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APPLICATION OF A COMBINATION OF RANGE OF MOTION (ROM) AND HEAD OF BED (HOM) ELEVATION IN ISCHEMIC STROKE PATIENTS WITH PHYSICAL MOBILITY IMPAIRMENT IN SURABAYA HOSPITAL: A CASE STUDY

Yayuk Ernawati [1*], Yurike Septianingrum [1], Lono Wijayanti [1], Umdatus Soleha [1]

[1] Faculty of Nursing and Midwifery, Universitas Nahdlatul Ulama Surabaya

Correspondence:
Yayuk Ernawati
Faculty of Nursing and Midwifery, Universitas Nahdlatul Ulama Surabaya
e-mail: 1110024006@student.unusa.ac.id

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ABSTRACT

Background: Stroke patients often experience hemiplegia or hemiparesis. Proper treatment can help the healing and recovery process.
Objectives: This study aims to provide an overview of the implementation of the combination of Range of Motion (ROM) and Head of Bed (HOB) Elevation in ischemic stroke patients with impaired physical mobility in patient Mrs. L in Room Y, Surabaya Hospital.
Methods: This type of research is descriptive, using a case study approach. Nursing care was provided from June 4 - June 6, 2025. The results of the assessment on Mrs. L had a stroke with hemiparesis. The nursing problems obtained were decreased intracranial adaptive capacity, impaired physical mobility, and risk of falling. The interventions given were head up 30 º, Range of Motion, and education of patients falling.
Results: The application of a combination of Range of Motion and Head of bed elevation with impaired physical mobility significantly helps the healing and recovery process in stroke infarction patients.
Conclusion: Evaluation of nursing problems shows that the nursing diagnosis of decreased intracranial adaptive capacity and impaired physical mobility is partially resolved with increased muscle strength from 1 to 2 and increased range of motion, and the patient does not fall.

Keywords: Ischemic Stroke, Range of Motion, Head of Bed.

INTRODUCTION

The number of patients suffering from stroke is currently increasing. Stroke is a serious problem because it often causes death. Stroke is the third leading cause of death after coronary heart disease and cancer in both developed and developing countries. One in 10 deaths is caused by stroke. WHO data shows that every year, there are 13.7 million new cases of stroke, and around 5.5 million deaths occur due to stroke (Setiawan, 2020). Every year, 15 million people worldwide suffer from stroke, and as many as 5 million die, and another 5 million become permanently disabled, whose lives depend on family and society (WHO, 2023). Meanwhile,

East Java has a stroke prevalence above the national average, namely 9.0 per 1,000 population (SKI, 2023).

One of the causes of stroke is high blood pressure. Other factors include smoking, inappropriate physical activity, unhealthy diet, alcohol use, increased blood lipid levels, obesity, stress, and depression. Patients who suffer from stroke can experience physical disability, difficulty communicating, loss of work, income, and social networks. Stroke patients can also experience loss of vision or speech, paralysis, and confusion (WHO, 2023). The manifestations of stroke will differ in each patient depending on the cerebral artery that is ischemic. The most common manifestation is weakness involving the face and arms, and sometimes the legs. According to Aprilia (2017), the most common consequence of stroke is hemiplegia or hemiparesis; even 80 percent of stroke patients suffer from hemiparesis or hemiplegia, which means one side of the body is weak or even paralyzed.

The application of Range of Motion (ROM) in stroke patients aims to maintain or increase muscle and joint flexibility, prevent muscle contractures, and minimize joint stiffness (Faradisi, 2021). The main purpose of implementing Range of Motion (ROM) for stroke patients with impaired physical mobility is to maintain muscle and joint flexibility. Regular and controlled movements of the joints affected by stroke can help maintain muscle and joint flexibility (Maelani, 2022). This is very important in preventing muscle and joint stiffness, which can worsen the patient's condition. Increased muscle strength: Muscle weakness is often experienced by stroke patients. Targeted Range of Motion (ROM) exercises can help strengthen weakened or affected muscles. Increased muscle strength will help patients improve their movement abilities and perform daily activities. Improve balance and coordination: ROM exercises can also help improve the patient's balance and coordination. Stroke patients often face problems in maintaining balance and performing coordinated movements. By doing the right Range of Motion (ROM) exercises, patients can improve their balance and coordination of movements (Waluyo, 2021).

Providing an elevated Head of Bed (HOB) position to stroke patients has significant benefits, namely, it can improve hemodynamic conditions by facilitating increased blood flow to the brain and optimizing brain tissue oxygenation and reducing intracranial pressure (Wahyudin, 2024).

