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ORIGINAL RESEARCH

The Associated Factors of Quality of Life among Stroke Survivors: A Study in Indonesia

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Abstract

Background: The prevalence and burden of stroke are still high, especially in low and middle-income countries. Stroke affects the economy and physics related to the Quality of Life (QoL). Various QoL-associated factors, including sociodemographic, functional outcome, emotional, and cognitive function, were studied. However, there was very limited information about the QoL-associated factors among stroke survivors in Semarang, Indonesia.
Purpose: This study aimed to identify the QoL-associated factors among stroke survivors in Semarang, Indonesia.
Methods: This cross-sectional study was conducted in outpatient services and involved 57 ischemic stroke survivors using convenience sampling. Demographic and clinical information were obtained using medical records and questionnaires. The questionnaires were the Short Version of Specific Stroke Quality of Life (SS-QoL) to measure QoL, GRID-HAMD 17 to measure Post Stroke Depression (PSD), Mini-Mental Status Examination (MMSE) to measure cognitive impairment, Barthel–Index (BI) to measure functional outcome, Hamilton Anxiety Rating Scale (HAM-A) to measure anxiety, and Multidimensional Scale of Perceived Social Support (MSPSS) to measure social support. Linear regression was conducted in the model performance of QoL-associated factors.
Results: The stroke duration was 155(18) days, and 50.9% of participants were males. The linear regression showed that age (-.164 95% CI -.412 - .084), marital status (3.937 95% CI 1.010 - 6.864), functional outcome (.127 95% CI .013 - .241), PSD (-1.090 95% CI -2.144 - -.036), cognitive function (.308 95% CI -.482 - 1.098) and anxiety (-.408 95% CI -1.125 - .268) were QoL-predictors (p<.001, adjusted R2=52.1). It is assumed that age, marital status, functional outcome, PSD, cognition, and anxiety significantly predict the QoL among ischemic stroke survivors.
Conclusion: The QoL-associated factors were age, marital status, functional outcome, PSD, cognition, and anxiety. These associated factors of QoL should be considered as elements in formulating nursing interventions that aim to improve the good QoL among stroke survivors.

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1. Introduction

A stroke is a life-threatening cerebrovascular disease which affects the blood vessels that carry oxygen to the brain (Coupland et al., 2017). This disorder is one of the leading causes of long-term disability and mortality globally (Donkor, 2018). The burden of stroke has significantly increased over the world in recent decades due to aging and population growth, as well as the increased frequency of modifiable stroke risk factors, particularly in low- and middle-income nations (Katan & Luft, 2018). Stroke has an impact on cognitive function (Tang et al., 2018), depression (Mohammed et al., 2019), and motor function and imbalance (Hayes et al., 2016). More than 50% of stroke survivors were chronically impaired, which can seriously affect social and economic factors and the overall quality of life (Donkor, 2018; Hyuk et al., 2016).

The World Health Organization (WHO) defines the quality of life (QOL) as an individual's perception of their position in life concerning their expectations, standards, goals, and concerns in the context of the value systems and culture in which they live (World Health Organization [WHO], 2020). It is multidimensional and comprises objective and subjective evaluations of physical, material, social, emotional, and developmental activities of well-being (Felce & Perry, 1995). When assessing the effectiveness of stroke management, consideration is given to the

health-related QoL of stroke patients since it reflects the survivors' subjective opinions (Hyuk et al., 2016; Numminen et al., 2016). Although there has been progress in our understanding of stroke's quality of life, stroke is still viewed as an illness with various problems (Donkor, 2018).

Furthermore, consideration must be explicitly given to the QoL-associated factors. Several studies have mentioned the factors that can affect the quality of life, such as age, motor function (Hyuk et al., 2016; Ramos-Lima et al., 2018), cognitive function (Lee, 2018), and psychological aspects (Katona et al., 2015). Age and maturity can impact a person's capacity to adjust to the obstacles faced in undergoing stroke therapy (Norlander et al., 2018). Furthermore, motor disturbances in stroke survivors can affect their ability to carry out daily activities. The ability of survivors to carry out daily tasks (ADL) can also be hampered by emotional alterations such as fear and hopelessness (Ezema et al., 2019; Handayani et al., 2021). When individuals are incapable of performing their daily activities, their quality of life is compromised (Kim et al., 2014). In addition, cognitive impairment also reduces the quality of life for stroke survivors as they are unable to solve problems that arise in everyday life (Fitri & Fithrie, 2020).

