

Quality of life in patients with stroke at 1-year after discharge from inpatient rehabilitation: A multicenter study

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Abstract

Background: Stroke is a major health problem leading to chronic disability and a negative impact on the quality of life (QoL). This study aimed to investigate QoL and its related factors 1-year after discharge from post-stroke inpatient rehabilitation.

Methods: This longitudinal study was performed among 9 rehabilitation centres. QoL of stroke patients was evaluated using the WHOQOL-BREF. Its score ranged from 26-130, with a higher score representing better QoL. Factors related to QoL were analysed using univariate and multiple linear regression.

Results: One hundred and ninety-seven patients were recruited, with a mean age of 62.3 years. The majority of patients were male (57.4%). The mean score of QoL score of patients with stroke at 1-year was significantly lower than the score at discharge period. In multiple linear regression analysis, 5 factors were associated with QoL, including having a leisure activity, modified Barthel Index at follow-up period, need caregiver, anxiety, and depression score with regression coefficient (b) of 6.29 (95%CI: 2.23, 10.35), 0.63 (95%CI: 0.07, 1.20), -7.72 (95%CI: -12.04, -3.40), -0.78 (95%CI: -1.40, -0.17), and -1.14 (95% CI: -1.72, -0.57).

Conclusion: At 1 year, patients with stroke had poorer QoL compared to discharge period. Factors strongly related to QoL included having leisure activity, no need for caregiver, and no depression. The other factor were high functional score at follow-up period and no anxiety. Further study with adequate sample size and consider physician visits to patients who fail to follow-up should be performed in order to strengthen the integrity of these findings.

Trial registration: TCTR20180531006 (Retrospectively registered). Date 31 May 2018

Keywords: Stroke, quality of life, rehabilitation, WHOQOL-BREF

Background

Stroke is a major worldwide public health problem that often leads to chronic disability [1]. Results from the Epidemiologic Stroke Study of Thailand reveal a crude prevalence of stroke among adults aged ≥ 65 years of 2.7% (95%CI: 2.28%, 3.11%) [2]. Stroke survivors suffer from functional dependency and adversely affected abilities in daily life, including inability to perform self-care, transfer, and ambulation. The long-term consequences of stroke have a negative impact on the quality of life (QoL) of both patients with stroke and their caregivers. A 2015 study from Korea reported that stroke is ranked as the 3rd highest cause of quality-adjusted life-year (QALY) loss [3]. Moreover, poor QoL can cause depressive symptoms in patients with chronic stroke [4], and post-stroke depression has a negative impact on functional outcomes and QoL of patients with stroke [5]. Godwin *et al.* reported that a higher level of depression was associated with lower mental QoL [6].

Several studies have evaluated QoL of patients with stroke. Some of those studies reported improved QoL after stroke at periods of follow-up that varied by study. For example, van Mierlo *et al.* conducted a multicentre prospective longitudinal cohort study specific to the course of QoL from 2 months up to 2 years after stroke [7]. Their results revealed that health-related quality of life (HRQoL), participation, and life satisfaction improved during the first year after stroke, with most changes occurring during the first 6 months. In contrast, Paredes *et al.* studied HRQoL of stroke at 12 months and found that all indices of HRQoL were lower over time in stroke individuals compared to healthy controls [8]. Laurent *et al.* reported QoL of stroke survivors at 2-year follow-up and found that QoL was significantly impaired, as compared to control group [9]. In addition, Kusambiza-Kiingi and colleagues performed a study in the community health centres, and reported that stroke survivors had poor QoL [10]. However, studies concerning QoL in Thai stroke patients receiving rehabilitation are scarce. The aim of this study was to investigate QoL and its related factors in patients with stroke at one year after discharge from post-stroke inpatients rehabilitation centres in Thailand.

Methods

This longitudinal multicentre study was a part of the Thai Stroke Rehabilitation Registry (TSRR): a 1-year follow up project. This study was performed during January 2008 to June 2009. The study protocol was approved by the institutional review board of all 9 centres that participated in this study. All centres were located in four parts of Thailand (1 in northern, 1 in north-eastern, 1 in southern and 6 in central parts), and fully complied with the principles and standards set forth in the Declaration of Helsinki and all of its subsequent amendments. Written informed consent was obtained from all participants prior to their inclusion in the study. Stroke participants in this registry (TSRR) who had received inpatient stroke rehabilitation one year prior were invited to participate [11]. Those patients who were unable to be followed up were excluded.

