Adopting the World Health Organization's eye care competency framework in Saudi healthcare system

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Background: The World Health Organization (WHO) introduced the Eye Care Competency Framework (ECCF) as a guideline to ensure proper delivery of eye care in healthcare systems. Improving the eye healthcare system in Saudi Arabia is essential to prevent or limit the high rate of ocular morbidity. This may be achieved by enabling optometrists to function as primary eye care providers within the primary eye healthcare system in line with WHO's framework.

Aim: This study aimed to engage experts in eye healthcare services to explore the possibilities of adopting the WHO's ECCF in Saudi Arabia's healthcare system.

Setting: A 2-round Delphi study was conducted by enrolling 19 experts with great knowledge and experience in ocular health from different institutes across Saudi Arabia.

Methods: The experts' opinions were collected using a 5-point Likert scale during both rounds to determine their opinions regarding the clinical skills of optometrists in Saudi Arabia. Statements reaching a consensus of ≥ 80% were adopted and considered applicable.

Results: The statements were classified into six domains: practice, professionalism, learning and development, management and leadership, community and advocacy, and evidence. All statements were deemed suitable to be adopted and applied to the healthcare system in Saudi Arabia.

Conclusion: This study established the applicability of the ECCF as a universal model and guideline to enable optometrists to function as primary eye care providers.

Contribution: This model can be applied to improve the primary eye healthcare system in other countries.

Keywords: primary eye care; optometry; Saudi Arabia; scope of practice; Delphi study.

Introduction

Healthcare services improved significantly over the last decade in Saudi Arabia. This improvement is visible at the level of major and specialised hospitals in the capital and major cities respectively. Nevertheless, in addition to the challenges faced at the level of primary care centres in peripheral regions and rural areas, the healthcare system in Saudi Arabia continues to be associated with drawbacks, such as the high cost of healthcare services provided at major hospitals, rapid increase in population, limited and unequal accessibility to specific healthcare services, absence of speciality clinics at primary care centres, and the long waiting lists in major hospitals.[1,2,3] Furthermore, the quality and safety of healthcare services offered by primary care centres do not always align with the quality standards in Saudi Arabia.[4] Consequently, patients tend not to seek treatment at primary care centres. A previous study revealed that patients who sought treatment at primary care centres in Saudi Arabia were not satisfied with the quality of care and availability of specialised medical staff.[5] Primary care centres function as the first level of health services for the citizens of Saudi Arabia. Therefore, a strategy plan for 2010–2020 was initiated by the Ministry of Health (MoH) to address these challenges and enable primary care centres to provide adequate and safe healthcare services to the community.[6]

Primary eye care (PEC) is an essential medical service provided by primary care centres. Primary eye care comprises available, accessible, and affordable comprehensive eye care. Furthermore, it may include the complete assessment of the adnexa, visual examinations, such as ophthalmic refraction, and subsequent prescription of spectacles and contact lenses for adults and children; detection and diagnosis of common ocular diseases; implementation of ocular therapeutic and

Note: Additional supporting information may be found in the online version of this article as Online Appendix 1 and Online Appendix 2.

treatment strategies for common ocular diseases; and referral to other specialists for further treatment.[7,8] Primary eye care providers are the first-line medical staff that can perform a comprehensive eye examination of patients as well as continuing eye care through lifetime.[7,8] All community individuals from all age groups must have an easy access to a continuous, available, and affordable PEC. The lack or reduction in proper PEC services may lead to avoidable visual impairment and blindness. Despite emphasising the importance of the availability of PEC services, they are not offered by primary care centres in Saudi Arabia.

According to the current model of eye care in Saudi Arabia, patients are initially evaluated by general practitioners at the level of primary care centres and subsequently referred to hospitals if ophthalmic treatment is necessary. The patients are directed to an ophthalmologist in hospital settings and may be further referred to an optometrist. Optometrists perform refraction examinations and prescribe spectacles or contact lenses as needed. The number of ophthalmologists in certain hospitals is not sufficient to meet the requirements of all patients, especially in peripheral areas. This results in an increase in waiting time before a patient can access adequate ophthalmic treatment in central hospitals. Furthermore, this model is costly and impractical as ophthalmologists are overwhelmed by the requirement for assessing non-surgical and minor eye conditions, such as blepharitis, conjunctivitis, dry eye, refractive errors, early cataract, and screening for patients with diabetic retinopathy. These assessments can be performed by an optometrist.[9] The number of optometrists in Saudi Arabia may not be sufficient to meet the healthcare requirements. The World Health Organization (WHO) recommends maintaining a ratio of at least 1 PEC specialist per 50 000 individuals by 2020.[10] However, Al Motowa et al. estimated that the ratio was 1 optometrist per 95 000 individuals in Saudi Arabia,[11] indicating the urgent requirement for increasing the number of optometry graduates and facilitating proper ocular care in primary care centres following international health standards.