However, in Indonesia, there was a limited investigation of QoL predictors. The latest study revealed that disability is related to the quality of life among stroke patients (Arief-Sulistyono et al., 2022). Moreover, the quality of life of post-stroke patients is directly affected by marital status, employment status, family support, and functional disorders (Zamzam et al., 2020). We hypothesize that among people who have have a stroke, each of these factors is related to the quality of life. Therefore, research on the factors associated with the quality of life of stroke survivors in Indonesia is crucial. These associated factors can be used as elements for nursing intervention formulation to improve stroke survivors' quality of life. Accordingly, this study was conducted to identify the QoL-associated factors among stroke survivors in Semarang, Indonesia.

2. Methods

2.1 Research design

This study used a correlational research design with a cross-sectional approach. This approach was undertaken all at once to collect data from stroke survivors (Loiselle et al., 2011).

2.2 Setting and samples

This study was conducted in a public hospital in Semarang, Indonesia between January and March 2020. In the previous study of QoL-associated factors in Turkey (Em et al., 2015), the effect size was 0.42. The minimum sample that can be achieved using G power analysis is 48 samples, with a power of 0.8, a significance level of 0.05, and 6 independence variables. A total of 57 patients from 98 who presented with an ischemic stroke met the inclusion criteria and were conveniently included in this study. The inclusion criteria were patients diagnosed with ischemic stroke, admitted to outpatient hospital services, aged 18–80 years old, had no aphasia, and MMSE score was ≥17. Stroke survivors with hearing impairments were excluded from the study. The researchers obtained the demographic data through an appointment at the outreach hospital services. Candidates who were recognized as a hemorrhaging transformation from the time of recruiting till data collection were dropped. The diagnosis of acute ischemic stroke is determined by clinical investigations and computed tomography of the brain based on the 2013 American Heart Association (AHA) guidelines (Sacco et al., 2013). The neurologist signed the diagnosis authentication.

2.3 Measurement and data collection

The data on PSD was assessed using the GRID-HAMD 17 questionnaire, which consists of 17 questions (Williams et al., 2008). GRID-HAMD 17 provides interview guidelines for establishing the validity of patient-reported outcomes during data collection (Patrick et al., 2011). Patients with scores of ≤ 7 were classified to have no PSD, 8-13 have moderate PSD, 18-23 have severe PSD, and ≥ 24 have very severe PSD. The reliability test of this instrument among stroke survivors in Indonesia yielded a Cronbach's alpha coefficient of 0.78 (Handayani et al., 2021).

Cognitive function was evaluated using MMSE in the Indonesia version, which consists of six subscales: orientation, registration, attention, calculation, recall, and language. Those subscales were used to determine the severity of cognitive impairment and to classify patients based on their clinical level of cognitive impairment (Handayani et al., 2021). In addition, the researchers

examines the cognitive function of the patients using MMSE by questioning and instructing them (Folstein et al., 1975).

To evaluate functional outcomes, the Barthel Index (BI) was employed (Mohoney & Barthel, 1965). The range of category include: scores of >90 independent, 61-90 mildly dependent, 41-60 moderately dependent, 21-40 severely dependent, and ≤20 totally dependent. Inter-rater observation between two data collectors was used to evaluate the reliability of this tool. Two observers observed and measured Barthel Index among ten ischemic stroke survivors at separate times. The obtained Kappa value was .001.