Demographic data of participants at discharge and 1-year follow up periods were recorded, including age, gender, discharge location, employment, source of income, having leisure activities, need caregiver, and type of stroke (infarction or hemorrhage). The World Health Organization Quality of Life-BREF (WHOQOL-BREF) questionnaire was used to assess QoL. It comprises 4 dimensions, including physical, psychological, environment, and social dimensions. The score ranges from 26-130, with a higher score indicating a better QoL. This questionnaire has good psychometric properties and it was translated into Thai language and validated [12]. Participants were evaluated QoL by interviewing them in rehabilitation centres at one year after discharge from inpatient rehabilitation ward.

Patient functional score was evaluated by modified Barthel Index (mBI). The mBI score ranges from 0-20, with a higher score representing greater independence [13]. Brunnstrom Motor Recovery Stage (BMRS) was used to assess motor recovery of leg [14]. BMRS is categorized into 6 stages, as follows: stage I – flaccidity; stage II – spasticity appears; stage III – spasticity increases; stage IV – spasticity decreases; stage V – spasticity continues to decline; and stage VI – spasticity disappears, except when fatigued. A higher stage of BMRS represents better recovery.

The Hospital Anxiety and Depression Scale (HADS; Thai version) is used to evaluate anxiety feature and depression using specific questions. [15] It ends to two separate scores. Each score ranges from 0-21. A score ≥ 11 defines a patient having anxiety or depression. The proportion of patients who developed one or more complications in the year after discharge was recorded. Complications included musculoskeletal pain, contracture, spasticity (measured by modified Ashworth Scale; MAS ≥ 3), pressure ulcer, deep vein thrombosis (DVT), bowel-bladder incontinence, and infections.

Factors related to QoL were analyzed, including personal factors, physical abilities and psychosocial factors at 1-year follow-up period. Personal factors comprised of age, gender, discharge locations, being employed, sources of income, having a leisure activity, need caregivers, having complications at 1 year, and readmission. Physical abilities consisted of mBI, BMRS of leg, using wheelchair, walking ability, and urine incontinence. Psychosocial factors including anxiety and depression at follow-up period were also included.

Results

The number of participants at discharge in TSRR project was 327. In this study, only 197 (60.25%) patients could be followed up. Among these, 21 patients (10.7%) were readmitted, 16 cases of single and 5 of double readmission (26 events) (Figure 1). The causes were due to recurrent stroke (5 events), urinary tract infection (5 events), gastrointestinal bleeding (4 events), convulsion (3 events), heart failure (2 events), bradycardia (2 events), pneumonia (2 events), warfarin overdose (1 event), severe knee pain (1 event), and hydrocephalus (1 event). The demographic data of participants at discharge and at 1 year after discharge period were presented in Table 1.

Figure 2 shows changes over time of QoL score at admission, at discharge and follow-up periods, which was statistically significant difference ($p < 0.001$). The QoL score at discharge period showed improvement compared to admission, but the score declined at 1 year after discharge.

Factors related to QoL at 1 year are shown in Table 2. Univariate analysis indicated that the following factors were significantly associated with QoL: being employed, having a leisure activity, need caregiver, having complications at follow-up, mBI at follow up, BMRS of leg, using wheelchair, walking ability, urine incontinence, anxiety and depression at follow-up period. In multiple linear regression analysis, 5 factors were associated with QoL, including having a leisure activity, modified Barthel Index (mBI) at follow-up period, need caregiver, anxiety, and depression score with the regression coefficient (b) of 6.29 (95%CI: 2.23, 10.35), 0.63 (95%CI: 0.07, 1.20), -7.72 (95%CI: -12.04, -3.40), -0.78 (95%CI: -1.40, -0.17), and -1.14 (95% CI: -1.72, -0.57) respectively.

Discussion

Most patients with stroke achieve good functional outcomes after rehabilitation [16], but some patients remain unsatisfied with the lowered quality of life they experience due to residual disabilities after stroke.

QoL is a subjective measurement of patient well-being that should be considered in the assessment of stroke survivors. Our study revealed that the mean QoL score of patients with stroke declined over 1-year after discharge, which was in line with the findings of study of Kusambiza-Kiingi and colleagues. They evaluated QoL among 108 stroke survivors at the community health centres with services of physiotherapists. They found poor QoL among patients with stroke, and positive correlation between community reintegration and QoL ($r = 0.51, p < 0.0001$) [10]. In contrast, Shyu et al. performed longitudinal study of stroke survivors and evaluated QoL at 1, 3, 6 and 12 months [17]. Even though the QoL of patients with stroke improved from first to twelve months after discharge, the QoL scores were considerably less than the normal populations, especially in social and physical functions.