Previous studies have focused on the impact of the reduction in PEC on ocular health in Saudi Arabia and worldwide. Pascolini and Mariotti[12] reported that uncorrected refractive errors (43%), followed by cataracts (33%), are the cause of visual impairment in approximately 285 million individuals worldwide encompassing all age groups. Thirty-nine million of these patients are blind, whereas the remaining 246m have partial vision. Visual impairments could have been avoided in 80% of these cases if treatment had commenced during the early stages of the disease.[12] Approximately 1.5% of the total population in Saudi Arabia is affected by blindness, and its prevalence among individuals aged >60 years has reached 20%.[13] A study conducted in the Al-Jouf province of Saudi Arabia revealed that the prevalence of blindness and visual impairment among patients who sought treatment at primary care centres was 0.8% and 13.9%, respectively. Refractive errors (36.0%), followed by cataracts (29.1%) and diabetic retinopathy (20.9%) were the most common causes, whereas glaucoma (5.8%) was the least common cause.[14] Aldebasi reported that <5% of school children with refractive errors in Qassim, Saudi Arabia, used corrective spectacles. Moreover, 94% of the children who were not using corrective spectacles had amblyopia.[15] According to the National Prevention of Blindness Committee (NPBC), MoH, Saudi Arabia, patients with diabetes aged >50 years have a 1.1% risk of developing diabetic retinopathy.[16] Approximately 36.8% of patients with diabetic retinopathy in Saudi Arabia are blind.[16] Easy access to proper treatment during the early stages of the disease may have helped prevent the incidence or reduced the severity of different ocular morbidities. The World Council of Optometry (WCO) defines optometry and optometrists as follows:

> Optometry is a healthcare profession that is autonomous, educated, and regulated (licensed and registered), and optometrists are primary healthcare practitioners of the eye and visual system who provide comprehensive eye and vision care, which includes refraction and dispensing, detection or diagnosis and management of disease in the eye, and the rehabilitation of conditions of the visual system.[17]

In addition to prescribing pharmaceutical agents, as needed, optometrists in Australia, Canada, the United States, the United Kingdom (UK), and other countries have been licensed to diagnose and treat common ocular diseases, since the 1970s.[18] Measures have been taken to ensure that the field of optometry education in Saudi Arabia adheres to international standards. Two universities provide a 6-year programme accredited by national and international accreditation institutes, with students graduating as optometrists each year. Optometry graduates in Saudi Arabia provide comprehensive PEC services. Moreover, these graduates work along with ophthalmologists to determine optimal treatment choices and refer patients to other specialities, if necessary. However, the current scope of practice for optometrists in Saudi Arabia is limited to performing refraction and prescribing spectacles and contact lenses.[9]

The scope of optometry ranges from visual assessment and optical correction in a few countries to the complete assessment of eye health in developed countries.[19] Several guidelines have been developed to define the role of optometry in PEC to consolidate the variations in the scope of optometry practice across different countries. The WCO has developed a framework describing the role of optometrists as PEC providers in providing diagnostic and therapeutic services in addition to optical dispensary services.[20] The College of Optometrists of Ontario, Canada has developed standards for optometric practice. These standards define the role of optometrists in PEC, which is similar to the description provided by WCO.[21] The Royal College of Ophthalmologists, UK, has developed an ophthalmic service guideline that emphasises the role of optometrists as PEC providers, including their role in the management and co-management of common ocular diseases in community centres.[22] The Eye Care Competency Framework (ECCF), proposed by the WHO in 2022, is considered the most recent and most comprehensive guideline describing the role of optometrists

and other PEC providers at different levels ranging from primary to tertiary eye care centres.[8]

Eye Care Competency Framework comprises six domains: practice (P), professionalism (PM), learning and development (LD), management and leadership (ML), community and advocacy (CA), and evidence (E). Each domain focuses on a specific role and skill that must be acquired by PEC providers. Practice (P) refers to the interaction of the PEC provider with patients. Professionalism (PM) refers to best practice care that is ethical, safe, efficient, and effective, in addition to being of high quality. Learning and Development refers to the professional development of PEC providers and other personnel; it encompasses teaching, learning, and reflective practice. Management and Leadership relate to service development, resource management, team leadership, and organisation. Community and Advocacy relates to advocating for the needs of the community, empowering the members to access available resources, and contributing to long-term beneficial changes. Evidence (E) relates to the use, generation of, contribution to, and dissemination of evidence for eye care interventions, services, and systems.[8]

