Assessment of quality of life in patients with epilepsy

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Abstract. Patients with epilepsy have a higher risk regarding low quality of life. Objective: to determine the impact of different clinical and demographic factor upon the quality of life. Material and methods: the study group was comprised by 113 patients diagnosed with epilepsy, evaluated between 01.03.2008 and 31.03.2010 in Neurology Clinic from Cluj-Napoca. All patients filled the quality of life in epilepsy – QQLIE 31. Results: age was negatively correlated with almost all QQLIE items (p<0.05). Patient's sex and marital status did not influenced patients' quality of life (p>0.05). The employment and economic status were correlated with almost all QQLIE items (p<0.05). The quality of life was negatively correlated with disease duration (p<0.05). The frequency of epileptic seizures independently affected the quality of life (p<0.05), but the type of epileptic seizures and etiology of epilepsy did not it (p>0.05).

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Introduction

Quality of life is defined as "individuals perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (World Health Organization 1998). Thus, quality of life in medicine involves physical, mental and social well-being, as well as patients' ability to perform everyday tasks. Over the last decades, considerable efforts have been made to develop dedicated quality of life assessment in patients with epilepsy and to assess the impact of demographic, clinical, psychosocial factors and epilepsy-associated comorbidities on quality of life.

Although there are numerous studies assessing quality of life of people with epilepsy worldwide, similar studies have not been found for our country. It is necessary to determine the extent of the problem as part of the systematic approach in the management of epilepsy.

Materials and methods

There was a total number of 113 patients enrolled in the study, evaluated between 1 March 2008 ans 31 March 2010 in the Clinic of Neurology, Cluj-Napoca, presenting idiopathic epilepsy (genetic), structural-metabolic epilepsy or epilepsy of unknown cause with mono or polytherapy. Patients enrolled in the study had a stable treatment scheme for at least one month prior to the study.

Based on customized questionnaires, complex demographic data and clinical parameters were collected: age, disease duration, gender, education, employment status, financial situation, type of epilepsy, etiological factors, type of seizures, number of seizures (during the last month and the last year, respectively), antiepileptic drugs (AED) administered.

Patients had to fill in the questionnaire on quality of life in epilepsy (QOLIE-31). The questionnaire on quality of life in patients with epilepsy (QOLIE-31) consists of seven scales covering the following concepts of health: emotional well-being, overall quality of life, social functioning, energy/fatigue, cognitive functioning, seizure worry and medication effects.

The score corresponding to each scale as well as QOLIE-31 total score was calculated for each patient.

MedCalc software version 12.7 was used for statistical analysis. Data were organized as categorical and quantitative variables. Categorical variables were characterized by frequencies and percentages. Kolmogorov-Smirnov test was used to determine the normality of the distribution of quantitative variables. Quantitative variables with normal distribution were described using mean and standard deviation, and those with non-normal distribution were described using median, 25th and 75th percentiles. The analysis of the differences in variables with normal distribution between two different groups was performed using the T test for independent variables, while Mann-Whitney test was employed for variables with non-normal distribution. Analysis of variance and Tukey posthoc analysis were used to analyze the differences in quantitative variables between three groups. Depending on the situation, Pearson's correlation or Spearman's correlation was used for the analysis of two continuous variables.

Chi-squared test (χ^2) was used for univariate analysis of categorical variables.

A p-value of 0.05 was set as level of statistical significance.

Results

Patients in the study were aged between 18 and 70 years, with a median age of 33 (25.5, 49) years.

The study consisted of 72 (63.7%) female patients and 41 (36.3%) male patients. There were no significant differences in patient age depending on gender (p=0.3) .

Overall quality of life score (with non-normal distribution) had a median value of 9.4 (6.4, 11.5), a minimum value of 1.8 and a maximum value of 14.

We determined the existence of a negative correlation of average statistical significance between age and cognitive functioning scale score (r=-0.3, p=0.001), overall quality of life scale score (r=-0.32, p=0.001) and of low statistically significant correlations between age and emotional well-being scale score (r=-0.245, p=0.009), social functioning score (r=-0.212, p=0.02) and QOLIE-31 total score (r=-0.29, p=0.002). There were no statistically significant correlations between age and other QOLIE scales (p> 0,05).

