ORIGINAL ARTICLE

The Optical Refractive Correction Questionnaire (ORCQ): A Face Validity

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ABSTRACT

Introduction: Uncorrected refractive error is a major global public health challenge that significantly affects an individual's quality of life (QoL). Despite its impact, no validated questionnaire is specifically designed to comprehensively assess the optical correction prescriptions and characteristics for ametropic individuals. The absence of such tools prevents a thorough evaluation of the factors influencing ametropes' QoL. This study aimed to conduct a thorough face validity of the Optical Refractive Correction Questionnaire (ORCQ) to ensure its clarity, relevance, and overall quality. **Materials and methods:** The ORCQ serves as an instrument designed to assess the optical prescription and characteristics of correction modes worn by individuals with refractive errors. It encompasses 11 items across four domains: the optical prescription (Items 1-2), spectacle frame characteristics (Items 3-5), ophthalmic lens characteristics (Items 6-8) and contact lens characteristics (Items 9-11) currently worn by individuals with refractive errors. Face validity was carried out by six panel of experts (PEs) who are experienced optometrists. The validation criteria included evaluating grammar, clarity, and instrument layout. Quantitative responses were analysed for agreement, and adjustments were implemented based on the qualitative feedback provided by the PEs. **Results:** Items 1 and 2 in the optical prescription domain garnered solid agreement, confirming their clarity and appropriateness. Adjustments were made in the response box position for items 3 to 5 in the spectacle frame characteristics domain and items 6 to 8 in the ophthalmic lens characteristics domain, refining the overall layout of the instrument. In the contact lens characteristics domain, items 9 to 11 incorporated English terminologies to address clarity concerns raised by the PEs. **Conclusion:** The ORCQ has successfully undergone a meticulous face validity process. Therefore, it can be effectively utilised to evaluate optical correction prescriptions and characteristics among individuals wearing spectacles and contact lenses.
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Keywords: Face validity, Refractive error, Spectacle, Contact lens, Quality of life

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INTRODUCTION

Uncorrected refractive error is one of the leading causes of global visual impairment, representing a major ocular public health issue. An estimated 153 million individuals aged over five have been diagnosed with visual impairment attributed to uncorrected refractive error, with a staggering eight million among them facing blindness. This presents an undeniable impact on individual well-being [1].

The appropriate selection of refractive correction modes plays a crucial role in alleviating visual impairment. Studies have shown that different correction modes might have varying effects on the individuals' quality of life (QoL). Individuals who underwent refractive surgery reported significantly higher QoL compared to those using optical corrections such as spectacles and contact lenses. Visual convenience emerged as the primary factor contributing to these differences [2,3]. Despite these findings, optical corrections remain the most

common method for correcting ametropia globally. Therefore, a specific questionnaire is needed to evaluate the characteristics of optical correction and its impact on the QoL of ametropes.

A comprehensive validation process is imperative for a new questionnaire to ensure that the instrument effectively captures and reflects the intended variables appropriately, validly, and reliably [4]. Face validity is a qualitative approach and a crucial initial phase in the validation process. This validation method involves subject matter experts reviewing the questionnaire's clarity, relevance, and overall presentation. The main objective is to identify any issue in style and format, language clarity and readability, sentence syntax and practicality, and terminology appropriateness that could affect the instrument's validity or participants' ability to comprehend and respond accurately [5,6].

To the best of our knowledge, specific questionnaires have yet been developed and validated to comprehensively assess the optical prescription and the characteristics of spectacles frame, ophthalmic lenses, and contact lenses worn by individuals with refractive errors. Hence, the objective of this study was to validate the recently developed questionnaire, the Optical Refractive Correction Questionnaire (ORCQ), using the face validity method. This validation process is crucial for ensuring the instrument's appropriateness, accuracy, and reliability in capturing essential information related to optical correction for individuals wearing spectacles and contact lenses.