Each domain has a list of competencies and activities that describe the roles and performance of PEC providers. Competencies reflect knowledge and skills related to the behaviour of the PEC provider towards patients and staff. Activities reflect knowledge and skills that are related to the clinical practice and performance of the PEC providers. Eye Care Competency Framework classifies PEC providers into four categories: introductory, intermediate, advanced, and expert levels. The framework classifies optometrists into the advanced level for most competencies and activities or the expert level for other competencies and activities. The advanced level comprises PEC providers with a high level of knowledge and practical skills who exhibit competency and accurately complete the activity. The expert level comprises PEC providers with an expert level of knowledge and practical skills that enable them to exhibit competency, complete activities, create opportunities, lead a team, and impart learning.[8]

The quality, safety, and patient experience of PEC service in Saudi Arabia require improvement. Policymakers must improve these domains by developing a new eye care system or adopting an existing model that adheres to international standards and is recognised by authorities such as ECCF.

The Delphi method is a repeated measures methodology that collects opinions from a group of experts with expertise in a certain field until consensus is reached. This method uses a series of newly developed statements or existing statements developed using previous literature. The responses are modified based on feedback.[23] This method has been used widely in different areas of research, including healthcare studies.[24] The responses obtained using this method are considered robust as the participants can freely express their opinions owing to the anonymity of the participants, repetition of measurements, feedback control, and the final decision being made based on the consensus results of the majority of participants.[23] The Delphi method is cost-effective, and it has the ability to reach to consensus judgement by contacting a limited number of expert participants.

The quality, safety, and patient experience of PEC service in Saudi Arabia need improvement and this study aimed to adopt the ECCF proposed by the WHO by considering the opinions of experts in the field of optometry and ophthalmology regarding the role of optometrists as PEC providers in primary health care centres in Saudi Arabia. To the best of our knowledge, a similar study has not been conducted in Saudi Arabia before.

Research methods and design
Competency framework selection

An extensive literature review regarding the field of PEC and the scope of optometry practice was conducted to select a good PEC model that can be effectively applied to the healthcare system in Saudi Arabia. A suitable model with many competency indicators that can be used to cover all aspects of PEC procedures that optometrists can perform worldwide and can be established in Saudi Arabia was identified. The competency indicators were measured by experts to achieve consensus.

Relevant scientific articles and reports published between 2000 and 2023 were retrieved from the databases of PubMed, Scopus, Web of Science, VisionCite, Science Direct, Google Scholar, and Medline. The search terms included 'primary eye care and optometry', 'optometrists and primary eye care', 'primary eye care and scope of practice of optometry', 'optometry and Saudi Arabia', 'ocular diseases', 'ocular morbidity', 'eye diseases', and 'optometry and primary health care centres'.

A public health researcher with experience in the field of ocular health reviewed all titles and abstracts. Four international guidelines considered to be good models were selected. The first guideline was developed by WCO[20]; the second guideline was developed by the College of Optometrists of Ontario, Canada[21]; and the third guideline was developed by the Royal College of Ophthalmologists, UK.[22] Eye Care Competency Framework, which was developed by WHO, was selected as it is the most recent and most comprehensive guideline that describes the role of optometrists in PEC centres. Experts from different countries around the world participated in the development of this framework; thus, it can be applied to most countries around the world, including Saudi Arabia.[8]

Competency framework validation

Eye Care Competency Framework comprises six domains of practice, and each domain consists of several competencies and activities that describe the role of PEC providers. The PEC providers are divided into four categories for each competency or activity. Each level has a specific statement that describes the role of PEC providers in the selected competency or activity. Optometrists are classified into the advanced or

expert level by ECCF; therefore, statements from the advanced or expert level were selected. Appropriate statements (advanced or expert) from all domains of the ECCF were selected to describe the role of optometrists in Saudi Arabia and compiled into a single research questionnaire.

The validity of the questionnaire was determined by performing the following procedures. Firstly, the research questionnaire was reviewed by professors from the Departments of Ophthalmology and Optometry, an expert in the field of public health, and a statistician. The final draft of the questionnaire was created based on the suggestions of these individuals. Secondly, a pilot study was conducted by surveying a sample consisting of three expert optometrists and a public health professor to evaluate the final draft of the questionnaire. The final version of the questionnaire was modified using statements from ECCF and constructed using Google Forms (Online Appendix 1 and Online Appendix 2).

