

The Effect of Early Mobilization on Improved Motor Function in Patients with Non-Hemorrhagic Stroke in the Neurology Ward of Jenderal Ahmad Yani General Hospital, Metro City

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ABSTRACT

Background & Objective: A stroke is a disruption of brain function caused by a blockage in blood flow to the brain (non-hemorrhagic stroke), resulting in tissue damage and impaired motor function. One effective nursing intervention to accelerate the recovery of motor function is early mobilization, which involves gradually moving the patient once their hemodynamic condition has stabilized. Early mobilization has been shown to prevent complications of immobility, increase muscle strength, and improve body movement coordination in stroke patients. This study aims to determine the effect of early mobilization on improving motor function in non-hemorrhagic stroke patients in the Neurology Ward of Jenderal Ahmad Yani General Hospital, Metro City. **Method:** This study is a pre-experimental study using a one-group pre-test post-test design. The sample consisted of 58 respondents selected using purposive sampling. Data collection was conducted using a motor function observation sheet before and after early mobilization. Data analysis utilized the Wilcoxon Signed-Rank Test. **Result:** The results indicated that prior to early mobilization, the majority of respondents (51 respondents, 87.9%) had moderate motor function, whereas after early mobilization, the majority (41 respondents, 70.7%) remained in the moderate category, with improved movement ability in the extremities. The Wilcoxon test yielded a p-value of 0.000 (< 0.05), indicating a significant effect of early mobilization on the improvement of motor function in non-hemorrhagic stroke patients. **Conclusion:** There is a significant association between early mobilization and improved motor function in non-hemorrhagic

stroke patients in the Neurology Ward of General Ahmad Yani Regional General Hospital, Metro City. Early mobilization has been proven to help accelerate the rehabilitation process and improve patients' mobility. It is recommended that nursing staff routinely perform early mobilization according to the patient's condition as part of standard care for stroke patients.

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Introduction

Stroke ranks third among the leading causes of death, following heart disease and cancer in developed countries. In developing countries, where the incidence is high and mortality rates remain significant, stroke is the most common neurological disorder (Khasanah, 2022). Stroke attacks are acute and can lead to sudden death, with mortality rates reaching up to 36%. However, the exact cause remains unclear to this day. Pathophysiologically, it is stated that non-hemorrhagic stroke is associated with impaired blood flow to the brain (Marliana et al., 2023).

Non-hemorrhagic stroke ranks third among causes of death, following heart disease and cancer in developed countries. In developing countries, in addition to its high prevalence, the mortality rate remains quite high; stroke is the most common neurological disease (Faridah & Susanti, 2023). A non-hemorrhagic stroke is an acute condition that can lead to sudden death, with a mortality rate reaching up to 36%. However, the exact cause remains unclear to this day. From a pathophysiological perspective, non-hemorrhagic stroke is associated with impaired blood flow to the brain (Isrofah et al., 2023).

According to data from the World Health Organization (WHO), 15 million people worldwide suffer from stroke each year (Marliana et al., 2023). Of these, 5 million die, while another 5 million suffer permanent disabilities. Many stroke patients become disabled, unable to earn a living, dependent on others, and often become a burden to their families (Paar & Surya, 2023). In Indonesia, the incidence continues to rise year after year. Non-hemorrhagic stroke in Indonesia is the third leading cause of death after infectious diseases and coronary heart disease (Indonesian Ministry of Health, 2022). Approximately 28.5 percent of stroke patients in Indonesia die. One of the causes of the rising incidence of cardiovascular diseases, such as heart disease and stroke, is the lack of public awareness regarding the adoption of a healthy lifestyle (Kep & Kom, 2020). At General Hospital General Ahmad Yani alone, the number of stroke patients has increased annually; in 2022, there were 518 non-hemorrhagic stroke patients, in 2023, the number of non-hemorrhagic stroke patients was 991, and in 2024, it doubled from 2022 to 1,077 (Ahmad Yani General Hospital Medical Records, 2025).

