



## Vision-Related Quality of Life Impact of Refractive Correction among Myopes in Kelantan

Nur Solehah Muzir<sup>1</sup>, Noorhazayti Ab Halim<sup>3</sup>, Imtiyaz Syaddad Mohamad Zailani<sup>4</sup>, Somnath Ghosh<sup>5</sup>, Md Mustafa Md-Muziman-Syah<sup>1,2,\*</sup>

- <sup>1</sup> Department of Optometry and Visual Science, Kulliyah of Allied Health Sciences, International Islamic University of Malaysia  
<sup>2</sup> Children Health and Well-Being Research Group, Kulliyah of Allied Health Sciences, International Islamic University Malaysia, 25200 Kuantan, Pahang, Malaysia  
<sup>3</sup> Department of Paediatric Dentistry and Dental Public Health, Kulliyah of Dentistry, International Islamic University of Malaysia  
<sup>4</sup> Optometris Keluarga, PT 1500, Tingkat Bawah, Jalan Kuala Krai, Bandar Baru Tunjung, 15150 Kota Bharu, Kelantan  
<sup>5</sup> Department of Allied Health Science and Technology, Kazi Nazrul University, Asansol, West Bengal, India

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### ABSTRACT

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Uncorrected refractive errors, particularly myopia, can significantly affect an individual's vision-related quality of life (VRQoL). While refractive correction with spectacles or contact lenses is common, its actual impact on patients' functional and emotional well-being remains underexplored. This study aimed to evaluate the VRQoL of myopic individuals using their current refractive correction. A cross-sectional study was conducted at four optometry practices in urban and suburban areas of Kelantan, Malaysia. A total of 54 myopic participants aged 18 to 39 years were recruited through convenience sampling. Participants completed the validated Malay version of the Quality of Life Impact of Refractive Correction questionnaire. Overall and emotional VRQoL scores were derived and analysed. Results showed that the magnitude of refractive correction significantly influenced overall VRQoL, with participants wearing correction of spherical equivalent refraction (SER)  $\geq 3.00$  D reporting lower overall VRQoL scores than those with SER  $< 3.00$  D. Age and gender significantly influenced emotional VRQoL, with males and the middle-aged adult group of 30 to 39 years reporting better emotional well-being. In conclusion, specific demographic and refractive correction characteristics impact overall and emotional aspects of VRQoL. These findings underscore the need for personalised optometric care and support systems that address not only refractive correction but also psychological well-being in myopic patients.

## 1. Introduction

Good vision is fundamental to quality of life, particularly for individuals with refractive errors. Refractive correction by spectacles or contact lenses enables ametropes to achieve the functional

\* Corresponding author.  
E-mail address: [research.virtue@gmail.com](mailto:research.virtue@gmail.com)

vision necessary for daily tasks across all ages. Assessing vision-related quality of life (VRQoL) provides insight into how refractive correction influences not only visual function but also broader aspects of well-being. This aligns with the United Nations Sustainable Development Goals (SDGs), particularly Goal 3 (Good Health and Well-Being) and Goal 11 (Sustainable Cities and Communities), which emphasise equitable access to health and quality of life outcomes. Importantly, reduced VRQoL may also reflect lower satisfaction with prescribed refractive correction [1].

Uncorrected refractive errors remain the leading global cause of visual impairment [2]. Their impact extends beyond visual disability to include adverse effects on academic achievement, employment productivity, and overall socioeconomic outcomes [3,4]. Among refractive errors, myopia is the most prevalent and fastest-growing condition worldwide, posing a significant public health challenge [5]. Nevertheless, the patient-reported outcome of VRQoL among myopes using refractive correction remains underexplored, particularly in local populations.

Kelantan, a state on the East Coast of Peninsular Malaysia, comprises a majority Malay population and distinct socioeconomic profiles compared to other states in Malaysia [6]. However, limited evidence exists on how refractive correction affects VRQoL in this population, especially among myopes. Therefore, the present study aimed to evaluate VRQoL among myopic individuals using spectacles and/or contact lenses in both urban and suburban optometry practices in Kelantan. The findings provided baseline evidence to guide optometric practice and inform future interventions in the region.