Participants

Participants (for the Delphi study) were selected via criterion rather than random sampling. All participants had extensive experience in the selected subject; therefore, they were capable of making decisions about a specific research question using their knowledge and experience.[25] Unlike traditional survey studies, a large sample size is not required to collect opinions using the Delphi method. However, it is recommended that a minimum of 8–10 expert participants with a high level of knowledge, ≥ 10 years of experience, and/or holding a leading position in the field be included as participants in a Delphi study.[25,26,27]

All participants invited to participate in this study were experts in different domains of eye care and were from different organisations in Saudi Arabia. The participants included consultant ophthalmologists, consultant optometrists from specialised hospitals, academic professors from ophthalmology and optometry university departments, and pharmacists with experience in the field of ocular pharmacology. All participants had ≥ 10 years of experience and were professionally active. In addition, leaders from the MoH and other governmental organisations involved in policy formulation pertaining to eye care and management were invited. Invitations were sent via emails, phone text messages, or phone calls.

Among the 25 eligible participants contacted, 19 participants responded (response rate = 76%) and Table 1 summarises the characteristics of the study participants.

Procedures

An optimal number of rounds have not been established for a Delphi study. However, a minimum of two rounds of questionnaires must be sent to experts to collect their responses. The responses from the first round are used to modify the questionnaire for the subsequent rounds until a consensus is achieved.[25,26,27]

TABLE 1: Characteristics of the study participants.

Categories	n	%
Gender		
Male	17	89
Female	2	11
Professional group		
Optometrists	12	64
Ophthalmologists	3	16
Pharmacists	2	10
Administrators	2	10
Academic degree		
BSc	0	-
MSc	5	26
MD	4	20
PhD	11	58
Role or position		
Academic teaching and research	10	53
Clinician	7	37
Academic leading position (Head of academic department or Dean)	2	10
Head of hospital department	5	26
Decision makers and strategy planners	2	10
Type of institution		
Academic department or academic hospital	10	53
Non-academic hospital	6	32
Governmental Ministry or organisation	2	10
Private sector	1	5

BSc, Bachelor of Science; MSc, Master of Science; MD, Doctor of Medicine; PhD, Doctor of Philosophy.

The first round of the study was commenced by contacting all participants who consented to participate in the study via phone calls. The purpose and the significance of the study were described in detail to the study participants. An electronic version of the first-round questionnaire with all details and instructions was sent to the participants via email. A duration of 2 weeks was provided to complete the questionnaire. For each statement of the questionnaire, the participants were instructed to rate the ability of optometrists in Saudi Arabia to perform a specific role in PEC based on the qualifications, skills, and professional experience of the optometrists. The responses were recorded using a Likert scale (1 = Not confident at all, 2 = Not confident sometimes, 3 = Neutral, 4 = Confident, 5 = Strongly confident). Furthermore, the participants could add new comments, statements, or suggestions in a comment box provided at the end of each section of the questionnaire.

Data were analysed after receiving the responses to the first-round questionnaire to determine which of the statements did and did not achieve consensus. The statements with Likert scores of 4 and 5 were pooled to determine the consensus level. No specific criterion is used to determine the consensus level in a Delphi study. However, a consensus level can be predefined by the researcher based on the type of study.[23] In this study, the consensus level was defined as at least 80% of the responses for each statement being in the upper 50% percentile (Likert scores of 4 and 5). All statements that reached or exceeded this level were adopted. Statements that did not reach this level were modified based on the suggestions and comments from the participants and included in the second round.

Analysis of the responses from the first round revealed that 22 statements did not reach 80% consensus; therefore, these statements were modified and included in the second round of the study. The remaining statements from the first round achieved 80% consensus. Comments from the first round were included without modifications. All participants from the first round who were contacted again to participate in the second round participated in the second round. The results and comments from the first round were shared with the participants. The second-round questionnaire was constructed electronically using Google Forms and sent to the participants via email. The modified statements were shaded. Similar to the first round, all statements were adopted and included in the final model if they achieved 80% of the consensus level. A duration of 2 weeks was provided to complete the questionnaire.

Ethical considerations

Written informed consent forms were sent to the participants via email before participating in the study. The corresponding author ensured that all personal information remained confidential. All participants agreed to participate via email or phone call. The study protocol and the survey questionnaire were reviewed and approved by the Ethical Committee at King Saud University (IRB number KSU-HE-23-574). The study adhered to the tenets of the Declaration of Helsinki.[28]

Data analysis

Data analysis involved describing descriptive measures for all responses obtained for each statement. These include the frequency and percentages of the upper 50% percentile (Likert scores of 4 and 5) for all responses. In addition, descriptive statistics, including the mean and standard deviation, were included for each statement in both rounds. All statistical analyses were performed using IBM® SPSS® version 28.

