those who agreed to participate, and "no" for those who did not agree. Only those participants who consented and selected "yes" proceeded to the next page to complete the questionnaire.

Data Handling and Record Keeping

All data were stored at the principal investigator's office and could be accessed only by the investigators. No names or identifiable data were collected.

Ethics Considerations

This study was conducted in accordance with the ethical principles established by the National Committee of Bio and Medical Ethics at King Abdulaziz City for Science and Technology, Saudi Arabia. Ethical approval was obtained on February 3, 2022, from the Biomedical Research Ethics Committee, Faculty of Medicine of King Abdulaziz University, Jeddah, Saudi Arabia (Reference number 62–22). Written informed consent was obtained from each participant prior to completing the questionnaire. The guidelines outlined in the Declaration of Helsinki were followed.

Statistical Analysis

Statistical analyses were conducted using IBM's SPSS Software, version 29.0.0. First, we conducted a descriptive analysis to summarize participants' demographic characteristics. Qualitative data were presented as frequencies and percentages, and quantitative data were presented as mean and standard deviation (SD). Subsequently, inferential analyses were conducted to detect predictors of higher levels of ophthalmology knowledge among the participants. First, univariate logistic regression was conducted to analyze and examine the association of each predictor variable with the outcome. Multivariate regression was then applied to the significant predictors. The level of statistical significance was set as a p-value of 0.05 or lower and a 95% confidence interval.

Results

Our study included 63 family physicians and residents. Among the 63 participants, 46% were females, and 54% were males. As for their experience in family medicine, 33.3% were residents/fellows, and 23.8% had between 5 and <10 years of experience. Most of them completed their undergraduate studies by 2021 or earlier. Ophthalmology training during their undergraduate and postgraduate years varied. A majority (44.4% and 61.9%) spent 3–4 weeks in undergraduate and postgraduate training. Approximately 66.7% of the cases in practice involved less than 25% of ophthalmology. Almost all participants (96.8%) believed that continuous professional development courses were necessary. A majority (87.5%) expressed a willingness to attend such courses. The majority (82.5%) also believed that family physicians should take the lead in ophthalmology care, whereas 17.5% believed optometrists were suitable Physicians, on average, rated their ophthalmology knowledge at 5.5 (SD 1.9) on a scale of 1–10. Their mean knowledge score, according to the questionnaire, was 5.1 (SD 2.0), with an interquartile range of 4–7, suggesting moderate proficiency. The proportion of undergraduate and post-graduate universities for ophthalmic training is shown in Table 1.

Table 2 shows participants clinical ophthalmology knowledge. Notably, identification rates varied, with 20.6% recognizing anterior uveitis (ie inflammation of the middle layer of the eye wall) and 42.9% identifying acute angle-closure glaucoma symptoms. A strong awareness (81.0%) was observed for signs of proliferative diabetic retinopathy. Proficiency was mixed: for example, 44.4% associated prolonged blurred vision with potential refractive errors and

Table 1 Sociodemographic Characteristics of the Participants (N = 63)

		n (%)
Gender	Female	29 (46.0)
	Male	34 (54.0)
Year of experience in family medicine	Currently Resident/Fellow	21 (33.3)
	1 to < 2 years	3 (4.8)
	2 to < 5 years	13 (20.6)
	5 to <10 years	15 (23.8)
	10 to < 20 years	8 (12.7)
	Equivalent to or more than 20 years	3 (4.8)

(*Continued*)

Table 1 (Continued).

		n (%)
Completed undergraduate program	2021 or before	52 (82.5)
Time spent in ophthalmology training during undergraduate program	None	2 (3.2)
	Less than a week	2 (3.2)
	1–2 weeks	19 (30.2)
	3–4 weeks	28 (44.4)
	More than 4 weeks	12 (19.0)
Time spent in ophthalmology training during post-graduate program	None	6 (9.5)
	Less than a week	2 (3.2)
	1–2 weeks	9 (14.2)
	3–4 weeks	39 (70.0)
	More than 4 weeks	7 (11.1)
Percentages of ophthalmology cases in practice	Less than 25%	42 (66.7)
	25 to < 50%	20 (31.7)
	50 to < 75%	1 (1.6)
CPD courses needed to increase family physician's knowledge about ophthalmology	No	2 (3.2)
	Yes	61 (96.8)
Will you attend such courses?	No	8 (12.7)
	Yes	55 (87.3)
Who will be responsible for primary eye care?	Family physician	52 (82.5)
	Optometrist	11 (17.5)
Rating of ophthalmology knowledge by physicians (Scale: 1–10)	Mean (SD)	5.5 (1.9)
	IQR	4–7
Score on the physicians' knowledge that was assessed using questions	Mean (SD)	5.1 (2.0)
	IQR	4–7
Undergraduate universities for ophthalmology training	King Abdulaziz University	23 (36.5)
	Other	40 (63.5)
Post-graduate university for ophthalmology training	Jazan	6 (9.5)
	Jeddah	15 (23.8)
	Other	36 (57.1)