MATERIALS AND METHODS

The Optical Refractive Correction Questionnaire (ORCQ)

The ORCQ was developed based on a review of peer-reviewed literature, with the primary objective of acquiring comprehensive information regarding the prescribed optical correction for ametropes [7–9]. This questionnaire is structured into four domains: A) Optical Prescription (Items 1 and 2), B) Spectacle Frame Characteristics (Items 3 to 5), C) Ophthalmic Lens Characteristics (Items 6 to 8), and D) Contact Lens Characteristics (Items 9 to 11) worn by ametropes (Supplementary Table).

Face validity

The face validity process consisted of five well-defined phases, namely the i) preparation of the face validity form, ii) selection of the panel of experts (PEs), iii) distribution of the ORCQ and face validity form, and conduct of the face validity process, iv) review of the returned face validity forms, and v) analysis of the collected data [10].

Preparation of the face validity form

The face validity form was designed to incorporate ten specific face validity criteria (Table I), as outlined in Patel & Desai (2020) [10], namely grammar (N1), clarity (N2), spelling (N3), sentence structure (N4), font size and spacing (N5), printout legibility (N6), given instructions (N7), instrument layout (N8), difficulty of items (N9), and correspondence of items to the purpose of the instrument (N10). A participant information sheet and consent form were affixed to the face validity form. The information sheet encompassed essential standard information, providing a comprehensive overview that includes the introduction, brief procedures, purpose, benefits derived from participation, potential risks associated with involvement, the right to withdraw from the study, and details on whom to contact for additional inquiries related to the research.

Selection of the PEs

A convenience sampling method was employed to recruit the PEs. A total of ten optometrists were invited, of whom six agreed to participate and met the predefined inclusion criteria: i) duly registered optometrists with the Malaysia Optical Council, ii) actively practising optometry, and iii) possessing a minimum of three years of professional experience, ensuring a profound familiarity with the subject matter [11] in order to effectively evaluate the face validity of the ORCQ. Face validity is considered a subset of content validity, which assesses whether the measurement tool appears valid on the surface [12]. Previous studies recommended a panel of two to 20 experts from professional or lay groups to review the tool [4,12–14], ensuring adequate control over the potential for chance agreement [14]. Each PE who agreed to participate provided signed consent forms. The study procedures strictly adhered to the principles outlined in the Declaration of Helsinki and secured ethical clearance obtained from the IIUM Research Ethics Committee (IREC 2023-007) in January 2023.

Distribution of the ORCQ and face validity form and conduct of the face validity process

The printed ORCQ, face validity form, participant information sheet, and consent form were dispatched to PEs using registered mail services. It ensured the PEs had sufficient time to thoroughly review the ORCQ earlier. An online session was organised for the face validity process within the following week. During the session, the researcher (NSM) explained the face validity process and clarified the instructions for completing the face validity form. The PEs were asked to provide both quantitative feedback by marking ‘yes’ or ‘no’ and qualitative feedback in the form of comments or suggestions for improvement for each of the ten validity criteria. Any questions raised by the PEs were promptly addressed to ensure a clear understanding of the process. PEs were required to return the completed face validity and signed consent forms within two weeks. This systematic approach ensured the thorough execution of the face validity process.

Review of the returned face validity forms

The returned validity forms from PEs underwent a thorough review to ensure the completeness of their responses. All received responses were then organised and presented in tabular format according to their respective domains (Tables II, III, IV, and V). This systematic arrangement facilitated a comprehensive overview of the feedback obtained from the PEs in relation to the various domains of the questionnaire under scrutiny.

Analysis of the data

The PEs' responses underwent analysis following the methodology that Patel and Desai (2020) outlined [10]. To facilitate the calculation of the percentage of agreement, the responses 'yes' and 'no' were recoded as '1' and '0', respectively. The agreement for each criterion was derived from the number of responses agreed upon by the PEs. Subsequently, the overall agreement for the entire ORCQ was determined based on the total percentage agreement across all criteria. The percentage calculations of the agreement per criterion and overall agreement of the ORCQ are as follows:

$$\text{Agreement per validation criterion (\%)} = \frac{\text{Number of agreed PEs per criterion}}{\text{Total number of PEs per criterion}} \times 100$$

$$\text{Overall agreement (\%)} = \frac{\text{The sum \% of all criteria}}{\text{Total number of criteria}} \times 100$$

The validation criteria were categorised based on the percentage of agreement as follows: i) less than 80% indicated poor agreement that required restructuring, ii) 80 to 90% indicated substantial agreement that required revision, and iii) greater than 90% indicated excellent agreement, with no further changes needed.

