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Quality of life in epilepsy: comparison between Indonesian version of QOLIE-10 and QOLIE-31

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ABSTRACT

Quality of Life in Epilepsy Inventory 10 (QOLIE-10) and QOLIE-31 is used to measure patient's quality of life. While longer version of QOLIE-31 is thought to have higher validity and reliability, QOLIE-10 is shorter and more practical to use in clinical setting. This study aimed to compare Indonesian version of QOLIE-10 and QOLIE-31. This was a cross sectional study conducted at Dr. Moewardi General Hospital, Surakarta, Indonesia. Participant were asked to complete the Indonesian version of QOLIE-10 and QOLIE-31, and data obtained then analysed to find the correlation between QOLIE-10 and QOLIE-31. A total of 51 epilepsy patients were included on this study. We observed correlation of 0.41 to 0.84 ($p<0.05$) for each item of QOLIE-10 with their respective QOLIE-31 subscale. We also found correlation value of 0.898 ($p=.000$) between total score of QOLIE-10 and QOLIE-31 showing strong positive correlation of two questionnaire. Independent T-sample test on QOLIE-10 and QOLIE-31 T-score result of $p=.361$, showing no statistical difference between two questionnaires. Frequency of seizure is correlated with patients' quality of life. QOLIE-10 has strong positive correlation to QOLIE-31, which make it a useful tool to assess epilepsy patients' quality of life.

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1. INTRODUCTION

Epilepsy is a common neurological disorder with clinical manifestation of seizure [1]. Epilepsy could developed at any age, and it is estimated that over 45 million people are living with epilepsy in the world [2]. Prevalence of epilepsy in developed countries ranged from 4-7 per 1,000 population and in developing countries, 5-74 per 1,000 population [3].

Epileptic seizure occurs due to excessive and abnormal neuronal activity in the brain. This seizure could affect neurobiological and cognitive function, with could result in daily activity limitation and difficulty to find work. Furthermore, it also could affect psychological aspect and social relationship. Epilepsy patients, particularly those with uncontrolled seizure, face resentment and inadequate support from their relatives [4], [5]. Several studies show that patients with epilepsy had worse quality of life compared to their healthy counterparts [6], [7].

Quality of life is defined by World Health Organization (WHO) as an individual's 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. Quality of life is determined by biological factors, and cultural, social,

and religious beliefs [8]. Several factors, for instance seizure severity, seizure frequency, stigmatization, and cognitive impairment, contribute to low quality of life on epilepsy patients [6], [9]. Quality of life in epilepsy should portrays patients' condition at interictal period [10].

In epilepsy, quality of life could be measured with Quality of Life in Epilepsy Inventory-89 (QOLIE-89), Quality of Life in Epilepsy Inventory-31 (QOLIE-31), and Quality of Life in Epilepsy Inventory-10 (QOLIE-10), which consist of 89, 31, and 10 items, respectively [11], [12]. QOLIE-89 and QOLIE-31 consist of subscale significant for quality of life in epilepsy patients. Questionnaire with multi-item scales is thought to have high reliability and validity, and provide detailed information, but it is unpractical to use in clinical setting. A shorter version of QOLIE-10 could be used as a screening tool for quality of life in epilepsy patients [13]. The purpose of this study is to compare Indonesian version of QOLIE-10 and QOLIE-31.

2. METHOD

This was a cross sectional study conducted at Dr. Moewardi General Hospital, Surakarta, Indonesia. Patient in Neurology Clinic from January to March 2022 were asked to complete Indonesian version of QOLIE-10 and QOLIE-31 questionnaire. QOLIE-10 questionnaire used was developed and validated in our institution, and QOLIE-31 was translated to Indonesian and validated before by Gunadarma *et al.* [14]. This study was approved by Universitas Sebelas Maret Research Ethic Committee with Ethical Clearance No. 101/UN27.06.6.1/KEP/EC/2021.

Participants of this study was outpatient of Neurology Clinic, Dr. Moewardi General Hospital. Purposive sampling was used in this study, where potential participants that meet inclusion and exclusion criteria were included in this study. Inclusion criteria for this study were: i) aged >18 years old; ii) could read, write, and not dependent to anyone to complete the questionnaire; iii) Indonesian native speaker; and iv) agreed to participate on this study. Exclusion criteria for this study were: i) patient with severe hearing and visual disability; and ii) patient with acute psychiatric, neurological, or medical symptoms that influence quality of life.