The selection of Ahmad Yani General Hospital in Metro as the research site was based on the consideration that this hospital is one of the primary referral hospitals in the Metro City area and its surroundings, equipped with comprehensive facilities and adequate neurology services. Additionally, Ahmad Yani General Hospital in Metro consistently admits a relatively high number of non-hemorrhagic stroke patients annually. This particularly includes non-hemorrhagic stroke patients with impaired

motor function, making it easier for researchers to obtain a sufficient number of respondents meeting the study criteria. The selection of non-hemorrhagic stroke patients as respondents was also driven by the high prevalence of this stroke type compared to hemorrhagic stroke, as well as the importance of understanding risk factors, management, and quality of life for patients post-non-hemorrhagic stroke in efforts to improve more targeted healthcare services.

Non-hemorrhagic stroke can cause a decline or even loss of function controlled by the affected neural networks. One of the resulting symptoms is muscle weakness in the affected limbs, such as the fingers (Retnaningsih, 2023). Hand function is crucial for daily activities. If this function is impaired, it will hinder daily activities. Individuals experiencing muscle weakness become highly dependent on others. Rehabilitation is a key strategy to minimize disability following a stroke. One approach to stroke patient rehabilitation is early mobilization therapy (Ilyas & Rambu, 2023). Early mobilization helps prevent complications resulting from prolonged bed rest, such as deep vein thrombosis, infections, and falls, as well as secondary issues like reduced cardiovascular endurance, muscle atrophy, and the accumulation of intramuscular fat. Preclinical studies indicate that there is a critical window or period for enhancing neuroplasticity shortly after a stroke. The effectiveness of rehabilitation diminishes over time; therefore, it is recommended to begin training early, as this will influence future improvements. Mobilization following a stroke can reduce infarct volume in animal research models. These findings provide a basis for implementing early mobilization in humans. However, there are still few studies addressing when to begin and what the appropriate intensity of training should be (Mustikaningrum et al., 2023).

According to the findings of a study conducted by Ilyas & Rambu (2023), early out-of-bed mobilization in the stroke unit within 24–72 hours following an intracerebral hemorrhage (ICH) can improve functional outcomes related to patient independence compared to standard early mobilization. Additionally, FAC scores showed significant improvements by the second and fourth weeks, and the length of stay in the stroke unit was shorter in the group that underwent early mobilization within 24–72 hours post-stroke. Supported by a study (Pristianto et al., 2022), all study participants received standard care; however, in the early mobilization group, rehabilitation was initiated as soon as possible within 48 hours of ICH onset. Meanwhile, the control group began rehabilitation after the 7th day. A total of 243 out of 326 patients were enrolled as study participants in this study. The results showed that initiating rehabilitation within 48 hours in ICH stroke patients (as reported in the *Journal of Physical Therapy and Rehabilitation*) improved survival and functional outcomes at 6 months post-stroke.

Preliminary study results conducted by the researchers revealed that among stroke cases at General Ahmad Yani Regional General Hospital in Metro City, many patients exhibited motor function impairments such as difficulty moving the extremities, muscle weakness, and partial paralysis (plegia). Early mobilization, performed immediately following the acute phase of stroke, is a critical rehabilitation intervention aimed at preventing complications such as muscle atrophy and enhancing motor function recovery. However, in daily practice, there remains significant variation in the implementation of early mobilization, and the extent to which it influences motor function improvement in these stroke patients remains unclear. Some patients experience significant improvements in motor function after

undergoing early mobilization and gradually resuming walking activities, while others with non-hemorrhagic stroke show little change in motor function following early mobilization. Based on these observations, the researchers were motivated to conduct a study on the effect of early mobilization on motor function improvement in patients with non-hemorrhagic stroke at the Neurology Ward of General Ahmad Yani Regional General Hospital in Metro City.

Objective

This study aims to determine the effect of early mobilization on the improvement of motor function in patients with non-hemorrhagic stroke in the Neurology Ward of Jenderal Ahmad Yani General Hospital in Metro City.

Method

This study is a pre-experimental study using a one-group pre-test post-test design. The sample consisted of 58 respondents selected using purposive sampling. Data were collected using a motor function observation sheet before and after early mobilization. Data analysis was performed using the Wilcoxon Signed Rank Test.

