

## Original Article

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# Medication-Related Quality of Life in Thai Epilepsy Patients

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**Background and Purpose:** This study aimed to assess medication-related quality of life in Thai patients with epilepsy. The second objective was to evaluate the associations between the medication therapy-related quality of life and patient characteristics.

**Methods:** This was a cross-sectional study. A convenience sample of 173 outpatients with epilepsy was recruited from a university hospital in Bangkok, Thailand. Inclusion criteria were aged 18 or over who were continuously taking an epileptic drug for at least 3 months, understanding Thai language, and willing to participate in the study. The Patient-Reported Outcomes Measure of Pharmaceutical Therapy for Quality of Life (PROMPT-QoL) was utilized to measure the medication therapy-related quality of life. Pearson's correlation coefficients and stepwise multiple linear regressions were employed to assess the relationships between eight PROMPT-QoL domain scores and patient demographic and clinical characteristics.

**Results:** Mean age was 36.4±9.5 years and approximately 57% were female. Among eight domains of the PROMPT-QoL, the therapeutic relationships with health care providers and psychological impacts of medication use domains yielded the highest (77.9) and lowest (61.9) mean scores, respectively. Seven out of eight PROMPT-QoL domain scores were considered as moderate-to-good. Age, gender, duration of epilepsy, seizure frequency, and treatment preference were significantly associated with PROMPT-QoL domain scores in multivariate linear regression analyses.

**Conclusions:** This study showed that Thai patients with epilepsy had moderate-to-good medication therapy-related quality of life. Healthcare providers should pay more attention to patients' psychological impacts of antiepileptic drugs and those with characteristics related to lower medication therapy-related quality of life. (2019;9:139-146)

**Key words:** Epilepsy, Medication, Drug, Pharmaceutical, Quality of life, Thailand

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## Introduction

Epilepsy is a common chronic neurological disease that affects around 50 million people worldwide and 80% of people with epilepsy live in low- and middle-income countries.<sup>1</sup> In rural Thailand, its prevalence was estimated to be 7.2 per 1,000 people.<sup>2</sup>

Epilepsy is defined as having two or more unprovoked seizures separated by 24 hours.<sup>3</sup> Epilepsy can have an extremely negative impact on patients' quality of life due to seizure frequency and adverse effects of antiepileptic drugs.<sup>4-6</sup> Nevertheless, up to 70% of people living with epilepsy could live seizure-free with appropriate use of antiepileptic drugs.<sup>1</sup> Therefore, antiepileptic drugs can have both pos-

itive and negative effects on patients' lives, so assessment medication-related quality of life in patients with epilepsy is essential.

One of the most widely used quality of life questionnaires in patients with epilepsy is the Quality of Life in Epilepsy (QOLIE-31) which is an epilepsy-specific measure.<sup>7</sup> However, the QOLIE-31 focuses on measuring the impacts of epilepsy on patients' lives rather than those of medication use since there are only three out of 31 items assessing the impacts of medication. Other tools are also related to measuring the side effects of antiepileptic drugs.<sup>6</sup> Hence, previous studies in this area have not extensively assessed medication-related quality of life in patients with epilepsy.<sup>4-6</sup>

A novel generic questionnaire called Patient-Reported Outcomes

Measure of Pharmaceutical Therapy for Quality of Life (PROMPT-QoL) was developed.<sup>8</sup> It was originally in Thai and was mainly created by applying the concept of patient-centered pharmaceutical care.<sup>9</sup> In this concept, a practitioner has to be responsible for patients' drug-related needs including drug and disease understanding, expectation of effectiveness, safety or concern, and convenience to achieve their positive outcomes. The PROMPT-QoL can also be used to measure the impacts of medication therapy on patient's physical, psychological, and social aspects, etcetera. The PROMPT-QoL was found to be practical, reliable, valid,<sup>10</sup> and responsive<sup>11</sup> in Thai patients with chronic diseases. Thus, this study aimed to assess medication-related quality of life using the PROMPT-QoL, a specific medication measure for health-related quality of life, in Thai patients with epilepsy. Little was also known about associations between medication-related quality of life and patient characteristics in epilepsy patients since most previous studies assessed the relationships with health-related quality of life, non-specific medication measures.<sup>4-6,12-15</sup> Hence, the second objective was to evaluate such associations. This information will be helpful for healthcare providers to manage medication therapy for epilepsy patients.

