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Validity and Reliability of the Quality of Life in Epilepsy Inventory (QOLIE-10) For Turkey

Epilepsili Hastalarda Yaşam Kalitesi Ölçeği'nin (QOLIE-10) Geçerlilik ve Güvenilirliği

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ABSTRACT

Introduction: The purpose of this study was to test as a shortened form of the health-related quality of life for patients with epilepsy inventory (QOLIE).

Methods: A study of 148 adult epileptic patients admitted to the Neurology Outpatient Clinic at Cumhuriyet University Hospital in Sivas was used to derive a brief screening tool from a longer instrument (QOLIE-31).

Results: The 10-item questionnaire (QOLIE-10) contains general and epilepsy-specific dimensions grouped into three domains: Epilepsy Effects (memory, physical effects, and mental effects of medication), Mental Health (energy, depression, overall quality of life), and Role Functioning (seizure worry, work, driving, social limits). Cronbach's alpha (measure of internal consistency) was high, as were the associations between QOLIE-10 and the Nottingham Health Profile (NHP). High correlations between QOLIE-10 and NHP domains (emotional reactions, energy, physical mobility, and social isolation) were found.

Conclusion: The QOLIE-10 questionnaire is considered to be a valid and reliable tool for use in Turkey. Health professionals are encouraged to use this questionnaire to routinely examine the influences of the disease process in epilepsy patients.

Keywords: Turkish version of quality of life in epilepsy-10 inventory, epilepsy, quality of life

ÖZ

Amaç: Bu çalışmanın amacı, epilepsili bireylerde sağlıkla ilgili yaşam kalitesi boyutlarını inceleyen özet bir ölçek geliştirmektir.

Yöntem: Çalışma Cumhuriyet Üniversitesi Hastanesi Nöroloji Polikliniğine başvuran 148 yetişkin epileptik hasta üzerinde yapılmıştır. Epilepsili Hastalarda Yaşam Kalitesi-31 Ölçeği (QOLIE-31)'nden daha kısa bir tarama aracı olan Epilepsili Hastalarda Yaşam Kalitesi-10 Ölçeği (QOLIE-10) türetilmiştir.

Bulgular: Toplam on maddelik QOLIE-10 Ölçeği, genel sağlık ve epilepsiye özgü maddeleri içeren toplam üç alt boyuttan oluşmuştur. Bunlar; Epilepsinin Etkileri (hafıza, fiziksel etkiler ve ilaçların mental durum üzerine etkileri), Mental Sağlık (enerji, depresyon, genel yaşam kalitesi) ve Rol Fonksiyonu (nöbetle ilgili kaygılar, çalışma hayatı, araba kullanma, sosyal sınırlılıklar) alt boyutlarıdır. QOLIE-10'un iç tutarlılığı (Cronbach's α) ve Nottingham Sağlık Profili (NSP) ve QOLIE-10 Ölçeği arasındaki ilişki oldukça yüksekti. QOLIE-10 ve NSP'nin boyutları (emosyonel tepkiler,enerji, fiziksel hareketlilik ve sosyal izolasyon) arasında yüksek düzeyde ilişki bulunmuştur.

Sonuç: QOLIE-10, Türkiye toplumu için geçerli ve güvenilir bir ölçek olarak değerlendirilmektedir. Hastalık sürecinin epilepsili hastalar üzerindeki etkilerini değerlendirmek için bu ölçeği sağlık çalışanlarının rutin olarak kullanmaları önerilmektedir.

Anahtar sözcükler: Epilepsi yaşam kalitesi ölçeği-31 Türkçe versiyonu, epilepsi, yaşam kalitesi

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INTRODUCTION

Epilepsy represents a public health problem because of the increasing number of people with epilepsy who are handicapped by the disorder and its consequences (1). Difficulties in working, interpersonal touch, and familial and social relationships-such as the perception of stigma and discrimination-have been associated with depressive states (2,3). This situation can lead to a reduction in the quality of life (QOL), as it is reflected in different aspects, as well as a decreased physical condition, impaired physical functioning, lack of vitality, difficulty in social relationships, and emotional instability (4,5).