Results

TABLE 1. Frequency Distribution of Motor Function Before Early Mobilization of Non-Hemorrhagic Stroke Patients in the Neurology Ward of General Ahmad Yani Regional General Hospital, Metro City

City		
Pre-Test	n	%
Low	5	8,6
Medium	51	87,9
High	2	3,4
Total	58	100,0

According to Table 1, the motor function of the 58 respondents prior to early mobilization was predominantly in the moderate category, totaling 51 (87.9%)

TABLE 2. Frequency distribution of motor function after early mobilization of non-hemorrhagic stroke patients in the Neurology Ward of General Ahmad Yani Regional General Hospital, Metro City

Post Test	n	%
Moderate	41	70,7
High	17	29,3
Total	58	100,0

According to Table 2, the motor function of the 58 respondents after early mobilization was predominantly in the moderate category, totaling 41 (70.7%)

TABLE 3. The Effect of Early Mobilization on the Improvement of Motor Function in Non-Hemorrhagic Stroke Patients in the Neurology Ward of General Ahmad Yani Regional General Hospital, Metro City

Variable	n	Mean Rank	Sum of Ranks	z	p-value
Pre-test	58	15,27	198,50	-4,992	0,000
Post Test	58				

The results of the bivariate test using the Wilcoxon test based on Table 3, yielded a p-value of $0.000 < 0.05$, indicating that early mobilization has an effect on the improvement of motor function in non-hemorrhagic stroke patients in the Neurology Ward of General Ahmad Yani Regional General Hospital, Metro City.

Discussion

Frequency distribution of motor function prior to early mobilization of non-hemorrhagic stroke patients in the Neurology Ward of General Ahmad Yani Regional General Hospital, Metro City

According to Table 1, the motor function of the 58 respondents prior to early mobilization was predominantly in the moderate category, totaling 51 (87.9%). This indicates that the majority of non-hemorrhagic stroke patients treated in the Neurology Ward of General Ahmad Yani Regional General Hospital in Metro City experience significant motor function impairment but still have the potential for improvement through early mobilization exercises.

According to Smeltzer & Bare (2013), motor function is an individual's ability to perform bodily movements involving coordination between the central nervous system and the musculoskeletal system. In stroke patients, motor function impairment occurs due to damage to brain tissue that regulates body movement, particularly in cases of hemiparesis or hemiplegia. The sooner mobilization is initiated, the greater the likelihood of motor function recovery, as muscles and nerves are still in the neuroplastic adaptation phase.

Research conducted by Aulia (2020) indicates that the majority of non-hemorrhagic stroke patients, prior to early mobilization, were classified as having moderate motor impairment (85%), and following early mobilization, their motor function improved to the mild category. This aligns with the study by Sari et al. (2021), which explains that early mobilization stimulates sensory and motor input, enhancing neural plasticity and thereby accelerating the recovery of motor function.

Based on these findings and supported by theory and previous research, it can be assumed that the majority of respondents exhibited moderate motor function prior to early mobilization because most non-hemorrhagic stroke patients experience impaired cerebral circulation, leading to muscle weakness and reduced motor coordination. However, this condition remains amenable to improvement through gradual exercises such as early mobilization, which stimulates neuromuscular adaptation. Thus, the researchers assume that the moderate motor function observed in most respondents is due to the early phase of post-stroke recovery, during which the muscles have not yet fully atrophied, leaving significant potential for motor function recovery through appropriate and regular early mobilization exercises.

Frequency distribution of motor function following early mobilization of non-hemorrhagic stroke patients in the Neurology Ward of General Ahmad Yani Regional General Hospital, Metro City

The results in Table 2, show that among the 58 respondents, the majority (41, or 70.7%) were in the moderate category following early mobilization. Although the majority remained in the moderate category, there was a decrease in the number of respondents in this category compared to before the intervention (87.9%), indicating an improvement in motor function following early mobilization.

According to Guyton & Hall (2016), early mobilization can improve cerebral perfusion, enhance muscle tone, and optimize neuroplasticity – that is, the brain's ability to form new connections following injury. Light, controlled physical activity helps the central nervous system adapt to stroke-related impairments by forming alternative neural pathways that support motor function recovery.

