Risk factors of stroke survivors' quality of life

Oktania Candrawati*[1], Ronny Tri Wirasto[2]

[1]Kota Yogyakarta Hospital, Yogyakarta, Indonesia
[2]Departement of Psychiatry, Faculty of Medicine, Universitas Gadjah Mada/Dr.Sardjito Hospital, Yogyakarta, Indonesia

Original Article

ABSTRACT

Background: Stroke can lead into long-term disabilities and affect stroke survivors' quality of life (QOL). The importance of stroke survivors' QOL is still receiving little medical attention.

Objective: To determine stroke survivors' QOL and associated risk factors, including sociodemography, activity daily living, cognitive, and depression levels.

Methods: This cross-sectional study was conducted in April-October 2014 at Neurology Clinic Dr. Sardjito Hospital, Yogyakarta. Subjects' criteria were minimal four weeks after the first stroke incident and accompanied by the primary caregiver. Subjects were interviewed about sociodemographic condition and filled WHOQOL-BREF, Mini Mental State Examination (MMSE), and Beck Depression Inventory (BDI) questionnaires. Meanwhile, the primary caregiver filled the Barthel Index (BI) questionnaire. Bivariate Chi-square and logistic regression analyses were done.

Results: There were 64 subjects analyzed. QOL domain affected the most is physical, while the least is environment domain. Bivariate analysis found that not working after stroke and higher BDI score associate with lower WHOQOL-BREF physical (r=9.286, p<0.01 and r=5.361, p<0.05) and psychological domain (r=3.935, p<0.05 and r=14.527, p<0.001). No risk factors associate with WHOQOL-BREF social relationship domain. Higher BDI score associates with lower WHOQOL-BREF environment domain (r=5.861, p<0.05). Regression analysis shows that older age (p<0.05) and not working after stroke are risk factors for lower WHOQOL-BREF physical domain (p<0.01), while higher BDI score is risk factor for lower WHOQOL-BREF psychological (p<0.01) and environment domain (p<0.05).

Conclusion: Older age and not working after stroke incident are risk factors for physical domain of QOL. Depression is risk factor for psychological and environment domain of QOL.

Latar Belakang: Stroke menyebabkan disabilitas jangka panjang yang mempengaruhi kualitas hidup pasien. Pentingnya menilai kualitas hidup pasien pasca stroke masih belum menjadi perhatian.

Tujuan: Mengetahui kualitas hidup pasien pasca stroke dan faktor risiko yang berhubungan, meliputi faktor sosiodemografi, aktivitas hidup sehari-hari, kognitif, dan depresi.

Metode: Studi ini merupakan studi cross-sectional yang dilaksanakan pada April-Oktober 2014 di Poliklinik Neurologi RSUP Dr. Sardjito, Yogyakarta. Subyek adalah pasien yang mengalami stroke minimal 4 minggu

sebelumnya dan datang beserta orang yang merawat. Penelitian meliputi wawancara terkait kondisi sosiodemografis dan pengisian kuesioner WHOQOL-BREF, Mini Mental State Examination (MMSE), serta Beck Depression Inventory (BDI) oleh pasien. Orang yang merawat pasien mengisi kuesioner Barthel Index (BI). Hasil penelitian dianalisa menggunakan uji Chi-square dilanjutkan dengan regresi logistik.

Hasil: *Sebanyak 64 data dianalisis. Kualitas hidup paling buruk adalah domain fisik sedangkan paling baik adalah domain lingkungan. Analisis Chi-square menunjukkan bahwa tidak bekerja setelah stroke dan tingginya skor BDI berhubungan dengan rendahya skor domain fisik (r=9,286; p<0,01 dan r=5,361; p<0,05) dan psikologis WHOQOL-BREF (r=3,935; p<0,05 and r=14,527, p<0,001). Tidak ada faktor risiko yang berhubungan dengan domain interaksi sosial WHOQOL-BREF. Skor BDI yang tinggi berhubungan dengan rendahnya skor domain lingkungan WHOQOL-BREF (r=5,861; p<0,05). Regresi logistik menunjukkan bahwa usia tua (p<0,05) dan tidak bekerja setelah stroke (p<0,01) merupakan faktor risiko domain fisik dan skor BDI yang tinggi merupakan faktor risiko domain psikologis (p<0,01) dan lingkungan WHOQOL-BREF (p<0,05).*

Kesimpulan: *Usia tua dan tidak bekerja setelah stroke merupakan faktor risiko domain fisik kualitas hidup, sedangkan depresi sebagai faktor risiko domain psikologis dan lingkungan kualitas hidup pasien pasca stroke.*

INTRODUCTION

Stroke was a leading cause of death in Indonesia, killing 328.5 thousand (21.2%) people in 2012.[1] The prevalence of stroke in Indonesia in 2013 was 12.1‰ and 16.9‰ in Yogyakarta.[2] Many stroke survivors are left with significant long-term disabilities. Stroke can lead into physical, cognitive, and emotional consequences which may also affect stroke survivors' quality of life (QOL).

