# Psychometric properties and validation of Persian version of quality of life in epilepsy inventory (QOLIE-89)

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**Background:** Several epilepsy-specific quality of life questionnaires have been developed. One of them is quality of life in epilepsy-89 version. The objective of this study was to develop a Persian version of QOLE-89 and confirm its psychometric properties. **Materials and Methods:** Participants were 75 patients with epilepsy. The quality of life questionnaire was adapted to Persian language through a translation and translation-back procedure. Internal consistency by Cronbach's α, was determined and construct validity was assessed by correlation with GHQ-12 and BDI-PC and discriminant validity was confirmed by comparing scores for known groups. **Results:** Reliability based on internal consistency (Cronbach›s α) for QOIE-89 was 0/96 and for 17 subscales was varied form 0/70 to 0/89 and Test-retest reliability (Pearson's correlation coefficient) for the Farsi version of the QOLIE-89 ranged from 0.75 to 0.88. Total score of QOLIE-89 discriminated well between the patients according to depression severity and drug resistance and seizure controllability. Correlation between the total scores, BDI-PC and GHQ-R to confirm construct validity was 0/55 and 0/63, respectively. **Conclusion:** In this cross-sectional survey, Persian version of the QOLIE-89 was reliable and showed properties supporting the construct and discriminant validity at a level comparable with the original and some other versions. Thus, this questionnaire has suitable properties in Iranian population and can be used in clinical trials with epileptic patients.

**Key words:** Epilepsy, psychometric properties, quality of life, QOLIE-89 validity, reliability, sensitivity, specificity, seizure

## INTRODUCTION

Epilepsy is one of the most frequent neurological disorders so the house by house epidemiological studies estimated its prevalence of 2.2-41 in per ten thousand people.[1] Assessment and understanding the effect of epilepsy on patients' quality of life (QOL) as an important clinical component has increasingly drawn the attention of researchers towards it. Epilepsy can include a wide range of psychological and functional domains in patients so that evaluating the QOL is a major approach to assess the effects.[2]

Health-related quality of life is defined as patient's assessment and interpretation from the effect the deficiencies, disorders, damages, defects and treatments has on daily functions and social opportunities.[3-5] In epileptic patients, the essential areas of quality of life are under four main categories which include: Mental health, cognitive problems, epilepsy-related general stressors and physical health.[6]

One of the specific tools to measure the quality of life in epileptic patients is QOLIE-89 (Quality of Life in Epilepsy Inventory with 89 items). It is a self-report inventory which evaluates life satisfaction in four scales and 17 subscales. Its psychometric properties have been reviewed in several countries. In the American sample, internal consistency reliability (Cronbach's alpha) of this questionnaire had a range from 0.87 to 0.92. The test-retest reliability for the 17 subscales had a range of 0.85 to 0.86. Furthermore, there was a statistical significant correlation between all the scores of QOLIE-89 and profile of mood states (POMS).[3]

The psychometric quality of the Norwegian version of QOLIE-89 on 379 epileptic patients showed 0.76-0.92 Cronbach's alpha and 0.67-0.98 test-retest reliability. The inter-correlation between the mentioned scale and the Health Status Questionnaire was 0.47-0.76.[7]

The psychometric characteristics of Chinese version of QOLIE-89 on Chinese patients with epilepsy were

determined. The test-retest reliability was done for the Chinese version and also the QOLIE-31 calculated was 0.97.[8]

In validation study of the Brazilian-Portuguese version of QOL questionnaire for epilepsy, the internal consistency reliability (Cronbach's alpha) reported 0.73-0.92 and its test-retest reliability also reported 0.6-0.84. Construct validity of QOL questionnaire in this study reported were acceptable due to high correlation with Nottingham Health Scale, Beck Depression Inventory and Neuropsychological Assessment.[9]

The present study was conducted given the lack of a valid tool in determination of the QOL in epileptic patients in Iranian population as well as the necessity of validation for tools in different societies and cultures. This study aimed to determine the psychometric characteristics of the Persian version of quality of life in epilepsy inventory-89.

