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Analysis between cognitive impairment with the level of disability post-stroke patients: A cross-sectional study



Siti Nur Hasina^{1*}, Nur Ainiyah¹, Anggy Dyayu Nur Wardhini¹, Lono Wijayanti¹

ABSTRACT

Introduction: The condition that appears in patients who have had a stroke is cognitive impairment. Cognitive impairment can worsen the condition of stroke patients so that it can slow down the recovery process and have a high risk of disability. This study aims to analyze the correlation between cognitive impairment and the level of disability in post-stroke patients.

Methods: This study uses a correlational analytical design with a cross sectional technique design with a population of 70 participants and a sampling technique using consecutive sampling obtained a sample of 64 participants. The independent variable in this study is cognitive impairment of post-stroke patients while the dependent variable is the level of disability of post-stroke patients. The instrument for collecting data on cognitive impairment was using the MoCA-Ira questionnaire and the level of disability using the WHODAS questionnaire. The data were analyzed using the Spearman Rank test with significance < 0.05.

Results: The results of this study showed that most of the 52 (81.2%) participants had cognitive impairment and most of the 42 (65.6%) participants had moderate disabilities and a small portion of 10 (15.6%) participants had severe disabilities. The results of statistical tests on the relationship between cognitive impairment and the level of disability in post-stroke patients through the Spearman Rank test showed $p = 0.000$ with a significant correlation 0.665.

Conclusions: The analysis test showed a strong correlation between cognitive impairment and the level of disability in post-stroke patients. Post-stroke patients with cognitive impairment must be treated properly so that it does not result in disability in patients that has a direct impact on the psychosocial and quality of life of the patient.

Keywords: Cognitive Impairment, Disability, Stroke.

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INTRODUCTION

Stroke is a major health problem in both developed and developing countries. Stroke is a term used to describe neurological changes caused by an interruption in the blood supply to part of the brain.¹ One of the conditions that arise in patients who have had a stroke is cognitive impairment. Cognitive impairment can worsen the condition of stroke patients so that it can slow down the recovery process and increase the risk of disability. Sun, Tan, & Yu (2014) stated that stroke can cause cognitive impairment which tends to be neglected because it is covered by severe disability.² Based on Gottesman & Hillis (2010), Cognitive disorders after stroke that often appear are aphasia (language impairment) and hemispatial (failure to attend or respond to stimuli on the

contralateral side to the stroke).³

Based on previous studies, the prevalence of post-stroke cognitive impairment ranges from 20% to 80%, which varies for differences between countries, races, and diagnostic criteria. The risk of post-stroke cognitive impairment is related to demographic factors such as age, education and occupation as well as vascular factors.² Purba & Utama (2019) researching the disability of post-stroke patients towards depression shows that there is a significant relationship between the level of disability of post-stroke patients and depression.⁴ Putri, Mutiawati, Mahdani (2017) examined the relationship between stroke degree and cognitive status in ischemic stroke patients, it was found that 22 people (55.0%) had moderate stroke degree and 19 people (47.5%) had mild cognitive impairment.⁵ There is a

strong relationship between the degree of stroke with cognitive status with a value of $p = 0.000$. Prakoso, Vitriana and Ong (2016) examined the relationship between cognitive function and activities of daily living in post-stroke patients. It was found that there was a significant relationship between cognitive function and IADL ($r^2=0.517$, $p=0.03$).⁶ According to research by Catherine et al (2015) on the relationship between disability and cognitive impairment in the Tanzanian population, cognitive impairment is a significant predictor of disability in the elderly.⁷

According to data obtained from RSI Jemursari Surabaya as many as 303 people with stroke in the last 4 months. Stroke is the number one cause of disability in Indonesia. A total of 71.8% (1,648 people) of stroke sufferers experience psychological

disabilities and 56.1% (1,290 people) have social disabilities.⁸ The number of stroke patients at RSI Surabaya Jemursari in July-August 2020 was 70 post-stroke patients. There have been many studies on the correlation between cognitive impairment and the level of disability of patients, but in Indonesia no one has examined this correlation, especially with post-stroke patients with the number of stroke sufferers in Indonesia.⁸

The risk of cognitive deficits increases as a result of stroke, and 25-50% of stroke survivors develop post-stroke dementia. A higher frequency of post-stroke cognitive deficits has also been found during the third month after stroke onset compared with the frequency one year after stroke. This may be due to the higher mortality rate in post-stroke patients with cognitive impairment. So that patients who experience stroke on average experience cognitive impairment.⁹ Disorders of cognitive function can lead to psychosocial disorders if not handled properly, so it can be said that the quality of life of the sufferer will decrease. One of the simplest examples is the occurrence of senility after a stroke which is certainly very disturbing daily activities.