Quality of life (QOL) is defined as individuals' perceptions 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.[3] However, the importance of stroke survivors' QOL is still receiving little medical attention. Several factors have been shown to be associated with QOL, including increasing age, sex, educational level, working after stroke, marital status, physical disability, cognitive impairment, and depression.[4-14]

This study aims to determine stroke survivors' QOL and the associated risk factors including sociodemography, activity daily living (ADL), cognitive, and depression levels. This information may be helpful for health care providers to address strategies to improve stroke survivors' QOL.

METHODS
Study design

The study design was a cross-sectional study. The data was collected from April 18th-October 18th, 2014 at the Neurology Outpatient Clinic from Dr. Sardjito Hospital, a tertiary hospital in Yogyakarta, Indonesia.

Population and subjects

Study population was post stroke patients, either ischemic or hemorrhagic. Inclusion criteria of the subjects were minimal four weeks after the first stroke incident, in stable and no ongoing neurologic condition, no preexisting disability prior to stroke incident, was accompanied by primary caregiver (age ≥18 years), and gave a written informed-consent by subject and/or the primary caregiver. The exclusion criteria for subjects were: had recurrent stroke, aphasia, or dementia; had ADL and cognitive impairment, depression or bipolar before stroke incident; psychotic disorder and alcohol or substance abuse disorders before and after stroke; and uncomplete data.

Ethical consideration

This ethical approval was given by the Medical and Health Research Ethics Committee (MHREC) Faculty of Medicine Universitas Gadjah Mada. Prior to participation, informed-consent forms were completed by the subjects and/or the caregiver on behalf of the subjects' willing.

Measurement

Interviews were performed with subject and primary caregivers after subjects underwent physical examination. QOL as the dependent variable was measured with WHOQOL-BREF. WHOQOL-BREF which was administered to patients has 26 questions, i.e. seven questions about physical domain, six questions about psychological domain, three questions about social domain, eight questions about environmental domain, one question about overall perception of QOL and one question about overall perception of health. Each question allowed responses between '1'= the poorest to '5'= the best. If more than 20% questions of each domain (except social domain social, ≥1 question) were not answered then data would be excluded. The mean score of each domain then was converted into WHOQOL-100 score from 0–100, 0 (the poorest QOL) and 100 (the highest QOL).[3,15] Cut off point ≥50 rated as better QOL was decided from expert opinion. The risk factors measured were social demographic factors, such as: age, sex, education level, marital status, working after stroke incident; ADL, cognitive function, and depression level.

Activity daily living (ADL) was measured with Barthel Index (BI). BI was obtained from interview to with the subjects' caregiver to reduce the bias of self-measurement. BI has 10 questions which include responses as 0 to 1, 0 to 2, or 0 to 3 depending on the functional status description in the form. The total score 0-20 was categorized into 0-4 (totally dependent), 5-8 (severe dependent), 9-11 (moderate dependent), 12-19 (mild dependent), 20 (independent). Cut off <20 was considered as having dependency in ADL.[7]

Cognitive function was measured with the Mini Mental State Examination (MMSE). The MMSE has 11 questions and commands about orientation to time and place, registration, attention and calculation, recalling, and language. The total score 0-30 was categorized into 0-16 (definite cognitive impairment), 17-23 (probable cognitive impairment), and 24-30 (normal). Cut off <24 indicates cognitive impairment.[16]

Depression was measured using Beck Depression Inventory (BDI)-II. The BDI-II administered to patients has 21 questions which include responses between '0'= no symptom to '3'= severe symptom. The total score 0-63 was categorized into 31-63 (severe depression), 21-30 (moderate depression), 17-20 (cut-off to mild depression), 11-16 (minimal depression), and 0-10 (no depression). Cut off ≥17 indicates depression.[17]

Data analysis

Data were analyzed descriptively. Bivariate correlation was analyzed with Chi-square tests. Multivariate analysis was done to identify significant risk factors for each domain of stroke survivors' QOL. Variables with p<0.25 in bivariate analysis were included in backward stepwise logistic regression. P value <0.05 was considered as significant.

