



Cognitive Disorders in Post-Stroke Patients

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ABSTRACT

Blood circulation disorders in post-stroke patients can cause cognitive disorders. Cognitive disorders in post-stroke patients can include memory impairment, difficulty speaking, difficulty understanding things, difficulty communicating, and mood disorders. The presence of cognitive disorders in stroke patients can worsen the patient's post-stroke condition, requiring longer treatment time. This study aimed to identify the level of cognitive disorders in post-stroke patients. This research is a descriptive study to identify dementia in post-stroke patients. The sampling technique was accidental sampling for two weeks at the Neurology Polytechnic and Stroke Clinic at one of the hospitals in Bandung, totaling 83 people. The questionnaire used in this research was the Mini-Mental State Examination (MMSE). The collected data is analyzed and presented using frequency and percentage distributions. The results of this study showed that the majority of post-stroke patients (72.3%) did not experience dementia or did not experience cognitive impairment, 15.66% experienced mild cognitive impairment, and 12.04% experienced severe cognitive impairment. From the results of this study, it can be concluded that some post-stroke patients do not experience cognitive impairment, but some post-stroke patients experience severe cognitive impairment. Cognitive impairment in stroke patients can worsen the patient's condition and increase the length of treatment time. Based on the results of this research, health workers especially nurses, are expected to be able to carry out early assessments and provide particular interventions for post-stroke patients aimed at preventing the worsening of dementia and improving the patient's cognitive abilities. The intervention can be in the form of education, psychological support, and social support in the form of counseling during rehabilitation.

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ABSTRAK

Gangguan peredaran darah pada pasien pasca stroke dapat menyebabkan gangguan kognitif. Gangguan kognitif pada pasien pasca stroke dapat berupa gangguan daya ingat, kesulitan berbicara, kesulitan memahami sesuatu, kesulitan berkomunikasi, dan gangguan mood. Adanya gangguan kognitif pada pasien stroke dapat memperburuk kondisi pasien pasca stroke sehingga memerlukan waktu pengobatan yang lebih lama. Penelitian ini bertujuan untuk mengetahui tingkat gangguan kognitif pada pasien pasca stroke. Penelitian ini merupakan penelitian deskriptif untuk mengidentifikasi demensia pada pasien pasca stroke. Teknik pengambilan sampelnya adalah accidental sampling selama dua minggu di Politeknik Neurologi dan Klinik Stroke salah satu Rumah Sakit di Bandung yang berjumlah 83 orang. Kuesioner yang digunakan dalam penelitian ini adalah Mini-Mental State Examination (MMSE). Data yang terkumpul dianalisis dan disajikan dengan menggunakan distribusi frekuensi dan persentase. Hasil penelitian menunjukkan bahwa sebagian besar pasien pasca stroke (72,3%) tidak mengalami demensia atau tidak mengalami gangguan kognitif, 15,66% mengalami gangguan kognitif ringan, dan 12,04% mengalami gangguan kognitif berat. Dari hasil penelitian dapat disimpulkan bahwa sebagian pasien pasca stroke tidak mengalami gangguan kognitif, namun sebagian pasien pasca stroke mengalami gangguan kognitif berat. Gangguan kognitif pada pasien stroke dapat

memperburuk kondisi pasien dan menambah lamanya waktu pengobatan. Berdasarkan hasil penelitian ini, tenaga kesehatan khususnya perawat diharapkan mampu melakukan pengkajian awal dan memberikan intervensi khusus pada pasien pasca stroke yang bertujuan untuk mencegah memburuknya demensia dan meningkatkan kemampuan kognitif pasien. Intervensi tersebut dapat berupa pendidikan, dukungan psikologis, dan dukungan sosial berupa konseling selama rehabilitasi.