The Short Version of the SS-QOL 12 item (SSQ-12) was used to identify the QoL, which includes self-care, mobility, upper extremity, language, vision, work, thinking, family roles, social roles, personality, mood, and energy (Post et al., 2011). The questionnaire's validity and reliability were tested on 30 stroke patients. The test validity results show that all question items were valid, with validity scores ranging from 0.393 to 0.717 (r>0,30), while the reliability test indicated a Cronbach Alpha (α) of 0.882 (Dharma, 2015).

The Hamilton Anxiety Scale (HAM-A) was used to assess anxiety (Maier et al., 1988). This questionnaire was translated into the Indonesian language by a qualified translator and nursing specialist. Face validity was performed to ensure that every HAMA statement was rigorous. Thirty stroke patients were utilized to examine the instrument's validity and reliability. All question items were valid, according to the test validity findings, which ranged from 0.479 to 0.940 (r>0,30). Meanwhile, Cronbach Alpha (α) of 0.95 was found in the reliability test.

2.4 Data analysis

This study aimed to identify the QoL-associated factors. The percentage sum of participants' sociodemographic data, such as gender, income, marital status, education, family type, and comorbidities, was provided. The Shapiro-Wilk test was used to assess the homogeneity of age, cognitive, PSD, anxiety, functional outcome, and QoL. Age and day of onset were expressed as a mean or median, range, standard deviation, or Inter-Quartile Range (IQR). Cognitive, functional outcome, PSD, and HAMA were categorized and reported as percentages. The linear regression method was utilized in multivariate analysis, and the significance threshold was set at 0.05. IBM-SPSS version 23.0 was used for all statistical analyses.

2.5 Ethical considerations

Ethical clearance was obtained legally from the Ethics and Health Research Committee of Tugurejo Hospital (Number 123/KEPK.EC/VIII/2019). The trained investigators explained the research purpose and the principle of confidentiality. Informed consent was obtained from the patients. No personal identifiers were collected to protect the participants' anonymity and the data's confidentiality.

3. Results

3.1 Characteristic of the respondents

As shown in Table 1, the results of this study showed that the period after onset was 155(18) days. The demography also showed that the male and female populations are nearly equal, with only a 1.8% difference. Most respondents are married, graduated from elementary school, and have a low income. Despite a 3.5% difference, respondents who live with extended families outnumber those who live with nuclear families. Hypertension is the most prevalent comorbidity among respondents, over three times that of diabetes and high cholesterol level. Most respondents experienced mild anxiety (98,2%) and did not have PSD (82,5%). Almost half of the respondents were independent. Dependent respondents were primarily in the mild category, followed by total dependent respondents. Furthermore, 40.4% of respondents had cognitive impairment (Table 1).

3.2 Associated factors of QoL

The regression model showed that age (-.164 95% CI -.412 - .084), marital status (3.937 95% CI 1.010 - 6.864), functional outcome (.127 95% CI .013 - .241), PSD (-1.090 95% CI -2.144 - .036), cognitive (.308 95% CI -.482 - 1.098) and anxiety (-.408 95% CI -1.125 - .268) were the associated factors of QoL (p<.001, adjusted R2=52.1) (Table 2).

Table 1. Characteristics of ischemic stroke survivors (n=57)