The implementation of nursing management in reducing disability and weakness of the extremity muscles in patients with impaired physical mobility due to stroke is very important, to accelerate the healing process and minimize the impact of disability. The application of a combination of 30º head position and Range of Motion (ROM) shows an effect on the NIHSS score in stroke patients (Kusuma, 2021). Nurses should be able to carry out independent interventions related to this combination to provide healing and recovery for stroke patients. Previous studies have shown that the management of neurosensory needs with nursing problems of decreased intracranial adaptive capacity is carried out by nursing actions with a combination of 30° head elevation and passive ROM for 10-15 minutes in one action, the results of the intervention showed a decrease in the NIHSS score from 23 to 18 (Andri, 2023). This is the basis for the author to want to know the effect of the application of Range of Motion (ROM) and Head of Bed (HOB) elevation settings on CVA Infarction patients with nursing problems of impaired physical mobility at the Surabaya Hospital.

METHODS

Study Design

Nursing care for patients with ischemic stroke uses a descriptive research type with a case study approach that is carried out on patients who were treated in room Y of Surabaya Hospital.

Settings

This case study was conducted in Room Y of Surabaya Hospital, a secondary referral hospital located in East Java, Indonesia. The setting was chosen due to the hospital's capacity to provide comprehensive care for stroke patients, including access to neurological consultation, intensive care services, and rehabilitation facilities. The patient involved in the study, Mrs. L, was initially admitted to the Intensive Care Unit (ICU) for thrombolytic therapy and subsequently transferred to Room Y for continued treatment and observation. The nursing care, including the application of Range of Motion (ROM) exercises and Head of Bed (HOB) elevation, was implemented during the inpatient care from June 4 to June 6, 2025. The environment of Room Y, which is equipped for individualized nursing care and clinical monitoring, supported the implementation and evaluation of the intervention focused on improving physical mobility and neurological function in ischemic stroke patients.

Research Subject

The subject of this case study was a 63-year-old female patient, referred to as Mrs. L, who was diagnosed with ischemic stroke and admitted to Surabaya Hospital. Mrs. L had a medical history of hypertension for five years and a previous stroke one year before admission. Upon evaluation, she presented with left-sided hemiparesis, muscle weakness (initially grade 1), limited range of motion, joint stiffness, and complaints of pain when attempting to move. She was admitted to the hospital on June 2, 2025, underwent thrombolysis in the ICU, and was transferred to Room Y for continued nursing care. The nursing interventions were focused on addressing impaired physical mobility through the application of Range of Motion (ROM) exercises and Head of Bed (HOB) elevation. Mrs. L and her family were also involved in the intervention process through education and collaboration to support mobility improvement and fall prevention during her recovery.

Instruments

The instrument used in this case study was a nursing assessment format based on the Indonesian Nursing Diagnosis Standards (SDKI), Nursing Intervention Standards (SIKI), and Nursing Outcome Standards (SLKI). Additional tools included the Morse Fall Scale to assess the risk of falling, the Numeric Rating Scale (NRS) for pain assessment, and the Glasgow Coma Scale (GCS) for evaluating consciousness. Muscle strength was assessed using the Manual Muscle Testing (MMT) scale (0–5), and joint movement was measured using a goniometer to determine the degree of range of motion.

Data Collection

Data were collected through direct observation, interviews with the patient and family, physical examination, and review of medical records. The nursing assessment was conducted on June 4, 2025, and included both subjective data (e.g., patient complaints of weakness and pain) and objective data (e.g., muscle strength scores, vital signs, and range of motion). The implementation of interventions and the evaluation of outcomes were documented daily over three days from June 4 to June 6, 2025.

Data Analysis

The data were analyzed descriptively using a case study approach. Nursing diagnoses were formulated based on the SDKI after synthesizing assessment data. Interventions were designed according to SIKI, and outcomes were evaluated using SLKI indicators. Changes in muscle strength, range of motion, pain scale, and fall risk score were used to measure the effectiveness of the nursing interventions applied.

Ethical Considerations

Ethical considerations were addressed by obtaining informed consent from the patient and her family before conducting the nursing interventions. The purpose, benefits, and procedures of the study were clearly explained, and confidentiality of the patient's identity was maintained by using initials and anonymized documentation. The study followed ethical principles by the Declaration of Helsinki and institutional nursing research ethics guidelines.

RESULTS

Based on the assessment, there were 3 problems found in patient Mrs. L, including decreased cranial adaptive capacity, impaired physical mobility, and risk of falling.