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INTRODUCTION

Stroke is a disease that can cause death and have long-lasting impacts on the sufferer. The incidence of stroke in Indonesia continues to increase. Based on the results of Indonesian Basic Health Research in 2018, the incidence of stroke in Indonesia continues to increase to 10.9 per 1000 population. Stroke has become the leading cause of death in almost all hospitals in Indonesia, reaching 15.4 percent. Based on the results of Indonesian Basic Health Research in 2013, the incidence of stroke in West Java also increased, reaching 11.4 per 1000 population (Ministry of Health Republic of Indonesia [MOHRI], 2017). The increasing incidence of stroke causes an economic burden for the country so treatment and prevention of stroke complications are needed (Strilciuc et al., 2021).

Stroke can be caused by rupture of blood vessels or blockage of blood vessels in the brain. This condition can disrupt blood circulation to the brain. This condition can cause the brain to lack oxygen and experience functional disorders. Brain function disorders experienced by stroke patients depend on the extent to which parts of the brain experience a lack of oxygen (Kuriakose & Xiao, 2020). Stroke can cause sequelae and even death. The clinical manifestations experienced by stroke patients can vary according to which part of the brain is experiencing the disorder (Laurent et al., 2022). Signs and symptoms that often appear in stroke patients include decreased consciousness, weakness or paralysis of the limbs, speech disorders, impaired urine or fecal elimination, swallowing disorders, and others. Apart from physical symptoms, stroke can also cause psychological symptoms. Psychological symptoms commonly experienced by stroke patients include anxiety, depression, and emotional disturbances (Devereux & Berns, 2023). Stroke can cause lesions in cerebral blood vessels (Sun et al., 2014). Blood circulation disorders in the brain in stroke patients can cause cognitive disorders or what is usually called vascular dementia. Damage to brain tissue in post-stroke patients can cause cognitive impairment (El Husseini et al., 2023).

Cognitive impairment in post-stroke patients can occur through various mechanisms, including cerebral infarction and ischemic cascade, which occurs in stroke patients, causing blockages in the flow of blood vessels in certain areas of the brain, and causing tissue damage. This condition causes hypoperfusion which causes white matter lesions, micro infarcts, and other disorders of the blood vessels which can cause damage to areas of the brain responsible for cognitive processes. Apart from that, neurodegradation can also occur, disrupting synaptic connections, and neurodegradation which can cause cognitive disorders. Cognitive disorders can also be caused by disruptions of neurotransmitter systems which are responsible for learning and memory processes so they can disrupt the cognitive abilities of post-stroke patients (Elendu et al., 2023).

Cognitive disorders in stroke patients can include thought process disorders, memory problems, concentration problems, or emotional disorders. Cognitive impairment can worsen the condition of post-stroke patients. The incidence of dementia in post-stroke patients reaches 16.5%. Dementia can increase the risk of death by 45.5% in post-stroke patients (Craig et al., 2022).

Follow-up care for post-stroke patients does not only focus on physical disorders but also psychological and cognitive because psychological disorders and cognitive disorders in post-stroke patients can worsen the condition of post-stroke patients. In addition, cognitive impairment in post-stroke patients can increase healthcare costs (Ayehu et al., 2023; Sarfo et al., 2017). Post-stroke patients can experience physical and cognitive disorders or behavioral changes that can affect the lives of families and health workers. Cognitive impairment is the leading cause of stroke patients' dependence on other people. Cognitive impairment in post-stroke patients can hinder the patient's daily activities (Jeffares et al., 2022). This condition can impact the quality of life of post-stroke patients. Management of cognitive impairment in post-stroke patients must be adjusted to the patient's level of dementia. Nurses in the stroke unit pay less attention to the cognitive disorders experienced by patients. Therefore, this research was conducted to determine the level of cognitive impairment in post-stroke patients. So the question of this research is "What is the level of cognitive impairment in post-stroke patients?". This research is the first step in the early assessment of cognitive disorders in stroke patients and can help plan appropriate nursing care and rehabilitation for patients.

METHOD

Research Design.

This descriptive study describes the level of dementia in post-stroke patients at the Neurology Polyclinic and Stroke Center, one of the hospitals in Bandung.

Population and Sampling procedures.

The samples in this study used accidental sampling for two weeks because post-stroke patients at this hospital had control once every two weeks on average. The number of samples in this study was 83 people. The inclusion criteria in this study were post-stroke patients who had full consciousness and did not experience aphasia. Aphasia patients could not be included in this study because filling out the questionnaire requires the patient's verbal response. Diagnosis of aphasia in patients is carried out by conducting a direct assessment of the patient and the results are confirmed with information in the patient's medical record.