## **2. Methodology**

This cross-sectional study was conducted in Kelantan, Malaysia, involving two optometry practices in the capital city (classified as urban) and two in non-capital cities (classified as suburban). The urban–suburban classification followed the definitions provided by the Department of Statistics Malaysia [6].

### *2.1 Inclusion and Exclusion Criteria*

Participants were recruited through convenience sampling from patients attending selected optometry practices where their current refractive correction (spectacles and/or contact lenses) had been prescribed. Enrollment was limited to individuals who fulfilled the study's inclusion criteria: aged 18–39 years, with a spherical equivalent refraction (SER) of  $\leq -0.50$  D [7], astigmatism of  $\leq 2.00$  D, and a minimum of three months of consistent refractive correction wear. Exclusion criteria included anisometropia of  $\geq 2.00$  D, the presence of binocular vision anomalies, prior ocular surgery or trauma, and any ocular or systemic conditions recorded in medical history or detected during examination.

Ethical approval for the study was granted from the Institutional Research Ethics Committee (IREC 2023-007), and all procedures adhered to the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants before data collection commenced.

### *2.2 Tools*

Overall and emotional VRQoL were assessed using the Malay-translated Quality of Life Impact of Refractive Correction (Malay QIRC) questionnaire. The overall VRQoL construct comprised 12 items addressing visual function, symptoms, and convenience, economic issues, and health concerns, while the emotional VRQoL construct included seven items assessing emotional well-being [8]. The

questionnaire was self-administered, and responses were converted to scores using the Malay QIRC scoring table, with 'do not know/did not perform' treated as missing data. Construct scores were calculated as the sum of all item scores divided by the number of items answered, with higher values indicating better VRQoL. Refractive correction characteristics were additionally collected using the validated Optical Refractive Correction Characteristics questionnaire (ORCQ) [8].

### 3. Statistical Analysis

Data were analysed using SPSS software (version 22; SPSS Inc., Chicago, USA). Normality of the data was assessed through the Shapiro-Wilks test, inspection of histograms, and evaluation of skewness values. Group differences in overall VRQoL and emotional VRQoL across demographic and refractive correction characteristics were examined using either the independent *t*-test or the Mann-Whitney *U* test, depending on distributional assumptions. Statistical significance was set at  $p < .05$ .

### 4. Results

#### 4.1 Demographic and Refractive Correction Characteristics

A total of 54 participants were included in the analysis, with a mean age of 24.4 (SD, 5.9) years, ranging from 18 to 39 years. Most participants identified as female and Malay. The distribution of participants based on the locations of optometry practices where they received refractive correction (urban versus suburban) was relatively balanced. In terms of working status, the majority were students ( $n = 32$ ), while a smaller portion were not working ( $n = 3$ ), forming the unemployed group. The remaining participants were employed in the private sector, government service, or were self-employed ( $n = 18$ ).

Regarding refractive correction characteristics, approximately 91% of participants used spectacles only. About 59% had a refractive correction magnitude of less than 3.00 D SER. The SER values ranged from  $-0.50$  to  $-8.50$  D, with a mean of  $-2.83$  (SD, 2.00) D. Further details on the demographic and refractive correction characteristics are presented in Table 1.

**Table 1**  
 Demographic and refractive correction characteristics

Parameters	N = 54	
	<i>n</i>	%
Age		
18-29 years	43	79.6
30-39 years	11	20.4
Gender		
Male	11	20.4
Female	43	79.6
Location		
Urban	25	46.3
Suburban	29	53.7
Race		
Malay	53	98.1
Others	1	1.9
Working Status		
Employed	18	33.3
Unemployed	36	66.7
Correction types		
Spectacle only	49	90.7

Spectacle and contact lenses	5	9.3
Magnitude of correction		
SER < 3.00 D	32	59.3
SER ≥ 3.00 D	22	40.7

D dioptre, SER spherical equivalent refraction

## 4.2 VRQoL

The mean overall VRQoL score was 41.00 (SD, 4.16), while the emotional VRQoL score was higher, with a mean of 47.93 (SD, 14.67).