Abbreviations: n, Frequency: %, Percentage: SD, Standard deviation: IQR, Interquartile range.

39.7% linked third nerve palsy to a cerebral aneurysm. Participants' understanding of the "swinging light test" was notable at 57.1%.

Table 3 shows potential predictors of high levels of knowledge among participants in ophthalmology, highlighting significant odds ratios (OR). A noteworthy finding was that among physicians with a percentage of ophthalmology cases

Table 2 Knowledge Questions for Family Physicians in Clinical Ophthalmology (N = 63)

		Correct Answer	Frequency n (%)
Q1	"A patient presents with a unilateral, painful, red eye with hazy vision, photophobia and a small pupil. what is the most likely diagnosis?"	Anterior uveitis	13 (20.6)
Q2	"How do you diagnose acute angle closure glaucoma before referral to an ophthalmologist?"	Red painful eye, fixed pupil, decreased vision, increased IOP	27 (42.9)
Q3	"Is the initial treatment of uveitis chloramphenicol (antibiotic) ointment?"	No, Chloramphenicol in any form is not a treatment for uveitis	29 (46.0)
Q4	"What is the clinical sign of proliferative diabetic retinopathy?"	New vessels on the Retina	51 (81.0)
Q5	"A young patient presents to you with a history of long-standing blurred vision. The vision in both eyes improves dramatically with pinhole. Which of the following is the most appropriate? (select from four options):"	Patient may be near/far-sighted and need glasses	28 (44.4)
Q6	"In a patient who presents with headache and a complete third nerve palsy of recent onset, with the pupil involved, what would the most likely cause be?"	Dilated pupil would make cerebral Aneurysm a possible cause	25 (39.7)
Q7	"How do you test for a relative afferent pupil defect and what does it signify?"	Swinging light test signifies retinal or optic nerve disease	36 (57.1)
Q8	"How important is the use of topical dexamethasone (a steroid) for herpes simplex dendritic ulcer?"	Avoided at all cost	25 (39.7)
Q9	"A mechanic presents with a painful red eye about 6 hours after welding, with no visible foreign body on the cornea. What is your next step?"	Evert upper lid to exclude a foreign body	38 (60.3)
Q10	"A patient sees flashing lights and floaters. What is this patient in danger of developing?"	Retinal detachment	54 (85.7)

Abbreviations: n, Frequency; %, Percentage; IOP, Intraocular pressure.

Table 3 Predictors of High Levels of Knowledge Among Participants (Using the Results of the Univariate Analysis)

	OR	95% CI for OR		Significance Values
		Lower	Upper	
Percentages of ophthalmology cases in practice				
Less than 25%	Ref	Ref	Ref	0.090
25 to < 50%	0.081	0.009	0.763	0.028
50 to < 75%	0.000	0.000		1.000
CPD courses needed to increase family physician's knowledge about ophthalmology				
CPD courses are necessary	2.594	0.006	1152.407	00.759
Will you attend such a course?				
Yes	0.054	0.000	6.943	0.238

(*Continued*)

Table 3 (Continued).

