·Investigation·

Validity and reliability study of Turkish version on low vision with quality of life questionnaire

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Abstract

• AIM: To adapt the low vision-related quality of life (LVQOL) instrument into Turkish language and to assess its validity and reliability.

• METHODS: The study was conducted in 387 patients attending the Centre of Low Vision Rehabilitation, Faculty of Medicine, Ankara University. For statistical analyses, the Spearman's correlation coefficient, Cronbach's alpha coefficient and Confirmatory Factor Analysis (CFA) were used.

• RESULTS: According to results of CFA, the item in the "Adjustment" subscale because of having the factor loading below 0.40, was excluded from the questionnaire. The reliability of the questionnaire was assessed according to Cronbach's alpha coefficients. The reliability of the "Distance Vision, Mobility, and Lighting" subscale was α=0.863; of the "Adjustment" subscale was α=0.694; "Reading and Fine Work" was α=0.791, and "Activities of Daily Living" was α=0.770. So these results indicate that the questionnaire is reliable to measure the vision related quality of life of low-vision patients. The correlations between the subscales were also analyzed, and the correlation between "Adjustment" and "Reading and Fine Work" was found to be the lowest (r_s=0.336, P<0.001), whereas the strongest correlation was found between the "Reading and Fine Work", and "Activities of Daily Living". Additionally, the "Adjustment" dimension showed the strongest correlation with only "Distance Vision, Mobility, and Lighting" dimension.

• CONCLUSION: After removing the last item in the second dimension, the Turkish adaptation of all dimensions of the LVQOL has been shown to be reliable, valid and suitable for use in patients with low vision in Turkey.

• KEYWORDS: low vision-related quality of life; Turkish version; low vision rehabilitation
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INTRODUCTION

In the last few years, the concept of quality of life gained importance, and many questionnaires were developed. So, the field of ophthalmology did not stay out of this improvement [1]. Since the 1980s, an increase in the patient-centered quality of life instruments and studies relevant to eye health have been observed [2]. The World Health Organization (WHO) defines quality of life as the perception of the goals, expectations, standards, and concerns according to the situations, and value systems in the individual context of people lives[3,4]. This perception is a result of individual physical health, psychologic condition, social network, the state of independence, and his own beliefs[5]. The evaluation of the functions, and the analyses of quality of life which are important fields of medicine, enhance the supplying with optimum health services which prioritize the perceptions of the patients [6]. The measurements of quality of life raise concern whether they represent the well-being of the individual or what they measure or evaluate, by which methods of measurement. The quality of life and qualitative characteristics of life are together and can not be evaluated independently [7]. The measurements of quality of life were performed first to evaluate the achievement of cataract surgery[8-10]. Later, for some ophthalmologic diseases such as glaucoma [11-13], optic neuritis[14], many scales were developed in order to evaluate patient contentment. Although the measurements of quality of life had been used in the management of some ophthalmologic diseases, a few methods of instruments were developed to evaluate the effect of low vision rehabilitation[5].

For arranging and improving the low vision services, the quality of life and the effect of rehabilitation programs of the people who have low vision have to be measured. The lack

of education programs for insufficient ability of seeing affects the individuals' life, resulting in social, and public health consequences such as a decline in production and level of income. The cost due to low vision rehabilitation services is less than the cost due to consequences of visual disorders. The prevalence of low vision has increased since the last decade because of the aging of the populations [15]. Different measurements are applied in routine ophthalmologic services. These measurements are distance vision, near vision, the speed of reading, duration of reading, and the fluency of reading, but these measurements do not evaluate patient's perceptions of his own disease, and physician-based estimations of the burden of a specific disease are inadequate [16,17]. The achievement in low vision, means providing a useful aid for the patient, and solving the problems due to low vision[18,19].