Results

The ECCF comprises 119 statements encompassing all competencies and activities from the six domains. Among these 119 statements, 97 (82%) statements achieved at least 80% consensus during the first round. Among these 97 statements, 33 (34%) statements achieved 100% consensus. These statements have been delineated using bold font in Table 2. Twenty (18%) of the 119 statements did not achieve 80% consensus. These statements have been delineated using bold font, italic font, and underlined cells in Table 2. However, 13 of these 22 statements reached >75% of the consensus level.

The majority of statements that did not achieve consensus were related to domain P, which relates to the ability of optometrists to perform vision and eye examinations accurately in clinical settings (11 statements). A few participants suggested that optometrists in Saudi Arabia must receive additional practical training in hospitals under the supervision of an expert, such as an ophthalmologist or an optometrist

with additional training (for instance, a residency certificate) in PEC or the management of ocular diseases from international institutes before being considered qualified to conduct eye examinations, diagnose ocular diseases, and prescribe proper treatment. The second most common statements that did not reach consensus were related to domain E, which relates to planning, strengthening, and implementing research (6 statements). These statements and the remaining statements that did not reach consensus were modified according to the comments and suggestions of the experts and included in the second round. Additional statements were not provided by the participants in this round.

Table 3 shows only the modified statements from the first round. All 22 statements included in the second round achieved 80% consensus. Moreover, 5 statements (23%) achieved 100% consensus (bold cells in Table 3). Additional suggestions, comments, or new statements were not provided by the participants during this round. Thus, the second-round questionnaire was adopted as the final model for the PEC system to be adopted by the healthcare system in Saudi Arabia in this study (Online Appendix 2).

Discussion

The World Report of Vision released by WHO in 2019 proposes a few strategies to improve the quality of PEC services being offered to the community. The first recommendation is to increase the level of consciousness among citizens and communities about the importance of undergoing routine eye examinations. This could increase the probability of detecting and treating ocular diseases at an early stage. The second recommendation is to enhance the quality of PEC services by increasing the number of qualified and trained PEC providers capable of detecting, diagnosing, and managing common ocular diseases and referring complicated cases to specialists during the early stages of the disease. The third recommendation is to increase collaboration between eye healthcare services and other programmes, such as diabetes awareness, child health programmes, and public health programmes.[29]

Traditionally, the role of optometrists is restricted to the detection and correction of refractive errors in Saudi Arabia. Optometry programmes in Saudi Arabia adhere to the international standards and scope of optometry practice. Thus, optometrists in Saudi Arabia can provide PEC services safely and effectively. Optometrists play an active role in the eye healthcare system across different countries around the world. Thus, ocular health professions must be surveyed to identify domains that require improvement and further steps must be taken to improve the quality of PEC services in Saudi Arabia. This can be achieved by enabling optometrists to participate in PEC services in primary care community centres.

The applicability of the ECCF proposed by the WHO to Saudi Arabia and the statements that achieved consensus according to the experts in the field of eye healthcare in Saudi Arabia

TABLE 2: Descriptive statistics for all the statements included in Round 1.

Competency	Frequency		Mean	s.d.
	n	%		
PC				
PC1. Maintains people centred practice				
PC1.1†	*15*	*78.9*	*4.15*	*1.11*
PC1.2	17	89.5	4.31	0.67
PC1.3	18	94.7	4.47	0.77
PC1.4‡	**19**	**100**	**4.57**	**0.50**
PC2. Scope of practice and abilities				
PC2.1	18	94.7	4.47	0.61
PC2.2	16	84.2	4.36	0.76
PC3. Evidence-based practice				
PC3.1	17	89.5	4.31	0.82
PC4. Problem-solving and decision making				
PC4.1	16	84.2	4.26	0.99
PC4.2‡	**19**	**100.0**	**4.52**	**0.51**
PC4.3	18	94.7	4.57	0.50
PC5. Communications				
PC5.1	17	89.5	4.31	0.94
PC5.2	18	94.7	4.57	0.50
PA				
PA1. Consent forms				
PA1.1	16	84.2	4.31	1.0
PA1.2	16	84.2	4.36	0.89
PA2. Maintaining documentation				
PA2.1‡	**19**	**100**	**4.57**	**0.50**
PA3. Conducting vision and eye examination				
PA3.1†	*13*	*68.4*	*3.89*	*0.99*
PA3.2†	*15*	*78.9*	*4.15*	*0.89*
PA3.3†	*15*	*78.9*	*4.00*	*1.1*
PA3.4†	*14*	*73.7*	*3.94*	*1.22*
PA3.5†	*12*	*63.1*	*3.63*	*1.21*
PA3.6	17	89.5	4.42	0.83
PA3.7†	*15*	*78.9*	*4.21*	*0.91*
PA3.8	16	84.2	4.36	0.89
PA4. Diagnosis				
PA4.1	16	84.2	4.21	0.97
PA5. Advices				
PA5.1	18	94.7	4.47	0.77
PA5.2	18	94.7	4.42	0.60
PA6. Referrals				
PA6.1‡	**19**	**100.0**	**4.57**	**0.50**
PA6.2	17	89.5	4.31	0.67
PA6.3	18	94.7	4.31	0.749
PA7. Management plans				
PA7.1†	*15*	*78.9*	*3.89*	*0.99*
PA7.2†	*13*	*68.4*	*3.78*	*1.00*
PA8. Conducting eye care interventions				
PA8.1	18	94.7	4.68	0.58
PA8.2‡	**19**	**100.0**	**4.89**	**0.31**
PA8.3†	*15*	*78.9*	*4.00*	*1.20*
PA8.4†	*15*	*78.9*	*3.94*	*1.00*
PA8.5‡	**19**	**100.0**	**4.57**	**0.50**
PA8.6	17	89.5	4.42	0.69
PA9. Continuity of care				
PA9.1	17	89.5	4.42	0.69
PMC				
PMC1. Ethical conduct				
PMC1.1	17	89.5	4.31	0.82
PMC1.2‡	**19**	**100.0**	**4.57**	**0.50**
PMC1.3	17	89.5	4.57	0.69
PMC1.4	18	94.7	4.52	0.96