### 4.2.1 Overall VRQoL

No statistically significant differences in overall VRQoL scores were found across age, gender, practice location, or working status groups (all  $p > .05$ ). However, a significant difference was observed based on refractive correction magnitude. Participants with a SER < 3.00 D reported significantly higher overall VRQoL scores than those with SER ≥ 3.00 D ( $U = 230, p < .05$ ). Table 2 presents the comparison of overall VRQoL between groups according to demographic and refractive correction characteristics.

Figure 1 displays the mean and median scores for individual items within the overall VRQoL construct. Among the items, the highest mean/median scores were observed for “frequency of eye fatigue or strain” and “anticipated trouble in wearing spectacles/contact lenses before doing any activities”, suggesting that these aspects are generally not perceived as major issues by most participants. Likewise, items such as “trouble driving in glare conditions” and “trouble is not being able to see upon waking up from sleep” also received relatively high scores, indicating minimal impact on overall VRQoL in these areas. Moderate scores were reported for items like “trouble wearing spectacles/contact lenses during physical and fitness activities”, “concern about ultraviolet (UV) light protection”, and “concern about initial and follow-up costs of correction”. The findings reflect mixed levels of difficulty experienced across individuals. In contrast, the lowest mean/median scores were recorded for “concern about possible medical complications from refractive correction” and “concern about additional costs related to refractive correction”. The findings highlight these as the main concerns for participants.

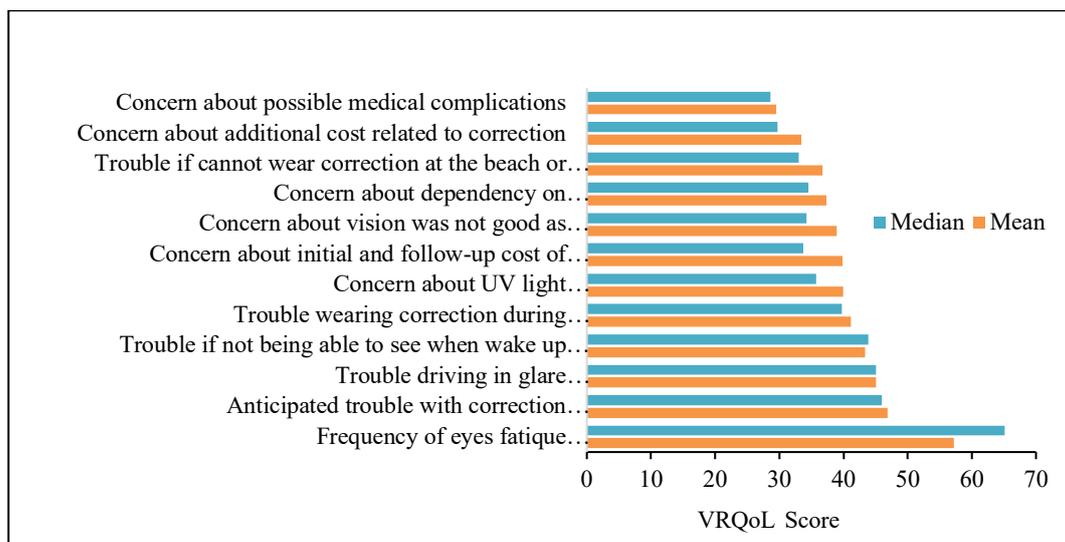


Fig. 1 The scores of overall VRQoL items

#### 4.2.2 Emotional VRQoL

The analysis of emotional VRQoL scores observed significant findings for both age and gender (Table 2). Participants aged 30–39 years had significantly higher emotional VRQoL scores compared to those aged 18–29 years ( $U = 99.5, p < .01$ ). Similarly, males reported significantly higher emotional VRQoL scores than females ( $U = 129, p < .05$ ). No statistically significant differences in emotional VRQoL were found based on practice location, working status, or refractive correction magnitude (all  $p > .05$ ).