## Methods

### Participants and procedures

This study was a cross-sectional survey. A convenience sampling was employed to recruit patients with epilepsy from King Chulalongkorn Memorial Hospital, a university hospital, in Bangkok, Thailand, between October 2016 and March 2017. Outpatients aged 18 or over, who were continuously taking an epileptic drug for at least 3 months, understood Thai language, and were willing to participate in the study, were included. Patients who could not complete the questionnaire were excluded. While waiting to see a physician at the hospital, the patients were asked to do the PROMPT-QoL by themselves. The data of patient characteristics including socio-demographic and clinical data were collected from interviews and medical records. Written informed consent was obtained from all patients. The study was approved by the Ethical Committee of the hospital (certificate of approval number: 812/2016).

### Measure

#### PROMPT-QoL

The PROMPT-QoL has 43 items including nine domains: general attitude toward medication use (1 item), medication and disease in-

formation (9 items), satisfaction with medication effectiveness (3 items), impacts of medications and side-effects (8 items), psychological impacts of medication use (9 items), convenience (3 items), availability and accessibility (4 items), therapeutic relationships with healthcare providers (3 items), and overall quality of life (3 items). Each item has 5-point Likert scale from "not at all" to "very much" except only one item of general attitude toward medication use domain, which provides respondents with four treatment types (medications, alternative medications [e.g., herbs, supplementary food, massage, acupuncture, mind-body interventions], both, or others than mentioned), and asks them to indicate their preferred type of treatment. Thus, only 42 items are summed to calculate the other eight PROMPT-QoL domain scores. The recall period of the PROMPT-QoL is today. In this study, the Cronbach's alpha of the 42-item PROMPT-QoL was 0.923, which was interpreted as good internal consistency reliability.<sup>16</sup>

Item scores range from 1 to 5, with higher scores indicating better quality of life. Observed domain scores are then converted to percentages (0-100) using the following formula: Domain scores =  $100 \times (\text{observed score} - \text{minimum domain score}) / (\text{maximum domain score} - \text{minimum domain score})$ . Domain scores range between 0-25, 26-50, 51-75, and 76-100, which are interpreted as low, fair-to-moderate, moderate-to-good and good-to-excellent quality of life, respectively.

### Data analysis

To summarize patient characteristics, means, standard deviations, medians, and interquartiles were calculated for continuous variables, while frequencies and percentages were used for categorical variables. Descriptive statistics of the PROMPT-QoL were presented with means, standard deviations, medians and interquartiles of its items and domains. The general attitude toward medication use item was presented with percentages. For univariate analyses, Pearson's correlation coefficients were utilized to assess the relationships between eight PROMPT-QoL domain scores and patient characteristics. To adjust for confounders, stepwise multiple linear regressions were employed. The data were checked and met all assumptions for a multiple linear regression. The patient characteristics included age, gender, education, employment status, duration of epilepsy, number of antiepileptic drugs, seizure frequency per three months, and treatment preference. A rule of thumb of 10 to 12 participants per variable was used.<sup>17</sup> Thus, the required sample size was at least 80 to fit multiple linear regression models. *p*-values less than 0.05 were con-

sidered significant. All analyses were performed using IBM SPSS version 22 (IBM Corp., Bangkok, Thailand).

## Results

### Patient characteristics

Of 180 eligible patients, seven patients who could not complete the PROMPT-QoL were excluded. Thus, there were 173 patients left for data analysis. Table 1 shows the patient characteristics. The mean age was 36.4±9.5 years and approximately 57% were female. Most patients finished at least university. More than half of the sample was employed. The average duration of epilepsy was 17.8±9.5 years. Most patients used polytherapy. About half of the sample had at least one seizure per three months.