## MATERIALS AND METHODS

This was a psychometric cross-sectional study. First, the permission to use and translate the QOLIE-89 and a manual was done through correspondence with its author. QOILE-89 was translated to Persian by a research team consisting of PhD psychologists, psychiatrists and neurologists experts separately. The translations were modified and corrected in a common meeting. Thereafter, it was re-translated to English by a Psychology Professor with MA in English Language, so that no significant difference was observed with the original version. The final Persian version was prepared to be used with re-editing. In order to evaluate the understanding of patients from questions and executive and technical problems, the questionnaires were given to 14 epileptic patients with inclusion criteria and their comments were collected. Some corrections were implemented according to the opinion of the research team and the feedback received from the patients. Seventy-five patients with epilepsy in Kashani and Al-Zahra University Hospitals were accurately examined by neurologists and then enrolled in the study after the diagnosis confirmation and inclusion criteria. The inclusion criteria were over 12 years of age, literacy to read and write, speaking Persian, diagnosis of epilepsy seizures and duration of suffering for at least one year. The exclusion criteria also were suffering from major psychiatric disorders including schizophrenia, bipolar, mood disorders with psychosis symptoms, and any psychotic disorder with mental retardation, degenerative neurological diseases, cerebral stroke and brain tumors.

### Method
The patients admitted were examined by a neurologist. The cases with diagnosis of one of the epileptic disorders and

inclusion criteria were selected. They also were examined by a psychiatrist in order for consistency with inclusion and exclusion criteria. After obtaining the patients' consent, QOLIE-89, general health questionnaire (GHQ-12) and beck depression inventory-primary care (BDI-PC) were completed. The correlation analysis, discriminant analysis and factor analysis were used to analyze the validity and reliability and also Cronbach's alpha.

### Tools
#### 89-Item Quality of Life in Epilepsy Inventory (QOLIE-89)
QOLIE-89 consists of 17 subscales and 89 items which covers the following subjects in association with the health. This scale was made by Devinsky *et al* (1993) which through correspond with the original questionnaire, the manual was implemented and scoring was done. The subscales are as follows: Emotional well-being, general QOL, work limitations due to emotional problems, social support, health perception, energy-fatigue, fear of seizures, medication effects, disappointing to health, work-driving social performance, attention-concentration, language, memory, physical functioning, pain, work limitations due to physical problems and social isolation. The total score of the questionnaire was calculated through weighted-scale and summing the scores of the subscales.

The validity of the original QOLIE-89 version reported in the range of 0.58-0.86 and its Cronbach's alpha was 0.78-0.92.[3] The validity of the Chinese version reported 0.97 through correlation with other versions of QOLIE in epileptic patients and test-retest reliability of its subscales also varied from 0.7 to 0.98.[8] The validity of the Norwegian version obtained 0.47-0.76 through correlation of its scores with General Health Status.[7]

#### General Health Questionnaire (GHQ-12)
GHQ-12 consists of 12 questions evaluating the intensity of mental problems in recent few weeks (or a month).[10] In Iran, Cronbach's alpha for the entire questionnaire, physical symptoms, anxiety and insomnia, social dysfunction and depression were 0.97, 0.88, 0.90, 0.87 and 0.94, respectively. Besides, its criterion validity reported 0.781 (the correlation with psychiatric diagnosis).[11]

#### BDI-PC; Beck Depression Inventory-Primary Care
It is the short form of beck depression inventory (BDI-II). It has seven items from major depressive symptoms which is as Four-Degree Likert Scale. Its internal reliability was obtained as 0.88 and has 0.82 sensitivity and 0.92 specificity with clinical cut-off point.[12]

### Statistical analysis methods
The data were analyzed by *SPSS-20*, in terms of correlation methods, T-test and discriminate analysis.

## RESULTS

Mean age of the patients was 27.69 (minimum 12 and maximum 65 years). The duration of disease varied from 6 months to 30 years. The first seizure also varied from 1 to 51 years. Table 1 illustrates the descriptive findings of this study considering the mean score of QOL, minimum and maximum scores and the percentage of those obtained the highest or lowest score from the subscales. In Iranian population, the best status in the QOL subscales was related to physical functioning and the weakest status was related to concern about the epilepsy [Table 1]. The total Cronbach's alpha coefficient obtained was 0.96. Seventeen subscales had Cronbach's alpha coefficient from 0.70 (for overall QOL) to 0.89 (physical functioning subscale) [Table 2]. Test-retest reliability (Pearson's correlation coefficient) for the Chinese version of the QOLIE-89 ranged from 0.70 to 0.88.