	Frequency (f)	Percentage (%)
Onset after stroke (mean(SD), years)	155(18)	
Age (mean(SD), days)	59.7(11.1)	
Min	36	
Max	81	
Sex		
Female	28	(49.1)
Male	29	(50.9%)
Status		
Married	32	(56.1 %)
Single	11	(19.3%)
Widow/ widower	14	(24.6%)
Education		
Elementary School	39	(68.4 %)
Senior High School	10	(17.5 %)
University	8	(14.0 %)
Income		
Low	43	(75.4 %)
Middle	11	(19.3 %)
High	3	(5.3 %)
Type of family		
Core family	23	(40.4 %)
Extended family	25	(43.9 %)
Aged Family	6	(10.5 %)
Kin Network	2	(3.5 %)
Dyad family	0	0
Living Alone	1	(1.8 %)
Employment		
Not Employ	41	(71.9 %)
Employ	16	(28.1 %)
Diabetes Mellitus		
Not	43	(75.4 %)
Yes	14	(24.6 %)
Hypertension		
Not	21	(36.8 %)
Yes	36	(63.2 %)
Cholesterol		
Not	43	(75.4 %)
Yes	14	(24.6 %)
PSD	Median 3, IQR 4 Min – Max 2-14	
No PSD	47	(82.5 %)
Mild	9	(15.8 %)
Moderate	1	(1.8 %)
Severe	0	0
Anxiety	Median 4, IQR 4 Min – Max 1-22	
Mild	56	(98.2 %)
Mild to moderate	1	(1.8 %)
Severe	0	0
Functional Outcome	Median 85, IQR 55 Min – Max 5 -100	
Independent	26	(45.6 %)
Mild Dependent	13	(22.8 %)
Moderate	4	(7.0 %)
Severe	4	(7.0 %)
Total	10	(17.5 %)
Cognitive	Median 27, IQR 11 Min – Max 17 -30	
Normal	34	(59.6 %)
Impairment	23	(40.4 %)

Table 2. The associated factors of QoL of respondents

Variable	B	Sig	95 % CI	
			Upper	Lower
Constant	30.588	.017		
Age	-.164	.191	-.412	.084
Marital Status	3.937	.009	1.010	6.864
Functional Outcome	.127	.029	.013	.241
Anxiety	-.428	.223	-1.125	.268
Post Stroke Depression	-1.090	.043	-2.144	-.036
Cognitive Function	.308	.437	-.482	1.098

Note: $p<.001$, adjusted $R^2 = 52.1$

4. Discussion

This study aimed to identify QoL-associated factors among ischemic stroke survivors. The results discovered that age, marital status, functional outcome, PSD, cognitive function, and anxiety were associated factors of QoL among stroke survivors.

Age is associated with the QoL of stroke survivors. This finding is supported by previous studies, which found a favorable correlation between age and QoL (De Bruijn et al., 2015; Salehi et al., 2019). Old age predicts QoL deterioration one year after the stroke (Boudokhane et al., 2021). Age and maturity can impact a person's capacity to adjust to the obstacles faced in undergoing stroke therapy (Norlander et al., 2018). Other researchers discovered that age did not affect QoL, although younger people have a greater quality of life (Liu et al., 2019; Ramos-Lima et al., 2018). Furthermore, other studies imply that age is a 'global' construct that may be associated with disability and severity in terms of QoL (Wang & Langhammer, 2018).

The study's findings also confirmed that marital status correlates with QoL among stroke survivors. This result is consistent with earlier research indicating that marital status is a risk factor for the quality of life in elder stroke patients (Chaleoykitti et al., 2020). Another study found that dyads of stroke survivors had similar degrees of physiological pain, emotional role, and mental health (Persson et al., 2017). However, married people are marginally more satisfied in life than separated people, divorced or widowed people, and single people. This indicates that the emotional and social aspects of partner living are critical to subjective well-being (Yeoh et al., 2019).

The present study also confirmed the hypothesis that functional outcome is associated with QoL. Previous studies also found that functional activity is associated with QoL (Ahmed et al., 2020; Owolabi, 2013; Vincent-Onabajo et al., 2015) and disability predicts QoL deterioration one year after the stroke (Boudokhane et al., 2021). Meanwhile, motoric impairment at admission predicted the Health-Related Quality of Life (HRQoL) at 3 and 12 months after onset in mobility, self-care, and routine activities dimensions, but not significant in the HRQoL index (Yeoh et al., 2018). Being functionally independent may give stroke survivors a positive outlook on the future (Vincent-Onabajo et al., 2015).

