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Correlation between Indonesian Version of Montreal Cognitive Assessment Score and Hospital Anxiety and Depression Scale Scores for Post-Stroke Patients

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Abstract

BACKGROUND: Cerebrovascular disease, with its complex anatomy, and various parts of the brain can cause neurological deficits. The Oxfordshire Community Stroke Project classification distinguishes a posterior circulation infarct from an Anterior Circulation Infarction using radiological examination. Anxiety after stroke occurs in about 24% of patients and it is a problem with quality of life associated with poor health. In post-stroke anxiety, there are still few studies on prevention, risk factors, and therapeutic interventions. More than 40% of stroke sufferers have cognitive impairment or post-stroke cognitive impairment.

AIM: The objectives of the study were to determine the correlation between Indonesian Version of Montreal Cognitive Assessment Score (MoCA-INA) and the Hospital Anxiety and Depression Scale Scores (HADS-A) for post-stroke patients in neurological road care installation in University of Sumatera Utara Hospital.

METHODS: This is a numerical correlation study with a cross-sectional approach. The sampling method is non-probability sampling with consecutive sampling type. The research subjects were then examined for the total MoCA-INA score. Then, the research subjects are examined for HADS-A. After all the results of the examination, the questionnaire and the subject's personal data are completely filled in, the questionnaire is collected. The analysis uses the Spearman correlation test

RESULTS: The results of the analysis using the Spearman correlation test for the correlation between MoCA-INA total score and HADS-A total score, the value of r is –0.602 with $p < 0.001$ (the correlation is very significant with negative correlation direction and the strength of the correlation is strong).

CONCLUSIONS AND SUGGESTIONS: With the influence of MoCa-INA score on the HADS-A score in post-stroke patients, it can provide an input for health workers to immediately detect and anticipate events of cognitive decline and anxiety in post-stroke patients.

Introduction

The World Health Organization (WHO) defines stroke as a clinical symptom that develops from impaired brain function or globally, with symptoms that last more than 24 h, or cause death, without a clear nonvascular cause. It is the third cause of death after heart disease and cancer. In addition to the high mortality rate, stroke ranks first among diseases that cause mental and physical disabilities in patients who last a lifetime [1].

The proportion of deaths caused by stroke is 10–12% in Western countries, and 12% of these deaths are in people younger than 65 years. However, due to the growing elderly population in Western countries. An estimate is that by 2030, stroke-related disability is ranked as the fourth leading cause of disability-adjusted life years [2].

Anxiety after stroke occurs in about 24% of patients and it is a problem with quality of life (QoL) associated with poor health. In post-stroke anxiety (PSA), there are still few studies on prevention, risk factors, and therapeutic interventions. A study from Li *et al*. in China reported that symptoms of anxiety are common after stroke and estimate that PSA affects 25% of stroke sufferers. The study also obtained scores of anxiety symptoms with a mean HARS ≥14 and found that the frequency of PSA is around 15% for stroke patients [3]. More than 40% of stroke sufferers have cognitive impairment or post-stroke cognitive impairment (PSCI). Cognitive impairment after 3 months of stroke was associated with a risk of death or disability on 3 and 4 years. The predictive predictors were patient age, stroke mechanism, location and volume of lesions, and comorbidities [4].

Although the early diagnosis and management of stroke has progressed and resulted in a reduction in the incidence and mortality of stroke, approximately 25–74% of stroke patients still suffer lifelong psychological disabilities and disorders and include cognitive impairment, anxiety disorders, and depression, motor and sensory disorders [1].

Clinically significant mental health disorders occur in more than one-third of post-stroke patients and may be associated with increased morbidity and mortality. The most common disorders after stroke are depression and anxiety. Around the world, anxiety disorders are the most common group of mental health disorders, with an estimated life span prevalence of around 11%. Anxiety following a stroke or transient ischemic attack (TIA) occurs in about 24% of patients and it is a troublesome problem associated with poorer health-related QoL. Despite this prevalence, PSA is an unknown area compared to other post-stroke psychological disorders such as depression. There are no studies on the prevention of PSA and very few randomized trials of interventions to treat it. This may partly reflect underreporting of risk factor data and its association [5]. Independent determinants of cognitive impairment were lesion location, stroke severity, and premorbid functional status. To establish the Montreal Cognitive Assessment Score (MoCA) value, studies comparing the performance of MoCA in the post-acute/subacute stroke period with those on this extensive neuropsychology demonstrated that baseline MoCA could predict PSCI progression on 3, 6, and 12 months with an accuracy of ≥90%. In our study, MoCA baseline score was the independent determinant of the PSCI with an odds ratio of 1.4 for each missing test point. MoCA scores were also associated with poor functional status as measured by a modified Rankin scale at 3–6 months in patients with ischemic stroke or TIA 14 and at 12 months in patients with subarachnoid hemorrhage [4].

