

Original Article

Psychometric properties of the national eye institute refractive error correction quality-of-life questionnaire among Iranian patients

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Background and Aim: To evaluate the psychometric properties of the national Eye Institute refractive error correction quality of life questionnaire (NEI-RQL-42) among Iranian patients with refractive errors.

Materials and Methods: Two samples of patients (n1 = 296, n2 = 95) were consecutively selected from the eye clinic of the Boo-Ali Hospital, Qazvin. A forward-backward procedure was conducted to translate and cross-culturally adapt the Iranian version of the NEI-RQL-42. A homogeneity, stability, and reliability test was conducted for the first sample after a two-week interval. Convergent validity was computed using the correlation between the NEI-RQL-42 subscale scores, National Eye Institute-Visual Functioning Questionnaire (NEI-VFQ-25), and the Short Form-36 (SF-36). Furthermore, Known-group analysis was performed, to determine the discriminant validity between the subgroups of patients with hyperopia, emmetropia, and myopia. Responsiveness to clinical change was tested by administering NEI-RQL-42 on the second sample that was scheduled for surgery.


Results: Homogeneity was satisfactory with the Cronbach's alpha coefficients ranging between 0.70 and 0.92. The 13 subscales of the NEI-RQL-42 showed a considerable stability in intra-class-correlation (ICC) ranging between 0.70 and 0.89. Positive correlation coefficients were found among all subscales of the NEI-RQL-42 and the other quality-of-life instruments (NEI-VFQ-25 and SF-36). The NEI-VFQ-25 displayed excellent discriminant validity to differentiate the subgroups of patients, and was found to be responsive to change after the surgical correction at three months.

Conclusions: The Iranian version of the NEI-RQL-42 is a valid and reliable instrument to assess refractive error correction quality-of-life in Iranian patients. Moreover this questionnaire can be used to evaluate the effectiveness of interventions in patients with refractive errors.

Keywords: Methodology, NEI-RQL-42, quality of life, refractive error, validity

Introduction

It is known that refractive errors are associated with about 43%

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of the causes related to visual impairment.^[1,2] The simplified approach of refractive errors indicates four primary types: Myopia (nearsightedness), Hyperopia (farsightedness), Presbyopia (abnormal close-up focusing due to aging), and Astigmatism (abnormal focusing due to irregular shape of cornea).^[3] According to the World Health Organization (WHO) reports, there are approximately 153 million people around the world living with visual impairment due to uncorrected refractive errors.^[4] Insufficient management of refractive errors in developing countries could result in reversible blindness.^[5,6] A recently published Iranian study demonstrated that uncorrected refractive errors accounted for about 64% of the most prevalent causes of visual disorder among middle-aged people.^[7]

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It is recognized that visual impairments due to refractive errors significantly affect the vision-specific quality of life and prospectively lead to reduced productivity.^[8,9] They can also contribute to psychological disorders such as depression.^[10,11] In fact the exploration of the impact of refractive disorders requires, further to traditional clinical indexes like visual acuity, the assessment of contemporary indexes that reflect the subjective perception of visual capacity. Among the prevalent instruments that evaluate quality of life and visual capacity, one is the National Eye Institute Refractive Error Quality of Life Questionnaire (NEI-RQL-42), originally developed for the American English-speaking populations.^[11,12] It is a disease-specific questionnaire that is prevalently used for the evaluation of the impact of refractive errors and their correction on the visual dimension of quality of life.^[13,14]

NEI-RQL-42 has been translated to French, Turkish, Portuguese, Chinese, and Greek languages.^[15-18] The psychometric properties of the scale in these studies suggests that it is a valid and reliable tool for collecting relevant data as a self-report questionnaire. The scale has been administered for emmetropes as well as for various conditions including myopic or hyperopic patients, comparison of intraocular lenses, LASIK treatments, and keratomileusis.^[15,18-20] Moreover, the measure has revealed sufficient sensitivity to refractory surgery outcomes.^[21] However, there are still some questions about the multidimensionality of the scale, as raised by McAlinden *et al.*^[22] Moreover, there is no considerable evidence about its application or effectiveness in other languages and cultures, especially among developing countries.

