Original Article

Quality of Life in Stroke Patients at Outpatient Rehabilitation Clinic, Siriraj Hospital

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ABSTRACT

Objectives: To study quality of life in stroke patients measured with Stroke Impact Scale (SIS) and related factors.

Study design: Descriptive study

Setting: Department of Rehabilitation Medicine, Siriraj Hospital

Subjects: Stroke patients at outpatient clinic, Department of Rehabilitation Medicine, Siriraj Hospital

Methods: Data collection and interview by questionnaire: demographic data, Thai version of SIS 3.0, modified version of Rankin scale (MRS), the Barthel index (BI) and the Patient Health Questionnaire-9 (PHQ9) Thai version.

Results: There were 175 stroke patients with an average age 63 years old (SD 11.4). The study revealed 59.4% males, 65.7% ischemic stroke, 82.9% first time stroke, 50.9% history of inpatient rehabilitation admission and 60% spasticity. Common comorbidities were 88.6% hypertension, 76.6% dyslipidemia, 32.6% diabetes mellitus and 18.9% heart disease. SIS score in descending order were communication 94.1 (12.0), memory and thinking 89.8 (16.2), emotion 72.7 (16.0), participation in social 64.8 (21.1), activities of daily living 62.6 (27.6), mobility 59.7 (31.5), the self-recovery rating 56.6 (22.2), the use of the weak hand 44.4 (36.9) and the strength of the body 40.8 (21.2) respectively. The mean of SIS composite physical domain was 51.9 (25.6). The factors that correlated with quality of life SIS composite physical domain were ability to perform activities of daily living by BI score (p <0.001), disability level by MRS (p < 0.001), spasticity (p < 0.05) and depression by PHQ9 score (p < 0.05).

Conclusion: Stroke affects quality of life in domains of body strength and the use of the weak hand more than other domains. The important factors were ability to perform activities of daily living by BI score and depression by PHQ9 score. Therefore, this study suggested that rehabilitation program to increase ability to perform activities of daily living and treatment of depression would improve quality of life.

Keywords: stroke, quality of life, depression, outpatients, rehabilitation

ASEAN J Rehabil Med. 2020; 30(3): 123-128.

Introduction

In Thailand, stroke is one of the common diseases in general practice. From the study in 2014, the prevalence of cerebrovascular disease was 1.30%[1] and is more common in males. The average age of stroke occurs at 65 years.[2] Stroke was also the leading cause of disease burden in Thailand.[3] Burden of disease is indicated by Disability-Adjusted Life Years (DALYs) which is associated with quality of life (QOL). Quality of life depends on multiple factors such as physical, psychological, social and environmental factors.

There were two kinds of QOL assessment form used in stroke patients, general QOL and stroke specific QOL assessment form. General QOL assessment form commonly used in Thailand are the Short Form 36 (SF-36)[4] or World Health Organization Quality of Life Instruments (WHOQOL-BREF).[5,6] There are many types of stroke-specific QOL assessment forms, such as Stroke Impact Scale (SIS), Stroke Specific Quality of Life measurement (SSQOL), and so on. The assessment of QOL for stroke patients should be performed in all aspects due to the variety of symptoms and severity. SIS is a questionnaire which has questions more than other measurements. It covers the effects of stroke in various areas. The third version of SIS (SIS 3.0) is a fifty-nine-item stroke-specific outcome. It consists of eight domains: strength, memory and thinking, emotion, communication, activity of daily living (ADL), mobility, hand function and social participation. Four of the subscales: strength, ADL, mobility and hand function, can be combined into a physical domain.[7] Scores for each domain range from 0 to 100 and higher scores indicate better QOL. According to a comparative study of the SIS and SF-36, SIS covers more specific problems with stroke patients especially in domains of ADL, mobility, hand function and social participation.[8]

In Thailand, SIS 3.0 was translated into Thai. The reliability and validity study of Thai version of SIS 3.0 found that it can be used to evaluate the QOL of Thai stroke patients.[9] However, there was no study using Thai version of SIS 3.0 to evaluate QOL in stroke patients in large scale. And as time

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Received: 6th November 2019 Revised: 8th July 2020 Accepted: 3rd September 2020

passed, financial, social and environmental factors affecting QOL would change. Therefore, the objective of this research is to study the QOL of stroke patients by using the Thai version of SIS 3.0 and to find factors related to the QOL. The information will be useful for rehabilitation planning, helping patients and their families and developing stroke patient care guideline.