Data obtained was analyzed with Kolmogorov Smirnov test to determined data distribution. Data then analyzed to determine the correlation between each item of QOLIE-10 and respective QOLIE-31 subscales, and between total score of QOLIE-10 and QOLIE-31 with Pearson bivariate analysis, where $r>0.279$ indicates a correlation. Comparison between QOLIE-10 and QOLIE-31 was performed using independent T-sample test, which $p>0.05$ indicates no significant difference between the two questionnaires. Characteristic affecting quality of life was analyzed using Anova test for data with normal distribution, and Kruskal Wallis or Mann Whitney for data with abnormal distribution. Value of $p<0.05$ indicates statistically significant data. All statistical analysis was carried out using SPSS 20.0 version.

3. RESULTS AND DISCUSSION

This study was conducted at Neurology Clinic, Dr. Moewardi General Hospital, Surakarta, Indonesia in January to March 2022. A total of 51 epilepsy patients met the inclusion and exclusion criteria and included on this study. QOLIE-10 and QOLIE-31 questionnaire were completed by participants and analyzed to be compared. Characteristic of participants were presented in Table 1.

We performed Pearson bivariate analysis on each item of QOLIE-10 to its respective subscale of QOLIE-31. We observed correlation of 0.41 to 0.84, with $p<0.05$ which shows positive correlation between QOLIE-10 and QOLIE-31. Result of Pearson bivariate analysis is detailed in Table 2.

From the data obtained, we also perform calculation to determine quality of life score. On QOLIE-10, lower score indicates fewer problems faced and better quality of life. In contrast, on QOLIE-31, higher score indicates better quality of life. To compare the questionnaires, both QOLIE-10 and QOLIE-31 was converted into a T-score according to the scoring guidelines of each questionnaire. Score and T-score of QOLIE-10 and QOLIE-31 were presented on Table 3. Both T-scores then analyzed with Kolmogorov Smirnov test to determined data distribution. We discovered $p=.51$ and $p=.96$ ($p>.05$) for QOLIE-10 and QOLIE-31 T-score, respectively. This result shows T-score data is normally distributed. Pearson correlation test was done to determined correlation between T-score of QOLIE-10 and QOLIE-31. We discovered correlation of 0.898 ($p=.000$) which indicates strong correlation between both questionnaires. Independent T-sample test also done on QOLIE-10 and QOLIE-31 T-score, with result of $p=.361$, showing no statistical difference between two questionnaires.

Table 1. Subject characteristics

Subject characteristics	Total (%)
Age (years)	
18-32	16 (31.4%)
33-54	27 (52.9%)
55-72	8 (15.7%)
Gender	
Male	26 (50.9%)
Female	25 (49.1%)
Marital status	
Single	16 (31.4%)
Married	33 (64.7%)
Divorced or widowed	2 (3.9%)
Educational level	
No formal education	2 (3.9%)
Primary school	8 (15.7%)
Secondary school	7 (13.7%)
High school	20 (39.2%)
Academy	4 (7.9%)
University	10 (19.6%)
Occupation	
Student	5 (9.8%)
Employee	11 (21.6%)
Housewife	8 (15.7%)
Not working	10 (19.6%)
Entrepreneur	8 (15.7%)
Others	9 (17.6%)
Monthly Income	
No income	20 (39.2%)
<Rp. 1,000,000	8 (15.7%)
Rp. 1,000.000-Rp. 5,000,000	20 (39.2%)
>Rp. 5,000,000	3 (5.9%)
Seizure frequency	
Seizure free ≥2 years	6 (11.8%)
Seizure free 1-2 years	5 (9.8%)
Occasional: <1 seizure/year	12 (23.5%)
Moderate: 1-11 seizure/year	16 (31.4%)
Frequent: ≥1 seizure/month	12 (23.5%)
Seizure type	
Focal onset	6 (11.8%)
General onset	42 (82.3%)
Unknown	3 (5.9%)
Last seizure	
<1 month	26 (50.9%)
1 to <12 months	17 (33.3%)
12 to <24 months	2 (3.9%)
≥24 months	6 (11.8%)
Epilepsy type	
Idiopathic	31 (60.8%)
Symptomatic	20 (39.2%)
Anti-epileptic drug quantity	
Monotherapy	34 (66.7%)
Polytherapy	17 (33.3%)
Anti-epileptic drug type	
Phenytoin	27 (52.9%)
Valproic acid	3 (5.9%)
Carbamazepine	4 (7.9%)
Combination	17 (33.3%)