The reasons why QoL of stroke in our study declined over the 1-year after discharge may be explained by 2 reasons, including: 1) More patients with stroke in the TSRR had developed depression by the 1-year after discharge than those that had depression at discharge (21.0% vs. 14.7%) [18]; and, 2) More than three-fourths (76.8%) of patients with stroke in the TSRR had developed at least one complication within 12 months after discharge from rehabilitation wards and nearly 60% of patients with complications at discharge still had the same complications one year later [19]. The strategies to prevent depression and other complications should be concerned in order to gain QoL score at 1-year period.

Concerning factors related to improve QoL in patients with stroke, the present study found many factors including higher scores of mBI at follow-up period, having no anxiety and no depression, having leisure activity, and no need for caregiver. As reported by Heikinheimo and Chimbay, factors related to QoL were age, gender and functional recovery [20]. Mutai et al. also found age, functions and depression related to QoL [21]. Laurent et al. revealed that life satisfaction and QoL of stroke were significantly impaired in all life domains [9]. In addition, QoL was strongly correlated with functional independence, persistence of hemiplegia, and depressed mood [9]. Functional recovery was another factor reported by many studies [9, 20, 21] which was in line with our study. Even though mBI was one of positive factors, its effect was not large ($b=0.63$). This might be due to change score of mBI at 1-year and at discharge was 2.39 ± 3.92 [11]. However, the mBI score at 1-year follow-up period was more than discharge period (mean mBI at 1-year and at discharge were 16.04 ± 4.30 and 13.66 ± 4.34 respectively).

Moreover, some reported that greater anxiety and depression were the important factors related to QoL [22-23]. Both anxiety and depression could obstruct rehabilitation process and outcomes, and could be predictors of QoL of patients with stroke. In addition, QoL can be improved in the long-term period if physicians can detect and treat anxiety and depression adequately [23]. Related to anxiety, Tang and colleague measured anxiety using HADS and its effect on patients with stroke, and found that anxiety was associated with HRQoL ($r=-0.154$) [24]. These studies were in line with our study. However, Morris et al. reported that anxiety appears to be more important than depression in predicting QoL at 6 months after stroke [25].

There were many studies reported about depression affecting QoL of patients with stroke [9, 21, 26-28]. For example, QoL in stroke with depression was more severe impaired than non-depressed stroke [26].

Depression after stroke has a negative impact on outcomes including self-care functions and QoL after stroke [5, 26]. Not only depression, but also pain and fatigue could determine QoL of stroke [28]. As depression is common consequences after stroke, medical personnel should keep in mind for early detection of these conditions by using simple screening tools such as HADS or Patient Health Questionnaire-9 (PHQ-9), etc.

Concerning leisure activity, patients love to do these activities for relaxation and healing their minds. Our study found that having leisure activity was one of the positive factors to increase QoL score. Authors have experience in using creative art therapy, which was composed of art and music therapy, for enhancement rehabilitation program among 118 inpatient stroke, and found that creative art therapy twice a week for four weeks (8 sessions), combined with conventional physical therapy (20 sessions), can significantly decrease depression, improve physical functions and increase quality of life compared with physical therapy alone [29].

Another factor related to QoL of stroke survivors was no need of caregiver. There is a study performed in Mongolia reported that being single was one of the factor associated to low QoL [30]. This may indirectly imply that they had no caregiver. Our study also reported that discharge to their home was related to good QoL of patients with stroke. This may be because our people get used to living with extended family more than staying in nursing home as people in Western countries.

There were some limitations including 1) This study did not have a large enough sample, so some variables could not be detected statistical significance. 2) All centres were tertiary care centres, therefore, our study population may not be representative of general stroke patient population. 3) There were many tools for assessment the QoL including the Stroke Impact Scale, the Stroke Specific Quality of Life scale, the Burden of Stroke Scale and WHOQOL-BREF which are specific health-related QoL instruments developed in the last decade [31], therefore direct comparison could not be performed. 4) Only 60% of subjects from the TSRR project could be followed-up for a full 12 months after discharge. This high loss to follow-up rate was influenced by some factors that may include difficulty in contacting the patient, transportation-related problems, inconvenience of or disinterest in being followed-up at the evaluating hospital, and a failure to remember to attend. It should be noted that nearly 40% of our patients resided in a rural area, which would have made travel to the evaluating centre more difficult and inconvenient. Future studies should include this outcome into the study design and consider physician visits to patients who fail to follow-up in order to strengthen the integrity of these findings.