	OR	95% CI for OR		Significance Values
		Lower	Upper	
Who will be responsible for primary eye care?				
Family Physicians	5.791	0.289	116.040	0.251
Gender				
Male	0.052	0.003	0.843	0.038
Year of experience in family medicine				
Resident/fellow	Ref	Ref	Ref	0.277
1 to <2 years	0.142	002	10.208	0.370
2 to <5 years	2.385	0.168	33.930	0.521
5 to <10 years	1.031	0.064	16.621	0.983
10 to <20 years	16.934	0.362	792.861	0.149
Equal to or more than 20 years	0.011	0.000	4.206	0.136
Time spent in ophthalmology training during undergraduate training				
None	Ref	Ref	Ref	0.988
Less than one week	0.711	0.003	162.239	0.902
1–2 weeks	0.466	0.006	37.950	0.734
3–4 weeks	0.382	0.008	17.349	0.621
More than 4 weeks	0.593	0.009	40.295	0.808
Time spent in ophthalmology training during post-graduate education				
None	Ref	Ref	Ref	0.682
Less than one week	3535000027.235	0.000		0.999
1–2 weeks	18.951	0.347	1035.019	0.149
3–4 weeks	2.663	0.125	56.930	0.531
More than 4 weeks	3.232	0.021	502.812	0.649
Undergraduate training university				
Other	Ref	Ref	Ref	0.128
King AbdulAziz University	0.054	0.002	1.647	0.094
Postgraduate ophthalmology training university				
Other	Ref	Ref	Ref	0.451
Jeddah	0.293	0.013	6.734	0.442
Jazan	0.168	0.004	6.988	0.348

Abbreviations: OR, Odds ratio; CI, Confidence interval; Ref, Reference value; CPD, Continuous professional development.

between 25 and <50%, the odds of a high level of ophthalmology knowledge decreased significantly (OR: 0.081, p = 0.028). Males exhibited a lower likelihood of a high knowledge level (OR: 0.052, p = 0.038) and other participant characteristics showed non-significant odds ratios.

Discussion

In Saudi Arabia, as in other countries, inadequate ophthalmology training for FM trainees is recognized. Unlike other specialties, junior doctor posts in ophthalmology are rare, leading to limited exposure and training. This problem is global, as it has been identified in Australia, the UK, New Zealand, and the USA.[1–6] One recent study by Alwazea et al showed poor knowledge regarding glaucoma among physicians (including Family physicians) in Riyadh, Saudi Arabia.[11] Workshops improving the ophthalmic skills of primary healthcare providers' have proven effective elsewhere, but such courses are not available in Saudi Arabia, and there is a notable low number of published studies assessing family physicians' knowledge of ophthalmology.[12] Our study aimed to evaluate family physicians' knowledge and confidence in clinical ophthalmology by assessing their proficiency and comfort in managing eye-related conditions.

The gender distribution reflected a balanced representation, with 46% female and 54% male family physicians, suggesting that more males have a preference for clinical ophthalmology and are more confident in clinical practice. A previous study showed that clinical skills differ significantly between males and females. Sabet et al found that gender differences were more prominent during intimate examinations, with males having a lower odds of conducting breast examinations (OR = 0.11, 95% CI: 0.04–0.28) and vaginal examinations (OR = 0.22, 95% CI: 0.02–1.98). More male students conducted prostate examinations (OR = 11.00, 95% CI: 1.39–87.03), and genitalia examinations (OR = 16.31, 95% CI: 3.75–70.94).[13] Our participants had diverse levels of experience, with 33.3% being residents or fellows, and 23.8% had 5 to <10 years of experience in family medicine. The majority completed undergraduate studies before 2021.

Participants who underwent ophthalmology training during their undergraduate and postgraduate years reported diverse levels of training. A significant proportion, comprising 44.4% and 61.9%, respectively, spent 3–4 weeks in training. This diversity in training duration underscores the need for a nuanced approach to continuous professional development (CPD) initiatives, recognizing differing exposure levels among family physicians. Lindsay et al showed that many physicians were satisfied with current CPD systems, yet a notable portion sought alternative options, such as personal study, online resources, and advancement in CPD programs.[14]

Approximately 66.7% of participants reported involvement in fewer than 25% of cases, indicating a broad spectrum of caseloads. This finding highlights the multifaceted nature of family medicine, where physicians manage various health issues, necessitating a comprehensive skill set. Similarly, Kaur et al found that eye-related complaints constituted 2–3% of the primary care visits, emphasizing the need for family physicians to possess essential knowledge in managing such cases.[15]

An overwhelming 96.8% of participants believed that CPD courses were necessary, demonstrating a strong commitment to ongoing education. Moreover, 87.5% expressed a willingness to attend such courses, underscoring the receptiveness of family physicians to further enhance their skills in clinical ophthalmology. Similarly, Hersi et al suggested that family physicians should be encouraged to perform thorough eye examinations and should enhance their skills in ophthalmology, as they are first-contact physicians for eye-related cases.[16] This positive attitude toward professional development aligns with evolving medical practice, thereby emphasizing the importance of staying abreast of advancements.