Table 2 continues on the next page →

TABLE 2 (Continues...): Descriptive statistics for all the statements included in Round 1.

Competency	Frequency		Mean	s.d.
	n	%		
PMC1.5†	***15***	***78.9***	***4.21***	***1.08***
PMC1.6	17	89.5	4.42	1.01
PMC1.7	18	94.7	4.52	0.96
PMC1.8	17	89.5	4.42	0.96
PMC2. Practices within the legal framework				
PMC2.1	17	89.5	4.52	0.69
PMC2.2	17	89.5	4.52	0.84
PMC3. Professional responsibilities				
PMC3.1‡	**19**	**100.0**	**4.57**	**0.50**
PMC3.2	18	94.7	4.57	0.60
PMC3.3‡	**19**	**100.0**	**4.57**	**0.50**
PMC4. Environmental responsibilities				
PMC4.1‡	**19**	**100.0**	**4.57**	**0.50**
PMC4.2‡	**19**	**100.0**	**4.57**	**0.50**
PMC4.3‡	**19**	**100.0**	**4.57**	**0.50**
PMC4.4‡	**19**	**100.0**	**4.57**	**0.50**
PMC4.5‡	**19**	**100.0**	**4.57**	**0.50**
PMC4.6‡	**19**	**100.0**	**4.57**	**0.50**
PMC5. Representations				
PMC5.1	**17**	**89.5**	**4.36**	**0.89**
PMA				
PMA1 Managing risks				
PMA1.1	16	84.2	4.42	0.90
PMA1.2†	*15*	*78.9*	4.26	0.93
PMA2 Quality				
PMA2.1	**18**	**94.7**	**4.47**	**0.77**
PMA3 Inclusivity				
PMA3.1	**19**	**100.0**	**4.57**	**0.50**
LDC				
LDC1 Maintaining				
LDC1.1†	*15*	*78.9*	*4.10*	*1.24*
LDC1.2‡	**19**	**100.0**	**4.57**	**0.50**
LDC2 Supporting				
LDC2.1‡	**19**	**100.0**	**4.57**	**0.50**
LDC2.2	17	89.5	4.36	0.83
LDC3 Strengthen				
LDC3.1	16	84.2	4.31	1.24
LDC3.2	16	84.2	4.21	1.22
LDA				
LDA1 Continuing education				
LDA1.1	16	84.2	4.31	1.15 v
LDA1.2‡	**19**	**100.0**	**4.57**	**0.50**
LDA1.3	17	89.5	4.47	0.96
LDA1.4‡	**19**	**100.0**	**4.57**	**0.50**
LDA2 Teaching others				
LDA2.1	17	89.5	4.57	0.69
LDA2.2‡	**19**	**100.0**	**4.57**	**0.50**
LDA2.3	16	84.2	4.36	1.00
MLC				
MLC1 Team enhancement				
MLC1.1†	*15*	*78.9*	*4.05*	*1.12*
MLC1.2	17	89.5	4.31	1.10
MLC2 Services enhancement				
MLC2.1‡	**19**	**100.0**	**4.57**	**0.50**
MLC2.2	17	89.5	4.47	0.84
MLC2.3	17	89.5	4.47	0.84
MLC3 Health coverage				
MLC3.1	17	89.5	4.42	0.83

Table 2 continues on the next page →

TABLE 2 (Continues...): Descriptive statistics for all the statements included in Round 1.