RESULTS

The demographic profile of the PEs in this face validity study is summarised in Table I. The ages of the PEs ranged from 28 to 54 years, with four of them being female. The distribution of the PEs' practice locations was evenly split between urban and suburban areas, and the majority had more than five years of professional experience as practising optometrists.

Table I: Demographic profile of the panel of experts

Parameters	Mean (SD)	Median (IQR)	Range	*n*	%
Age, *year*	43.8 (12.4)	50 (25)	28 to 54	-	-
Gender					
Male	-	-	-	2	33.3
Female	-	-	-	4	66.7
Professional Experience, *year*	20 (12.1)	26 (24)	4 to 30		
≤ 5 years	-	-	-	2	33.3
> 5 years	-	-	-	4	66.7
Location of PE's Practice					
Urban area (*Kota Bharu, Kuala Terengganu*)	-	-	-	3	50
Suburban area (*Ketereh, Wakaf Bharu, Kerteh*)	-	-	-	3	50

IQR= interquartile range; PE= panel of expert; SD = standard deviation; n = number; % = percentage; ≤ = less than or equal to; > = more than

Face validity

Domain I: Optical prescription

All PEs responded 'yes' for all the validation criteria, indicating agreement with every item in the optical prescription domain, as detailed in Table II. No adjustments were considered necessary, so all the original items in this domain were retained without modification.

Table II: Face validity results for the ORCQ items in the optical prescription domain

Validation Criteria	Responses of PEs for Domain I: Optical Prescription								PEs' comment	Action taken for the comment given
	PE 1	PE 2	PE 3	PE 4	PE 5	PE 6	Agreement per criterion (%)	Overall agreement (%)		
N1. Grammar	1	1	1	1	1	1	100		Nil	NA
N2. Items clarity	1	1	1	1	1	1	100		Nil	NA
N3. Spelling	1	1	1	1	1	1	100		Nil	NA
N4. Structure	1	1	1	1	1	1	100		Nil	NA
N5. Font size and spacing	1	1	1	1	1	1	100	100	Nil	NA
N6. Print out	1	1	1	1	1	1	100		Nil	NA
N7. Instructions	1	1	1	1	1	1	100		Nil	NA
N8. Instrument layout	1	1	1	1	1	1	100		Nil	NA
N9. Difficulty level	1	1	1	1	1	1	100		Nil	NA
N10. Items correspond to the instrument purpose	1	1	1	1	1	1	100		Nil	NA

1 = Yes; 0 = No; NA= Not applicable; PEs = Panel of experts

Domain II: Spectacle frame characteristics

Table III depicts face validity results for the items in the spectacle frame characteristics domain. Of the six PEs, two PEs (PE 2, female, 28 years old, and PE 3, male, 53 years old) indicated 'no' for validation criterion N8, which assessed the layout of the instruments, resulting in a 66.7% agreement rate per validation criterion. Both PEs highlighted that the arrangement of response boxes was inappropriate for all items. Furthermore, PE 3 suggested relocating all response boxes to the left side of the response options. Therefore, as suggested by the PEs, the recommended action was taken to enhance the overall layout of the instrument.

