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VALIDATION OF THE LITHUANIAN TRANSLATION OF THE NATIONAL EYE INSTITUTE REFRACTIVE ERROR QUALITY OF LIFE QUESTIONNAIRE (NEI RQL-42)

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ABSTRACT

AIM: The aim of this study was to determine the reliability and validity of the Lithuanian version of the National Eye Institute Refractive Error Quality of Life Questionnaire (NEI RQL-42) among Lithuanian patients with refractive errors.

METHODS: The linguistic translation was made according to the international guidelines of forward and backward translation.47 subjects who reported refractive disturbances were included in the study, they filled the Lithuanian version of the NEI RQL-42. 37 patients completed the Lithuanian version of the NEI RQL-42 for the second time within 1-2 weeks. For assessment of concurrent validity 16 participants completed the Lithuanian version of the 36-Item Short Form Health Survey (SF-36). Test-retest and internal consistency reliability as well as concurrent validity were calculated.

RESULTS: The Lithuanian version of the NEI RQL-42 and its subscales showed good internal consistency (Cronbach's = 0.757–0.971) except two subscales: activity limitations (= 0.538) and worry (= 0.653). Test-retest reliability was assessed by the intraclass correlation coefficient (ICC) and was high (ICC = 0.810–0.948) with the exception for the subscales: activity limitations (ICC = 0.599) and worry (ICC = 0.622). Almost all subscales showed significant intercorrelations. Very low to moderate correlations were found between the subscales of the NEI RQL-42 and the SF-36 survey.

CONCLUSION: The results suggest that the Lithuanian version of the NEI RQL-42 is a reliable and valid measure of vision-related quality of life in patients with refractive error.

KEYWORDS : Refractive Errors, Reproducibility of Results, Validation Studies.

INTRODUCTION

Refractive error is a problem with focusing of light on the retina due to the shape of the eye[1]. It is estimated that uncorrected refractive errors cause 153 million of people worldwide to get visual impairment[2]. 43% of the cases of visual impairment are caused by uncorrected refractive errors as well as 3% of blindness cases in the world are due to uncorrected refractive errors and trachoma[3]. Refractive error as a chronic visual impairment cannot be separated from other aspects of personal and social life[4]. Quality of life questionnaires provide an instrument to evaluate the effect of the disease on the quality of life. Some questionnaires such as SF-36 assess general quality of life while vision is out of scope of this instrument[5]. NEI RQL-42 was designed specifically to assess the impact of refractive error and its correction on vision-related functioning[6]. Despite that, there are some cases about its usage in keratoconus patients as well as evaluation of quality of life after cataract and refractive surgeries[7-10]. To our knowledge the NEI RQL-42 was translated to Turkish, Portuguese, Greek, French, Iranian and Chinese languages[11-17].

The aim of this study was to evaluate the psychometric properties of the NEI RQL-42 among Lithuanian patients with refractive errors.

Material and Methods:

The linguistic validation of the original NEI RQL-42 into Lithuanian version was made using all methods that are required. Validation consisted of three steps. The translation followed forward-backward translation procedure. In the first step two independent translations from original NEI RQL-42 English version to the Lithuanian language were performed - one translation by the professional interpreter, another one by a physician with excellent English language proficiency. In the second step backward translations from Lithuanian to the English were performed by the professional translator and another by the professional who has basic knowledge of medical translations from English. The translations were matched paying particular attention to the correct translation of phraseological expressions and was finally refined. That is how the first version of questionnaire was made. Then the third step, a pilot study, was performed in the group of 20 people with refractive errors to find out about the problems in comprehension of the questionnaire. All patients pointed that the questions are understandable so the final version of Lithuanian version of the National Eye Institute Refractive Error Quality of Life Instrument was made. The Lithuanian version of the SF-36 was used for validation of the Lithuanian version of the NEI RQL-42.

The study procedure was approved by the Lithuanian University of Health Sciences Research Ethics Committee (reference number BEC-MF-14).

The Lithuanian version of the NEI RQL-42 was administered to 47 people with refractive errors. The inclusion criteria were: age above 17 year old, ability to read and understand Lithuanian language. The patients were excluded if they had visual impairment (except refractive error), major systemic diseases (diabetes, neurological diseases), cognitive impairment or pregnancy. Participants who had any type of eye surgeries during the study period were also excluded. The same group of participants were tested for the second time during 1-2 weeks period and formed the test-retest stability testing group. For assessment of concurrent validity a subgroup of 16 participants completed the Lithuanian version of the SF-36 survey[18]. SF-36 health survey is reliable and valid psychometric instrument already used among Lithuanian patients.