Methods

This descriptive study was conducted at the outpatient rehabilitation clinic of Siriraj Hospital – Thailand's largest university-based tertiary referral center (Bangkok, Thailand). The protocol for this study was approved by the Siriraj Institutional Review Board (SIRB), Faculty of Medicine, Siriraj Hospital, Mahidol University (Si 636/2016 (EC2)).

Participants

Inclusion criteria

- Diagnosis of stroke with hemiplegia at least 1 month
- At least 18 years old

Exclusion criteria

- Dementia or cognitive impairment (defined as Thai Mental State Examination (TMSE) ≤ 23)
- Language impairment or could not speak Thai
- Unstable medical conditions

Instruments

1. Thai Mental State Examination (TMSE)[10]
2. Basic characteristic questionnaire
3. Barthel activities of daily living index (BI)[11-13]
4. Thai version of the Patient Health Questionaire-9 (PHQ9)[14,15]
5. Thai version of SIS 3.0[9]
6. Modified Rankin scale (MRS)[16-18]

Participants were interviewed by using basic characteristics questions, BI, PHQ-9 and Thai version of SIS 3.0. The participants did the Thai version of SIS 3.0 by themselves or the interviewer read the question and recorded the answers for them.

Statistical analysis

Data were analyzed by PASW (SPSS) Statistics for Windows version 18 (SPSS Inc. Chicago, IL, USA). Descriptive statistics were used to describe the basic data in this study. Categorical data were presented by the frequencies and percentage. Continuous data were presented by mean and standard deviation (SD). The continuous outcomes of Thai version of SIS 3.0 were analyzed by unpaired t-test for two independent groups and one-way analysis of variance (ANOVA) for more than two independent groups. A multi-factor ANOVA or general linear model (GLM) was used to determine factors related to QOL. Statistical significance was set at $p < 0.05$.

Results

There were 175 stroke patients with an average age of 63 years old (SD 11.4). The study revealed 59.4% males, 65.7% patients with ischemic stroke, 30.3% patients with hemorrhagic stroke, 82.9% had first time stroke. The number of patients with weakness of the left hemisphere and the right hemisphere were nearly equal. Basic characteristics, MRS disability level, BI and PHQ9 are shown in Tables 1 and 2.

SIS scores in various domains are shown in Table 3. The top three highest QOL scores were communication 94.1 (12.0), memory and thinking 89.8 (16.2) and emotion 72.7 (16.0) while the lowest score was the strength of the body domain at 40.8 (21.2).

Factors related to SIS scores were age, education, hypertension, occupation, income, spasticity, BI, MRS and depression. (Table 4)

In regard to SIS composite physical domain score, factors that were significantly correlated with better outcome were ability to perform activities of daily living by BI score ($p < 0.001$), low disability level by MRS ($p < 0.001$), no spasticity ($p < 0.05$), no depression by PHQ9 score ($p < 0.001$), history of rehabilitation ($p = 0.049$) and younger age ($p = 0.016$).

Table 1. Demographic data of 175 stroke patients

Information	
Age (years)[1]	63 (11.4)
Sex[2]	
Male	104 (59.4)
Female	71 (40.6)
Marital status[2]	
Single	26 (14.9)
Married	115 (65.7)
Divorced	12 (6.9)
Widowed	22 (12.6)
Caregiver[2]	
Family	163 (93.1)
Non-family	6 (3.4)
None	6 (3.4)
Residence[2]	
House	172 (98.3)
Nursing care	3 (1.7)
Education[2]	
Under bachelor degree	134 (77.0)
Bachelor degree and higher	40 (23.0)
Occupation[2]	
None	131 (74.9)
Employed	26 (14.9)
Own business	18 (10.3)
Income (baht)[2]	
< 30,000	154 (88.0)
≥ 30,000	21 (12.0)
Debt[2]	
Yes	44 (25.1)
No	131 (74.9)

[1]Mean (SD), [2]number (%)