Within this context the aim of study was to evaluate the psychometric properties of the National Eye Institute Refractive Error Correction Quality Of Life Questionnaire (NEI-RQL-42) among Iranian patients with refractive errors.

Materials and Methods

Patients

Two samples of patients were included after clarifying the aim of the study and signing a consent form. The first group (n = 296) was consecutively selected from the eye clinic of the Boo-Ali Hospital, Qazvin. The inclusion criteria were: (1) Should be 18 years of age or more, (2) able to read and understand Persian, (3) have no visual impairment, regardless of the refractive error, and (4) have a visual acuity of at least 0.8 for near and far vision, while using their current correction. The patients were excluded if they had major systematic diseases (such as diabetes, neurological disease), cognitive impairment or pregnancy.

The second sample (n=95), also selected from the same hospital and scheduled for surgery, included patients having myopia (n = 63) and hyperopia (n = 32). Inclusion criteria were: (1) Should be 18 years of age or more, (2) able to read and understand Persian, and (3) have a vision of 20/32 or better, for near and far vision, in the worst eye with current correction.

Translation procedure

Cross-Cultural Adaptation of the NEI-RQL-42 was performed based on Beaton *et al.*'s guidelines.^[23] As Beaton *et al.* suggested, five steps had to be administered to create a Persian version, which was equal to the original English language. At the first step, two bilingual translators (with Persian as their mother tongue) translated the NEI-RQL-42 independently into Persian (forward translation). The translators tried to translate the questionnaire in a simple, clear and concise manner. Next, these translators along with a project Manager (A.H.P) compared their translations and resolved the discrepancies and then consented on a single version. Afterward, the first Persian version of the NEI-RQL-42 was translated into the English language by two native English translators and bilingual in Persian (backward translation). The translators were not aware of the original version of the NEI-RQL-42. This step was done to ensure the Persian version reflected the same item content as the original English version. Next, this Persian version was sent to a committee of experts in optometry, ophthalmology, health psychology, and nursing. The expert committee reviewed all the translations and consolidated them into a pre-final version. The next step, the pre-final Persian version of the NEI-RQL-42 was piloted on 37 patients having emmetropia, myopia, and hyperopia, from two optometry clinics at the same hospital. The pilot sample had a variant background with regard to family income and educational status. In the pilot trial, the meanings of the items and responses were explored. This step led to changing the wordings of item 35, as suggested by the patients. The pilot sample was not included in any of the two main samples.

Measurements

The complete questionnaire included three parts of questions, besides demographic questions, including, age, gender, educational status, and family income.

The NEI RQL-42 questionnaire has 42 items, which summarize them into 13 subscales including: Clarity of vision, expectations, near vision, far vision, diurnal fluctuations, activity limitations, glare, symptoms, dependence on correction, worry, suboptimal correction, appearance, and satisfaction with correction. All items are scored, hence, a high score represents a better quality of life. Each item is then converted to a 0 to 100 possible range, so that the lowest and highest possible scores are set at 0 and 100, respectively. To create subscale scores, all items within each subscale are averaged together.^[24]

The National Eye Institute-Visual Functioning Questionnaire (NEI-VFQ-25) has 25 items assessing the vision-related quality of life. It was developed by the American National Eye Institute and has been translated into several languages, including Persian.^[25-27] The NEI-VFQ-25 is grouped into 12 subscales including: General health (GH, one item); general vision (GV, one item); ocular pain (OP, two items); difficulty with near-vision activities (NV, three items); difficulty with distance-vision activities (DV three items); limitation of social functioning due to vision (SF, two items); mental health problems due to vision (MH, four items),

role limitations due to vision (RL, two items); dependency on others due to vision (DP, three items); driving difficulties (DR, two items); difficulty with color vision (CV, one item); and difficulty with peripheral vision (PV, one item). Each item response is converted into a scale from 0 (the worst function) to 100 (the best function). The means of all 12 subscales yield a composite NEI-VFQ-25 score. The Iranian version of the NEI-VFQ-25 has been shown to be highly valid and reliable for using in patients with chronic eye diseases.^[27]