Conclusion

Patients with stroke had poorer QoL at 1 year compared to discharge period. Factors strongly related to improve QoL were having leisure activity, and no need for caregiver. The other factors were increase modified BIFU, no anxiety and no depression.

Abbreviations

QoL: quality of life

QALY: quality-adjusted life-year

HRQoL: health-related quality of life

WHOQOL-BREF: World Health Organization Quality of Life-BREF

mBI: modified Barthel Index

BMRS: Brunnstrom Motor Recovery Stage

Declarations

Ethics approval and consent to participate

The study protocol was approved by the institutional review board of all 9 centres that participated in this study including Faculty of Medicine Siriraj Hospital and Faculty of Medicine Ramathibodi Hospital, Mahidol University; Faculty of Medicine, Chulalongkorn University; Faculty of Medicine, Chiang Mai University; Faculty of Medicine, Khon Kaen University, Faculty of Medicine, Prince of Songkla University; Pramongkutklao hospital; Prasat Neurological Institute; and Sirindhron National Medical Rehabilitation Center, Ministry of Public Health. Written informed consent was obtained from all participants.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

VK, TT, and CH designed the study. VK and TT supervised the data collection. TT and CH performed the statistical data analysis. All authors provided important input for the interpretation of the results. VK wrote the manuscript assisted by TT. All authors contributed to the article and have read and approved the final version of the manuscript.

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Tables

Table 1 Demographic and clinical characteristics of stroke patients at discharge and at 1-year after discharge

Characteristics	At discharge (N=327)	1-year after discharge (N=197)
Age (years), (mean \pm SD)	62.2 \pm 12.1	62.3 \pm 12.4
Gender: Male, n (%)	193 (59.0%)	113 (57.4%)
Discharge location: home, n (%)	268 (82.0%)	185 (93.9%)
Need caregiver: Yes, n (%)	325 (99.4%)	157 (79.7%)
Type of stroke: Infarction, n (%)	235 (71.9%)	143 (72.6%)
mBI (mean \pm SD)	13.3 \pm 4.9	16.0 \pm 4.3
BMRS leg, n (%)		
Stage I-III	152 (46.5%)	57 (28.9%)
Stage IV-VI	175 (53.5%)	120 (60.9%)
Missing	-	20 (10.2%)
Complications, n (%)	232 (70.9%)	123/186 (66.1%)
Anxiety, n (%)	17 (6.8%)	21 (10.7%)
Depression, n (%)	41 (16.3%)	41 (20.8%)
WHOQoL-BREF score, (mean \pm SD)	77.7 \pm 10.7	81.1 \pm 14.5

Abbreviations: mBI, modified Barthel Index; BMRS, Brunnstrom Motor Recovery Stage; FU, follow-up period

Table 2 Factors related to improve QoL at 1 year using univariate and multiple linear regression analysis

	Univariable analysis [#]		Multiple linear regression			
	Mean (SD)	p-value	b	95%CI of b	SE (b)	p-value
Age (years)	r = 0.116	0.115				
Gender		0.262				
Male	80.1 (15.7)					
Female	82.5 (12.9)					
Discharge location		0.071				
Nursing home	73.8 (19.0)					
Home	81.6 (14.2)					
Employment		<0.001*				
No	79.5 (14.4)					
Yes	90.3 (12.6)		2.01	(-2.96, 6.98)	2.52	0.425
Source of income		0.054				
Themselves/spouse	83.6 (15.6)					
Others	79.4 (13.6)					
Having leisure activity		0.004*				
No	74.3 (15.0)					
Yes	82.5 (14.2)		6.29	(2.23, 10.35)	2.06	0.003*
Need caregiver		<0.001*				
No	93.8 (9.9)					
Yes	77.9 (13.8)		-7.72	(-12.04, -3.40)	2.19	0.001*
Complications _{FU}		<0.001*				
No	87.7 (13.4)					
Yes	78.4 (13.9)		-1.98	(-5.55, 2.07)	1.58	0.273
Readmission		0.169				
No	81.6 (14.5)					
Yes	76.7 (15.1)					
mBI _{FU}	r = 0.466	<0.001*	0.63	(0.07, 1.20)	0.29	0.028*
BMRS leg _{FU}		<0.001*				
Stage IV, V, VI	84.4 (13.9)					
Stage I, II, III	75.3 (13.8)		-1.31	(-5.33, 2.70)	2.03	0.519