Table 2. Clinical characteristics of stroke

Parameters	Number (%)
Type	
Ischemic	115 (65.7)
Hemorrhagic	53 (30.3)
Both	7 (4.0)
Side of weakness	
Right	78 (44.6)
Left	85 (48.6)
Both	12 (6.9)
Attack number	
1 time	145 (82.9)
> 1 time	29 (16.6)
Onset	
< 6mo	50 (28.6)
6mo-less than 1yr	32 (18.3)
1yr- less than 5yrs	49 (28.0)
5yr- less than 10yrs	25 (14.3)
> 10yr	19 (10.9)
Comorbidity	
Hypertension	155 (88.6)
Dyslipidemia	134 (76.6)
Diabetes mellitus	57 (32.6)
Heart disease	33 (18.9)
History of rehabilitation	
Never	48 (27.4)
Outpatient	38 (21.7)
Inpatient	89 (50.9)
Feeding	
Oral	167 (95.4)
NG tube	5 (2.9)
Both	3 (1.7)
Spasticity	
Present	105 (60.0)
Absent	70 (40.0)
Severity level of disability (MRS)	
0 No symptom	1 (0.6)
1 No significant disability	34 (19.4)
2 Slight disability	57 (32.6)
3 Moderate disability	54 (30.9)
4 Moderate severe disability	22 (12.6)
5 Severe disability	7 (4.0)
Activities of daily living, Barthel index (BI)	
BI 0-20	9 (5.1)
BI 25-45	25 (14.3)
BI 50-70	38 (21.7)
BI 75-90	39 (22.3)
BI 95-100	64 (36.6)
Depression, PHQ9	
Absent (0-8)	129 (73.7)
Present (9-27)	46 (26.3)

NG, nasogastric; MRS, modified Rankin Scale;
PHQ9, Patient Health Questionnaire-9

Table 3. Mean scores in each domain of SIS comparing to other studies

Dimensions	This study mean (SD)	Garnjanagoonchorn A. [9] mean (SD)	Carod-Artal FJ et al.[19] mean (SD)
SIS1 Strength	40.8 (21.2)	38.1 (21.7)	47.6 (27.9)
SIS2 Memory and thinking	89.8 (16.2)	86.5 (19.3)	70.8 (22.3)
SIS3 Emotion	72.7 (16.0)	72.0 (21.6)	52.2 (12.4)
SIS4 Communication	94.1 (12.0)	95.4 (9.3)	77.6 (22.1)
SIS5 ADL IADL	62.6 (27.6)	65.0 (26.1)	53.0 (25.5)
SIS6 Mobility	59.7 (31.5)	60.5 (30.3)	50.0 (28.5)
SIS7 Hand function	44.4 (36.9)	30.1 (33.6)	26.5 (34.2)
SIS8 Participation	64.8 (21.1)	65.0 (29.1)	50.6 (23.2)
The self-recovery rating	56.6 (22.2)	56.8 (20.5)	56.6 (25.1)
SIS Physical domain (1+5+6+7)	51.9 (25.6)	48.4 (20.3)	46.6 (24.8)

ADL, activities of daily living; IADL, instrumental activities of daily living

(Table 5) Regarding history of rehabilitation, there was significant difference between never and history of inpatient group at *p*-value 0.045.

A multi-factor ANOVA or general linear model (GLM) was conducted to determine factors that affect SIS physical domain score significantly. Factors that were significantly related to SIS physical domain score include the ability to perform ADL by BI score ($p < .001$), disability level by MRS ($p < 0.001$), spasticity ($p = 0.006$) and depression by PHQ9 score ($p = 0.034$). (Table 5)

Regarding rehabilitation program attendance and the severity of disability, 43.8% of those in the no rehabilitation program group (never rehabilitation) were patients with slight disability (MRS = 2), 37.1% of those with a history of inpatient rehabilitation were patients with moderate disability (MRS = 3) and 34.2% of those with a history of outpatient rehabilitation were patients with moderate to severe disability (MRS = 4-5).