The short form-36 (SF-36), a 36-item generic, health-related, quality-of-life questionnaire, was developed by the Rand Health Insurance study and the Medical Outcomes study.^[28,29] It has been widely used throughout the world and its psychometric properties are well established. The SF-36 is grouped into eight subscales: Physical function (PF, ten items), role limitations due to physical health (RP, four items), bodily pain (BP, two items), general health (GH, five items), vitality (VT, four items), social function (SF, two items), role limitations due to emotional problems (RE, three items), and mental health (MH, five items). It can also be summarized into two component scales; the Physical Component Scale (PCS) and the Mental Component Scale (MCS). Scores in each scale range from zero to 100, with zero representing the worst and 100 representing the best possible score. Validity and reliability of the SF-36 has been confirmed among 4163 Iranian healthy population and patients.^[30]

Procedure

All questionnaires, distributed by a trained assistance, were completed by the patients at the hospital. The first sample completed the NEI RQL-42 for the second time after two weeks from the initial assessment. In case of the second sample, the NEI RQL-42 was completed before undergoing surgery as well as three months after surgery.

Statistical analysis

In the first sample, the distribution of responses was examined by the floor-and-ceiling effects. A floor-and-ceiling effect were considered to exist if more than 15% of the patients tended to select only the lowest or the highest response options, respectively.^[31]

In the first sample, reliability of the NEI RQL-42 was assessed both for homogeneity and stability: A Cronbach's α coefficient 0.70 or higher was an acceptable threshold for homogeneity,^[32] while an Intraclass Correlation Coefficient (ICC) of 0.70 or higher was acceptable for stability.^[33]

In the first sample, convergent validity was obtained by studying the relationship between each item and its own scale and by calculating the Spearman correlation coefficients using multitrait scaling. It was assumed that item-scale correlations 0.40 or higher demonstrated evidence of convergent validity.^[34]

In the first sample, discriminant validity was evaluated by calculating the correlations between each item with other subscales. It was assumed that an item most likely reached a

high correlation with its own subscale, as compared to other subscales. The discriminant validity was further examined using Known-group comparisons. Known-group validity was determined by comparing the mean scores between subgroups of patients with hyperopia, emmetropia, and myopia, using the analysis of variance (ANOVA) with post-hoc Tukey.

In the second sample selected for surgery, sensitivity and responsiveness of the NEI RQL-42 was estimated. The responsiveness was assessed by calculating the change in scores for patients before and after surgery. Cohen's Effect sizes (ES) were calculated, to estimate the magnitude of the changes before and after surgery for the 13 NEI RQL-42 subscales.^[35] ES values of 0.20, 0.40, and 0.80 were considered small, medium, and large, respectively. The Benjamini-Hochberg procedure was used to control the probability of Type I errors due to multiple comparisons.^[36]

All statistical analyses were performed using SPSS® version 16 for Windows (SPSS Inc., Chicago, IL) and a *P* value < 0.05 was considered statistically significant.

Ethics

The study procedure was approved by the Ethics Committee of the Qazvin University of Medical Sciences, Iran.

Results

As Table 1 shows the first sample (*n* = 292) consisted of female and married patients with a mean age for emmetropes of 30.8 years, myopes of 34.7 years, and hyperopes 33.8 years, respectively. The second sample (*n* = 95) consisted of female (66.3%) and married (72%) patients with a mean age of 33.5 years.

Floor-and-ceiling effects

Range of measurement for the NEI RQL-42 was assessed by floor and ceiling effects. A slight floor effect was observed for two subscales, that is, dependence on correction and worry, where the responses were centered around 'All of the time' and 'rarely' for worry and 'yes, all of the time' for dependence on correction. Moreover, the ceiling effect was identified for three subscales including 'near vision', 'diurnal fluctuations,' and 'glare'.