**Table 1.** Patient characteristics (n=173)

Characteristic	Value
Age (years)	36.4±9.5
Median (interquartile)	36 (29-44)
Gender	
Male	75 (43.4)
Female	98 (56.6)
Number of education years	12.5±3.8
Median (interquartile)	12 (9-16)
Employment status	
Employed	97 (56.1)
Housewife	18 (10.4)
Student	12 (6.9)
Retired	7 (4.1)
Unemployed	39 (22.5)
Duration of epilepsy (years)	17.8±9.5
Median (interquartile)	17 (12.0-21.5)
Number of antiepileptic drugs	2.2±1.1
Median (interquartile)	2 (2-3)
Seizure frequency per 3 months	
0	87 (50.3)
>0	86 (49.6)
Treatment preference	
Medications	132 (76.3)
Alternative medications	4 (2.3)
Both medications and alternative medications	29 (16.8)
Others	8 (4.6)

Values are presented as mean±standard deviation or number (%) unless otherwise indicated.

### Medication therapy-related quality of life

For the general attitude toward medication use question, most of the sample preferred to use only medication treatment (76%), while the others wanted both medication and alternative treatments (17%), others (5%), or only alternative treatments (2%), respectively (Table 1). The descriptive statistics of the items and the other domains of the PROMPT-QoL are presented in Table 2.

For the medication and disease information domain, the items with the mean scores lower than 3.5 included "strength (3.2)" and "what to do if medication doses are missed (3.4)". For the satisfaction with medication effectiveness domain, the "onset of medication action" item provided the lowest mean score (3.7). For the impacts of medications and side-effects domain, the item "memory and cognition" yielded the lowest mean score (3.5). Regarding the psychological impacts of medication use domain, all items had the mean scores lower than 4 except only the item "taking medication in front of others" (4.2).

For the convenience domain, the item "appropriate dosage forms" provided the lowest mean score (3.5). For the availability and accessibility domain, the items "service process and waiting time" and "travel or self-support to hospital" yielded the lowest mean scores of 3.5. For the therapeutic relationships with healthcare providers domain, all items provided the mean scores above 4. For the overall quality of life domain, the item "happiness" had the lowest mean score (3.6).

As for domain scores, the therapeutic relationships with health care providers and the psychological impacts of medication use domains yielded the highest (77.9) and lowest (61.9) mean scores, respectively.

### Associations between medication therapy-related quality of life and patient characteristics

As shown in Table 3, younger age, shorter duration of epilepsy, and higher number of antiepileptic drugs were significantly associated with higher medication and disease information domain scores. However, after adjusting for covariates by the multiple linear regression (Table 4), only age was significantly correlated. Patients with free seizure and medication preference had significantly higher satisfaction of medication effectiveness domain scores than those with seizure and combined medication and alternative treatments (both univariate and multivariate analyses).

Patients with medication preference provided significantly higher impacts of medications and side-effects domain scores than those with combined medication and alternative treatments (both uni-