Table 2. Correlation between item of QOLIE-10 and subscale of QOLIE-31

Item on QOLIE-10	Subscale of QOLIE-31	Pearson Correlation	p
Seizure-worry	Seizure-worry	0.65	0.00*
Overall quality of life	Overall quality of life	0.84	0.00*
Emotional well-being	Emotional well-being	0.61	0.00*
Energy/fatigue	Energy/fatigue	0.70	0.00*
Cognitive functioning	Cognitive functioning	0.75	0.00*
Physical effect of medication	Medication effects	0.54	0.00*
Mental effects of medication	Medication effects	0.46	0.001*
Driving	Social functioning	0.41	0.003*
Work	Social functioning	0.66	0.00*
Social	Social functioning	0.62	0.00*

*Statistically significant

Table 3. Score and T-score of QOLIE-10 and QOLIE-31

	Minimum	Maximum	Mean	SD
QOLIE-10 score	1	4.5	2.27	1.64
QOLIE-10 T-score	18	69	50.00	10.00
QOLIE-31 score	11	100	66.00	18.10
QOLIE-31 T-score	18	73	51.29	11.16

We also analyzed quality of life based on subjects' characteristic. Each characteristic was first analyzed with Kolmogorov Smirnov test. Data with normal distribution then analyzed with ANOVA test, while data with abnormal distribution was analyzed with Kruskal Wallis or Mann Whitney test. Result of ANOVA, Kruskal Wallis, or Mann Whitney test were summarized in Table 4.

Table 4. Characteristics affecting quality of life

Characteristics	Data distribution (p)	QOLIE-10 (p)	QOLIE-31 (p)
Age	0.001	0.049*	0.059
Gender	0.000	0.92	0.37
Marital status	0.000	0.93	0.70
Educational level	0.037	0.49	0.58
Occupation	0.128	0.22	0.21
Monthly income	0.002	0.34	0.32
Duration of seizure	0.000	0.75	0.51
Seizure frequency	0.028	0.04*	0.03*
Seizure type	0.000	0.71	0.78
Last seizure	0.000	0.07	0.01*
Epilepsy type	0.000	0.89	0.48
Anti-epileptic drug quantity	0.000	0.07	0.02*
Anti-epileptic drug type	0.000	0.18	0.15

*Statistically significant

QOLIE is an instrument developed to assess quality of life in epilepsy patients [14]. QOLIE-89 and QOLIE-31, which consist of 89 and 31 question respectively, are widely known and was translated to several languages, including Indonesian [11], [15]. Although providing a comprehensive picture of epilepsy patients' quality of life, it requires relatively long time to complete, which make these questionnaires unpractical to use [16], [17]. Therefore, a shorter questionnaire is required as a screening tool for quality of life in epilepsy patients [18]. QOLIE-10, which consists of 10 items, is shorter, yet capture important aspect of quality of life [12]. QOLIE-10 consisting of seven components, specifically seizure worry, overall quality of life, emotional well-being, energy/fatigue, cognitive functioning, medication effects (physical and mental effects), and social functions (driving, work, and social) [11]. This questionnaire has been translated into Thai, Korean, Chinese, and several other languages [16]–[19]. This study aims to compare Indonesian version of QOLIE-10 we developed, with previously translated and validated QOLIE-31.

In this study, we performed Pearson bivariate correlation test between each item from QOLIE-10 and its respective subscale from QOLIE-31. The results of the analysis show a significant correlation with correlation value (r) between 0.41 to 0.84 ($p<0.05$). Cramer *et al.* who developed QOLIE-10 from QOLIE-89, analyzed the correlation between the English version of QOLIE-10 item and its respective subscale from QOLIE-89 and shows correlation value (r) between 0.54 to 0.73 [12]. Cramer *et al.* in their study comparing QOLIE-31 and QOLIE-10 in a clinical trial of levetiracetam also showed a good correlation between those questionnaires [20]. Study by Kanjanasilp *et al.* comparing the Thai version of QOLIE-10 and QOLIE-31 also showed a significant correlation between QOLIE-10 and QOLIE-31 items [17]. A significant correlation between the QOLIE-10 items and QOLIE-31 respective subscale was also observed on the Korean and the Turkish version [13], [19].