Homogeneity and stability reliability

Homogeneity for the 13 subscales of the NEI-RQL-42, as measured by Cronbach's α coefficient, ranged from 0.70 for 'glare' to 0.92 for 'expectations' [Table 2]. All subscales exceeded the acceptable figure of 0.70. Besides the homogeneity, the reliability of the NEI-RQL-42 was further evaluated by its stability over two weeks. Stability was computed using ICCs for the 13 subscales of the NEI-RQL-42. The ICCs were higher than the recommended figure, that is, 0.70, and ranged between 0.70 for 'near vision' and 'suboptimal correction' to 0.89 for 'expectations' [Table 2].

Convergent and discriminant validity

In order to assess the convergent validity of the NEI-RQL-42, correlations between the subscale scores and the NEI-VFQ-25

Table 1: Demographic characteristics of the first sample; that is, patients (n=296) with emmetropia, myopia, and hyperopia

Patient sociodemographic characteristics	Emmetropia (n=98)		Myopia (n=112)		Hyperopia (n=86)	
Age (years) Mean (SD)	30.79	15.55	34.66	14.90	33.76	14.41
Years of education Mean (SD)	3.72	1.22	3.42	1.20	3.51	1.14
Gender N (%)						
Male	33	33.7%	37	33.0%	26	30.0%
Female	64	66.3%	75	67.0%	60	70.0%
Marital status N (%)						
Married	53	54.1%	65	58.0%	58	67.5%
Single	45	45.9%	47	42.0%	30	34.9%
Employment status N (%)						
Employed	74	75.5%	80	71.4%	64	74.4%
Unemployed	24	24.5%	32	28.6%	22	25.6%
Monthly income N (%)						
Good (>1000\$)	36	36.8%	42	37.5%	31	36.0%
Moderate (500-1000\$)	53	54.1%	61	54.5%	49	57.0%
Poor (<500\$)	9	9.1%	9	8.0%	6	7.0%

Table 2: The homogeneity, stability, and reliability of the Iranian version of the NEI-RQL-42

The NEI-RQL-42 Subscales	Cronbach's α coefficient (n=296)	Intraclass Correlation Coefficient (n=272)	95% CI
Clarity of vision	0.86	0.85	0.77-0.90
Expectations	0.92	0.89	0.84-0.93
Near vision	0.78	0.70	0.55-0.80
Far vision	0.82	0.80	0.70-0.87
Diurnal fluctuations	0.84	0.72	0.57-0.81
Activity limitations	0.91	0.80	(0.70-0.87)
Glare	0.74	0.82	0.73-0.88)
Symptoms	0.78	0.76	0.63-0.84
Dependence on correction	0.83	0.88	0.77-0.90
Worry	0.86	0.77	0.66-0.85
Suboptimal correction	0.77	0.70	0.54-0.81
Appearance	0.84	0.76	0.63-0.84
Satisfaction with correction	-	0.75	0.62-0.84

and SF-36 scores, were examined. The results indicated that the NEI-RQL-42 subscales were correlated most significantly with the 12 subscales of the NEI-VFQ-25. However, these correlation coefficients were modest and ranged from 0.17 to 0.62 [Table 3]. Similar results were obtained from the correlations between subscale scores of the NEI-RQL-42 and SF-36 scores [Table 4]. Furthermore, all items were significantly correlated 0.54 or higher with their own scales, corrected for overlap (data not shown). All items had lower correlations with other scales than with their own scales, that is, r ranged from 0.12 to 34.

In order to ensure discriminant validity of the NEI-RQL-42, the patients were divided into three groups, myopes, hyperopes, and emmetropes, according to the type of refractive error. As Table 5 indicates, the NEI-RQL-42 subgroup scores were significantly different based on the type of refractive error, even when a

multiple-testing correction was used, that is, the Benjamini-Hochberg procedure [Table 6]. Patients with emmetropia reported higher scores for all 13 subscales of the NEI-RQL-42 than those with myopia and hyperopia [Table 5]. The effect sizes were found to range from medium to large.