Furthermore, based on the present study's findings, PSD is associated with QoL. A qualitative study of stroke survivors with post-stroke depression discovered that the disease led them to a grey shadow of existence, confinement, and the discovery of themselves as new persons (Kouwenhoven et al., 2012). A previous study found that depression predicts QoL deterioration one year after a stroke (Boudokhane et al., 2021). Another study also found that improved Health-Related Quality of Life (HR-QoL) is associated with less depression (Visser et al., 2015). Depression had several implications. Five years after onset, stroke survivors with depression six months after onset had lower QoL (Kielbergerova et al., 2015), and depression influenced stroke recurrence (Yuan et al., 2012). Stroke survivors with low QoL would have a 2.32 times higher death risk than stroke survivors with excellent QoL (Kielbergerova et al., 2015). It is believed that patients with depression will affect functional recovery (Matsuzaki et al., 2015) when functional dependency influences the QoL (Ahmed et al., 2020).

According to the findings of the study, anxiety predicts QoL. The emergence of anxiety is related to the health consequences, evolution and fear of worsening illness, changes in financial status, and need for care. This is revealed in severe anxiety (Baumann et al., 2014). Furthermore, some research has revealed that the nervous feelings caused by worries (such as recurring illness

attacks, falling, and returning to work) following disease attacks may impact everyday living (Campbell Burton et al., 2013). Another study also discovered that anxiety and depression are related to QoL (Em et al., 2015; Kielbergerova et al., 2015; Liu et al., 2019). According to a review and meta-analysis, anxiety was frequent during the first year following the stroke. Anxiety influenced QoL and predicted depression (Rafsten et al., 2018). A previous study stated that even young patients with mild ischemic stroke experienced depression and anxiety disorders even after long-term follow-up, which affected QoL. Anxiety is expected to have an influence on QoL for one year or longer following a stroke (De Bruijn et al., 2015). Another previous study, however, found that anxiety predicts QoL in hemorrhagic stroke instead of depression in the year following the stroke (Zhu & Jiang, 2019). It is conveyed that depression showed less stability and persistence than anxiety, especially in the first stage after stroke (Morris et al., 2013).

Lastly, this study also found that cognitive function is associated with QoL Prior studies discovered a link between cognitive performance and QoL in elderly stroke patients (Lee, 2018), and cognitive abnormalities had been identified as risk factors for QoL (Ahmed et al., 2020). Moreover, cognitive function, particularly attention and visuospatial ability, is strongly associated with post-stroke quality of life (Cumming et al., 2014). Post-stroke cognitive abnormalities were largely documented in executive function, memory, language, and processing speed (Terroni et al., 2012). These abnormalities (executive function, memory, language, and processing speed) will impact daily activities (ADL). A prior study stated that early cognitive impairment was linked to a greater probability of disability and poor ADL activities (Li et al., 2020). The functional activity was then used to predict QoL (Ahmed et al., 2020; Boudokhane et al., 2021; Carod-Artal et al., 2009; Owolabi, 2013; Vvincent-Onabajo et al., 2015). This demonstrated that cognitive impairment will impact daily living and that they will be unable to achieve a satisfactory QoL.

5. Implication and limitations

The present study provides insight on the factors associated with the quality of life among patients with ischemic stroke in Semarang, Indonesia, including age, marital status, functional outcome, PSD, cognitive function, and anxiety. These results may implicate the nursing practices in caring for patients with stroke. The QoL-associated factors as identified in this study can be used as elements for nursing interventions to improve the quality of life of stroke survivors. This study, however, has limitations. Severe cognitive impairment was excluded from the research. On the other hand, the cognitive function has a major impact on QoL. Thus, the findings of this study cannot be generalized among ischemic stroke, which has serious cognitive function impairment.

6. Conclusion

Age, marital status, functional outcome, PSD, cognitive function, and anxiety are associated with QoL among stroke survivors. These associated factors of QoL can be considered as the elements in formulating nursing interventions for patients with stroke. Regarding the limitation, it is necessary to study factors related to QoL in stroke survivors with severe cognitive impairment.

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Author contribution

All authors (FH, NSDK, RSU, CBR, and YDH) contributed substantially to the study's conceptualization, including the formulation of the goal. FH developed the methodology and curated the data. The manuscript was written, reviewed, and edited by FH, NSD, and RSU. CBR and YDH were involved in project management. All authors approved the final manuscript

Conflict of interest

There are none to declare.

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