Impaired cognitive function in the long term if not treated optimally will increase the incidence of dementia. Manifestations of cognitive decline associated with vascular disorders include deficits in the speed of information processing, decreased abstract reasoning, attention, and executive functions of the brain related to problem solving and planning, and organization of goal-directed and goal-oriented behavior.¹⁰ Cognitive impairment can trigger an individual's functional ability to perform activities of daily living independently to be disturbed. Disability in stroke patients is a disability associated with disturbances in body structure and function, such as changes in motor function, limitations in certain activities, changes in mobility, increased risk of falling during functional activities, and limitation of participation.⁷ Disability is a limitation or lack (resulting from interference) of the ability to perform an activity within the range considered normal for humans.¹¹

Disability in post-stroke clients can

be in the form of decreased function of the extremities, such as the presence of hemiparesis in the extremities. Disturbance Upper extremity function is a common problem that weighs heavily on post-stroke clients. This post-stroke client's extremity disorder causes disability in the client after stroke. This agrees with what was stated by Avicenna, (2010) which states that 56% of clients still have showed a real hemiparesis after being examined five years after a stroke, the hemiparesis experienced by clients with post-stroke is what causes post-stroke clients stroke has a disability so that in carrying out daily activities or activities it depends on other people.¹² Where previously the client was able to carry out daily activities without the help of others. This is the psychological impact on post-stroke clients, which affects mental and cognitive status disorders and even depression and language disorders. Based on this description, the purpose of this study was to analyze the correlation between Cognitive Disorders and Disabilities in Post-Stroke Patients.

METHOD

General Background of Research

The type of research used in this research is correlational analytic, using cross sectional technique. The location of this research is the Neurology Polyclinic of RSI Surabaya Jemursari. This research was conducted in July-August 2020.

Sample of Research

The population in this study were all stroke patients at the Neurology Clinic of RSI Jemursari Surabaya. The number of stroke patients visiting the Neurology Clinic for 2 months is 70 people. The sample in this study was taken by means of consecutive sampling technique by fulfilling the inclusion criteria, namely the participants were stroke patients who had stroke with composmentis awareness, had recurrent strokes, were willing to become participants, and were willing to have their cognitive impairment and level of disability measured. Exclusion criteria in this study were stroke patients who were not willing to participate and were in a state of decreased consciousness. So that the sample in this study obtained 64 participants.

Instrument and Procedures

This study uses a research instrument in the form of a MoCA-Ina (Montreal Cognitive Assessment) questionnaire which includes 30 questions to measure cognitive impairment. This questionnaire has a score indicator, namely a score <26 meaning no cognitive impairment, a score >26 experiencing cognitive impairment and giving an additional score of 1 if the individual has had formal education for 12 years or less, with a total score of <30. The Indonesian translation of the MoCA-Ina (Montreal Cognitive Assessment) questionnaire has been tested for validity and reliability with the results of the validity of the value of $r = 0.529$ with $p = 0.046$ and the reliability test obtained by the value of $r = 0.963$ with $p = 0.000$.¹³

Meanwhile, the level of disability in post-stroke patients can be measured using the Indonesian version of the WHODAS (World Health Organization Disability Assessment Schedule) 2.0 questionnaire which includes 12 questions about how much their disability affects their daily lives and activities. With the following categories of answers: No difficulty with a score of 1, Slight difficulty with a score of 2, Moderate difficulty with a score of 3, Very difficult with a score of 4, Unable to do with a score of 5. The WHODAS questionnaire indicator is not having a disability if the score is 12, disability mild if the score is 13-27, moderate disability if the score is 28-42, severe disability with a score of 43. The Indonesian version of the WHODAS (World Health Organization Disability Assessment Schedule) 2.0 questionnaire has a validity value of $r = 0.862$ which was tested using the Pearson test and the reliability value tested by the Pearson relationship test has the results of $r = 0.764-0.866$ while the reliability value tested by the Cronbach-Alpha test with alpha results > 0.6 (0.634-0.853).¹⁴

The procedure for this research is that the research team obtained a permit for initial data application from the Universitas Nahdlatul Ulama Surabaya Institution which was given to RSI Jemursari Surabaya, the arrangement of research permits and research ethics at the Training and Education of RSI Surabaya Jemursari. The researcher gave a research cover letter to the head of the Outpatient Installation

of RSI Surabaya Jemursari. Researchers in collecting information related to post-stroke patients made a statement not to disseminate data on post-stroke patients at the Neurology Polyclinic RSI Surabaya Jemursari. Reading the post-stroke patient registration book document at the Neurology Poly of RI Surabaya Jemursari. Make a list of post-stroke patients at RSI Jemursari Surabaya. Meeting patients at the polyclinic or appointments at each participant's home to measure cognitive impairment and level of disability.