Sensitiveness and responsiveness

Sensitiveness and responsiveness to change in the NEI-RQL-42 over time was assessed in the second sample, that is, patients having surgical correction because of myopia and hyperopia. The mean age of the patients was 33.5 years and most of them were females (66.3%). The results indicated that the surgical correction was associated with significant changes in the NEI-RQL-42 subscales for patients with both myopia and hyperopia [Table 7]. Patients who underwent surgical correction had improved scores in the 13 subscales of the NEI-RQL-42, three months after surgery, compared to before surgery.

Discussion

This is the first study carried out in Iran using the NEI-RQL-42, which aimed to evaluate psychometric properties of the NEI-RQL-42 in Iranian patients with refractive errors.

The present study confirmed the appropriateness of the NEI-RQL-42 as a highly valid and reliable tool to be used among Iranian patients. The dimensional score distributions of the NEI-RQL-42 were examined by evaluating the floor-and-ceiling effects. Negligible floor and ceiling effects were seen for all subscales of the NEI-RQL-42. Therefore, the Persian version of the NEI-RQL-42 was able to cover the full range of severity of patients and allowed discrimination. A floor effect for a subscale of 'worry' indicated that the patients were very concerned by their visual problems. This finding was similar to the original NEI-RQL-42 and the Greek translated version.^[18,37]

The present study showed good homogeneity for most of the NEI-RQL-42 subscales. Furthermore, all the NEI-RQL-42

Table 3: Correlation coefficients between the NEI-RQL-42 and NEI-VFQ 25 (n=296)

The NEI-RQL-42 Subscales	GH	GV	OP	NA	DA	SF	MH	RD	Dep	Dri	CV	PV
Clarity of vision	0.33	0.24	0.20	0.31	0.29	0.41	0.31	0.37	0.24	0.23	0.35	0.43
Expectations	0.51	0.27	0.24	0.30	0.26	0.34	0.34	0.22	0.42	0.35	0.23	0.20
Near vision	0.43	0.45	0.32	0.27	0.26	0.31	0.47	0.33	0.52	0.44	0.20	0.25
Far vision	0.39	0.41	0.27	0.25	0.37	0.29	0.43	0.24	0.29	0.62	0.28	0.26
Diurnal fluctuations	0.29	0.36	0.34	0.42	0.22	0.30	0.41	0.42	0.34	0.19	0.32	0.39
Activity limitations	0.17	0.29	0.45	0.34	0.55	0.46	0.29	0.45	0.44	0.25	0.36	0.45
Glare	0.51	0.34	0.30	0.39	0.44	0.25	0.36	0.21	0.27	0.29	0.49	0.28
Symptoms	0.38	0.40	0.36	0.46	0.36	0.33	0.33	0.37	0.31	0.35	0.17	0.34
Dependence on correction	0.26	0.32	0.28	0.34	0.37	0.23	0.30	0.25	0.37	0.25	0.28	0.37
Worry	0.56	0.41	0.39	0.28	0.27	0.35	0.42	0.29	0.44	0.43	0.44	0.36
Suboptimal correction	0.43	0.27	0.47	0.23	0.23	0.26	0.29	0.34	0.38	0.20	0.37	0.25
Appearance	0.37	0.46	0.34	0.29	0.24	0.42	0.21	0.44	0.21	0.31	0.23	0.50

All P values<0.05, CV: Color vision, DA: Distance activities, Dep: Dependency, Dri: Driving, GH: General health, GV: General vision, MH: Mental health, NA: Near activities, OP: Ocular pain, PF: Physical functioning, PV: Peripheral vision, RD: Role difficulties, RE: Role emotional, RP: Role physical, SF: Social functioning, VT: Vitality

Table 4: Correlation coefficients between the NEI-RQL-42 and SF-36 (n=296)