There were no differences in QOLIE-31 total score based on patient gender (p>0,05).

The study included 41 (32.7%) subjects with unknown marital status, 35 (31%) married and 37 (32.6%) unmarried or divorced individuals. There were no statistically significant differences in QOLIE scale scores based on marital status (p>0,05).

The study included 18 (15.9%) patients without a job, 68 (60.2%) patients with a job and 27 (23.9%) retired patients (because of age or disease).

Score values related to emotional well-being, energy/fatigue, cognitive functioning, social functioning and QOLIE-31 total score were statistically significantly different depending on the degree of employment of epileptic patients (p<0,05). Tukey's post hoc analysis revealed the groups of professions that showed statistically significant differences (Table 1).

The study included 14 (12.4%) patients with primary education (maximum 8 years of study), 52 (46%) patients with secondary education and 47 (41.6%) patients with higher education. Thirty-four (30.1%) patients revealed an unsatisfactory financial situation, 37 (32.7%) subjects an average financial situation, and 42 (37.2%) patients had a better financial situation. Overall quality of life, emotional well-being, energy/fatigue, cognitive functioning, medication effects, social functioning and QOLIE-31 total score values were statistically significantly different depending on the financial situation of epileptic patients (p<0, 05). Tukey's post hoc analysis indicated the financial situations determining statistically significant differences in QOLIE-31 questionnaire scales (Table 3).

There were no significant correlations between age of onset of epilepsy and QOLIE scores (p>0.05). We demonstrated a negative correlation of low statistical significance between disease age and overall quality of life score (r=-0.23, p=0.01), energy/fatigue score (r=-0.194, p=0.04), cognitive functioning score (r=-0.206, p=0.02) and QOLIE-31 total score (r=-0.224, p=0.01). We demonstrated the existence of a negative correlation of high statistical significance between the yearly number of seizures and social functioning score (r=-0.533, p< 0.001). We found a

negative correlation of average statistical significance between the yearly number of seizures and overall quality of life score (r=-0.352, p=0.001), cognitive functioning (r=-0.37, p<0.001) and QOLIE-31 total score (r=-0.454, p< 0.001). We determined the existence of a negative correlation of low statistical significance between the yearly number of seizures and the seizures worry (r=-0.252, p=0.01), emotional well-being (r=-0.259, p=0.01), energy/fatigue score (r=-0.288, p=0.005) and medication effects score (r=-0.229, p=0.02).

Table 1. Correlations between employment and QOLIE scales

Variable	(I) Profession	(J) Profession	Difference (I-J)	p
Emotional well-being	Without job	With job	-1.9	0.09
		Retired	0.2	0.9
	With job	Without job	1.9	0.09
		Retired	2.1	0.01
Energy/ fatigue	Without job	With job	-1.3	0.1
		Retired	0.2	0.9
	With job	Without job	1.3	0.1
		Retired	1.6	0.02
Cognitive functioning	Without job	With job	-7.6	<0.001
		Retired	0.1	0.9
	With job	Without job	7.6	<0.001
		Retired	7.7	<0.001
Social functioning	Without job	With job	-4	0.009
		Retired	-1.2	0.7
	With job	Without job	4	0.009
		Retired	2.7	0.03
QOLIE-31 total score	Without job	With job	-16.8	0.002
		Retired	-0.5	0.9
	With job	Without job	16.8	0.002
		Retired	16.2	<0.001

There were no significant correlations between age of onset of epilepsy and QOLIE scores (p>0.05). We demonstrated a negative correlation of low statistical significance between disease age and overall quality of life score (r=-0.23, p=0.01), energy/fatigue score (r=-0.194, p=0.04), cognitive functioning score (r=-0.206, p=0.02) and QOLIE-31 total score (r=-0.224, p=0.01). We demonstrated the existence of a negative correlation of high statistical significance between the yearly number of seizures and social functioning score (r=-0.533, p< 0.001). We found a negative correlation of average statistical significance between the yearly number of seizures and overall quality of life score (r=-0.352, p=0.001), cognitive functioning (r=-0.37, p<0.001) and QOLIE-31 total score (r=-0.454, p< 0.001). We determined the existence of a negative correlation of low statistical significance between the yearly number of seizures and the seizures worry (r=-0.252, p=0.01), emotional well-being (r=-0.259, p=0.01), energy/fatigue score (r=-0.288, p=0.005) and medication effects score (r=-0.229, p=0.02).