Table III: Face validity results for the ORCQ items in the spectacle frame characteristics domain

Validation Criteria	Responses of PEs for Domain II: Spectacle Frame Characteristics								PEs' comment	Action taken for the comment given
	PE 1	PE 2	PE 3	PE 4	PE 5	PE 6	Agreement per criterion (%)	Overall agreement (%)		
N1. Grammar	1	1	1	1	1	1	100		Nil	NA
N2. Items clarity	1	1	1	1	1	1	100		Nil	NA
N3. Spelling	1	1	1	1	1	1	100		Nil	NA
N4. Structure	1	1	1	1	1	1	100		Nil	NA
N5. Font size and spacing	1	1	1	1	1	1	100		Nil	NA
N6. Print out	1	1	1	1	1	1	100		Nil	NA
N7. Instructions	1	1	1	1	1	1	100		Nil	NA
N8. Instrument layout	1	0	0	1	1	1	66.7	96.7	"The positioning of the response boxes for all items were inappropriate." (*PE 2, female, 28 years old*) "The positioning of the response boxes for all items were confusing. Thus, I would suggest shifting them from the right side to the left side of the response options. It may improve the instrument's construction." (*PE 3, male, 53 years old*).	Correction done: The positions of the response boxes were shifted from the right side to the left side of the response option.
N9. Difficulty level	1	1	1	1	1	1	100		Nil	NA
N10. Items correspond to the instrument purpose	1	1	1	1	1	1	100		Nil	NA

1 = Yes; 0 = No; NA= Not applicable; PEs = Panel of experts

Domain III: Ophthalmic lens characteristics

Table IV presents face validity results for the items in the ophthalmic lens characteristics domain. Among the six PEs, one PE (PE 2, female, 28 years old) expressed disagreement with validation criterion N8 (layout of the instrument), resulting in a percentage of agreement per validation criterion of 83.3%. The PE commented that the placement of response boxes was deemed inappropriate for all items. Hence, the comment was rectified by relocating the response boxes from the right to the left side of the response options.

Table IV: Face validity results for the ORCQ items in the ophthalmic lens characteristics domain

Validation Criteria	Responses of PEs for Domain III: Ophthalmic Lens Characteristics								PEs' comment	Action taken for comment
	PE 1	PE 2	PE 3	PE 4	PE 5	PE 6	Agreement per criterion (%)	Overall agreement (%)		
N1. Grammar	1	1	1	1	1	1	100		Nil	NA
N2. Items clarity	1	1	1	1	1	1	100		Nil	NA
N3. Spelling	1	1	1	1	1	1	100		Nil	NA
N4. Structure	1	1	1	1	1	1	100		Nil	NA
N5. Font size and spacing	1	1	1	1	1	1	100		Nil	NA
N6. Print out	1	1	1	1	1	1	100		Nil	NA
N7. Instructions	1	1	1	1	1	1	100	98.3	Nil	NA
N8. Instrument layout	1	0	1	1	1	1	83.3		"The positioning of the response boxes for all items were inappropriate." (*PE 2, female, 28 years old*)	Correction done: The positions of the response boxes were shifted from the right side to the left side of the response options.
N9. Difficulty level	1	1	1	1	1	1	100		Nil	NA
N10. Items correspond to the instrument purpose	1	1	1	1	1	1	100		Nil	NA

1 = Yes; 0 = No; NA= Not applicable; PEs = Panel of experts

Domain IV: Contact lens characteristics

Table V demonstrates face validity results for the items in the contact lens characteristics domain. Only one PE (PE 6, male, 54 years old) expressed disagreement with item N2 (clarity and unambiguity of items), resulting in a percentage of agreement of 83.3%. The PE suggested incorporating commonly used English terminologies among optometrists, along with the Malay translations to improve the clarity of certain items and options. Thus, the English terminologies were included before each of the Malay-translated terminologies.