The NEI-RQL-42 Subscales	PF	RP	BP	GH	VT	SF	RE	MH
Clarity of vision	0.65	0.44	0.24	0.34	0.31	0.29	0.22	0.39
Expectations	0.40	0.33	0.33	0.29	0.44	0.45	0.24	0.35
Near vision	0.44	0.37	0.29	0.31	0.38	0.37	0.35	0.41
Far vision	0.51	0.40	0.35	0.52	0.29	0.34	0.30	0.58
Diurnal fluctuations	0.42	0.36	0.39	0.47	0.42	0.31	0.33	0.47
Activity limitations	0.50	0.45	0.36	0.36	0.33	0.38	0.42	0.45
Glare	0.59	0.29	0.27	0.51	0.28	0.33	0.39	0.30
Symptoms	0.57	0.43	0.46	0.45	0.35	0.27	0.34	0.29
Dependence on correction	0.48	0.31	0.38	0.49	0.44	0.37	0.46	0.38
Worry	0.56	0.35	0.40	0.39	0.38	0.29	0.33	0.44
Suboptimal correction	0.62	0.33	0.49	0.31	0.25	0.51	0.41	0.49
Appearance	0.73	0.30	0.41	0.61	0.48	0.50	0.36	0.31
Satisfaction with correction	0.57	0.42	0.44	0.37	0.53	0.38	0.51	0.47

All P values<0.05, GH: General health, MH: Mental health, PF: Physical functioning role difficulties, RE: Role emotional, RP: Role physical, SF: Social functioning, VT: Vitality

Table 5: Mean scores and mean changes in subscales of the national eye institute refractive error quality of life instrument-42 before and after surgery in patients with myopia (n=63)

The NEI-RQL-42 Subscales	Before surgery	After surgery	Effect size
Clarity of vision*	65.08 (19.96)	69.92 (20.44)	0.23
Expectations*	47.37 (23.66)	65.61 (23.65)	0.77
Near vision*	78.65 (19.37)	85.42 (17.28)	0.36
Far vision*	68.86 (17.27)	76.27 (13.45)	0.48
Diurnal fluctuations*	71.55 (22.38)	77.65 (23.13)	0.27
Activity limitations*	70.14 (23.55)	92.24 (16.55)	1.08
Glare*	58.47 (23.97)	65.05 (25.44)	0.27
Symptoms*	58.99 (18.33)	65.63 (21.32)	0.33
Dependence on correction*	34.67 (21.59)	50.97 (26.32)	0.68
Worry *	29.97 (20.09)	35.80 (23.74)	0.23
Suboptimal correction*	63.65 (22.34)	70.36 (25.59)	0.28
Appearance*	59.04 (22.16)	68.33 (26.54)	0.42
Satisfaction with correction*	69.89 (18.03)	80.10 (17.84)	0.57

*Statistically significant according to Benjamini-Hochberg procedure

subscales met the acceptable figures for homogeneity, with the Cronbach's α coefficient ranging from 0.74 to 0.92. The homogeneity was similar to those obtained by other versions of the NEI-RQL-42 in America (Cronbach's α coefficient 0.64 - 0.90),^[37] Greece (Cronbach's α coefficient 0.49 - 0.94),^[18] and Turkey (Person indices 0.62 - 0.89).^[16] The differences between the versions may be explained by incomplete or diverse sample sizes in these studies.

Stability of the NEI-RQL-42 was evaluated by a test-retest analysis, demonstrating that the subscale scores were stable over time. These results indicated good stability of the subscale scores, measured within a two-week interval. Similar findings were seen in the NEI-RQL-42 in other languages as well as the original version.^[16,18,37] Convergent validity of the NEI-RQL-42 was tested by calculating the correlation between each item and its own scale. As hypothesized, each item had a considerable correlation with its own scale, while it had negligible correlations with other scales. These results confirmed the existence of convergent validity in the NEI-RQL-42. The convergent validity was further evaluated by using NEI-RQL-42, the generic NEI-VFQ-25, and the generic SF-36, simultaneously. The NEI-RQL-42 subscale scores were shown to be affected by the NEI-VFQ-25 and the SF-36 subscale scores. However, the magnitude of these correlations was modest to suggest that