	Univariable analysis [#]		Multiple linear regression			
	Mean (SD)	p-value	b	95%CI of b	SE (b)	p-value
Using wheelchair		0.001*				
No	77.4 (14.2)					
Yes	84.5 (13.9)		-1.69	(-5.58, 2.20)	1.97	0.391
Walking ability		<0.001*				
Unable	71.7 (14.2)					
Able	83.3 (13.8)		1.74	(-3.65, 7.12)	2.72	0.525
Urine incontinence		<0.001*				
FU	83.1 (14.3)					
No	72.2 (11.6)		-0.84	(-5.57, 3.88)	2.39	0.725
Yes						
Anxiety _{FU}	r = -0.575	<0.001*	-0.78	(-1.40, -0.17)	0.31	0.013*
Depression _{FU}	r = -0.661	<0.001*	-1.14	(-1.72, -0.57)	0.29	<0.001*

[#] Unpaired t-test and Pearson's correlation coefficients (r)

b=regression coefficients, SE=standard error

*Statistically significant

Abbreviations: mBI, modified Barthel Index; BMRS, Brunnstrom Motor Recovery Stage; FU, follow-up period

Figures

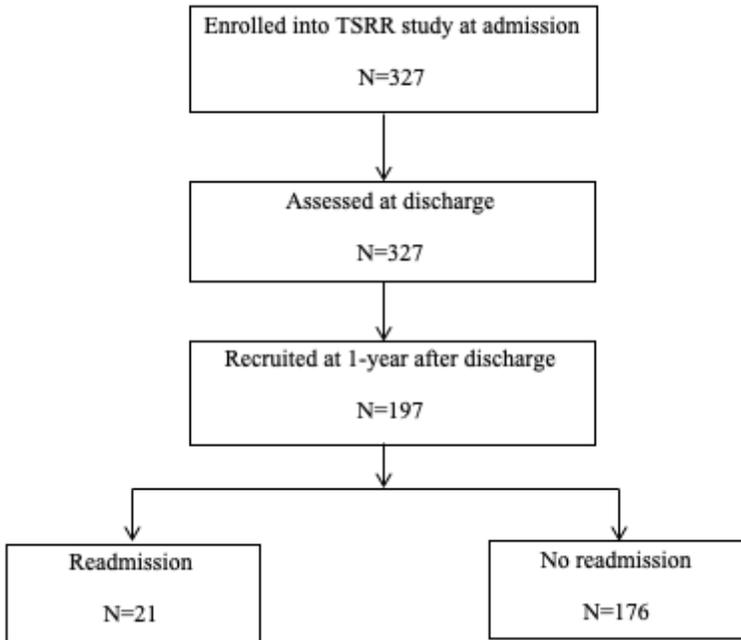
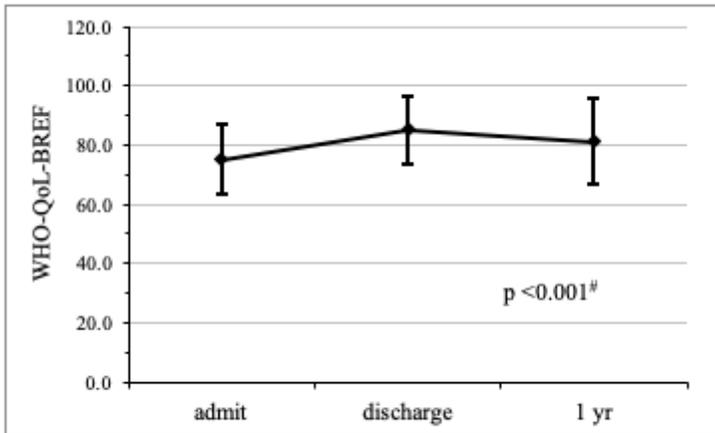


Figure 1

Flow of Study.



[#] Repeated measures analysis of variance (ANOVA)

Figure 2

Changes over time of QoL scores during admission, discharge and 1-year follow up periods (N=197).