Discussion

To our knowledge, this is the largest quality of life study in stroke patients using Thai version of SIS 3.0 in Thailand. Regarding stroke characteristics, ischemic stroke was the most common one. Hypertension, dyslipidemia and diabetes mellitus were the most common comorbidities which were modifiable stroke risk factors. Our study revealed that all domains of QOL of stroke patients measured by Thai version of SIS 3.0 is consistent with the previous research.[9,19] The study had the similar tendency of the SIS score as shown in

Table 4. Factors related to each domain of stroke impact scale (SIS)

Variable	*p*-value[a] SIS score									
	Physical 1+5+6+7	SIS1 Strength	SIS2 Memory and thinking	SIS3 Emotion	SIS4 Communication	SIS5 ADL	SIS6 Mobility	SIS7 Hand function	SIS8 Participation	Self-rating
Age	0.016*	0.906	0.691	0.923	0.960	0.006*	0.001*	0.036*	0.728	0.825
Sex	0.718	0.916	0.201	0.992	0.961	0.953	0.956	0.345	0.330	0.160
Marital status	0.693	0.535	0.869	0.318	0.875	0.727	0.845	0.165	0.276	0.169
Education	0.078	0.657	0.845	0.584	0.325	0.095	0.041*	0.100	0.703	0.813
Hypertension	0.603	0.601	0.902	0.503	0.002*	0.426	0.947	0.622	0.492	0.374
Dyslipidemia	0.794	0.815	0.402	0.919	0.420	0.749	0.874	0.629	0.059	0.264
Diabetes mellitus	0.566	0.741	0.294	0.785	0.122	0.488	0.620	0.645	0.521	0.120
Heart disease	0.173	0.894	0.149	0.084	0.280	0.113	0.094	0.273	0.201	0.479
Occupation	0.693	0.274	0.568	0.033*	0.989	0.160	0.046*	0.493	0.415	0.770
Income (Baht)	0.854	0.536	0.406	0.113	0.635	0.474	0.172	0.406	0.029*	0.364
Debt	0.463	0.326	0.521	0.983	0.476	0.875	0.741	0.282	0.272	0.066
Type	0.530	0.469	0.639	0.946	0.813	0.748	0.813	0.343	0.397	0.935
Side	0.678	0.205	0.303	0.583	0.752	0.743	0.917	0.391	0.855	0.520
Attack number	0.603	0.247	0.240	0.484	0.490	0.750	0.466	0.243	0.614	0.355
Onset	0.904	0.100	0.100	0.313	0.068	0.740	0.785	0.933	0.572	0.253
Spasticity	0.005*	0.002*	0.412	0.102	0.324	0.078	0.005*	0.017*	0.370	0.000
Barthel Index	< 0.001*	< 0.001*	0.001*	< 0.001*	< 0.001*	< 0.001*	< 0.001*	< 0.001*	0.001*	< 0.001*
MRS	< 0.001*	< 0.001*	0.022*	< 0.001*	< 0.001*	< 0.001*	< 0.001*	< 0.001*	0.016*	< 0.001*
Depression	< 0.001*	< 0.001*	<0.001*	< 0.001*	0.003*	< 0.001*	< 0.001*	< 0.001*	0.363	0.004*

[a] Comparison among groups by t-test or 1-way ANOVA; *$p < 0.05$ indicates statistical significance

MRS, modified Rankin scale

Talbe 5. The stroke impact scale (SIS) physical domain mean score and related factors

Variables	SIS physical domain		ANOVA (GLM)	
	Mean (SD)	*p*-value[a]	F	*p*-value[b]
Age (year)		0.016*	0.496	0.686
≤ 60	57.3 (23.7)			
61-70	52.6 (25.6)			
71-80	44.5 (27.4)			
≥ 81	36.4 (22.9)			
Barthel Index		< 0.001*	13.435	< 0.001*
BI 0-20	12.8 (9.0)			
BI 25-45	27.0 (19.7)			
BI 50-70	36.2 (13.1)			
BI 75-90	53.0 (17.1)			
BI 95-100	75.7 (13.8)			
MRS		< 0.001*	6.418	< 0.001*
No significant disability	78.2 (15.0)			
Slight disability	62.5 (17.4)			
Moderate disability	39.0 (17.5)			
Moderate severe disability	23.2 (18.7)			
Spasticity		0.005*	7.677	0.006*
Spasticity	47.4 (24.3)			
No spasticity	58.5 (26.3)			
Depression PHQ9 (≥ 9)		< 0.001*	4.587	0.034*
No depression	57.4 (24.8)			
Depression	36.2 (21.1)			
History of rehabilitation		0.049*	0.311	0.733
Never	57.3 (25.8)			
History of outpatient	43.7 (25.9)			
History of inpatient	52.5 (24.4)			