The data obtained then calculated to determine the score of quality of life. On QOLIE-10, quality life score is ranged from 1 to 5 [21]–[23]. We found QOLIE-10 mean score of 2.27, ranging from 1 to 4.5. Lower score indicates fewer problems faced and better quality of life. Quality of life score on QOLIE-10 ranged from 0 to 100, where in contrast to QOLIE-10, higher score indicates better quality of life [23]. We found QOLIE-31 mean score of 65.99, ranging from 11 to 100. To compare total score of QOLIE-10 and QOLIE-31, a conversion is required to produce T-score. Kolmogorov Smirnov test on T-score show $p>0.05$, which implied that all data is normally distributed. Then, the Pearson correlation test was conducted, and we discovered the correlation value of 0.898 ($p<0.05$), which shows a strong correlation between the total score of QOLIE-10 and QOLIE-31. Independent T-sample test was also done to determine the difference between these two questionnaires, with $p=.361$ ($p>.05$), which indicate that there is no significant difference between

QOLIE-10 and QOLIE-31. Significant correlation between the total score of QOLIE-10 and the total score of QOLIE-31 also observed in the Thai version [17].

We also tried to determine differences in quality of life based on the patient characteristics, including age, gender, marital status, education level, occupation, monthly income, duration of seizure, seizure frequency, seizure type, time of last seizure, epilepsy type, anti-epileptic drug quantity, and anti-epileptic drug type. There is a significant difference in the quality of life on different age group when assessed by QOLIE-10, but there is no significant difference when assessed by QOLIE-31. On the other hand, time of last seizure and anti-epileptic drug quantity produce significantly different quality of life when assessed by QOLIE-31, but no significant difference when assessed by QOLIE-10. Quality of life is also determined by frequency of seizure, both measured by QOLIE-10 and QOLIE-31. Our finding is similar to Guekht *et al.* and Haritomeni *et al.* which discovered that frequency of seizures is one of the most important determinants of poor quality of life in epilepsy patients [24], [25]. These differences should be investigated by study with bigger number of samples. Other characteristics, specifically gender, marital status, education level, occupation, monthly income, duration of seizure, seizure type, epilepsy type, and anti-epileptic drug type did not significantly affect the quality of life in this study.

QOLIE-10 is a shorter version of QOLIE-31 and QOLIE-89. Measurements with shorter instruments allow health care providers to carry out assessments without spending a lot of time and resources, which required to fill longer instrument [26]. Shorter instrument also allows assessment without reviewing all aspect of quality of life on each visit [27]. Strong correlation of QOLIE-10 and QOLIE-31 indicates that the quality of the information collected is preserved [19], [20]. Calculating total score of QOLIE-10 is also simpler than calculating total score of QOLIE-31 [28]. However, QOLIE-31 provides more information on differentiating each aspect affecting quality of life in epilepsy patients [29], [30]. Which make QOLIE-31 as a better tool for quality of life assessment if time and resources are available [20].

Our study tried to assess the correlation between Indonesian version of QOLIE-10 and QOLIE-31. We also tried to evaluate characteristics that affects quality of life in epilepsy patients. Another study with bigger participant and multi-center design is required to further evaluate factor contribute to quality of life in epilepsy patient. Comparison with more comprehensive assessment tool of QOLIE-89 could also produce better understanding of QOLIE-10 questionnaire.

4. CONCLUSION

QOLIE-10 has strong positive correlation to QOLIE-31, which makes it a useful tool to assess epilepsy patients' quality of life. There is no statistically significant difference between the Indonesian version of QOLIE-10 and QOLIE-31, so the use of QOLIE-10 will greatly improve the efficiency of epilepsy patient service time, especially in assessing the quality of life of people with epilepsy. QOLIE-10 is recommended to be applied in daily practice; thus, early intervention needed could be given early for the better management of epilepsy patients.

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