Epilepsy is a chronic neurologic diseases with the potential to negatively influence QOL (4). As a consequence of the difficulty and extent of the uncertainty of living with a chronic problem, researchers have focused on analyzing the effect of the disease on the health-related quality of life (HRQOL) of the individuals affected (5,6). HRQOL can be examined in relation to treatment choice, symptom relief, knowledge

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regarding the disease, skills to manage its complications, and psychological compliance to the difficult situation in the face of a range of psychosocial problems (5, 7).

Different questionnaires have been developed for the assessment of HRQOL (6,7,8). Similarly, epilepsy-specific instruments are available for the assessment of aspects of HRQOL, which is an important concept to better understand the distress of people with epilepsy, even when seizures are controlled (5,8).

The Quality of Life in Epilepsy-89 Inventory (QOLIE-89) and the Quality of Life in Epilepsy-31 Inventory (QOLIE-31) consist of 89 of the 31 items, respectively, and contain subscales that appear to be the most significant from reports by people with epilepsy (4,9,10,11,12). The QOLIE-89 and QOLIE-31 surveys, which were designed to assess epilepsy-specific QOL topics, have been translated into Turkish. The validity and reliability of QOLIE-89 and QOLIE-31 for Turkish patients have been established (4,12). Both scales are difficult to apply in a clinical setting due to the large numbers of items. Therefore, there is a need for screening of Quality of Life in Epilepsy-10 Inventory (QOLIE-10) which is a brief, 10-item questionnaire (6,10,13). This study was performed to determine the reliability and validity of the Turkish version of the QOLIE-10.

METHODS

Patients

This study involved 164 epileptic patients admitted to Neurology Outpatient Clinic at the Cumhuriyet University Hospital, Sivas, Turkey. The eligible and consenting patients were older than 17 years and capable of responding to the verbal administration of the instruments. Other inclusion criteria were persons who had no major medical or mental health problems other than epilepsy that would affect QOL, who were using antiepileptic drugs, who had no history of craniotomy within the past year, and who were literate and willing to participate in the study. Of the epileptic patients, 11 did not want to participate in the study and five had problems in comprehending and answering the questions (because of cognitive disorders), leading to their exclusion from the study. The final sample included 148 people with epilepsy.

Data Collection Tools

We used the QOLIE-10 as the main data collection tool. The Nottingham Health Profile (NHP) was used to test the construct validity of the QOLIE-10 (14). Considering the frequent use of the NHP in the literature as a similar test, we evaluated the convergent validity of QOLIE-10 and NHP (11,14,15,16).

Quality of life in epilepsy-10 inventory (QOLIE-10): The validity and reliability of the QOLIE-89 inventory (12) and QOLIE-31 inventory (4) for Turkish patients were determined by Mollaoğlu et al. (9) QOLIE-10 was derived from QOLIE-31 (11,13,17). QOLIE-10 comprises three components: Epilepsy Effects (memory, physical effects, and mental effects of medication), Mental Health (energy, depression, overall QOL), and Role Functioning (seizure worry, work, driving, social limits) (18). Thus, QOLIE-10 has ten items drawn from seven QOLIE-31 subscales (15,16,17,18,19,20,21).

Nottingham health profile: The NHP is a questionnaire developed to measure subjective health status. The different aspects of people in this form are questionable. Answers to these questions are personal. The NHP has two sections-the first section includes 38 items related to health (pain, energy, sleep, mobility, emotional reaction, and social isolation), and the second section is about the affected life areas and consists of seven items (problems regarding occupation, housework, social life, family life, sexual function, hobbies, and leisure time). The second section of the NHP is optional and can be ignored without ruining the test result. It can be completed in about 10 minutes (14,19). The validity and reliability of the Turkish version of the NHP have been established (14).