Indonesian version of MoCA (MoCA–INA) was designed as a rapid screening instrument for mild cognitive dysfunction. MoCA is useful for detecting mild cognitive decline in a variety of conditions including Alzheimer's disease, vascular cognitive impairment, Parkinson's disease, Lewy body, frontotemporal dementia, multiple sclerosis, Huntington disease, brain tumors, ALS, sleep apnea, heart failure, substance abuse, schizophrenia, HIV, and head trauma [6].

MoCA has a sensitivity of 90% and a specificity of 87% for assessing cognitive function. In Indonesia, MoCA has been validated into Indonesian by Husein *et al*. in 2009 and is referred to as MoCA-INA. MoCA-INA is valid according to the organic validation rules and is trusted so that it can be used [6].

Hospital Anxiety and Depression Scale (HADS-A) is designed to provide a simple and reliable measurement tool in medical practice. The term "Hospital" in the title suggests that it is only valid in that setting, but numerous studies conducted around the world have confirmed that it is valid when used in community and practice medical services. HADS only takes 2–5 min to complete [7].

HADS-A consists of 14 statements that are divided into two subscales, namely, to assess anxiety (seven statements) and depression (seven statements), in which the patient classifies each statement into four value scales, from a value of 0 (not at all) up to a value of 3 (very often). A higher value indicates a problem. Subjects' answers are summed separately, namely, ratings for anxiety and ratings for depression, with the minimum and maximum numbers being 0 and 21 for the scales, respectively. The recommended intersection is more than or equal to 16 which represents a severe case, the 11–15 intersection is a moderate case, the 8–10 intersection is a mild case, and <8 is not a case of anxiety or depression validity and reliability of HADS that has been reported in several studies. In Indonesia, the reliability test was carried out by Widyadharma *et al* in 2015. The result of the inter-rater agreement for HADS-A was 0.706. The result of the inter-rater agreement for HADS-D is 0.681 where the value 0.61–0.80 means that the reliability is good [8]. Anxiety is the first mild stroke and it occurs in about a quarter of stroke sufferers. PSA may have a negative impact on the QoL of stroke sufferers. Apart from the stress resulting from acute ischemic stroke, the biological mechanism of PSA must also be considered [9].

The independent determinants of the occurrence of impaired cognitive function were the site of the lesion, the severity of stroke, and premorbid functional status. To establish the organic value of Moca, this study compared MoCA performances in the acute/subacute post-stroke period with those in extensive neuropsychology showing that Moca baseline can predict PSCI progression at 3, 6, and 12 months with an accuracy of 90%. In our study, baseline Moca score was an independent determinant of PSCI with an odds ratio of 1.4 for each missing test point. The Moca score was also associated with poor functional status as measured by the modified Rankin scale at 3–6 months in patients with ischemic stroke or TIA 14 and at 12 months in patients with subarachnoid hemorrhage [4].

Anxiety is the first minor stroke and occurs in about a quarter of stroke survivors. PSA may have a negative impact on the QoL of stroke survivors. Apart from the stress of acute ischemic stroke, the biologic mechanisms of PSA must also be considered [5].

Methods

This study is a numerical correlation study with a cross-sectional approach. The study is conducted at neurological road care installation at University of Sumatera Utara Hospital between December 2019 until January 2020. The research subjects are 62 men with post-stroke who are undergoing treatment at neurological road care installation at University of Sumatera Utara Hospital. The sampling method is non-probability sampling with consecutive sampling type. The inclusion criteria in this study were as follows: Patients were diagnosed according to the NIHSS with a value <6, age 40–80 years, suffering from a stroke over

3 months, cooperative, and willing to join the study. The exclusion criteria in this study were as follows: Having comorbid other medical illnesses, organic mental disorders, and other psychiatric disorders and patients who use additives other than cigarettes and caffeine.