The NEI RQL-42 questionnaire was developed to evaluate the vision-related quality of life[19]. It consists of 42 items and is divided into 13 subgroups 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 [20]. All questions are

scored and range from 0-100, a high score represents a better quality of life. To calculate subscale scores, all items within each subscale are averaged together.

SF-36 health survey is a brief self-administered questionnaire; it generates scores across 8 dimensions of health. The survey is grouped into eight subscales: physical function, role limitations due to physical health, bodily pain, general health, vitality, social function, role limitations due to emotional problems and mental health. It can also be divided into two components: physical component scale and mental component scale. Scores in each scale range from 0-100, the lower the score the more disability, the higher – the less disability[21].

Statistical analysis was performed using SPSS® version 20 for Windows. The level of statistical significance of 0.05 was used for testing statistical hypothesis. Concurrent validity was determined by comparing NEI RQL-42 with SF-36, correlation calculated between total questionnaire and all domains. The Pearson correlation coefficient was used. Cronbach`s coefficient was used for the internal consistency. Analysis of the test-retest reliability was done by calculating the ICC.

Results:

The Questionnaire was fully completed by 37 people. 31 (84%) subject had myopia, 2 (5%) - hyperopia and 4(11%) - astigmatism.
The internal consistency of the Lithuanian version of the NEI RQL-42 was examined using Cronbach's . The internal consistency was generally high for the 13 subscales of the NEI RQL-42 (Cronbach's ranged 0.757–0.971) with only the exception of two subscales: activity limitations and worry (Table 1).

Test-retest reliability, which was estimated by ICC, exceeded 0.70 for all subscales (ranged 0.810–0.948), except activity limitations and worry (Table 1).

Table 2 represents the intercorrelations of the Lithuanian version of the NEI RQL-42. The subscale correlation coefficients were mostly high at the significance level of 0.01, ranging from 0.267–0.713. Only the subscale of activity limitations gave non-significant correlations with expectations, glare with activity limitations, and dependence on correction with diurnal fluctuations.

Test of scaling assumptions (convergent validity) according to the comparison with the SF-36 health survey is shown in Table 3. Out of the 104 potential combinations of scales between the instruments, 100 correlations were found to be statistically significant.

Table 1. Internal consistency and test–retest reliability of the Lithuanian version of the NEI RQL-42.

Subscales	Internal consistency Cronbach	Test-retest reliability ICC	95% CI
Clarity of vision	0.851	0.894	0.821-0.938
Expectations	0.896	0.889	0.823-0.930
Near vision	0.888	0.927	0.899-0.947
Far vision	0.884	0.852	0.802-0.889
Diurnal fluctuations	0.971	0.906	0.851-0.941
Activity limitations	0.538	0.599	0.445-0.710
Glare	0.863	0.948	0.906-0.971
Symptoms	0.757	0.819	0.754-0.866
Dependence on correction	0.831	0.944	0.922-0.959
Worry	0.653	0.622	0.576-0.651
Suboptimal correction	0.870	0.899	0.839-0.936
Appearance	0.910	0.890	0.840-0.925
Satisfaction with correction	0.823	0.810	0.725-0.854
Overall	0.790	0.854	0.710-0.942

Table 2. Intercorrelations of the Lithuanian version of the NEI RQL-42.

Subscales	CV	E	NV	FV	DF	AL	G	S	DC	W	SC	A	SwC
CV	0.662	0.359	0.677	0.603	0.568	0.397	0.496	0.709	0.627	0.570	0.459	0.662	0.711
E		0.622	0.501	0.433	0.682	0.469*	0.551	0.577	0.702	0.652	0.598	0.644	0.680
NV			0.697	0.549	0.347	0.267	0.451	0.590	0.633	0.270	0.704	0.621	0.592
FV				0.652	0.446	0.611	0.632	0.688	0.625	0.269	0.713	0.663	0.441
DF					0.592	0.685	0.663	0.597	0.628*	0.433	0.686	0.578	0.632
AL						0.563	0.634*	0.560	0.483	0.397	0.702	0.452	0.548
G							0.657	0.558	0.521	0.475	0.658	0.512	0.545
S								0.673	0.657	0.433	0.571	0.603	0.540
DC									0.674	0.566	0.576	0.689	0.541
W										0.687	0.684	0.432	0.603
SC											0.687	0.540	0.641
A												0.656	0.704
SwC													0.473

All values are statistically significant ($p<0.01$), except the ones marked *.
CV clarity of vision, E expectations, NV near vision, FV far vision, DF diurnal fluctuations, AL activity limitations, G glare, S symptoms, DC dependence on correction, W worry, SC suboptimal correction, A appearance, SwC satisfaction with correction.