Statistical Analysis

The grouped variables were evaluated by frequency and percentage values, whereas the numerical variables were evaluated by arithmetic mean and standard deviation values using the Statistical Package for the Social Sciences version 17.0 software (SPSS Inc.; Chicago, IL, USA). Cronbach's alpha and item-total correlations were employed in the internal consistency assessment of the questionnaire. Pearson's correlation coefficient was applied to analyze the test-retest reliability. Convergent reliability was performed on the QOLIE-10 and NHP scales via Spearman and Pearson correlation analyses. A statistics expert from Cumhuriyet University provided assistance in the selection of the statistical methods and confirmation of the results.

Ethical Consideration of the Study

The adaptation of the questionnaire to the Turkish language was approved by the RAND Health Group via their cooperation through the Internet. The patients included in the study were informed, both verbally and in written form, about the aim and method of the study. The study was carried out in accordance with the Helsinki Declaration.

RESULTS

Of the 148 participants, 86 (58.1%) were men and their mean age was 32.5±10.71 years. The mean duration of epilepsy was 14.1±10.23 years. Twenty-one patients (14.2%) had been completely seizure free over the last year, 61 patients (41.2%) reported 1-9 seizures over the last year, 31 (20.9%) reported 10-20 seizures over the last year, and 35 (23.7%) reported >20 seizures over the last year. With respect to seizure type, 101 (68.2%) patients had been diagnosed with generalized tonic-clonic seizures and 47 (31.8) had complex partial seizures. Sociodemographic characteristics are summarized in Table 1.

Table 2 shows the item correlations between items in QOLIE-10 and the source scale in QOLIE-31 (range, 0.72-0.90). All correlations were statistically significant ($p<0.001$).

Reliability of the QOLIE-10 Inventory

Item-total score correlation coefficients were observed to vary between .54 and .72 (Table 3). Most of the QOLIE-10 items showed no change over time in view of the literature data and our results.

Factor Analysis and Reliability of QOLIE-10

The 10 items covered the three distinct topics of epilepsy effects, mental health, and role functioning. Factor analysis of the 10 items yielded three factors with eigenvalues >1.0. The first factor comprised two items (physical and mental effects) of medication and one item (memory) of cognitive functioning. The second factor comprised three items (driving, social, and work) of social function and one item of seizure worry. The third factor comprised one item each (overall QOL, depression, and energy) from the overall QOL, emotional well-being, and energy/fatigue scales (Table 4). Scales were derived for each of these factors by summing the raw scores for each item that loaded at >0.40 on each factor.

Internal consistency reliability coefficients (Cronbach's alpha) were 0.82 for epilepsy effects, 0.71 for mental health, and 0.74 for role function

Table 1. Some characteristics of patients (n=148)

Mean age (years)	32.5 (10.71)
Duration of epilepsy (years)	14.1 (10.23)
Age at onset of epilepsy (years)	17.2 (10.65)
Gender	
Female	62 (41.9)
Male	86 (58.1)
Marital status	
Married	85 (57.4)
Single	63 (42.6)
Employment status	
Employed	59 (39.9)
Unemployed	89 (60.1)
Education status	
Literate	26 (17.6)
Primary school	57 (38.5)
Secondary school	35 (23.6)
High school	21 (14.2)
University	9 (6.10)
Epilepsy type	
Generalized	101 (68.2)
Partial	47 (31.8)
Seizure number over the last year	
No seizures	21 (14.2)
1-9 episodes	61 (41.2)
10-20 episodes	31 (20.9
≥21 episodes	35 (23.7)
Medication type	
Polytherapy	126 (85.1)
Monotherapy	22 (14.9)

Table 2. Correlation of each QOLIE-10 item with the source summary scale in QOLIE-31