These findings are supported by Wulandari (2020), who studied 40 non-hemorrhagic stroke patients at Dr. Soetomo General Hospital in Surabaya and found that after seven days of early mobilization, 65% of the participants showed an improvement in motor function from moderate to mild. A study by Ananda et al. (2021) on 36 stroke patients at H. Adam Malik General Hospital in Medan also showed similar results, with 72.2% of patients experiencing improved motor function following routine early mobilization twice daily. Another study by Kusuma & Ningsih (2022) involving 50 non-hemorrhagic stroke patients at Margono General Hospital in Purwokerto found that following early mobilization, 68% of patients experienced a gradual improvement in upper and lower extremity motor function. Meanwhile, a study by Indriani (2023) at Cibabat General Hospital involving 45 patients showed that 71.1% of respondents experienced improved motor function following progressive early mobilization over a one-week therapy period.

Based on these research findings and supporting theories, the researchers hypothesize that although the majority of patients remain in the moderate motor function category (70.7%), there is a trend of improved motor ability compared to pre-intervention levels. This indicates that early mobilization has a positive effect on the recovery of motor function, even though the improvement is gradual. It is possible that some respondents remained in the moderate category due to factors such as age, the duration since stroke onset, and adherence to early mobilization exercises.

The Effect of Early Mobilization on the Improvement of Motor Function in Non-Hemorrhagic Stroke Patients in the Neurology Ward of Jenderal Ahmad Yani General Hospital, Metro City

The results of the bivariate test using the Wilcoxon test based on Table 3, yielded a p-value of $0.000 < 0.05$, indicating that early mobilization has an effect on improving motor function in non-hemorrhagic stroke patients in the Neurology Ward of General Ahmad Yani Regional General Hospital, Metro City. These results indicate that early mobilization exercises, when provided in a structured and continuous manner, can significantly improve patients' motor abilities.

According to Potter & Perry (2019), early mobilization is a nursing intervention aimed at maintaining and improving muscle strength, preventing contractures, and promoting blood circulation. In non-hemorrhagic stroke patients, early mobilization plays a crucial role in stimulating new neural connections through the process of neuroplasticity – the brain's ability to reorganize neuronal function following injury to specific areas. Thus, early mobilization is an integral part of the stroke patient rehabilitation process.

This study aligns with the findings of Ayu & Rachmawati (2020) at Dr. Kariadi General Hospital in Semarang, which demonstrated that early mobilization significantly improves motor function in non-hemorrhagic stroke patients (p-value = 0.001). The majority of participants experienced improved motor function after receiving early mobilization exercises for five consecutive days. Additionally, the study by Nasution et al. (2021) at H. Adam Malik General Hospital in Medan yielded similar results, with a p-value of 0.000, indicating that early mobilization can improve upper and lower extremity motor function in non-hemorrhagic stroke patients. The researchers explained that early mobilization exercises stimulate the peripheral nervous system and accelerate the healing process in the motor cortex.

A study by Hastuti & Kurniawan (2022) at Margono Soekarjo General Hospital in Purwokerto further supports these findings. They reported that non-hemorrhagic stroke patients who underwent early mobilization showed a significant improvement in motor function with a p-value of 0.002. Exercises were performed twice daily for 15–20 minutes, resulting in increased muscle strength and movement coordination. Meanwhile, a study by Indrawati et al. (2023) at Abdul Moeloek General Hospital in Bandar Lampung also found a significant association between early mobilization and improved motor function in non-hemorrhagic stroke patients, with a p-value of 0.000. They explained that early mobilization provides proprioceptive and sensory stimulation that aids in the formation of new synapses along motor nerve pathways.

Based on these findings, the researchers hypothesize that improvements in motor function following early mobilization are influenced by the consistency of exercise, family support, and the active involvement of nurses in facilitating the exercises. Although not all patients achieve optimal motor function improvement, these results indicate that early mobilization is an effective intervention that should be implemented early in non-hemorrhagic stroke patients, particularly once vital signs are stable.

Conclusion

Motor function prior to early mobilization was predominantly in the moderate category (87.9%). Motor function following early mobilization was predominantly in the moderate category (70.7%). Early mobilization has an effect on improving motor function in non-hemorrhagic stroke patients in the Neurology Ward of General Ahmad Yani Regional General Hospital, Metro City.

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