**Table 2.** Descriptive statistics of item and domain scores of the PROMPT-QoL

Measure	Mean±SD	Median	Interquartile
Receiving drug and disease information	66.5±19.1	66.7	55.6-79.2
Drug name	3.7±1.0	4	3-4
Strength	3.2±1.2	4	2-4
Indication	3.8±0.9	4	3-4
How to use medications	3.9±0.9	4	3-5
Reason for using medications regularly	3.9±1.0	4	3-5
What to do if medication doses are missed	3.4±1.2	4	3-4
Side-effects and management	3.6±1.1	4	3-4
Causes and prevention	3.8±1.0	4	3-4
Symptoms, severity, and treatment	3.7±1.0	4	3-4
Satisfaction with medication effectiveness	72.8±20.8	75.0	58.3-91.7
Symptom relief	4.0±0.9	4	4-5
Cure at first time	4.0±1.0	4	3-5
Onset of medication action	3.7±1.0	4	3-4
Impacts of medications and side-effects on	72.5±20.2	75.0	59.4-87.5
Mobility, energy, pain, and discomfort	3.8±1.2	4	3-5
Sleep	3.7±1.1	4	3-5
Memory and cognition	3.5±1.1	4	3-4
Appearance or body skin	4.0±1.1	4	3-5
Eating, digestion, or stool passing	4.2±1.1	4	4-5
Vision, hearing, and speech	4.0±1.1	4	3-5
Intercourse and sexual desire	4.4±1.0	5	4-5
Daily activities or socializing with others	3.8±1.3	4	3-5
Psychological impacts of medication use	61.9±23.5	61.1	45.8-80.6
Medication side effects	3.4±1.2	3	2-4
Feeling bored with taking medication every day	3.5±1.2	4	3-5
Medication resistance or ineffectiveness	3.5±1.3	4	3-5
Medication dependence	3.0±1.5	3	2-4-5
Changing type/strength of medication	3.5±1.3	3	3-5
Taking many medications	3.3±1.3	3	2-4-5
Taking medication in front of others	4.2±1.0	5	4-5
Medication interaction	3.6±1.2	4	3-5
Taking medication makes you less healthy than person with the same age	3.3±1.3	3	2-4
Convenience	67.3±20.0	66.7	50.0-83.3
Appropriate dosage forms	3.5±1.0	3	3-4
Convenience of use	3.7±1.0	4	3-4
Ease of carrying medications around	3.8±0.9	4	3-5
Availability/accessibility	69.0±18.1	68.9	56.3-81.3
Medication availability in a setting	4.4±1.0	5	4-5
Medication and travel expenses	3.7±1.2	4	3-5
Service process and waiting time	3.5±1.0	3	3-4
Travel or self-support to hospital	3.5±1.1	3	3-4
Therapeutic relationships with health care providers	77.9±16.8	75.0	66.7-91.7
Trust doctor's decision on medication treatment	4.2±0.8	4	4-5
Friendly manners and willingness to answer medication queries	4.1±0.9	4	4-5
Getting help to sort out medication-related problems or concerns	4.0±0.8	4	4-5
Overall quality of life	68.8±20.4	66.7	58.3-83.3
Satisfaction with medication use	3.9±0.9	4	3.5-5
Happiness	3.6±0.9	4	3-4
Improvement in daily life	3.7±1.09	4	3-4

PROMPT-QoL, Patient-Reported Outcomes Measure of Pharmaceutical Therapy for Quality of Life; SD, standard deviation.

**Table 3.** Pearson's correlation coefficients between PROMPT-QoL domain scores and patient characteristics

	MDI	SME	IMS	PIMU	CON	AA	TRHC	OQoL
Age (years)	-0.201*	0.146	0.082	0.092	0.190 <sup>†</sup>	0.202*	0.060	0.202*
Gender (1, female; 2, male)	-0.021	0.056	0.120	0.148	0.063	0.038	0.035	0.028
Number of education years	0.018	-0.029	0.051	-0.045	-0.050	-0.127	0.013	-0.012
Employment status (1, unemployed/housewife/student/retired; 2, employed)	-0.049	-0.066	0.087	0.083	0.010	0.095	-0.050	-0.022
Duration of epilepsy (years)	-0.178 <sup>†</sup>	0.094	0.101	0.164 <sup>†</sup>	0.019	0.131	0.007	0.142
Number of antiepileptic drugs	0.167 <sup>†</sup>	-0.066	-0.041	0.050	-0.014	0.059	0.143	-0.007
Seizure frequency per 3 months (1, 0; 2, >0)	0.083	-0.256*	-0.129	-0.153 <sup>†</sup>	-0.197*	-0.104	-0.051	-0.274*
Treatment preference (1, medications; 2, both medications and alternative medications, alternative medications and others)	-0.125	-0.274*	-0.246*	-0.247*	-0.064	-0.153 <sup>†</sup>	-0.069	-0.281*

PROMPT-QoL, Patient-Reported Outcomes Measure of Pharmaceutical Therapy for Quality of Life; MDI, medication and disease information; SME, satisfaction of medication effectiveness; IMS, impacts of medications and side-effects; PIMU, psychological impacts of medication use; CON, convenience; AA, availability and accessibility; TRHC, therapeutic relationships with healthcare providers; OQoL, overall QoL.

\* $p < 0.01$ .

<sup>†</sup> $p < 0.05$ .