Item in QOLIE-10	Source scale in QOLIE-31	Correlation of QOLIE-10 item with source scale*
Seizure worry	Seizure worry (five items)	0.75
Overall QOL	Overall QOL (two items)	0.81
Depression	Emotional well-being (five items)	0.76
Energy	Energy/fatigue (four items)	0.77
Memory	Cognitive functioning (six items)	0.74
Physical effect	Medication effect (three items)	0.89
Mental effect	Medication effect (three items)	0.90
Driving	Social function (five items)	0.72
Social	Social function (five items)	0.86
Work	Social function (five items)	0.84
*All p<0.001		

Table 3. Item-total correlation of QOLIE-10

Items	r
1. During the past 4 weeks, have you had a lot of energy?	.58
2. During the past 4 weeks, have you felt down-hearted and blue?	.62
3. During the past 4 weeks, has your epilepsy or antiepileptic medication caused trouble with driving?	.72
4. During the past 4 weeks, how much have you been bothered by memory difficulties?	.68
5. During the past 4 weeks, how much have you been bothered by work limitations?	.64
6. During the past 4 weeks, how much have you been bothered by social limitations?	.60
7. During the past 4 weeks, how much have you been bothered by physical effects of antiepileptic medication?	.56
8. During the past 4 weeks, how much have you been bothered by mental effects of antiepileptic medication?	.70
9. How fearful are you of having a seizure during the next month?	.64
10. During the past 4 weeks, how has the quality of your life been? That is, how have things been going for you?	.54

Table 4. Factor analysis and reliability of QOLIE-10

	Cronbach's α	Percentage variance	Test–retest Pearson correlation*
Epilepsy Effects Scale	0.82	22.7	0.74
Physical effect			0.78
Mental effect			0.68
Memory			0.74
Mental Health Scale	0.71	20.4	0.66
Overall QOL			0.69
Depression			0.60
Energy			0.67
Role Function Scale	0.74	24.1	0.71
Driving			0.72
Social			0.68
Work			0.73
Seizure worry			0.69
*All p<0.0001			

(Table 4). Test-retest data showed statistically significant correlations for individual items (r=0.60-0.78) and scales (r=0.66, 0.71, and 0.74).

Construct Validity

Correlation coefficients between the QOLIE-10 and NHP questionnaires are presented in Table 5. Correlations between the QOLIE-10 and NHP subscales were fairly strong, particularly between those subscales with close or interdependent content. Epilepsy Effects correlated with NHP emotional reactions (r=-0.68), social isolation (r=-0.71), and physical mobility (r=-0.64); Role-Function correlated with NHP emotional reactions (r=-0.73), social isolation (r=-0.79), and energy (r=-0.60); Mental Health correlated with NHP social isolation (r=-0.63) and emotional reactions (r=-0.80); and the Overall Score on the QOLIE-10

Table 5. Correlation (Spearman's coefficient) between QOLIE-10 and NHP scores

	NHP					
QOLIE-31	**Energy**	**Pain**	**Emotional reactions**	**Sleep**	**Social isolation**	**Physical mobility**
Epilepsy effects	-0.38	-0.43	-0.68	-0.52	-0.71	-0.64
Role-function scale	-0.60	-0.51	-0.73	-0.38	-0.79	-0.42
Mental-health scale	-0.55	-0.54	-0.80	-0.49	-0.63	-0.48
Overall Score (QOLIE-10)	-0.48	-0.47	-0.79	-0.52	-0.73	-0.39
Correlations ≥0.60 are shown in bold. All associations were statistically significant with $p<0.05$						

correlated with NHP social isolation (r=-0.73) and emotional reactions (r=-0.79) (Table 5).

DISCUSSION

Short-form measures can correlate well with longer instruments (11,19). In our study, all correlations between QOLIE-10 items and QOLIE-31 parent scales were statistically significant. Thus there was good correlation between QOLIE- 10 items and their origin scales in the QOLIE-31. Because of their briefness and simplicity, short-form dimensions allow health-care providers to evaluate a variety of issues without expending extra time and facilities required for administration and scoring of longer materials and without requiring an extended interview to review all subjects at every visit (9,11,21 Thus, QOLIE-10 that have short, practical, short-term feasible characteristics provides information about the quality of life in patients with epilepsy for healthcare workers and enable them to see the problems experienced by patients (6,13,22,23,24).