Many studies conducted to evaluate the efficiency of low vision rehabilitation showed no effective contribution to evaluation of low vision by quality of life measurements, but it led to vision-specific measurements in order to improve low vision[20]. Therefore to evaluate the consequences of low vision rehabilitation, vision related quality of life questionnaires were developed. The objective of these questionnaires was to identify and indicate the effect of low vision on daily life [9]. A low vision-related quality of life (LVQOL) questionnaire was developed by Wolffsohn[5]. This questionnaire was found to be successful when it was compared to other instruments [1]. It includes 5 dimensions, and 25 items. This instrument is used in clinical practices of low vision in order to identify the needs of patients, and to evaluate whether these needs can be met by low vision rehabilitation. As the score obtained from the questionnaire increases, the quality of life also increases. This instrument defines the state of seeing as well as contrast sensitivity, visual acuity, and the field of vision of the patient. The aim of this study was to test the reliability and validity of the "Low Vision Related Quality of Life Questionnaire in Turkish language adapted from Wolffsohn *et al* [5] study of LVQOL study.

MATERIALS AND METHODS

Subjects The study was conducted in 387 patients attending the Centre of Low Vision Rehabilitation in the Department of Public Health, Faculty of Medicine, Ankara University between December 2009 and February 2010. This study was performed according to the guidelines of the Declaration of Helsinki, and The Research Ethics Committee of Ankara University, Faculty of Medicine approved the study protocol, and all subjects gave written informed consent to participate in the study. The diagnosis of low vision was made according to criteria in the WHO Manual of the International Classification of Disease, Injuries and Causes of Death: corrected visual acuity of 20/70 or less than 20/70, but was equal to 20/400 or higher or field of vision being less than 20 degrees in the better eye was defined as "low vision", and the corrected visual acuity was less than 20/400 or the field of vision was less than ten degree in the better eye [21]. The patients included in the study, were the ones who had residual visional functions and ability to respond the low vision rehabilitation.

Methods Turkish validity of LVQOL Questionnaire was completed in three phases according to the criteria in the document of MAPI Research Institute of "Linguistic Validation of a Quality of Life Questionnaire"[22].

Linguistic Validation: 1) Forward translation: LVQOL Questionnaire was translated into Turkish independently by five people whose mother tongue was Turkish, and knew advanced level of English. A meeting was held with the local project coordinator and one ophthalmologist. Five translations were examined and necessary amendments were made and a resultant Turkish version (first version) was formed and the first report was prepared. During discussion the items named "getting the right amount of light to be able to see", and "finding out the time for yourself" were agreed to be consulted by the relevant experts. The questionnaire itself and the two items mentioned above were made clear by interviewing an ophthalmologist; 2) Backward translation: The first version was translated into English by two people independently, whose mother tongue was English and knew advanced level of Turkish. A meeting was held with the local project coordinator and the translators, and the translations were compared to the original version and necessary amendments were determined by consensus. In this meeting the item named "reading your letters and mail" was decided to be expanded as "reading your letters, messages and electronic mail". The second version was formed and the second report was prepared; 3) Patient testing: The second version of the questionnaire was administered to 10 patients with normal vision, and to 10 with low vision. These patients' mother tongue was Turkish that was also the target language. The questionnaire was applied by face-to-face interview by two persons. The problems about the relevant application were reviewed and final version and the third report were constituted. Each step was performed for at least two, maximum three weeks.

In order to test whether there was a relationship between the items and their corresponding dimensions, confirmatory factor analysis (CFA) for categorical data was applied using MPlus [23]. The items with factor loadings below 0.40 were eliminated. The Tucker Lewis Index (TLI: 0.90 acceptable, 0.95 excellent), the Comparative Fit Index (CFI: 0.90

acceptable, 0.95 excellent), and the Root Mean Square Error of Approximation (RMSEA: 0.08 acceptable, 0.05 excellent) were used as goodness-of-fit statistics[24].

Statistical Analysis The internal consistency of the LVQOL was tested by Cronbach's alpha [25]. The degree of association between dimensions was evaluated by Spearman's correlation coefficient.