The exclusion criteria in this study were unstable stroke patients with high blood pressure. The research was carried out by providing informed consent first and assuring respondents that the data obtained would only be used for research purposes and kept confidential. After the respondent agrees, data is collected using the instruments provided previously. If the respondent experiences difficulties, the researcher will help explain without directing the answer. If the respondent is tired, data collection will be stopped first and the respondent will be asked to rest first, then after that, it can be continued again according to the respondent's agreement.

Measures and covariates, and Quality of Measurements.

The instrument used in this research was the Mini-Mental State Examination (MMSE), developed by Folstein in 1975 (De Melo et al., 2020). MMSE is a tool that can be used to assess a person's mental status. Previous research has shown that the MMSE is valid (Cronbach alpha above 0.71), high test-retest coefficient (ranging from 0.80 to 0.89) and good inter-rater reliability (0.75) (Truong et al., 2024). This instrument consists of 11 questions measuring five areas of a person's cognitive function: orientation, registration, attention/concentration and calculation, memory, and language. Each question has a different score ranging from 1 to 5. The maximum score that can be achieved in this instrument is 30. The final score results can differentiate a person's mental status, namely, no cognitive impairment/normal (23-30), mild cognitive impairment (17 - 23), and severe cognitive impairment (0-16). The time required to fill this instrument is around 5-10 minutes. The MMSE is an instrument widely used in various hospitals in Indonesia, so it is available in Indonesia, and its validity has been tested. One of these instruments was developed by the Indonesian Psychiatric College.

Data analysis.

The collected data was analyzed using descriptive analysis. The research results are presented in the form of a frequency distribution of each category of cognitive impairment in patients.

Ethical Considerations.

If the patient experiences an unstable condition and it is not possible to continue the data collection process, filling out the questionnaire is stopped. Data collection was continued on another day with the patient's consent. The researcher explained the research procedures and the benefits that can be obtained by respondents as well as for the development of nursing science in general. If the patient was willing to be involved in the research, the researcher asked the respondent to fill out an informed consent form and sign it before completing the questionnaire.

RESULTS OF STUDY

Demographic Characteristics

The results of this study include the characteristics of respondents, such as age, duration of stroke, type of stroke, and comorbidities. Table 1 shows the characteristics of the respondents in this study.

Table 1
Respondent Characteristics

Characteristics	Frequency (f)	Percentage (%)
Age (Years Old)		
17 - 25	0	0
26 - 35	0	0
36 - 45	6	7,2
46 - 55	44	53
>55	33	39,8
History of stroke		
First stroke	45	54,2
Recurrence stroke	38	45,8
Long experience of stroke		
< 3 months	14	16,8
3 - 6 months	11	13,3
7 - 12 months	18	21,7
1-2 years	16	19,3
>2 years	24	28,9
Types of strokes		
Ischemic Stroke	76	91,6
Hemorrhagic Stroke	7	8,4
Comorbidities		
Hypertension	43	51,8
Diabetes Mellitus	4	4,8
Cholesterol	0	0
Other diseases	18	21,7
More than one disease	18	21,7

Cognitive impairment in post-stroke patients can be influenced by various factors, including age, stroke severity, and comorbidities. The characteristics of the respondents in this study were that most of them were aged > 55 years (39.8%), first stroke (54.2%), duration of stroke > 2 years (28.9%), ischemic stroke (91.6%), and comorbid hypertension (51.8%). These characteristics can influence cognitive impairment in the respondents of this study.