Approximately 82.5% of family physicians asserted that their professional cadre should assume all the responsibility for providing primary eye care, whereas 17.5% considered optometrists to be suitable. This distribution reflects a predominant reliance on family physicians for primary eye care, suggesting a perceived overlap in the scope of practice between family medicine and optometry. Ammary et al showed that PCPs, such as family physicians, though not ophthalmologists, do play a crucial role in managing the visual health of diabetic patients by encouraging eye examinations.[17]

Our physicians' self-rated knowledge of ophthalmology was 5.5 out of 10 points, indicating moderate proficiency. Their mean of 5.1 on the specific question that assessed knowledge indicated potential knowledge gaps requiring targeted interventions. Yet, a study by Wiggins et al found that primary care physicians (eg, family physicians) demonstrated a good overall depth of knowledge regarding diabetic-related eye disease.[18]

The assessment of family physicians' knowledge of clinical ophthalmology using individual questions revealed strengths and areas for improvement. Notably, only 20.6% of the physicians correctly identified anterior uveitis in a specific clinical scenario. The diagnosis of acute angle-closure glaucoma before referral was recognized by 42.9% of physicians, indicating a reasonable awareness of key symptoms. However, a previous study found a discrepancy between the PCP's perceived and actual performance in glaucoma care.[19] The rejection of chloramphenicol as the initial treatment for uveitis was identified correctly by 46.0%, leaving room for improvements in treatment decision-making.

A clear understanding was demonstrated in the recognition of new vessels in the retina as a clinical sign of proliferative diabetic retinopathy (81.0%). Rasheed et al reported that the diabetic retinopathy knowledge of PCPs is moderate (mean score = 57/100).[20] However, some recognized blurred vision in youth, signs of cerebral aneurysm, and the importance of the "swinging light test". Diversity was observed in recommendations, eg, dexamethasone use for herpes simplex dendritic ulcer.

Family physicians' handling of ophthalmology in 25 to <50% of cases was associated with a lower level of knowledge and confidence. Recognition of the necessity for CPD courses increased odds, and males showed lower odds of high knowledge levels. Participants with 10–20 years of experience had a positive impact on their knowledge; however, only being a male and handling 25 to <50% of eye cases were significant. Other demographics and training characteristics were not significantly associated with high knowledge scores. The small study population and the fact that it was conducted in only one center may explain this finding and that it was conducted in only one center. Larger studies across the country should be conducted to compare knowledge among universities and training programs, which can lead to conclusions that are helpful for curriculum development.

Implications

This study's findings have several implications. First, educational programs and curriculum development that incorporate ophthalmology training for family physicians should insure they are competent to handle common eye conditions in primary care. Second, establishing CME activities focused on ophthalmology is likely to enhance physicians' knowledge and skills in managing these cases, leading to better patient outcomes. Third, encouraging partnerships and collaboration with specialists between family physicians and ophthalmologists can improve patient care through shared expertise and resources. Fourth, ongoing research and evaluation are needed to assess the effectiveness of educational interventions and to adapt training continually based on the emerging needs in ophthalmology. Fifth, providing family physicians with access to resources, such as guidelines, tools, and referral networks can facilitate better management of ophthalmology cases. Last, health policies should prioritize integrated care approaches that recognize the role of family physicians in managing eye health and ensure they have the support needed to succeed.

Limitations

This study was conducted in one Saudi Arabia center; hence, the results do not reflect the knowledge of family physicians throughout the country because the results cannot be generalized. Reliance on self-reported data is also a limitation. As in all observational studies, only associations can be observed, and causation cannot be established.

Conclusion

This study provides an overview of family physicians' knowledge and confidence in clinical ophthalmology in a university hospital in Saudi Arabia. Our findings highlight the importance of tailored educational interventions that consider the diverse backgrounds and exposure levels of family physicians. Strengthening collaboration between academic institutions and healthcare providers, coupled with targeted CPD initiatives, can contribute significantly to enhancing proficiency in managing ophthalmic conditions within primary care settings.

Disclosure

The authors report no conflict of interest in this work.

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