Construct and concurrent criterion validity (convergent and discriminant validity) through the correlation between total scale scores and 17 subscales reported with GHQ-12 and BDI-PC [Table 2]. As indicated in the findings of [Table 3], the total scores of QOL scale and 17 subscales showed a positive significant correlation with general health, except concern about epilepsy and memory ($P < 0.05$). In addition, the total scores of QOL scale and 17 subscales showed a significant correlation with depression scores except the physical functioning, pain, limitation in physical role and memory which indicated the concurrent criterion validity of the questionnaire (convergent and discriminant).

Discriminative validity based on general health indicators, depression level (clinical and lack of clinical depression) and response to medication (drug resistant or under control) are shown in [Table 3].

The best clinical cut-off point of QOLIE-89 for epileptic patients (BDI-PC $\geq$ 7) and non-depressed patients scored 60.82 with sensitivity and specificity 0.82 and 0.70, respectively. Furthermore, the difference of QOL scores in the drug resistant and controlled patients was significant ($P < 0.05$) and the cut-off point of QOLIE-89 for discrimination of these two groups obtained 61.98 with sensitivity and specificity of 0.3 and 0.56 respectively.

## DISCUSSION

The Persian version of QOLIE-89 showed a high reliability rate for the total scale and all the subscales. The total reliability of the scale was similar to the reliability of the Norwegian version.[7] However, reliability of the subscales was a little higher in Norwegian version and was similar to the American version.[13] In fact, the weakest reliability was for social isolation (0.68) and the highest was for driving and social functioning (0.87). Moreover, the reliability of the Persian version was higher than Spanish version with total score scale 0.92 and other subscales from 0.55 to 0.83.[14] However, it is a little lower than the study of Leidy *et al*[15] with total reliability score of 0.98 and a little higher than the study of Cramer *et al*.[16] In fact, the reliability of the Persian version was in an appropriate level and comparable to the Norwegian, American and Spanish versions.

**Table 1: Statistical indicators related to scores of QOLIE-89 scale, GHQ-12 and BDI-PC**

| Scales | Number of items | Mean ± SD | Cronbach's alpha | Min. score | Max. score |
| --- | --- | --- | --- | --- | --- |
| Perception of health | 6 | 59.7±18.6 | 0.74 | 12.5 | 95.8 |
| Overall QoL | 2 | 63.7±14.2 | 0.70 | 25 | 95 |
| Physical functioning | 10 | 80.7±20.3 | 0.89 | 20 | 100 |
| Role limitation (physical) | 5 | 59.8±28.6 | 0.84 | 0 | 100 |
| Role limitation (emotional) | 5 | 53.4±28.8 | 0.86 | 0 | 100 |
| Pain | 2 | 74.3±17.4 | 0.71 | 32.5 | 100 |
| Job, driving and social functioning | 11 | 63.6±21.5 | 0.87 | 15.9 | 97.7 |
| Energy/Fatigue | 4 | 51.9±21.2 | 0.73 | 12.5 | 93.7 |
| Emotional well-being | 5 | 55.2±19 | 0.70 | 15 | 90 |
| Attention/focus | 9 | 66.22±19.12 | 0.85 | 27.7 | 100 |
| Disappointment to health | 2 | 60.4±31.1 | 0.82 | 00 | 100 |
| Concern about epilepsy | 5 | 44.6±29.1 | 0.85 | 0 | 100 |
| Memory | 6 | 67±17.7 | 0.75 | 29.1 | 100 |
| Language | 5 | 82±15.4 | 0.79 | 35 | 100 |
| Drug effects | 3 | 53.7±29.9 | 0.82 | 0 | 100 |
| Social support | 4 | 57.9±23 | 0.75 | 6.2 | 100 |
| Social isolation | 2 | 70.4±21.1 | 0.68 | 20 | 100 |
| Total QOLIE | 89 | 62.7±13.6 | 0.96 | 31 | 90 |
| GHQ-12 | 12 | 21±5.43 | – | 8 | 32 |
| BDI-PC | 7 | 6.07±4.92 | – | 0 | 20 |