RESULTS

During the study period, there were 92 subjects who received treatment at the Neurology Outpatient Clinic. Of those, 80 subjects and caregiver agreed to participate. Sixteen from 80 were excluded due to uncomplete data. The characteristics of 64 subjects were analyzed (Table 1).

Almost half (48.4%) of the subjects were older than 58 years old. From marital status, 13 (20.31%) subjects are not living together with their spouse. Among them, 2 (3.12%) were not married, 3 (4.68%) were divorced, and 8 (12.50%) were widow/widower. As many as 46 (71.88%) subjects had mild to severe dependency in ADL. There were 25 (39.06%) subjects who had cognitive impairment and 12 (18.75%) subjects who had depression. The QOL most affected was physical domain (52.44±14.78), while the least affected was environment domain (63.72±14.16).

Table 1. Characteristics of subjects (n=64)

Variable	n	%
Sex		
Male	36	56,3
Female	28	43,8
Education level		
Up to class 9	21	32,8
Higher	43	67.2
Working after stroke		
No	35	54,7
Yes	29	45,3
Marital status		
Living separate	13	20.3
Married (living together)	51	79,7
Age (years)	Mean±SD=56,98±12,14	
<50	16	25,0
51-58	15	23,4
58-63	14	21,9
≥63	19	29,7
BI	Mean±SD=16,41±4,571	
Total dependent	3	4,7
Severe dependent	2	3,1
Moderate dependent	2	3,1
Mild dependent	39	60,9
Independent	18	28,1
MMSE	Mean±SD=23,20±6,177	
Definite cognitive impairment	10	15,6
Probable cognitive impairment	15	23,4
Normal	39	60,9
BDI	Mean±SD=11,27±7,695	
Severe depression	2	3,1
Moderate depression	4	6,3
Mild depression	6	9,4
Minimal depression	17	26,6
No depression	35	54,7
WHOQOL-BREF domain		
Physical	Mean±SD=52,44±14,775	
<50	24	37,5
≥50	40	62,5
Psychological	Mean±SD=59,88±20,560	
<50	19	29,7
≥50	45	70,3
Social relationships	Mean±SD=59,03±21,268	
<50	16	25,0
≥50	48	75,0
Environment	Mean±SD=63,72±14,156	
<50	8	12,5
≥50	56	87,5

BI=Barthel Index; MMSE=Mini Mental State Examination; BDI=Beck Depression Inventory

Bivariate analysis determined that not working after stroke incident and severe depression were associated with lower score in the physical health domain of WHOQOL-BREF (r=9.286, p<0.01 and r=5.361, p<0.05). Those two risk factors also were associated with lower score in the psychological domain of WHOQOL-BREF (r=3.935, p<0.05 and r=14.527, p<0.000). No risk factor were associated with the social relationships domain of WHOQOL-BREF. While for the environment domain, depression was the only significant risk factor with significant correlation (r=5.861, p<0.05, Table 2).

The regression analysis shows that older age and unemployment after stroke incident are risk factors of physical domain of QOL. Higher depression score is a risk factor of psychological and environment domain of QOL (Table 3).

DISCUSSION

The QOL most affected is physical domain and associates with working after stroke and depression but when variable age is included in multivariate analysis, only age and working after

Table 2. Bivariate correlation between risk factors and QOL domains

Variables	Physical domain		Psychological domain		Social relationship domain		Environment domain	
	r	p	r	p	r	p	r	p
Sex, male	0.068	0.795	2.197	0.138	0	1.000	0.145	0.703
Education level, <up untill 9 class	0.383	0.536	0.517	0.472	0.024	0.878	0.253	1.000
Working after stroke, No	9.286	0.002**	3.935	0.047*	0.525	0.469	0.081	1.000
Marital status, living alone	1.448	0.339	2.119	0.180	1.577	0.282	0.345	1.000
Age, ≥57 years	1.930	0.165	0.056	0.813	0.197	0.657	2.110	0.245
BI, <20	0.021	0.886	0.159	0.690	2.576	0.197	0.044	1.000
MMSE, <24	0.905	0.341	2.022	0,155	2,309	0.129	0.356	0.704
BDI ≥17	5.361	0.043*	14.527	0.000***	2.188	0.156	5.861	0.035*