RESULTS

The second version of the questionnaire was tested in patients. With normal vision (group 1), 10 patients in total, as one female and one male patient, were selected from the age groups of 20-29, 30-39, 40-49, 50-59, 60-69 respectively. The duration of filling the questionnaire was minimum 10 and maximum 18 minutes, average 12 minutes. The minimum score was 110, and the maximum score was 125, the mean score was 114.8±8.2.

For the patients with low vision (group 2), ten patients were selected having the same gender and age distribution. In this group the time spending for responding was minimum 13 and maximum 25 minutes, average 18 minutes. The minimum score was 63, and maximum score was 109, and the mean score was 75.8 ±16.7. In both groups, no difficulty was observed in filling or understanding the questionnaire. As a result, the third version was formed. The third version of the questionnaire was administered to 387 patients with low vision. The socio-demographic characteristics of the patients were given in Table 1. Two hundred and fifty-three (65.4%) were male (n =253), and 134 (34.6%) were female. The mean age of the patients was 40.2±24.1. One hundred and six (27.4%) were educated upto secondary school and 89 (23.0%) were students.

Table 1 The characteristics of the patients (n= 387)

Characteristics	n	%
Gender		
Female	134	34.6
Male	253	65.4
Age		
≤24	142	36.7
25-34	78	20.2
35-44	36	9.3
45-54	22	5.7
55-64	22	5.7
≥65	87	22.5
Level of education		
Illiterate	32	8.3
Literate	54	14.0
Primary school	71	18.3
Secondary school	106	27.4
High school	97	25.1
> High school	27	7.0
Job		
Housewife	66	17.1
Working	35	9.0
Unemployed	59	15.2
Retired	55	14.2
Student	89	23.0
Employee-farmer	83	21.4

Validity The validity of the questionnaire was determined by CFA for categorical data. The original questionnaire included 4 dimensions, and 25 items. The first dimension included 12 items and was about "Distance Vision, Mobility, and Lighting"; the second dimension included 4 items and was about "Adjustment"; the third dimension included 5 items and was about "Reading and Fine Work"; the fourth dimension included 4 items and was about "Activities of Daily Living". The questionnaire was Likert-style, and "5" was rated as none, "3" as moderate, and "1" as great. The minimum score that would be get from the instrument was 25 and the maximum score was 125.

The factor structure of the LVQOL was evaluated by Confirmatory Factor Analysis (CFA). According to the CFA, except for the last item in the second dimension (how well has your eye condition been explained to you), all of the remaining items had factor loading more than 0.40 (changing from 0.413 to 0.865,Table 2). Due to the factor loading of less than 0.40 and lowest item-total correlation of 0.296, the last item in the second dimension was eliminated from the analysis (Table 2). The goodness-of-fit statistics were TLI=0.951, CFI=0.878 and RMSEA=0.097 for the remaining items indicating acceptable fit to the model.

Reliability The reliability of the instrument was evaluated by Cronbach's alpha, and the alpha coefficients were found as 0.863 for the first dimension; 0.694 for the second dimension after the last item in the second dimension was excluded, 0.791 for the third dimension, and 0.770 for the fourth dimension. Internal consistencies of the dimensions were adequate at the dimension level.

The Cronbach's alpha of the item "How well has your eye condition been explained to you" was excluded, was given in Table 2. The lowest item-total correlation was between the last item in the second dimension and total of the second dimension (r_s= 0.296, P<0.001). After excluding this item, Cronbach's alpha coefficient was increased from 0.661 to 0.694.