Figure 2 presents the mean and median scores for individual items within the emotional VRQoL. Among the emotional VRQoL items, “frequency of appearance met expectation” had the highest mean/median score, suggesting that participants generally felt satisfied with their appearance while wearing refractive correction. Similarly, high mean/median scores were observed for the “frequency of feeling confident” and the “frequency of feeling happy,” indicating a generally positive emotional response associated with refractive correction. Moderate scores were recorded for “frequency of feeling eager to try new things”, “frequency of feeling complimented”, and “frequency of feeling looked the best”. These findings reflect a moderate impact on emotional VRQoL in these areas. In contrast, the lowest mean/median score was observed for the “frequency of being able to do desired activities”, suggesting that this aspect may be perceived as more emotionally challenging by participants in relation to their refractive correction experience.

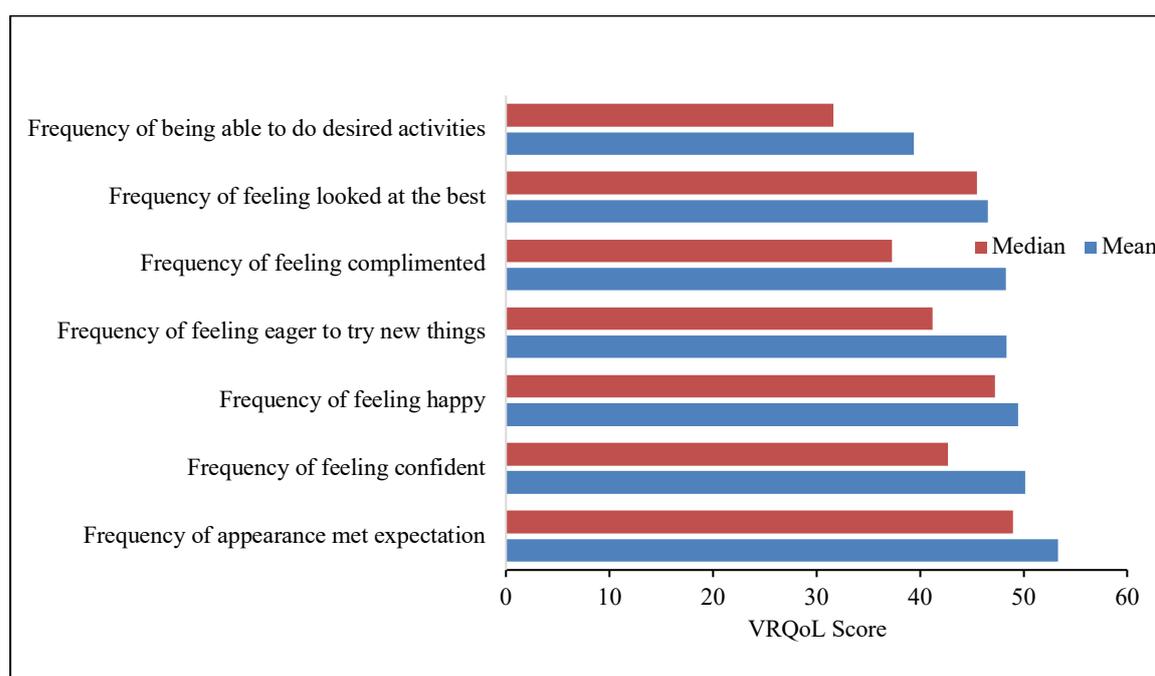


Fig. 2. The scores of emotional VRQoL items

#### 4. Discussion

This study explored the influence of demographic and refractive correction characteristics on overall VRQoL and emotional VRQoL. Higher VRQoL scores indicate fewer issues faced by participants in overall VRQoL and emotional VRQoL related to refractive correction wear.

Participants with a refractive correction magnitude of SER  $\geq 3.00$  D reported significantly lower overall VRQoL scores compared to those with SER  $< 3.00$  D. The effect size calculated using  $r$  was .3,

indicating a moderate effect based on Cohen's convention, which reinforces the clinical relevance of correction magnitude on overall VRQoL. This finding aligns with a previous study conducted in Pahang involving 21 spectacle wearers with moderate myopia (SER 3.00 to 5.00 D), which also reported a low mean overall VRQoL score using the English version of the QIRC questionnaire [9]. These results suggest that individuals with higher degrees of myopia may face greater visual challenges in performing daily tasks, even when their corrective lenses are on. By contrast, a Malawi study found no significant differences in total VRQoL between participants with SER < 3.00 D and those with SER ≥ 3.00 D. However, the study included participants with different types of refractive error and treated both overall VRQoL and emotional VRQoL together as a single construct in the analysis [10].