The study included 45 (39.8%) patients with more than one epileptic seizure per month. Patients with more than one seizure per month had lower values (of high statistical significance) of overall quality of life score compared to (8.4 (6.3, 10.1)) patients with controlled seizures (10.8 (8.4, 11.5)) (p<0.001). The correlations between the monthly frequency of epileptic seizures and QOLIE scores are shown in Table 4.

The study consisted of 43 (38.1%) patients with focal-onset seizures, 51 (45.1%) patients with generalized-onset tonic-clonic seizures, 3 (2.7%) patients with absences, 6 (5.3%) patients with myoclonus, 1 (0.9%) patient with atonic seizures and 9 (8%) patients with focal-onset seizures secondarily generalized. There were no differences in QOLIE scale scores between different types of epileptic seizures (p>0.05).

Table 2. Correlations between level of education and QOLIE scales

Variable	(I) Level of education	(J) Level of education	Mean difference (I-J)	p
Overall quality of life	Primary	Secondary	-0.8	0.464
		Higher	-2.2	0.01
	Secondary	Primary	0.8	0.464
		Higher	-1.3	0.021
Emotional well-being	Primary	Secondary	-2	0.062
		Higher	-3.7	<0.001
	Secondary	Primary	2	0.062
		Higher	-1.6	0.02
Energy/fatigue	Primary	Secondary	-1.1	0.296
		Higher	-2.2	0.011
	Secondary	Primary	1.1	0.296
		Higher	-1.1	0.078
Cognitive functioning	Primary	Secondary	-6.6	0.005
		Higher	-10.8	<0.001
	Secondary	Primary	6.6	0.005
		Higher	-4.1	0.011
Medication effects	Primary	Secondary	0	0.922
		Higher	-0.4	0.161
	Secondary	Primary	0	0.922
		Higher	-0.5	0.003
Social functioning	Primary	Secondary	-1.4	0.564
		Higher	-4.4	0.008
	Secondary	Primary	1.4	0.564
		Higher	-2.9	0.007
QOLIE total score	Primary	Secondary	-12.4	0.046
		Higher	-24.8	<0.001
	Secondary	Primary	12.4	0.046
		Higher	-12.4	0.001

A number of 60 (53.1%) patients were diagnosed with idiopathic epilepsy, while 39 (34.5%) were diagnosed with symptomatic epilepsy and 14 (12.4%) with cryptogenic epilepsy (of unknown cause). There were no significant associations between the etiological type of epilepsy and QOLIE score values (p>0.05). The score related to the effects of medication was significantly higher in patients who were treated with VPS (1.9 ± 0.7) compared to those without this therapy (1.5 ± 0.8) (p=0.03). Social functioning score was lower in patients treated with CBZ (12 ± 5.4) compared to those without this therapy (14 ± 4.6) (p=0,04). Socializing score and QOLIE-31 total score were lower in patients treated with PTH (12 ± 5.4, 49.1 ± 18.6 respectively) compared to those without this therapy (14 ± 4, 6, 59.8 ± 18.8 respectively) (p=0.03, p=0.05 respectively). Social functioning score was lower in patients treated with PB (10.7 ± 4.4) compared to those without this therapy (13.8 ± 5) (p=0.008). The score related to medication effects was lower in patients treated with TPM (11.5 ± 5.5) compared to those without this therapy (13.3 ± 5) (p=0.04).