*$p<0.05$; **$p<0.01$; ***$p<0.001$
BI=Barthel Index; MMSE=Mini Mental State Examination; BDI=Beck Depression Inventory

Table 3. Multivariate analysis risk factors of QOL domains

WHOQOL-BREF domain	Risk Factors	B	Adjusted R	95% CI	p value
Physical	Age	-1.979	0.138	0.028-0.689	0.016*
	Working after stroke	2.708	14.993	2.864-78.483	0.001**
Psychological	Depression	-2.534	0.079	0.018-0.348	0.001**
Environment	Depression	-1.792	0.167	0.034-0.805	0.026*

*$p<0.05$; **$p<0.01$

stroke are related with physical domain of QOL. Most (60.9%) of our subjects who have worse physical domain of QOL are experiencing older age. Older age is found to be a risk factor of the physical domain of QOL. Our result is similar with many previous studies.[4,6-8,13] The association between age and score in the physical domain may be a function of age-related changes, as much as the stroke sequele.[5,6]

The physical and psychological domain of QOL is lower in subjects who do not go back to work after stroke incident. Our finding is similar with other studies which report that working outside associates with better QOL.[10-12] On the other hand, another study reports the contrary.[8] This study also found that working after stroke is not significant in the multivariate analysis of the psychological domain of QOL. The fact of a stroke patient having returned to work after stroke did not increase the level of QOL over time. This finding might be partially explained by the interrelation with the perceived functional ability. A higher perceived functional ability corresponds to higher subjective QOL, and thus corresponds to higher probability of returning to work.[11] We suggest improving access to rehabilitation services to optimize QOL of stroke survival. Physiotherapy and occupational therapy may help to reduce post stroke disability in low QOL.

Some difficulties like fatigue, memory loss and concentration may also become obstacles. Struggling to work at the same level as before the stroke incident can become very demanding. This correlates with lower psychological domain of QOL.[12] Sociocultural factors may also correspond, since in our study there are more women who are housewives and must take responsibility for household management.[10] TThis sociocultural

factor may also influence the psychological domain of QOL.

Depression associates with physical, psychological and environmental domain of QOL. Depression also remains significant in the psychological and environment domains in the multivariate analysis similar with previous studies.[6,9,14] Depression is an important factor influencing QOL of stroke survivor and should not be neglected. As much as 18.8% subjects have depression but there are 26.6% of subjects who still have minimal symptoms that should be prevented from becoming worse. Another point in a developing country is, many of stroke survivors went back home rather than to a nursing home or other rehabilitation institution to learn copying strategies related to their disabilities. We suggest a screening to find any indication of depression in stroke survivors so that targeted support and intervention, such as self-help advice, education to those family members, establish stroke support group and counseling, even drug treatment for more severe subjects can be given. This approach might be an entry point to decrease depressive symptoms and improve stroke survivors' QOL.[6-18]

There are some limitations in this study. This study did not assess the severity of stroke survivors so that the outcome of stroke becomes widened as different comorbidities can affect different domains. Convenient sampling method and cross sectional study design resulted in non-standard follow up. Indonesia is a country with many regional socio-cultural variations so that the results might be different in other regions or another country. Despite the mentioned limitations, our study offers new information concerning stroke survivors' QOL with standardized measurement in a neglected area of medical research.

CONCLUSION

At the end of this study we conclude the physical domain has the most effect on QOL, while the environment domain has the least effect. Risk factors associated with QOL in the bivariate analysis include not working after stroke incident and more severe depression was associated with lower physical health and .psychological domain. No risk factor were associated with social relationships domain of QOL, while depression is the only significant factor associated with the environment domain of QOL. The risk factors found significant in the regression analysis were older age and not working after stroke, which associated with the physical domain of QOL, while severe depression was a significant risk factor of psychological and environment domains of QOL.

Improving access to rehabilitation services, such as physiotherapy or occupational therapy to optimize the physical domain of stroke survivors' QOL are needed. We also suggest a complete screening program to find any indication of depression among stroke survivors and giving support and intervention to stroke survivors diagnosed with depression. Further study with more relevant designs and more risk factors can be made to improve the study of stroke survivors' QOL.

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