Sampling data are preceded by a structured interview using the MINI ICD-10 and if the subject meets the criteria, he is asked to fill out written consent (informed consent). After getting a detailed and clear explanation to participate in further research, the research subjects are asked to fill in data regarding their personal identity and demographic characteristics. The subject of the study is then examined the total MoCA-INA score. Then, the research subject is examined for HADSA. After all the results of the examination, the questionnaire and the subject's personal data are completely filled in, the questionnaire is collected, and then the data are processed and analyzed.

Statistical analysis

Data are analyzed using SPSS version 21. To determine the demographic characteristics, MoCA-INA scores, HADS-A scores, and the correlation between MoCA-INA scores and HADS-A scores in post-stroke patients in neurological road care installation at University of Sumatera Utara Hospital used the test. Normality uses Kolmogorov–Smirnov test with P>0.05 if the data are not normal, a data transformation test will be carried out. After the data, normality test is carried out with Kolmogorov–Smirnov test, it is found that the total variable MoCA-INA score is not normally distributed with $p < 0.05$ and so also with the variable total score HADS-A, the results are not normally distributed with $p < 0.05$. Because all of these variables are not normally distributed, they are presented in the form of concentration (median) and spread (minimum-maximum).

For the correlation test between total MoCA-INA and total HADS-A, it is carried out using the Spearman correlation test, because the two variables, namely, the independent variable (total MoCA-INA score) and the dependent variable (total HADS-A score), are both not normally distributed after testing Kolmogorov–Smirnov and then have fulfilled the linearity test requirements with the attached scatter graph display. The result of the Spearman correlation test is that r-value is −0.602 with $p < 0.001$ (the correlation is very significant with a negative correlation direction and the strength of the correlation is strong) [10], [11].

Results

From the 62 study subjects in post-stroke patients who are undergoing treatment at neurological road care installation at University of Sumatera Utara Hospital, Table 1 shows that by age group is the median value of age in post-stroke patients who are undergoing treatment at neurological road care installation at University of Sumatera Utara Hospital which is 51.60 years and the maximum minimum value (41–69 years). Based on the highest gender, the total of male is 43 people (69.4%). Based on the marriage of post-stroke patients who are undergoing treatment at neurological road care installation at University of Sumatera Utara Hospital, the largest proportion is married, namely, 47 people (75.8%). Based on the education of post-stroke patients who are currently undergoing treatment at neurological road care installation at University of Sumatera Utara Hospital, the highest number of them is high school and tertiary education with the same number of 27 people (43.5%). Based on the work of post-stroke patients who are undergoing treatment at neurological road care installation at University of Sumatera Utara Hospital, the largest number of them are employed, namely, 37 people (59.7%). Based on the length of illness/post-stroke, the median value of post-stroke patients who are undergoing treatment at neurological road care installation at University of Sumatera Utara Hospital is 4 years and the minimum value is maximum (3–6 years). Based on the NIHSS score, the median value of post-stroke patients who are undergoing treatment neurological road care installation at University of Sumatera Utara Hospital is 4 and the minimum value is maximum (3–5). Based on the MoCA-INA score, the median value of post-stroke patients who are undergoing treatment neurological road care installation at University of Sumatera Utara Hospital is mostly female and male, namely, 23 and the minimum value is maximum (20–25). Based on the HADS-A score, the median value of post-stroke patients who are undergoing treatment at neurological road care installation at University of Sumatera Utara

Table 1: Distribution of research subjects based on demographic characteristics of post stroke patients who are undergoing treatment at neurological road care installation at university of Sumatera Utara Hospital

Sociodemographic characteristics	Average ± S.D., median (min-max)	n (%)
Age (year)	51.06 (41–69)	
Gender		
Male		43 (69.4)
Female		19 (30.6)
Marital status		
Married		47 (75.8)
Unmarried		15 (24.2)
Level of education		
Junior high school		10 (16.8)
Senior high school		27 (43.5)
University		27 (43.5)
Job		
Worker		37 (59.7)
Unworker		25 (40.3)
Duration of illness/post stroke (month)	4 (3–6)	
NIHSS score	4 (3–5)	
Total MoCA-INA score		
Male	23 (20–25)	
Female	23 (20–25)	
Total HADS-A score		
Male	9 (5–16)	
Female	9 (7–14)	

MoCA-INA: Indonesian version of Montreal Cognitive Assessment, HADS-A: Hospital Anxiety and Depression Scale.