The item-level observation provides supplementary insight into this relationship. Notably, participants with a higher magnitude of correction reported the lowest scores on items, namely "concern about possible medical complications from refractive correction" and "concern about additional costs related to refractive correction". These findings indicate that, beyond the physical limitations, worry about health risks such as pressure-induced skin irritation with prolonged spectacle wear or infections with contact lens use [11] and the financial burden of maintaining optimum correction, for example, high-index lenses or special contact lenses, are major contributors to lower overall VRQoL in this cohort. In contrast, higher mean scores were observed for items such as "frequency of eye fatigue or strain", "anticipated trouble in wearing spectacles/contact lenses before doing any activities", and "trouble driving in glare conditions". These results suggest that most participants, regardless of the magnitude of correction, did not perceive these issues as significant limitations in their daily lives. One possible explanation is that corrective lenses effectively manage general visual discomfort and glare sensitivity, mainly when modern lenses include anti-reflective coatings or photochromic materials that enhance comfort under various lighting and glaring conditions [12,13].

In addition, this current study did not observe statistically significant differences in overall VRQoL based on factors of age, gender, practice location, or working status. This suggests that, within this sample, visual function, symptom, and convenience outcomes, as well as economic issues and health concerns, do not vary considerably with these demographics. Alternatively, it may be postulated that refractive correction successfully mitigates the impact of demographic variation on daily visual tasks for most individuals.

The emotional VRQoL analysis revealed the significant impacts of age (effect size,  $r = .4$ ) and gender (effect size,  $r = .3$ ) on emotional VRQoL, both representing moderate effect sizes according to Cohen's conventions. Other variables, including practice location, employment status, and magnitude of correction, did not show statistically significant effects.

Participants aged 30–39 years reported significantly higher emotional VRQoL scores compared to participants aged 18–29 years, suggesting that this age group may have more positive perceptions of their emotional well-being or are less impacted by emotional challenges related to vision. Previous research reported that middle-aged adults of ≥ 30 years tend to use more adaptive emotion regulation strategies, such as cognitive reappraisal, and experience less anxiety and stress compared to younger adults [14]. These findings suggest that emotional control and resilience improve with age, which may help explain why items such as "appearance meeting expectations" and "feeling confident" received particularly high ratings among participants. A greater sense of emotional stability in middle adulthood may allow individuals to accept and adapt to the use of refractive correction more positively, thereby enhancing self-perception and confidence.

In contrast, the lowest-rated item, "being able to do desired activities", highlights that some participants perceive refractive correction as a barrier to fully engaging in specific tasks. This may be more pronounced among younger adults, who tend to be more socially active and involved in diverse

physical activities [15], making them feel more constrained by the limitations of spectacles or contact lenses compared to middle-aged adults, making them feel more constrained by the limitations of spectacles or contact lenses compared to middle-aged adults.

Gender differences were also observed, with males reporting significantly higher emotional VRQoL scores than females. This may be linked to differences in coping strategies, social expectations, or how refractive correction impacts self-image and daily functioning. For example, items such as “feeling complimented” or “feeling looked the best” may carry different emotional weight across genders, potentially reflecting broader societal pressures regarding appearance.

Together, these findings highlight the complex relationship between demographic factors and the emotional experiences associated with refractive correction. Age-related improvements in emotion regulation may buffer against negative perceptions, while gender-related differences highlight the role of social and psychological context in shaping emotional VRQoL outcomes.

A notable limitation of this study is the relatively small sample size. Nevertheless, the findings provide valuable preliminary insights that serve as an essential first step in understanding VRQoL among refractive correction wearers. These results highlight key trends that can guide and inform future research with larger and more diverse populations.

## 6. Conclusion

The magnitude of refractive correction may affect the overall VRQoL, while age and gender have a greater influence on emotional VRQoL. Item-level observations revealed that refractive correction supports positive self-perception but leaves concerns about costs, health risks, and activity limitations. These preliminary findings highlight the need to assess overall VRQoL as well as emotional VRQoL in future, larger-scale studies.

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