Competency	Frequency		Mean	s.d.
	n	*%*		
MLA				
MLA1. Team management				
MLA1.1	16	84.2	4.57	0.76
MLA1.2	17	89.5	4.52	0.69
MLA1.3	17	89.5	4.36	0.83
MLA1.4‡	**19**	**100.0**	**4.42**	**0.76**
MLA2. Services management				
MLA2.1‡	**19**	**100.0**	**4.42**	**0.76**
MLA2.2	17	89.5	4.47	0.84
MLA2.3	17	89.5	4.31	0.94
MLA2.4‡	**19**	**100.0**	**4.57**	**0.50**
MLA2.5	17	89.5	4.36	0.83
MLA2.6	17	89.5	4.52	0.61
CAC				
CAC1. Integrating eye care in health systems				
CAC1.1	18	94.7	4.52	0.61
CAC2. Empowers the community				
CAC2.1‡	**19**	**100.0**	**4.57**	**0.50**
CAC2.2	18	94.7	4.73	0.56
CAC2.3	18	94.7	4.84	0.50
CAC3. Enhancing awareness				
CAC3.1	18	94.7	4.68	0.74
CAC4. Advocating for eye care				
CAC4.1‡	**19**	**100.0**	**4.57**	**0.50**
CAC4.2	18	94.7	4.52	0.96
CAC4.3‡	**19**	**100.0**	**4.57**	**0.50**
CAA				
CAA1. Developing plans and programmes				
CAA1.1‡	**19**	**100.0**	**4.57**	**0.50**
CAA1.2‡	**19**	**100.0**	**4.57**	**0.50**
CAA1.3	17	89.5	4.42	0.83
CAA1.4†	*14*	*73.7*	*4.26*	*0.87*
CAA1.5	17	89.5	4.47	0.69
CAA2. Health promotion messages				
CAA2.1	16	84.2	4.47	0.90
CAA2.2	17	89.5	4.21	0.78
EC				
EC1. Integrates evidence-based practice				
EC1.1	18	94.7	4.42	0.96
EC1.2‡	**19**	**100.0**	**4.57**	**0.50**
EC1.3	17	89.5	4.10	1.04
EC2. Strengthens research				
EC2.1†	*15*	*78.9*	*3.78*	*1.13*
EC2.2†	*15*	*78.9*	*4.10*	*1.04*
EA				
EA1. Planning and implementing research				
EA1.1†	*14*	*73.7*	*3.89*	*1.19*
EA1.2	17	89.5	3.94	1.07
EA1.3	*17*	*89.5*	*4.10*	*1.14*
EA1.4†	**14**	**73.7**	**4.21**	**1.13**
EA1.5‡	**19**	**100.0**	**4.57**	**0.50**
EA2. Disseminating evidence				
EA2.1†	*14*	*73.7*	*4.10*	*1.19*
EA2.2‡	**19**	**100.0**	**4.57**	**0.50**
EA3. Monitoring and evaluation				
EA3.1†	*14*	*73.7*	*4.05*	*1.22*

s.d., standard deviation; PC, practice competencies; PA, practice activities; PMC, professionalism competencies; PMA, professionalism activities; LDC, learning and development competencies; LDA, learning and development activities; MLC, management and leadership competencies; MLA, management and leadership activities; CAC, community and advocacy competencies; CAA, community and advocacy activities; EC, evidence competencies; EA, evidence activities.

†, Indicates the statements did not achieve an 80% consensus level.

‡, Indicates the statements achieved a 100% consensus level.

TABLE 3: Descriptive statistics of the Round 2 questionnaire comprising all statements that did not achieve consensus in Round 1.

Competency	Frequency		Mean	s.d.
	n	*%*		
PC				
PC1. Maintains people centred practice				
PC1.1†	**19**	**100**	**4.57**	**0.50**
PA				
PA3. Conducting vision and eye examination				
PA3.1	16	84.2	4.42	0.90
PA3.2	16	84.2	4.42	0.90
PA3.3	18	94.7	4.42	0.96
PA3.4	17	89.5	4.36	0.83
PA3.5	18	94.7	4.42	0.96
PA3.7	17	89.5	4.36	0.83
PA7. Management plans				
PA7.1	17	89.5	4.36	0.83
PA7.2	17	89.5	4.36	0.83
PA8. Conducting eye care interventions				
PA8.3	18	94.7	4.42	0.96
PA8.4	18	94.7	4.42	0.96
PMC				
PMC1. Ethical conduct				
PMC1.5†	**19**	**100**	**4.57**	**0.50**
PMA				
PMA1. Managing risks				
PMA1.2†	**19**	**100**	**4.57**	**0.50**
LDC				
LDC1. Maintaining				
LDC1.1†	**19**	**100**	**4.57**	**0.50**
MLC				
MLC1. Team enhancement				
MLC1.1†	**19**	**100**	**4.57**	**0.50**
CAA				
CAA1. Developing plans and programmes				
CAA1.4	17	89.5	4.36	0.83
EC				
EC2. Strengthens research				
EC2.1	17	89.5	4.36	0.83
EC2.2	18	94.7	4.42	0.96
EA				
EA1. Planning and implementing research				
EA1.1	16	84.2	4.42	0.90
EA1.4	17	89.5	4.36	0.83
EA2. Disseminating evidence				
EA2.1	16	84.2	4.42	0.90
EA3. Monitoring and evaluation				
EA3.1	18	94.7	4.42	0.96