The moderate correlations were found between the dimensions as expected (Table 3). The highest correlation was between "Reading and Fine Work" and "Activities of

Table 2 The results of confirmatory factor analyses and Cronbach's alphas if item deleted

Distance Vision, Mobility and Lighting	Factor Loadings	Cronbach's alphas if item deleted
How much of a problem do you have:		
With your vision in general	0.653	0.850
With your eyes getting tired (e.g. only being able to do a task for a short period of time)	0.437	0.861
With your vision at night inside the house	0.596	0.854
Getting the right amount of light to be able to see	0.507	0.859
With glare (e.g. dazzled by car lights or the sun)	0.413	0.865
Seeing street signs	0.672	0.857
Seeing the television (appreciating the pictures)	0.755	0.850
Seeing moving objects (e.g. cars on the road)	0.659	0.849
With judging the depth or distance of times (e.g. reaching for a glass)	0.653	0.849
Seeing steps or curbs	0.744	0.846
Getting around outdoors (e.g. on uneven pavements) because of your vision	0.759	0.845
Cross a road with traffic because of your vision	0.733	0.846
Adjustment		
Because of your vision, are you:		
Unhappy at your situation in life	0.694	0.534
Frustrated at not being able to do certain tasks	0.711	0.552
Restricted in visiting friends or family	0.777	0.583
How well has your eye condition been explained to you	*0.373*	*0.694*
Reading and Fine Work		
With your reading aids/glasses, if used, how much of a problem do you have:		
Reading large print (e.g. newspaper headlines)	0.718	0.799
Reading newspaper text and books	0.787	0.732
Reading labels (e.g. on medicine bottles)	0.865	0.722
Reading your letters and mail	0.854	0.716
Having problems using tools (e.g. threading a needle or cutting)	0.617	0.785
Activities of Daily Living		
With your reading aids/glasses, if used, how much of a problem do you have:		
Finding out the time for yourself	0.660	0.747
Writing (e.g. cheques or cards)	0.806	0.687
Reading your own hand writing	0.772	0.674
With your everyday activities (e.g. house-hold chores)	0.722	0.748

Table 3 The degree of associations between dimensions (Spearman's correlation coefficients)

	Adjustment (after deleting the last item)	Reading and Fine Work	Activities of Daily Living
Distance Vision, Mobility and Lighting	0.514	0.609	0.566
Adjustment (after deleting the last item)		0.336	0.411
Reading and Fine Work			0.693

P<0.001 for all correlation coefficients

Daily Living" (r=0.693, P<0.001), whereas the lowest one was between "Reading and Fine Work" and "Adjustment" (r_s=0.336, P<0.001). The other correlations were r_s=0.411 (P<0.001) between "Adjustment" and "Activities of Daily Living"; r_s=0.514 (P<0.001) between "Distance Vision, Mobility and Lighting" and "Adjustment"; r_s=0.566 (P< 0.001) between "Distance Vision, Mobility and Lighting" and "Activities of Daily Living", and r_s=0.609 (P<0.001) between "Distance Vision, Mobility and Lighting" and "Reading and Fine Work" respectively.

DISCUSSION

The majority of low vision quality assessment instruments are in English. A few Chinese questionnaires are available for the evaluation of quality of life of patients with cataract or glaucoma. In addition, Chinese version and recently, Thai version of LVQOL were developed [2,4]. None of the vision related quality of life instruments had been translated into Turkish, and neither had been developed in Turkish except the one, NEI-VFQ 25 questionnaire which was translated into Turkish and whose validity and reliability were assessed