Table V: Face validity results for the ORCQ items in the contact lens characteristics domain

Validation Criteria	Responses of PEs for Domain IV: Contact Lens Characteristics								PEs' comment	Action taken for comment
	PE 1	PE 2	PE 3	PE 4	PE 5	PE 6	Agreement per criterion (%)	Overall agreement (%)		
N1. Grammar	1	1	1	1	1	1	100		Nil	NA
N2. Items clarity	1	1	1	1	1	0	83.3	98.3	"I would suggest including the established English terminologies that are commonly used among optometrists before the Malay translation. It may improve the clarity of certain items and options. For example, "wearing modality" for "*tempoh pemakaian.*" *(PE 6, male, 54 years old).*	Correction done: The English terminologies were included before each of the Malay-translated terminologies.
N3. Spelling	1	1	1	1	1	1	100		Nil	NA
N4. Structure	1	1	1	1	1	1	100		Nil	NA
N5. Font size and spacing	1	1	1	1	1	1	100		Nil	NA
N6. Print out	1	1	1	1	1	1	100		Nil	NA
N7. Instructions	1	1	1	1	1	1	100		Nil	NA
N8. Instrument layout	1	1	1	1	1	1	100		Nil	NA
N9. Difficulty level	1	1	1	1	1	1	100		Nil	NA
N10. Items correspond to the instrument purpose	1	1	1	1	1	1	100		Nil	NA

1 = Yes; 0 = No; NA= Not applicable; PEs = Panel of experts

DISCUSSION

In this study, the face validity involved PEs with diverse working experiences, including optometrists practising in urban or suburban areas. This approach ensures that the instrument is not only scientifically sound but also culturally adapted, user-friendly, and comprehensible to a broad audience [5,15]. Moreover, the face validity results underscore the importance of PEs' input in refining self-assessment tools before being applied in

real study [16].

Reis and Jaime (2021) emphasised the importance of PEs' input in evaluating the clarity and representativeness of items [17]. PEs explain their reasons for not considering a particular item representative or clear, suggesting changes, and providing additional comments. This process ensures the items are clear and represent the intended construct [17].

The face validity results for optical prescription items demonstrated 100% agreement among all PEs. This solid agreement indicates that the original ORCQ items for this domain were well-constructed and clear [10]. No suggestion for improvement from PEs further affirms the robustness of the instrument in effectively assessing information related to the optical prescription worn by individuals with refractive error.

The face validity results for the items in the spectacle frame and ophthalmic lens characteristics domains revealed valuable insights provided by two PEs. Their disagreement with the layout of the instrument indicates a need for refinement in its presentation. Our decision to relocate response boxes to the left side, based on the PEs' suggestions, reflects a responsive approach to enhancing the layout for improved clarity. This measure is consistent with the iterative nature of instrument development, ensuring that PEs' suggestions are duly considered when refining the instrument. Repositioning response boxes to the left side facilitated a more seamless reading experience, ensuring respondents encountered the question before the response options. This visual alignment between the question-and-response options further reduces cognitive load, promoting a cohesive and user-friendly experience [18].

The face validity results for the items in the contact lens characteristics domain provided constructive feedback from our PE regarding the clarity of the items when only Malay-translated terminologies were used. Given that the ORCQ was designed for optometrists, the emphasis by the PEs on the clarity and unambiguity of items prompted the inclusion of well-established and widely used English terminologies among optometrists alongside Malay translations, with the explicit aim of enhancing item clarity. This finding highlights the importance of face validity in evaluating respondents' comprehension of items. Furthermore, it underscores the significance of cross-cultural adaptation in developing a valid and reliable questionnaire [19]. Cross-cultural adaptation is a crucial process that involves multiple stages, including face validity assessment by experts [20]. This process necessitates a clear translation of variables, commonly used terminologies, and the demonstration of satisfactory results in content and semantic validity that align with the target group intended for the use of the instruments [21,22].

This study is subject to a limitation. The face validity assessment included optometrists as PEs from only two states. This limitation was primarily due to administrative feasibility and the availability of PEs to review the questionnaire. Expanding the study to additional states was not feasible at the time. Despite this limitation, the responses remain valid, as all selected PEs met the predetermined inclusion criteria.

CONCLUSION

In conclusion, a validation process is crucial to developing a questionnaire as a valid research instrument. This study demonstrates that the ORCQ underwent proper face validity, and all suggestions from the PEs were appropriately addressed. Hence, the ORCQ can effectively be utilised to assess the optical refractive correction information required among individuals with refractive errors.

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