**Table 4.** Multiple linear regression models of PROMPT-QoL domain scores

Patient characteristic (independent variable)	MDI	SME	IMS	PIMU	CON	AA	TRHC*	OQoL
Age (years)	-0.201 <sup>†</sup>	0.132	0.086	0.038	0.176 <sup>‡</sup>	0.204 <sup>†</sup>	-	0.187 <sup>†</sup>
Gender (1, female; 2, male)	-0.042	0.020	0.102	0.145 <sup>‡</sup>	0.067	0.047	-	0.010
Number of education years	-0.011	0.003	0.066	-0.001	-0.011	-0.091	-	-0.012
Employment status (1, unemployed/housewife/student/retired; 2, employed)	0.010	-0.065	0.101	0.038	-0.054	-0.050	-	-0.080
Duration of epilepsy (years)	-0.108	0.067	0.097	0.173 <sup>‡</sup>	-0.105	0.043	-	0.036
Number of antiepileptic drugs	0.140	0.002	-0.039	0.076	0.073	0.093	-	0.099
Seizure frequency per three months (1, 0; 2, >0)	0.067	-0.225 <sup>†</sup>	-0.100	0.098	-0.183 <sup>†</sup>	-0.070	-	-0.227 <sup>†</sup>
Treatment preference (1, medications; 2, both medications and alternative medications, alternative medications, others)	-0.122	-0.245 <sup>†</sup>	-0.246 <sup>†</sup>	-0.233 <sup>†</sup>	-0.044	-0.156 <sup>‡</sup>	-	-0.255 <sup>†</sup>
Adjusted R <sup>2</sup>	0.035	0.115	0.055	0.092	0.059	0.054	-	0.157

Values in the table indicate standardized regression coefficients.

PROMPT-QoL, Patient-Reported Outcomes Measure of Pharmaceutical Therapy for Quality of Life; MDI, medication and disease information; SME, satisfaction of medication effectiveness; IMS, impacts of medications and side-effects; PIMU, psychological impacts of medication use; CON, convenience; AA, availability and accessibility; TRHC, therapeutic relationships with healthcare providers; OQoL, overall QoL.

\*No variables were entered into the model since there were no significant variables.

<sup>†</sup> $p < 0.01$ .

<sup>‡</sup> $p < 0.05$ .

variate and multivariate analyses). For univariate analysis, longer duration of epilepsy, free seizure and medication preference were significantly related with higher psychological impacts of medication use domain scores (Table 3). Nevertheless, the multivariate regression showed that male gender, longer duration of seizure, and

medication preference were significantly correlated with higher psychological impacts of medication use domain scores (Table 4). Older age and free seizure were significantly associated with higher convenience domain scores (both univariate and multivariate analyses). Older age and medication preference were significantly correlated

with higher availability and accessibility domain scores (both univariate and multivariate analyses). Univariate analyses found that therapeutic relationships with healthcare providers domain scores were not significantly related with all eight patient characteristics (Table 3). Hence, there were no variables entered into the stepwise multivariate linear regression (Table 4). Older age, free seizure, and medication preference were significantly associated with higher overall quality of life domain scores (both univariate and multivariate analyses).

## Discussion

To the best of our knowledge, this is the first study to extensively assess medication therapy-related quality of life using a new specific medication questionnaire (i.e., PROMPT-QoL) and its associations with patients' demographic and clinical characteristics in epilepsy patients.

### Medication-related quality of life

For the general attitude toward medication use item, unsurprisingly, most patients preferred to use only medications for treating their epilepsy since the original purpose of their visit to the hospital was to receive antiepileptic drugs. However, approximately 19% of the sample wanted the combination between medication, alternative treatments and only alternative treatments. This is in line with the study conducted in Thailand reporting that 12.5% of patients with epilepsy used herbal medication use.<sup>18</sup>

For the other eight domains, the Thai patients with epilepsy provided seven mean domain scores between 61.9 and 72.8, which were considered as moderate-to-good. Only therapeutic relationships with health care providers domain had the highest mean domain score of 77.9, meaning a good-to-excellent medication therapy-related quality of life.

Among the eight domains, the psychological impacts of medication use domain yielded the lowest score of 61.9. The reason that patients with epilepsy had the lowest domain score for the psychological impacts of medication use may be due to the fact that most of them were still young (the mean age of 36). Hence, they were feared or worried about medication side effects, dependence, taking many medications, and their use of medication making them less healthy than person with the same age since these items provided low scores (<3.5). This is in line with a previous study that found patients with drug refractory epilepsy were worried about the long-term side ef-

fects of the drugs on their body.<sup>12</sup> Additionally, they were concerned about changing type/strength of medication, medication ineffectiveness, and feeling bored with taking medication every day (item scores of 3.5). Therefore, healthcare providers should take more care of these concerns of patients to enhance their medication therapy-related quality of life.