Table 4. Correlations between the frequency of epileptic seizures per month and QOLIE-31 scale scores

Variable	>1 seizure/ month	Mean	SD	p
Seizure worry	No	3.8	2	<0.001
	Yes	2.4	1.6	
Emotional well-being	No	9.9	3.4	0.004
	Yes	8	3	
Energy/ fatigue	No	7.3	2.6	0.001
	Yes	5.5	2.2	
Cognitive functioning	No	18.2	7.2	<0.001
	Yes	12.3	6.6	
Medication effects	No	1.8	0.8	0.002
	Yes	1.4	0.8	
Social functioning	No	15.4	4.4	<0.001
	Yes	10.7	4.2	
QOLIE-31 total score	No	66.7	18.1	<0.001
	Yes	48,8	15	

Discussions

Patients suffering from epilepsy tend to have a lower quality of life. Generally, there are more unemployed individuals among these patients, with poorer financial situation and lower marriage rates, facing social isolation.

The main objective of this study was to determine the impact of various clinical, social and demographic factors on quality of life in patients with epilepsy monitored at the Clinic of Neurology, Cluj-Napoca.

The median age of the study population was 33 years, without significant differences in patient age based on gender.

This study demonstrates that patient age had a negative impact on the cognitive function and overall quality of life, as well

Table 3. Correlations between financial situation and QOLIE scales

Variable	(I) Financial situation	(J) Financial situation	Difference (I-J)	p
Overall quality of life	Unsatisfactory	Average	-1.1	0.1
		Good	-1.9	0.003
	Average	Unsatisfactory	1.1	0.1
		Good	-0.7	0.3
Emotional well-being	Unsatisfactory	Average	-2	0.01
		Good	-3.1	<0.001
	Average	Unsatisfactory	2	0.01
		Good	-1	0.2
Energy/fatigue	Unsatisfactory	Average	-1.6	0.01
		Good	-2.3	<0.001
	Average	Unsatisfactory	1.6	0.01
		Good	-0.6	0.4
Cognitive functioning	Unsatisfactory	Average	-4.3	0.02
		Good	-8.1	<0.001
	Average	Unsatisfactory	4.3	0.02
		Good	-3.7	0.05
Medication effects	Unsatisfactory	Average	0.2	0.4
		Good	-0.2	0.4
	Average	Unsatisfactory	-0.2	0.4
		Good	-0.4	0.03
Social functioning	Unsatisfactory	Average	-0.7	0.7
		Good	-3.9	0.001
	Average	Unsatisfactory	0.7	0.7
		Good	-3.1	0.01
QOLIE-31 total score	Unsatisfactory	Average	-10.2	0.03
		Good	-20.3	<0.001
	Average	Unsatisfactory	10.2	0.03
		Good	-10	0.02

as on emotional state, socializing and QOLIE-31 total score. Similar correlations between age and QOLIE total score were reported in most of the studies in this field (Miller et al 2003; Szaflarski et al 2006; Giray et al 2009; Edefonti et al 2011). In the study "Quality of Life in Patients with epilepsy in India", the authors reported no correlation between age and QOLIE total score, but they did report negative correlations between age and emotional state (Shetty et al 2011). Data from other studies suggest that age does not exert negative correlations with QOLIE total score (Baker et al 2001; Canuet et al 2009). In the study conducted by Luoni et al and in previous reports, older age tended to be negatively correlated with QOLIE total score, with cognitive function, energy/fatigue score and medication effects (Djibouti 2003; Luoni et al 2011). Our results show that age does not significantly affect energy/fatigue and medication effects scale scores or the fear of the occurrence of new seizures. There were no differences in QOLIE-31 total score depending on patient gender (p>0.05). Other authors have reported differences in this respect, with the female population presenting

a significantly lower QOLIE total score than the male population (Shetty et al 2011). In a study conducted in Georgia, female patients had significantly lower scores in terms of the fear of developing new seizures (Djibouti 2003). Similar results were found in a study conducted by Buck, showing low scores of energy/fatigue and overall quality of life scores in women from 15 European countries. These women came from both developed countries and countries in economic transition. This may indicate that biological and psychological factors (family issues, personal life, motherhood) may play a more important role than socioeconomic factors and the availability and access to health services. Therefore, future studies need to find the reason for this lower quality of life in women with epilepsy (Buck et al 1999). Many reports suggest that there is a lower marriage rate in individuals with epilepsy compared to the general population (Baker et al 1997). Myeong-Kyu Kim studied marital status in Asian patients with epilepsy and reported high divorce rates in these patients (Kim 2007). An Indian study reported statistically significantly lower scores for energy, emotional instability and

social isolation in married patients with epilepsy (Shetty et al 2011). In the present study, there were no statistically significant differences in QOLIE scale scores based on marital status (p> 0,05).