Hospital is mostly male, namely, 9 and the maximum minimum value (5–16).

Table 2: Median (min.-max.) MoCA-INA total score on the subject

MoCa-INA score	n	Median (min.-max.)
	62	23 (20–25)

MoCA-INA: Indonesian version of Montreal Cognitive Assessment.

Table 2 shows that the median value of MoCA-INA total score is 23 with a minimum score of 20 and a maximum score of 25. Table 3 shows that the median value of the total MoCA-INA score is 9 with a minimum score of 5 and a maximum score of 16.

Table 3: Median (min.-max.) score of HADS-A total score in these subjects

HADS-A score	n	Median (min-max)
	62	9 (5–16)

HADS-A: Hospital Anxiety and Depression Scale.

Based on Table 4, the correlation test between total Mocha-Ina and HADS-A is carried out using Spearman correlation test, because the two variables, namely, the independent variable (MoCA-INA total score) and the dependent variable (HADS-A total score), are both not normally distributed after the test is carried out by Kolmogorov–Smirnov test. Then, it has met the linearity test requirements with the attached scatter graph display. The results of the Spearman correlation test showed that r-value is –0.602 with $p < 0.001$ (the correlation is very significant with a negative correlation direction and the strength of the correlation is strong).

Table 4: Correlation between MoCa-INA total score and HADS-A total score

Variable	Median	Min.–max.	p	r	n
MoCA-INA score	23	20–25			
HADS-A score	9	5–16	<0.001	–0.602	62

Spearman correlation test, MoCA-INA: Indonesian version of Montreal Cognitive Assessment, HADS-A: Hospital Anxiety and Depression Scale.

Discussion

The study of Barker et al. in New Zealand in 2007, examined prevalence of depression and anxiety as well as the relationships of age, gender, hemisphere of lession, functional independence, and cognitive functioning (e.i., memory, attention/impulsivity, cognitive speed) to depression and anxiety at 3 months post stroke in 73 individuals.

Prevalence of moderate to severe depression and anxiety in the sample were high (22.8 and 21.1%, respectively), with co-morbidity in 12.3% of cases. The prevalence of anxiety in this study consistently suggests that 25% of people will suffer from acute anxiety after a stroke, with 20% of them experience the anxiety on 3–6 months of follow-up. Moderate comorbid anxiety and depression are found in 6.8% of subjects, while an additional 5.5% has comorbid major depression with severe anxiety. In this study, the correlation between cognitive function scores and scores of anxiety symptoms was obtained, namely, $r = 0.712$ and $p < 0.001$. In this study, r- value was –0.602 with $p < 0.001$.

The limitations in this study, researchers only looked at the post-stroke without looking at the risk factors such as psychosocial and individual factors on MoCa-INA score and HADSA score. The strength of this study is to see the relationship between MoCa-INA total score and HADS-A total score in stroke patients. In the study Al-Busaidi in Saudi Arabia 2016, the only available data on the frequency of both anxiety and depression in stroke patients in Saudi Arabia come from a cohort of 76 patients (Y. Alamri, unpublished) who were given the HADS-A. In this group, 54% of whom were more than 60 years of age, men constituted about 55% of the sample. Fourteen patients (18.4%) met the criteria for moderate or severe anxiety on the HADS anxiety subscale whereas 18 patients (23.7%) met the criteria for moderate or severe depression on the HADS depression subscale. Longer duration since stroke (defined as >2 years since diagnosis) was associated with an increased risk for anxiety ($p = 0.02$) but not depression ($p = 0.25$). Women were significantly more likely to score higher for both anxiety ($p = 0.03$) and depression ($p = 0.04$). In the study, there was also no significant difference in the HADS-A score for male and female with $p = 0.335$. Therefore, gender in this study was not differentiated because it is not a confounding factor that must be controlled.

Conclusions

From the results of the study, the correlation test between total MoCA-INA and total HADS-A is carried out using Spearman correlation test, because the two variables are the independent variable (MoCA-INA total score) and the dependent variable (HADS-A total score). The correlation is very significant with a negative correlation direction and the strength of the correlation is strong.

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