[a]Comparison among groups by t-test or 1-way ANOVA; [b]A multi-factor ANOVA of factors related to QOL of stroke patients in SIS physical domain;
*$p < 0.05$ indicates statistical significance
MRS, modified Rankin scale; PHQ9, patient health questionnaire-9

Table 3. The strength of the body and hand function domains had the lowest mean score while communication, emotion, memory and thinking had high mean score. High communication score may be due to the exclusion of patients with communication problems. Regarding emotion, memory and thinking score, the perceptions of stroke survivors about changes in their thinking and emotion may be less accurate than their perceptions about physical limitations resulting in a better SIS mean score in emotion domain.

The low score of body strength and hand function were part of physical impairment. Low body strength and hand function score were consistent with the report that motor deficits were probably the most commonly recognized impairment in persons with stroke.[20] Low hand function score may be due to poor recovery of upper limb function after stroke which was perceived as a major problem.[21] Spasticity, BI and MRS were factors related to SIS scores. All of these suggested the importance of physical aspect on QOL. This was also the reason for more analyzing in physical aspects.

In terms of SIS composite physical domain score, one of the factors significantly correlated with better outcome was history of rehabilitation. Never rehabilitation group had SIS physical domain score 57.3 (25.8) which was higher than history of inpatient rehabilitation group 52.5 (24.4) and outpatient rehabilitation group 43.7 (25.9). It could be explained from the different level of MRS disability. In our setting, patients who were admitted for intensive rehabilitation must have potential for training and functional improvement. Therefore, patients with low potential will not be admitted. This may be why outpatient group had low SIS physical domain score. Most of patients in never rehabilitation group were patients with slight disability so they did not need to attend hospital-based rehabilitation program. This finding also correlated with the previous report that a significant proportion of chronic stroke survivors attending the rehabilitation clinic continue to face limitations in their physical activities.[22]

Factors that were significantly related include the ability to perform ADL by BI score ($p < 0.001$), disability level by MRS ($p < 0.001$), spasticity ($p = 0.006$) and depression by PHQ9 score ($p = 0.034$). (Table 5) Disability level by MRS and ability to perform ADL by BI score were the predictors of QOL in most stroke survivors.[9,19,22-24] Mean scores of SIS in all domain were lower in group of more severely affected stroke survivors. Post-stroke depression also was the strong predictor of low QOL in our stroke survivors. The prevalence of post-stroke depression by PHQ9 in our study was about 26% which fell in the range of the previous report rates, 16%-92%.[25] This negative predictor of depression on QOL

is a finding that has been reported by previous study.[19,22,23] Spasticity was also negative influence on QOL especially on physical domain. The prevalence of spasticity was 60% in our study which fell in the range of the previous report rates, 30%-80%[26] but rather high when compared to 25% reported by Gillard PJ et al.[27] Low score of body strength and spasticity were important problems which corresponded with the reasons for seeking complementary and alternative medicine.[28]

There are several limitations in this study. This study is a cross sectional study so there is no monitoring of QOL that may change over time. Most subjects still lived with family, had family as caregiver and were able to access to medical care at hospital. The data may not reflect the group of stroke patients in the community which may have a lower QOL because we collect data from the stroke patient who could came to the hospital. Furthermore, the patients who have aphasia were excluded from the study due to the limitation in data collection. This study may not yet reflect the overall of the entire population of stroke patients.

In conclusion, the study found that stroke affects the QOL in many aspects including physical, mental, emotional and participation in society. The use of the weak hand and body strength are affected more than other domains. The important factors determining QOL were ability to perform ADL, disability level, spasticity and depression. In caring stroke survivors, all these important factors should be focused.

Disclosure

The authors declare that there is no conflict of interest.

Acknowledgments

We are extremely thankful to the Faculty of Medicine Siriraj Hospital, Mahidol University who funded this work. Also we would like to acknowledge Suthipol Udompanturak for his support and expert comments on statistical analysis.

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