In addition to the psychological impacts of medication use items above, the items with low scores ( $\leq 3.5$ ) of their domains indicated that Thai healthcare providers should pay more attention. They included "strength", "what to do if medication doses are missed", the impacts of medications' side-effects on memory and cognition", "appropriate dosage forms", "service process and waiting time", and "travel or self-support to hospital."

### Associations between medication-related quality of life and patient characteristics

Both univariate and multivariate analyses found that age and treatment preference were significantly associated with most PROMPT-QoL domains. The older patients tended to have higher domain scores except for the medication and disease Information domain. A possible explanation is that the younger patients were more likely to ask healthcare providers the questions about drug and disease information when they did not understand than the older patients. However, the younger patients had lower scores of the convenience, availability and accessibility, and overall quality of life domains, which healthcare providers should pay more attention to. The patients who preferred only medication treatment also tended to have higher PROMPT-QoL domain scores. This is consistent with a previous study in Thai patients with chronic diseases.<sup>10</sup> A possible reason is that the patients who were not satisfied and worried about taking their medications were more likely to seek alternative medications or other treatments than those who were and were not.

The univariate analysis showed that the patients with at least one seizure in 3 months had significantly lower four domain scores, but the multivariate analysis found three significant domains. These results are in line with previous studies which found that good seizure control was significantly related with higher health-related quality of life.<sup>4,6</sup> A possible reason is that the patients with more seizure frequencies were more likely to be unsatisfied and inconvenient about taking antiepileptic drugs than those free from seizure.

Based on univariate and multivariate analyses, education and employment status were not significantly associated with all 8 PROMPT-QoL domain scores. This result is consistent with a previous

study which reported that education and employment status did not significantly affect health-related quality of life.<sup>13</sup> Additionally, gender was not significantly related with PROMPT-QoL domain scores in the univariate analyses. However, the multivariate analysis found that females were more likely to have lower psychological impacts of medication use than males. This contrasts with a previous systemic review that found that gender was not significantly associated with health-related quality of life in adults with epilepsy.<sup>15</sup>

Higher number of antiepileptic drugs was significantly associated with higher medication and disease information domain score in the univariate analysis. However, after adjusting for covariates, no significant result was found. This is in line with a previous study reporting that number of antiepileptic drugs was not significantly associated with health-related quality of life in Iraq patients with epilepsy.<sup>19</sup> Moreover, duration of epilepsy was significantly correlated with the medication and disease information and psychological impacts of medication use domain scores in the univariate analysis. Nevertheless, the multivariate analysis found that the patients with longer duration of seizure had significantly higher psychological impacts of medication use domain score than those with shorter duration. This is not consistent with a previous study which reported that lower health-related quality of life was significantly associated with longer duration of the disease.<sup>13-14</sup> A possible explanation is that the new patients might not get used to taking antiepileptic drugs, so they were more worried or concerned about taking them.

### Strengths and limitations

This study comprehensively assessed medication-related quality of life and its associations with patient characteristics in epilepsy patients, which have not been reported before. Nevertheless, it had some limitations as follows. First, since this study was conducted in only one public university hospital in Bangkok, the capital city of Thailand, it might not be generalized to other settings. Second, this study also employed convenience sampling, so it might cause sampling bias. Hence, further research can be done in other healthcare settings and apply a random sampling method.

This study has demonstrated the medication-related quality of life of Thai patients with epilepsy using the PROMPT-QoL a novel specific medication measure for health-related quality of life. Most domain scores were moderate-to-good. Age, gender, duration of epilepsy, seizure frequency, and treatment preference were significantly associated with PROMPT-QoL domain scores in multivariate linear regression analyses. Healthcare providers should pay more attention to

patients' psychological impacts of antiepileptic drugs and those with characteristics related to lower medication-related quality of life.

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### Conflict of Interest

The authors declare that they have no conflicts of interest.

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