s.d., standard deviation; PC, practice competencies; PA, practice activities; PA, practice activities; PMC, professionalism competencies; PMA, professionalism activities; LDC, learning and development competencies; MLC, management and leadership competencies; CAA, community and advocacy activities; EC, evidence competencies; EA, evidence activities.

†, Indicates the statements reached a 100% consensus level.

were assessed in this study. All 119 statements included in the ECCF achieved at least 80% consensus after two rounds, with certain statements being modified according to comments and suggestions provided by the experts. This study demonstrated that ECCF is highly applicable to the eye healthcare system in Saudi Arabia and can be used to improve the quality of service provided by optometrists as PEC providers. To the best of our knowledge, this is the first study to adopt the ECCF proposed by the WHO to assess the quality and availability of the eye healthcare system in Saudi Arabia.

Most statements (82%) achieved consensus during the first round but statements that did not reach consensus were clustered in two domains, namely: domains P and E. Nevertheless, the majority of experts stated that optometrists are not sufficiently qualified to perform specific roles related to clinical practice. The majority of statements (78.9%) achieved high levels of consensus, with 15 of the 19 participants being 'confident' or 'strongly confident' that the specific role can be fulfilled by an optometrist. Analysis of the comments and suggestions provided by the experts who were not confident revealed concerns regarding weaknesses observed in certain skills of optometrists and the requirement for additional training and participation in additional courses to acquire the skills to examine the eye and visual system and accurately prescribe therapeutic agents. Copies of the Optometry Doctor programme's curriculum and Programme Learning Outcomes (PLOs) that received full accreditations from national and international authorities were sent to the participants. The participants recommended that undergoing 3 months of extensive training under the supervision of an expert (for instance, a consultant ophthalmologist) is still necessary to perform certain roles that are concerned with the diagnosis and treatment of ocular diseases affecting the posterior segment. The remaining statements that did not achieve consensus belonged to domain E, which concerns research skills. All suggestions provided by the experts were used to modify the statements for the second round. The modified statements and the previous statements that achieved 80% consensus were included in the second-round questionnaire.

The findings of this study emphasise the urgent requirement for improving the quality of the eye healthcare system in Saudi Arabia by enabling optometrists to provide PEC services. The prevalence rate is high in both males (14.8%) and females (11.7%) in Saudi Arabia, and this prevalence rate has increased to almost double among patients with obesity. These patients are at a high risk of developing retinal disease that necessitates continuous monitoring for the maintenance of ocular health.[30] Aldebasi et al. reported that the majority of patients who visited ophthalmology departments of public hospitals in Saudi Arabia can be managed by optometrists. Moreover, they reported that approximately 68% of cases can be managed by prescribing spectacles, contact lenses, or low-vision devices for other minor conditions. However, the remaining 32% of cases required advanced treatments, surgeries, or referrals for further medical care.[9]

This study is novel in that, firstly data were collected from 19 experts. A sample size of 19 is considered sufficient for a Delphi study. Secondly, the expert panel comprised experts from various subspecialities, such as ophthalmologists, optometrists, ocular pharmacists, and authorities in the field of eye care. Thirdly, the participants represent different organisations, such as academic departments and hospitals, public hospital departments, private sectors, and decision-making authorities. Limitations identified in this study include that only a few experts from different geographical regions of the country, including Jeddah, Qassim, and Aljouf participated in the study, and most of the participants were concentrated in Riyadh.

Conclusion

The ECCF proposed by the WHO can be used as a model to reinforce the role of optometrists as PEC providers globally. The model facilitated achieving consensus levels for all statements applicable to the healthcare system in Saudi Arabia using a Delphi method. Thus, this model can be utilised to improve the PEC services by other countries facing similar challenges.

Data availability

The authors confirm that the data supporting the findings of this study are available within the article.

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