Prevalence of Cognitive Impairment

The level of cognitive disorders in post-stroke patients can be seen in Table 2. The research results show that the majority of respondents (72.3%) did not experience cognitive impairment, 15.66% experienced mild cognitive impairment, and 12.04% experienced severe cognitive impairment. From the results of this study, it can be seen that there are respondents who experience cognitive impairment, and there are even respondents who experience severe cognitive impairment. This condition requires appropriate treatment and prevention of more serious disorders

Table 2
Cognitive Impairment in Post-Stroke Patients

Level of cognitive impairment	Frequency (f)	Percentage (%)
No Cognitive Impairment	60	72,3%
Mild Cognitive Impairment	13	15,66%
Severe Cognitive Impairment	10	12,04%

DISCUSSION

Stroke can be caused by disturbances in blood circulation in the brain, either due to blockage or rupture of cerebral

blood vessels. Blood circulation disorders in the brain can cause damage to brain tissue, which causes various physical, psychological, and cognitive disorders (Rost et al., 2021). The risk of cognitive impairment in stroke patients is related to demographic factors such as age, education, occupation, and vascular factors. The mechanism of cognitive impairment in post-stroke patients is related to neuroanatomical lesions in central areas, such as the hippocampus and white matter lesions and small cerebral hemorrhages caused by cerebrovascular disease (Sun et al., 2014). In addition, cognitive impairment in post-stroke patients can occur due to disturbances in the neurotransmitter system and complications from the stroke experienced by the patient (Elendu et al., 2023). Cognitive disorders that post-stroke patients often experience include mood, concentration, and memory disorders. This condition can interfere with daily activities and affect the patient's quality of life (Sousa et al., 2020).

The results of this study follow the previous hypothesis that post-stroke patients can experience cognitive impairment. Based on this study's results, most respondents did not experience cognitive impairment (72.3%), 15.66% experienced mild cognitive impairment, and 12.04% experienced severe cognitive impairment. The results of this study are in line with the results of other studies conducted in several areas such as Asia, Australia, Europe, and the United Kingdom, the majority of post-stroke patients do not have cognitive impairment, and only 44% experience global cognitive impairment (Lo et al., 2019). This is also in line with research in China which explains that cognitive impairment occurs in 36% of post-stroke patients (Chau et al., 2023).

The results of this research can be influenced by risk factors including various characteristics of the respondents. This could be because the stroke experienced by most respondents was their first stroke. The first stroke is usually a little extensive. Vice versa, a repeat stroke is relatively more severe than the first stroke. The manifestations experienced by post-stroke patients depend on the extent and location of the brain area experiencing blood circulation disorders (Murphy & Werring, 2020). Cognitive disorders can occur if there is a disruption in tissue oxygenation in 1-4% of the brain volume (Medical (Chohan et al., 2019).

The results of this study can also be influenced by the characteristics of the respondents, where the stroke experienced by most respondents was ischemic. The stroke experienced by the majority of respondents in this study was the first stroke (54.2%), > two years (28.9%), and ischemic stroke (91.6%). The brain tissue that experiences blood circulation disorders in first-time ischemic stroke patients is usually not too extensive compared to hemorrhagic strokes. Hemorrhagic stroke has the risk of causing more severe symptoms because of increased intracranial pressure, which worsens the oxygenation conditions of cerebral tissue (Unnithan et al., 2023). The more severe the stroke the patient experiences, the greater the risk of cognitive impairment (Elendu et al., 2023).

Most of the respondents in this study were > 55 years old (39.8%). The older the patient, the greater the risk of experiencing cognitive impairment. Age over 75 years is a risk factor for cognitive impairment in stroke patients. The stiff characteristics of blood vessels in the elderly increase the risk of bleeding in vital areas of the brain (Huang et al., 2023). Elderly blood vessels that are relatively stiff and break easily are one of the causes of strokes that often occur in the elderly. In addition, elderly people are vulnerable to

hypertension and other diseases, which are risk factors for stroke (Sousa et al., 2020).

Most respondents had comorbid hypertension (51.8%). The burden caused by various comorbid diseases (more than one) can reduce cognitive abilities in post-stroke patients (Morrison et al., 2022). Hypertension, diabetes mellitus, atrial fibrillation, and hypercholesterolemia can cause disorders of the blood vessels, which can damage brain structure and disrupt cerebral blood circulation, causing cognitive impairment in patients (Elendu et al., 2023).