Item analysis, internal consistency, and time invariance are methods to evaluate the reliability of a questionnaire (21). Therefore, the QOLIE-10 was tested to measure time invariance, item-total correlation, and Cronbach's alpha correlation coefficient. Test-retest data indicated statistically significant reliability for individual items and scales of the Turkish version of QOLIE-10. Similar results were reported by Cramer et al. (18). Cronbach's alpha has been found to vary between .68 and .96 in other studies (6,18,22,23,24,25,26). In this case, we can say that the Turkish version of QOLIE-10 shows invariance over time. For individuals with epilepsy in our sample, test-retest reliability of the Physical Effects items were highest, while test-retest reliability was higher for the Epilepsy Effects Scale and Role Function Scale measures compared to the Mental Health Scale.

Internal consistency is usually measured with Cronbach's alpha, a statistic calculated from the pairwise correlations between items. At the level of group comparisons, Cronbach's alpha was calculated to test the reliability, and if the value was greater than 0.70 the questionnaire was considered as reliable (27,28). Cronbach's alpha of the QOLIE-10 was high in all three scales (Epilepsy Effects Scale, Mental Health Scale, and Role Function Scale), and Cronbach's alpha was >70 for each dimension. This study showed that QOLIE-10 can be reliably applied as a screening measure in Turkish epilepsy patients.

Compared to the original version, the factor analysis of the Turkish version of QOLIE-10 in this study fell into three categories based on the content of items loading on each factor: (1) Epilepsy Effects (three items), (2) Role Function (four items), and (3) Mental Health (three items). However, the factor analysis of the Korean version of the QOLIE-10 yielded two factors, including epilepsy effects/role function (seven items) and mental health (three items) (22). The items that constituted the epilepsy effects, mental health, and role-function factors in this study and the original QOLIE-10 were divided into three separate factors instead being loaded onto two factor as in Korean version (18,22). Unlike the Korean study, including overall QOL, depression, and energy, three items measured the scope of the mental health scale (22). The items that constituted the mental-health factor in the original version of QOLIE-10 (overall QOL, depression, and energy) were identical to those of this factor in the Turkish version of the QOLIE-10 (18).

Expectations related to convergent validity were met, with high correlations between QOLIE-31 and NHP scores for scales of similar content, and low correlations for those of dissimilar content that were epilepsy specific. In this study, there were strong correlations between the epilepsy effects, role function, and mental function subscales and the NHP emotional reactions and social isolation. However, the epilepsy effects scale correlated with NHP physical mobility, while the role-function scale correlated with NHP energy. Moreover, there was a relationship between the overall score of the QOLIE-10 and NHP social isolation and emotional reactions -where a negative correlation represents higher levels of emotional reactions or social isolation and worse QOL status-whereas they were poorly correlated with sleep, energy, and physical mobility items. These findings show the convergent validities of QOL. As can be seen, there was a particular relationship between the scales focusing on the psychological and social status of the patients. Psychosocial dimensions are recognized as important determinants of QOL in patients with epilepsy (24,25). This study showed a consistency between the psychological and social scales of the two questionnaires as well. Similar relationships *have been* reported in other studies (24-27). Patients with epilepsy generally have associated psychological, psychiatric, and social issues. Psychosocial interventions are significant for the patients (25,26,29). Psychosocial initiatives are helpful to increase self-control and support positive acceptance of a diagnosis, which will increase the patients' QOL (26,30,31,32).

In conclusion, this study indicated a good correlation between the items of QOLIE-10 and their source scales in the Turkish version of the QOLIE-31. QOLIE-10 was designed to evaluate QOL in a broad spectrum of adult patients suffering from epilepsy. It was derived from QOLIE-31 to give a more rapid test. It was found to have similar responsive indices as the longer version (4,9,12,22,23) and to be sensitive to change.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects", (amended in October 2013).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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