**Table 2: Correlation coefficient between scores of QOLIE-89 scale and subscales and scores of GHQ-12 and BDI-PC**

| Quality of Life Indicators | perception of health | Overall QoL | Physical functioning | Role limitation (physical) | Role limitation (emotional) | Pain | Job, driving and social functioning | Energy/Fatigue | Emotional well-being | Attention/focus | Disappointment to health | Concern about epilepsy | Memory | Language | Drug effects | Social Support | Social isolation | Total QOLIE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GHQ-12[2] | 0.40** | 0.60** | 0.29* | 0.34* | 0.54** | 0.36** | 0.43** | 0.62** | 0.70** | 0.40** | 0.51** | 0.14 | 0.22 | 0.40** | 0.06 | 0.39** | 0.49** | 0.63** |
| BDI-PC | -0.45** | -0.49** | -0.19 | -0.25 | -0.42** | -0.25 | -0.34 | -0.45** | -0.65** | -0.33** | -0.55** | -0.28* | -0.16 | -0.36* | -0.11 | -0.42** | -0.39** | -0.55** |

*is significant in 95% CI. **is significant in 99% CI. [1]Higher score indicated better QoL. [2]Higher score indicated better health.

**Table 3: Comparing the mean scores of QOLIE-89 in the identified groups of patients (depressed vs. non depressed; drug resistant vs. controlled; high mental health score vs. low mental health score)**

| Groups | Number | Mean ± SD | T student | Clinical cut-off point | Sensitivity | Specificity | Canonical correlation |
|---|---|---|---|---|---|---|---|
| Depressed | 28 | 531±13.6 | 4.69** | 60.82 | 81.8 | 0.70 | 0.55** |
| Non-depressed | 46 | 68.5±10.1 | | | | | |
| Total=74 | | | | | | | |
| Drug resistant | 32 | 59.23±12.42 | 2.18* | 61.98 | 0.63 | 0.56 | 0.30* |
| Controlled | 41 | 67.22±14.11 | | | | | |
| Total=73 | | | | | | | |

*is significant in 95% CI. **is significant in 99% CI.

In addition, in this study, there was a high positive and significant correlation between total scores of QOLIE-89 subscales and scores of GHQ-12 and also a negative and significant correlation with scores of BDI-PC. This relationship supported from convergent and discriminant validity and construct validity of this scale.[7,14] Unlike the Norwegian version of QOLIE-89 which all its subscales showed a significant inverse correlation with subscales of measure of health-related quality of life (15-dimensional).[7] In the present study, there was no significant correlation between physical function, pain and memory with BDI-PC. The correlation levels of the Norwegian and Spanish versions were approximately similar to the present study, which indicated the construct validity of the Persian version. The results of the present study are so similar to the Spanish version, in both studies, the correlation between QOLIE-89 with GHQ-12 exactly was 0.63. This level was a significantly correlation and their similarity in different studies indicated the reliability of the scale.

Distinctive validity of QOLIE-89 scale also determined through capacity of the scale discrimination between non-depressed/clinical patients and controlled/drug resistant patients [Table 3].

Generally, QOLIE-89 had the capacity of discrimination between identified groups of patients. As expected, the scale had a higher power in discrimination of non-depressed patients with epilepsy and qualified mental health and non-qualified mental health ($P < 0.01$) and also with a lower intensity was able to discriminate between the drug resistant and controlled patients ($P < 0.05$). Score 62 was the best cut-off point with 0.85 sensitivity and 0.84 specificity for discrimination of identified groups in terms of mentioned characteristics. These findings had some similarities with Norwegian version.[7] In the mentioned study, QOLIE-89 also had psychometric characteristics and clinical capacity which could discriminate the identified group of patients in terms of respond to drug, seizures in recent months, neurologic defects and comorbidity of psychiatric disorders.

In general, reliability and validity of the QOLIE-89 scale which was translated to Persian, was confirmed and therefore can be used as one of the reliable tools in epilepsy studies particularly in the clinical trials. Test-retest reliability was not reviewed, which was the limitation of this study.

## ACKNOWLEDGMENTS

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