The research team provided information related to the research to be carried out, measured the inclusion and exclusion criteria of participants, and then asked about their availability to become participants. If the patient is willing to be a participant, the researcher gives informed consent to be filled out by the patient. The researcher helped the participants in filling out the questionnaires by means of structured interviews to the participants and then filled out the questionnaires according to the answers given by the participants. If the participants had difficulty in filling out the questionnaire, the researcher again explained things that the participants did not understand.

Data Analysis

Analysis of the data in this study using the Spearman Rank test with SPSS version 16 for windows program with a significant level of < 0.05 .

RESULTS

Table 2 shows that from 64 participants, most of them 52 (81.2%) experienced cognitive impairment.

Based on table 3, it shows that from 64 participants, most of them 42 (65.6%) have moderate disability and a small proportion of 10 (15.6%) have severe disability.

Based on the results of statistical tests on the relationship between cognitive impairment and the level of disability in post-stroke patients through the Rank Spearman Correlation test tool with a significance value, the results obtained = 0.000 with a correlation coefficient of 0.665. This means that there is a strong relationship between cognitive impairment and the level of disability in post-stroke patients at the Islam Surabaya

Jemursari Hospital.

DISCUSSION

Cognitive impairment in post-stroke patients

Cognitive impairment in post-stroke patients was measured using a MoCA-Ina (Montreal Cognitive Assessment) questionnaire consisting of alternate tracing, visuoconstructional ability (cube), visuoconstructional ability (wall clock), naming, memory, attention, repetition of sentences, fluency in language, abstract ability, delayed memory, orientation

ability. On average, patients with cognitive impairment feel less precise in making decisions and solving problems they face. Cognitive impairment in patients is influenced by age, education level and history of the patient's illness.¹⁵ The average respondents who participated in the study were aged 60-80 years who were classified as elderly and most of the respondents were male. In the process of collecting data, it was shown that most of the male respondents had activities to fill their time while at home such as watching television or reading newspapers even though they had difficulty in carrying out

Table 1. Characteristics of Participants

Category	Participants (n = 64)	
	n	Percentage (%)
Age		
< 60 years	24	37.5
60-80 years	34	53.1
>80 years	6	9.4
Gender		
Male	54	84.4
Female	10	15.6
Education		
Primary School	14	21.9
Junior High School	12	18.7
Senior High School	22	34.4
College	16	25.0
Long had a stroke		
4-7 Minggu	20	31.2
8-12 Minggu	44	68.8
Stroke type		
Ischemic Stroke	52	81.2
Hemorrhagic Stroke	12	18.8
Comorbidities		
Hypertension	38	59.4
Heart disease	16	25.0
Diabetes mellitus	10	15.6

Table 2. Distribution of the frequency of participants based on cognitive impairment of post-stroke patients.

Cognitive Impairment	n	Percentage (%)
Cognitive Impairment	52	81.2
No Cognitive Impairment	12	18.8

Table 3. Distribution of the frequency of participants based on the level of disability of post-stroke patients.

The Level of Disability	n	Percentage (%)
No Disabilities	0	0.0
Mild Disabilities	12	18.8
Moderate Disability	42	65.6
Severe Disabilities	10	15.6

light activities such as standing or walking, mostly done at home is contemplating and sleeping. So that it affects the cognitive disorders experienced by respondents.⁴

Manifestations of cognitive decline associated with vascular disorders include deficits in the speed of information processing, decreased abstract reasoning, attention, and executive functions of the brain related to problem solving and planning, and organization of goal-directed and goal-oriented behavior. Patients with vascular dementia or Alzheimer's disease show progressive changes in mood and behavior (eg depression and apathy), as well as large deficits in memory processing and mental flexibility.⁶

Comorbidities possessed by post-stroke patients such as hypertension greatly affect the cognitive disorders experienced by patients. Based on the data in table 1 shows almost all respondents have a history of hypertension. In the data collection process, the average patient said that sometimes the patient felt difficult in making decisions, solving a problem he had faced and finally feeling frustrated when he thought that he would never recover from the illness he was experiencing. On average, patients with a history of hypertension said that they found it difficult to carry out activities to control their blood pressure levels such as exercising. Ministry of Health (2014) states that disturbances in cognitive function can lead to psychosocial disorders if not handled properly, so it can be said that the quality of life of the sufferer will decrease.⁸

Level of Disability Post-stroke Patients

Table 3 shows that from 64 participants, most of them 42 (65.6%) had moderate disability and a small proportion of 10 (15.6%) had severe disability. The level of disability experienced by respondents is related to the type of stroke experienced by the patient and the patient's history of stroke recurrence. Most of the respondents who participated in this study were respondents who had an ischemic stroke and had a stroke before. This is related to the disability caused by the stroke. The average participant who participated in this study experienced speech disorders and disorders of the extremities such as stiffness, tingling, which sometimes

Table 4. Analysis of the correlation between cognitive impairment and the level of disability in post-stroke patients.