Table 3. Convergent validity according to the comparison of NEI RQL-42 with the SF-36 health survey.

Subscales	SF-36								
	RP	RE	PF	BP	GH	VT	SF	MH	
NEI-RQL-42	CV	0.32	0.38	0.07	0.21	0.09	0.29	0.34	0.32
	E	0.22	0.17	0.18	0.32	0.26	0.21	0.45	0.25
	NV	0.44	0.34	0.06	0.16	0.08	0.27	0.31	0.31
	FV	0.36	0.28	0.04*	0.14	0.09	0.41	0.21	0.26
	DF	0.31	0.14	0.11	0.21	0.07	0.33	0.13	0.02*
	AL	0.45	0.29	0.17	0.11	0.13	0.06	0.32	0.25
	G	0.11	0.16	0.04*	0.13	0.13	0.17	0.07	0.03*
	S	0.19	0.23	0.51	0.27	0.16	0.09	0.32	0.13
	DC	0.14	0.17	0.09	0.18	0.08	0.05	0.29	0.25
	W	0.09	0.18	0.05	0.11	0.15	0.38	0.15	0.31
	SC	0.23	0.11	0.06	0.15	0.09	0.39	0.13	0.11
	A	0.38	0.16	0.07	0.11	0.12	0.08	0.19	0.08
	SwC	0.14	0.09	0.17	0.29	0.09	0.08	0.07	0.08

All values are statistically significant (p<0.05), except the ones marked *.
RP role – physical, RE role –emotional, PF physical function, BP bodily pain, GH general health, VTvitality, SF social functioning, MH mental health.
CV clarity of vision, E expectations, NV near vision, FV far vision, DF diurnal fluctuations, AL activity limitations, G glare, S symptoms, DC dependence on correction, W worry, SC suboptimal correction, A appearance, SwC satisfaction with correction.

Discussion:

This is the first study performed that used the Lithuanian version of the NEI RQL-42 and aimed to evaluate its psychometric properties.

The Lithuanian NEI RQL-42 version showed good internal consistency in almost all subscales, except the subscales of activity limitations and worry that had a questionable internal consistency. The reliability of other NEI RQL-[42] translations showed some limitations as well. The subscales of glare, suboptimal correction and appearance had internal consistencies less than 0.70 in Turkish NEI RQL-42[11], while Greek version had some results where Cronbach's was as low as 0.49 in glare subscale[13].The Lithuanian result does not reach the one of the original version of NEI RQL-42 where the overall internal consistency was excellent (Cronbach's =0.91)[22].

The stability of the Lithuanian NEI RQL-42 was evaluated by test-retest analysis and is similar to the result of the original NEI RQL-42 (ICC = 0.810–0.948 vs. 0.91), except the subscales of activity limitations and worry where ICC was less than 0.7 in Lithuanian version of the questionnaire[22]. Compared to the results of the other translations of NEI RQL-42, the Turkish version as well as Lithuanian had a subscale with ICC less than 0.7 (suboptimal correction) [10] while Iranian and Greek results were similar to the original ones, respectively ICC = 0.70–0.89; ICC = 0.76–0.93[13, 16].

The intercorrelations among the NEI RQL-42 subscales in most cases yielded good correlation coefficients with some exceptions showing that the questionnaire provides an instrument to define the refractive error specific quality of life.

The convergent validity of the Lithuanian NEI RQL-42 was determined by the use of SF-36 health survey[6, 18]. In most cases the correlation between the questionnaires was and ranged to moderate, in some cases there were no correlation at all due to the different aspects of the quality of life evaluated by the instruments. Only the correlation between physical function SF-36 and symptoms NEI RQL-42 exceeded 0.5 showing the slight conceptual relation.

The study included quite a small sample so further research might be needed to evaluate the differences between the groups of patients with various refractive errors.

The results of the translation and validation process of the Lithuanian version of NEI RQL-42 demonstrates that this instrument is valid and reliable for the assessment of the refractive error related quality of life in Lithuanian population.

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Conflicts of Interest:
Jaruseviciene R, None; Matuleviciute I, None; Zaliuniene D, None

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