This research was carried out in Indonesia so several other factors might influence the cognitive disorders experienced by patients, including lack of physical activity, irregular health checks, and lack of intake of vegetables, fruit, milk, and tea. Based on various research results, food consumption patterns in Indonesia still lack vegetables, fruit, and milk (United Nations Children's Fund, 2022). Therefore, this can cause an imbalance of fiber, vitamins, and minerals which can be a risk factor for cognitive impairment in patients (Mohd Zulkifly et al., 2016).

Even though most respondents in this study did not experience cognitive impairment, 27.7% of respondents experienced cognitive impairment. So it is hoped that assessment and intervention for the prevention and treatment of cognitive disorders will need to be a concern for further developments in the world of nursing. Cognitive impairment in post-stroke patients remains a concern for health workers, especially nurses. Cognitive impairment can worsen the condition of post-stroke patients. In addition, cognitive impairment in post-stroke patients can increase healthcare costs (Strilciuc et al., 2021b). Post-stroke patients can experience physical and cognitive disorders or behavioral changes that can affect the lives of families and health workers. Cognitive impairment is the leading cause of stroke patients' dependence on other people (Kaddumukasa et al., 2023). Cognitive impairment in post-stroke patients can hinder the patient's daily activities. This can impact the quality of life of post-stroke patients (Ahmed et al., 2020). Therefore, the treatment of stroke patients is not only aimed at treating physical disorders but also cognitive disorders.

Early assessment of the risk of cognitive impairment in post-stroke patients is critical. The assessment of cognitive impairment in post-stroke patients is carried out comprehensively, starting with clinical assessment, cognitive assessment, neuroimaging, and laboratory examination. This assessment is carried out to identify the cognitive disorders experienced by the patient, the causes, and appropriate actions for the patient. Actions that can be taken on patients include cognitive rehabilitation, pharmacological intervention, management of risk factors that can be modified, and supportive care and education (Elendu et al., 2023).

Information that can be given to post-stroke patients includes signs and symptoms, disease prognosis, medical actions that must be carried out, local treatment and supporting services, recommendations or advice to post-stroke patients in carrying out daily activities (Tarihoran et al., 2021). Medication is given according to the patient's post-stroke condition. Medications commonly given to post-stroke patients who experience cognitive impairment include cholinesterase inhibitors, and drugs for concentration disorders (Melkas et al., 2014). Rehabilitation that can be carried out for post-stroke patients who experience dementia includes physiotherapy, occupational therapy, and speech and language therapy (Donoghue et al., 2019). Rehabilitation in post-stroke patients can improve mobility or speech impairment (Institute of Neurological

Disorders et al., 2020). Rehabilitation for post-stroke patients aims to improve the patient's coping and ability to carry out daily activities.

This study has limitations in the variation of respondents obtained, including the length of time undergoing stroke treatment, and previous history of stroke. Therefore, further research is needed with more varied respondents.

CONCLUSIONS AND RECOMMENDATION

The majority of post-stroke patients did not experience cognitive impairment. However, 15.66% of respondents experienced mild cognitive impairment, and 12.04% of respondents experienced severe cognitive impairment. Cognitive impairment in post-stroke patients must be prevented or treated early because it can make the patient's condition worse, affecting the quality of life of the patient and family. Therefore, health workers, especially nurses, should be able to assess the mental status of post-stroke patients early so that dementia in post-stroke patients can be treated immediately. Nurses must also provide comprehensive nursing care to treat cognitive disorders in patients, such as education, medication collaboration, and involving families to prevent cognitive disorders and help patients carry out their daily activities. In addition, post-stroke patients are advised to undergo regular initial screening for cognitive disorders. The author recommends further research regarding cognitive impairment in post-stroke patients with a larger number of respondents with more varied characteristics. In addition, research can be carried out regarding risk factors and interventions to prevent or treat cognitive disorders in post-stroke patients.

DECLARATIONS

Ethics approval and consent to participate

This Research has received approval from the Research Ethics Commission at Hasan Sadikin Hospital, with ethical approval letter number L8.04.01/A05/EC/138/V/2017.

Consent for publication

Not applicable

Availability of data and materials

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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