Cognitive Impairment	The Level of Disability			
	Mild	Moderate	Severe	Total
No Cognitive Impairment	10	2	0	12
Cognitive Impairment	2	40	10	52
Total	12	42	10	64
Rank Spearman Correlation Test			0.000	
Correlation Coefficient			0.665	

caused the patient to walk using a cane. This causes the majority of respondents to have moderate disabilities. The moderate level of disability experienced by most patients is evidenced by the statement of patients who on average have little difficulty in being responsible with housework, doing activities in the community, building friendships, and carrying out personal daily activities such as bathing and changing clothes. In addition to being influenced by the type of stroke experienced, patients who have had a previous stroke on average, both patients and their families know how to take care and the rehabilitation process that must be done to avoid further complications even though the physical disability experienced by the patient is worse than before.⁵

The correlation between cognitive impairment with the level of disability in post-stroke patients

Table 4 shows that of the 12 respondents who do not experience cognitive impairment, 10 participants with mild disability levels and 2 participants with moderate levels of disability, and 52 respondents who experience cognitive impairment, most of them are 40 participants with moderate levels of disability. The results of statistical tests on the relationship between cognitive impairment and the level of disability in post-stroke patients through the Rank Spearman Correlation test tool with a significance value obtained the results of = 0.000 with a correlation coefficient of 0.665. This means that there is a strong relationship between cognitive impairment and the level of disability in post-stroke patients at the Islamic Hospital of Surabaya Jemursari. From the results of data, collection that has been carried out, it is found that patients with cognitive impairment tend to have moderate levels

of disability, even though they have had a stroke in the same period of time. Patients who do not have cognitive impairment and have cognitive impairment tend to feel less precise in making decisions and solving a problem they face.¹¹

The research conducted shows that it is possible if an environment that is able to provide full support can encourage patients to think positively in dealing with the situation they are experiencing and foster motivation so that patients do not have cognitive disorders. The support given to patients, for example, is letting patients do activities that can train their abilities by doing activities both at home (care for grandchildren, reading books, watching TV) or in the community that can help the patient's rehabilitation process. Most of the patients who were still actively participating in community activities said that they rarely felt depressed when they remembered that they would not recover from their illness. Most patients with moderate to severe disabilities on average often or always feel that they are useless, are a burden to their families, and often feel depressed if they think that they will never recover from their illness. When the interview was conducted, some of the respondents cried and admitted that they were sad and felt that they had no friends to share with, because of the limited opportunity to interact with the outside community. Most of the patients with moderate or severe disabilities admitted that they did not do any activities at home other than sleeping and sitting on the terrace or living room. The cognitive impairment experienced causes a decrease in the patient's motivation so that it affects the rehabilitation process and the level of disability experienced by the patient.⁹

This is in accordance with the statement of Wang et al (2016), one of the

factors that influence the disability of post-stroke patients is cognitive impairment. Disorders of cognitive function can lead to psychosocial disorders if not handled properly, so it can be said that the quality of life of the sufferer will decrease. One of the simplest examples is the occurrence of senility after a stroke which is certainly very disturbing daily activities.⁸

CONCLUSIONS

The aim of this study was to analyze the relationship between cognitive impairment and the level of disability in post-stroke patients. This study has identified that there is a strong relationship between cognitive impairment and the level of disability in post-stroke patients. Post-stroke patients with cognitive impairment must be treated properly so that it does not result in disability in patients which has a direct impact on the psychosocial and quality of life of the patient. Further studies with different designs and larger sample sizes are needed to determine other factors that influence cognitive impairment with the level of disability in post-stroke patients.

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AUTHOR CONTRIBUTION

All authors contributed to this study's conception and design, data analysis and interpretation, article drafting, critical revision of the article, final approval of the article, and data collection.

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CONFLICT OF INTEREST

There is no conflict of interest in this manuscript.

ETHICAL CONSIDERATION

This research has been declared "Ethically Appropriate" by the Health Research Ethics Commission of the Jemursari Islamic Hospital with the number 0049/KEPK-RSI JS/V/2019. The ethical principle of this research is the existence of informed consent, in this case the researcher will explain in full to the participants the purpose of the research and matters related to this research and ask for the consent of the participants to sign the agreement if the participant has understood and agreed to be the subject of the study. If the research subject refuses to become a participant, the researcher does not force and still respects his rights. Anonymity, research ethics in this way does not include the name of the participant in the questionnaire, but only includes the initials of the name and the researcher gives a serial number as the identity of the participant. The researcher also explained to the participants that their names would not be included in the research results and would not be published. And the principle of confidentiality, the principle of confidentiality is carried out by researchers by keeping the identities of participants and the information provided by participants secret, so that when analyzing and presenting data, they only describe the characteristics of the participants.

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