by Toprak *et al* [26]. The NEI-VFQ 25 has 25 items, and 11 dimensions, and has been developed to measure the dimensions of self-reported vision-targeted health status that are most important for persons who have chronic eye diseases such as glaucoma, cataract, and age-related macular degeneration (ARMD). It measures overall activities, difficulty with near-vision activities, difficulty with distance-vision activities, limitations in social functioning, dependency on others, mental health symptoms, driving difficulties, limitations with peripheral and color vision, ocular pain, and an additional subscale for general health[26]. In this study, the adaptation of validity of Low-Vision Related Quality of Life (LVQOL) questionnaire into Turkish was aimed. The LVQOL is an instrument developed for evaluating the effects of low vision on quality of life. It measures distance vision, mobility, lighting, general adjustment to life, reading and fine work, and activities of daily living of people of low-vision. According to structure validity analysis by CFA, the factor loading of the item "How well has your eye condition been explained to you" in the "Adjustment" dimension was found to be 0.373. As this value was below 0.40, it was excluded from the questionnaire. Similarly, item-total correlation, the correlation coefficient was r_s=0.296 (P<0.001). This result also indicated that the relevant item did not show a valid measurement property when evaluating the adjustment of the one with low-vision to life such as unhappiness at his situation in his life, being frustrated and not being able to do certain tasks, and feeling restricted in visiting friends or family. In Wolffsohn's study the items having low construct validity were also excluded from the questionnaire[5].

According to reliability analysis, as the four dimensions' reliability coefficients were almost above 0.700, the measurement of low-vision related of quality of life of the questionnaire was reliable. The correlation between "Adjustment" and "Reading and Fine Work" was low (r_s= 0.336). The difficulties in reading and fine work were not thought to be effective in general adjustment to life of the ones of low-vision. For example, reading with reading glasses/aids or performing an activity in near distance, were not indicated to be closely related with adjustment. On the other hand, the activities such as hobbies, daily living activities were seemed to be more related to adjustment (r_s= 0.411), but the strongest relation was observed between adjustment and distance vision, mobility and lighting (r_s = 0.514). The first seven items of the twelve items in the "Distance Vision, Mobility and Lighting" dimension, were particularly outdoor activities performing outside the house, the "Adjustment" dimension of low-vision people was thought to be affected by the limitation of the activities doing outside. Similar result was also obtained in Zou *et al* study [2]. In this study the first seven items of the "Distance Vision, Mobility and Lighting" dimension, were classified under the title of "General vision, and Lighting"; items 8-12 as mobility. There was a moderate correlation between the first and fourth dimension (r_s=0.566). It was thought that the properties about distance vision, mobility and lighting affected daily living activities such as hobbies in a moderate level. Nevertheless, a stronger relation was observed between reading and fine work and activities of daily living (r_s = 0.693). This was the highest correlation coefficient which was determined in evaluating the relations between dimensions. But in this questionnaire the evaluation of the reading and writing functions in different dimensions, was a weakness aspect of the instrument. Zou *et al* [2] had found a similar result, and the dimensions of "Reading and Fine Work", and "Activities of Daily Living" were combined in the same dimension named as "Reading, Fine Work and Activities of Daily Living". On the other hand, non-existing of any item measuring self-care among the activities of daily living, can lead to mis-evaluation of daily living activities. As using tools and performing hobbies provide the close level of vision function, taking place of these properties in different dimensions was another point of weakness in our opinion. In Zou *et al*study [2], reading and using tools were both indicated the main activities of daily living.

The need for seeing appropriate lighting, was only involved in the first dimension however, appropriate lighting is necessary and important for fine work and in near vision activities. So the lighting is suggested to be taken into consideration also in the evaluation of reading, writing, and fine work. A moderate correlation was observed between "Distance Vision, Mobility and Lighting" and "Reading and Fine Work" (r_s =0.609). In terms of visual acuity, distance and near visual acuity associate together, the related functions are expected to be correlated. In de Boer *et al* [27] study, the questionnaire was found to be moderate to good valid for cross-sectional constructivity. The subscale "Reading and Fine Work" indicated high construct validity; "Distance Vision, Mobility and Lighting" indicated moderate validity. In our study, similar results were observed. The subscales 1 and 2 showed moderate, but "Reading and Fine Work" showed a better validity compared to other subscales of their study.

In conclusion, after removing the last item in the second dimension, the Turkish adaptation of all dimensions of the LVQOL has been shown to be reliable, valid and suitable for use in patients with low vision in Turkey.

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