Table 6: Comparison of the NEI-RQL-42 scores by refractive error subgroup

The NEI-RQL-42 Subscales	Myopes (n=112)	Hyperopes (n=86)	Emmetropes (n=98)	Comparisons
Clarity of vision*	68.14 (28.19)	60.05 (33.14)	78.70 (28.01)	3>1,3>2
Expectations*	50.07 (32.74)	44.54 (35.12)	71.49 (35.43)	3>1,3>2
Near vision*	75.55 (20.38)	65.90 (29.49)	81.08 (20.04)	3>1,3>2
Far vision*	73.18 (23.78)	64.96 (31.83)	81.25 (24.95)	3>1,3>2
Diurnal fluctuations*	70.29 (23.90)	59.04 (31.43)	86.50 (21.62)	3>1,3>2
Activity limitations*	76.65 (29.51)	58.67 (39.78)	78.55 (30.62)	3>1,3>2
Glare*	57.59 (33.41)	45.37 (36.30)	63.13 (32.82)	3>1,3>2
Symptoms	60.40 (19.08)	54.76 (25.30)	63.93 (22.60)	3>1,3>2 ^a
Dependence on correction*	43.18 (30.01)	37.35 (30.06)	65.04 (35.16)	3>1,3>2
Worry *	32.56 (32.14)	29.11 (32.15)	48.71 (41.35)	3>1,3>2
Suboptimal correction*	65.85 (24.50)	62.32 (28.98)	75.68 (24.81)	3>1,3>2
Appearance*	57.27 (22.62)	48.88 (24.74)	65.03 (28.16)	3>1,3>2
Satisfaction with correction*	67.57 (31.30)	54.49 (34.27)	78.90 (26.72)	3>1,3>2

*Statistically significant according to Benjamini-Hochberg procedure for refractive error subgroup

Table 7: Mean scores of the national eye institute refractive error quality of life instrument-42 scales before and after surgery and mean change for hyperopes (n=32)

The NEI-RQL-42 Subscales	Before surgery	After surgery	Effect size
Clarity of vision*	47.10 (23.42)	51.10 (21.14)	0.18
Expectations*	29.03 (18.93)	53.06 (20.61)	1.21
Near vision*	73.26 (21.66)	80.52 (19.82)	0.35
Far vision*	70.50 (26.90)	78.31 (26.16)	0.30
Diurnal fluctuations*	69.89 (24.47)	76.88 (25.04)	0.28
Activity limitations*	69.33 (25.62)	79.94 (22.19)	0.44
Glare*	51.20 (22.33)	60.88 (26.04)	0.40
Symptoms*	57.76 (19.10)	63.53 (23.46)	0.27
Dependence on correction*	42.12 (22.01)	77.37 (24.41)	1.51
Worry *	31.45 (15.62)	41.12 (20.20)	0.53
Suboptimal correction*	68.05 (21.18)	77.31 (23.52)	0.41
Appearance*	54.04 (22.24)	67.61 (24.52)	0.58
Satisfaction with correction*	68.57 (25.77)	92.14 (15.71)	1.10

*Statistically significant according to Benjamini-Hochberg procedure

conceptually distinct quality-of-life domains were being assessed by the NEI-RQL-42. Similar results were obtained by the original English as well as the Turkish versions of the NEI-RQL-42.^[16,37]

Known-group analysis was conducted to test the ability of the NEI-RQL-42 to discriminate between subgroups of patients with various refractive error corrections. Significant differences in the expected direction were found in the comparisons between these groups. The results also revealed that patients with emmetropia had higher scores compared to those with myopia and hyperopia, quite in line with the other studies.^[16,18,37,38]

The NEI-RQL-42 was found to have evidence for responsiveness. The results indicated that surgical intervention significantly improved the quality of life in patients with refractive errors after three months.^[39]

Study limitations

This study has included a large, heterogeneous and urban sample to evaluate the validity and reliability figures of the NEI-RQL-42, but further research is needed to compare the domain scores of the NEI-RQL-42 in patients from other settings. Furthermore, the responsiveness of the NEI-RQL-42 has existed in a short-term perspective, but its applicability in a long-term perspective is under question.

This study demonstrates that the Iranian version of the NEI-RQL-42 is a valid and reliable instrument to assess refractive error correction of quality of life in Iranian patients. Moreover this questionnaire can be used to evaluate the effectiveness of interventions in patients with refractive errors.^[40]

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