This study included 18 (15.9%) patients without job (unemployed), 68 (60.2%) patients with job (employed) and 27 (23.9%) patients retired because of age or disease. Other studies have reported a much lower employment rate of patients with epilepsy (17%) (Djibouti 2003), while some of them reported a more or less similar employment rate to that in our study (65%) (Herodes et al 2001). In a comprehensive study that included 15 European countries, the employment of patients ranged from 32% in Spain to 65% in Sweden (Buck et al 1999). In the same study, the employment rate has significantly altered all QOLIE scales. Statistical analysis in the current study showed that unemployed patients or pensioners had significantly lower scores of emotional state, energy/fatigue, cognitive function, socializing scales than those who were employed. QOLIE total score was also higher in employed patients.

Education is one of the most important predictors of quality of life. This is valid for overall quality of life, cognitive function, socializing and QOLIE-31 total score (Djibouti 2003; Loring et al 2004). In this study, cognitive function scale score and QOLIE total score were statistically significantly influenced by the number of years of study.

Thirty-four (30.1%) patients revealed an unsatisfactory financial situation, 37 (32.7%) an average financial situation and 42 (37.2%) a good financial situation. Overall quality of life, emotional state, energy/fatigue, cognitive function, effects of medication, socializing and QOLIE-31 total score values were statistically significantly different depending on the financial situation of epileptic patients.

We found no significant correlations between age of onset of epilepsy and QOLIE scores (p>0.05). There was a negative correlation of low statistical significance between disease age and overall quality of life, energy/fatigue, cognitive function scores and QOLIE-31 total score. These data are similar to those from other studies showing that QOLIE total score decreases with the increasing duration of epilepsy. In some studies, duration of epilepsy was an independent predictor of the score related to the fear of new seizures (Shetty et al 2011). However, Herodes et al 2001 reported lower QOLIE total scores correlated with reduced length of disease and significant effects on energy and emotional state scores.

We demonstrated the existence of a negative correlation of high statistical significance between the number of seizures and socializing score. We found a negative correlation of average statistical significance between the number of seizures and overall quality of life score, cognitive function and QOLIE-31 total score. We found a negative correlation of low statistical significance between the number of seizures and the fear of new seizures, emotional state, energy/fatigue scores and the effects of medication. Other studies have reported that the high frequency of epileptic seizures has negatively influenced (high statistical significance) all QOLIE scales scores (Djibouti 2003; Loring et al 2004). The frequency of epileptic seizures also influenced the total score, the fear of new seizures, emotional state, energy/fatigue scores in the study conducted by Piperidou et al (2008), Birbeck et al (2002) have highlighted the significantly improved quality of life in epileptic patients who no longer have seizures. Strauss argued that long periods without seizures are the key to improving quality of life in patients with epilepsy. There have been studies that maintained the decreasing QOLIE trend correlated with increased seizure frequency, but without statistical significance (Shetty et al 2011).

There were no differences in QOLIE scale scores between different types of seizures (p>0,05). There are studies reporting a lower QOLIE total score in patients with focal-onset seizures, followed by patients with generalized-onset tonic-clinical seizures. Patients with myoclonic seizures had the highest total scores (the most affected being emotional state and effects of the medication scales) (Shetty et al 2011) .

There was no significant association between the etiological type of epilepsy and QOLIE score values (p>0.05), the results of the current study being in line with data obtained by various authors (Norsa'adah et al 2013).

The score related to the effects of medication was significantly higher in patients who were treated with VPA (1.9±0.7) than in those without this therapy (1.5±0.8), whereas patients treated with TPM had a lower score than those without this therapy. Socializing score was lower in patients treated with CBZ, PTH or PB than in those without this therapy. QOLIE-31 total score was lower in patients treated with PTH (49.1±18.6) than in those not taking this drug (59.8±18.8).

Conclusion

The control of epileptic seizures and AEDs are modifiable parameters that can be taken into consideration in order to improve quality of life in epileptic patients.

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