Cranial Adaptive Capacity Decreased

Based on the assessment, the patient appeared weak, compos mentis consciousness, BP: 161/83 mmHg, HR: 76 x / minute, complained of headache, there was a disorder of Nervus VII: Facial and Nervus XII: Hypoglossal, pain scale 2 Numeric Rating Scale (NRS), round isochoric pupils, had a history of hypertension 5 years ago and stroke 1 year ago. The results of a CT scan of the head without contrast showed hyperacute cerebral ischemic thromboembolism according to the vascularization of the left middle cerebral artery, ASPECT score left 8. The results of the chest X-ray were cardiomegaly. The problem found in the patient was a decrease in intracranial adaptive capacity, so that nursing implementation was carried out in the form of identifying the cause of increased intracranial pressure (cerebral edema), head up 30º, and monitoring complaints of headaches. Monitoring of intracranial pressure is done by monitoring vital signs and signs or symptoms of increased intracranial pressure. The pharmacological therapy given is Citicoline 500 mg/12 hours, metamizole 3x1, mecobalamin 2x500, OMZ 2x40mg, resfar 6 gr in pz 100 once, given intravenously. Orally aspirin 1x80mg, valsartan 160 mg/24 hours. Nurses also provide education related to hypertension and compliance with hypertension care with blood pressure monitoring, a low salt diet (low salt TKTP 1800 cal), and taking medication regularly. The evaluation results showed a decrease in intracranial adaptive capacity with a reduction in headache to 1 NRS, BP: 130/82 mmHg, pulse 72x/min, and a compos mentis level of consciousness.

Physical Mobility Impairment

Assessment on June 4, 2025 found left hemiparesis, limited range of motion, dependency scale 4, muscle strength of the upper and lower extremities on the left 3 and felt pain when moved, passive range of motion, the patient was reluctant to move because of pain, there was joint stiffness, and limited movement. The problem found in the patient was impaired physical mobility, so that nursing implementation was carried out in the form of assessing the ability to do activities and muscle strength, and identifying physical tolerance to changes in position. The next action was to train ROM actively and passively 2 times a day, namely in the morning and evening shifts. Before ROM training, the patient and family were first educated

regarding the goals, benefits, and steps of ROM in order to motivate the patient and family to be able to do ROM while at home. The evaluation results found that the patient experienced an increase in muscle strength from 1 to 2, increased range of motion, increased extremity movement, and increased gripping ability in the left hand.

Table 1. Assessment.

Day	Joints Assessed	Initial Range of Motion (degrees)	Final Range of Motion (degrees)	Initial Muscle Strength (Scale 0-5)	Final Muscle Strength (Scale 0-5)	Patient Notes/ Response
Day 1	Shoulder Flexion	60^o	-	1 (Contraction without movement)	-	The patient was in a weak condition, and the initial response was good
Day 1	Elbow Flexion	80^o	-	1 (Contraction without movement)	-	The patient was in a weak condition, and the initial response was good
Day 2	Shoulder Flexion	60^o	80^o	1	2 (Motion without resisting gravity)	Improvement, after ROM exercises
Day 2	Elbow Flexion	80^o	90^o	1	2 (Motion without resisting gravity)	Power began to increase
Day 3	Shoulder Flexion	80^o	90^o	2	2 (Motion without resisting gravity)	Patients become more active and independent
Day 3	Elbow Flexion	90^o	100^o	2	2 (Motion without resisting gravity)	Regular practice shows results

Risk of Falling

The results of the assessment on patient Mrs. L showed that the patient had been treated for a stroke 1 year ago. The current condition, the patient is left hemiparesis, appears weak, and has limited range of motion. The nurse conducted a fall risk assessment using the Morse

Scale. The patient showed a high risk of falling with a score of 60. The problem found in the patient was the risk of falling so that nursing implementation was carried out in the form of ensuring that the bed rail was installed, the bed wheels were locked, maintaining the bed rail installed, offering assistance to the family if they needed help, bringing the patient's personal belongings closer so that they were easy to reach, and teaching the patient and family about fall prevention by providing education on steps to prevent falls at home. The results of the nursing care that had been provided for four days, the patient did not experience any falls while in the hospital.

DISCUSSION

Cranial Adaptive Capacity Decreased

Decreased intracranial adaptive capacity is a disturbance of the intracranial dynamic mechanism in compensating for stimuli that can reduce intracranial capacity (PPNI, 2017). Decreased intracranial adaptive capacity can be caused by cerebral edema. Cerebral edema is cerebral swelling in the central nervous system. During treatment, nurses make plans in the form of identifying the causes of increased intracranial pressure, monitoring signs and symptoms of increased intracranial pressure, monitoring MAP (Mean Arterial Pressure), monitoring respiratory status, head up position 30º, Providing a 30º Head of Bed elevation position in the case of Mrs. L by the existing theory so that the patient does not have an increase in MAP, complaints of headaches decrease. Patient education related to hypertension using media and collaboration in drug administration. Pharmacological therapy given orally to patient Mrs. L is Aspilet and Valsartan 160 mg/24 hours. While Citicoline 500 mg/12 hours is given intravenously. According to the National Guidelines for Stroke Management Medical Services (2019), patients with ischemic stroke or with a history of previous stroke are more recommended to be given antiplatelets than anticoagulants to reduce the risk of recurrent stroke and other cardiovascular events. Platelet administration is better for preventing the risk of secondary ischemic stroke, myocardial infarction, and vascular death. Currently, patients are given citicoline, which can reduce vasogenic cerebral edema and restore the integrity of the blood-brain barrier. Meanwhile, Valsartan to restore blood flow quickly and precisely can saving the effects of ischemia in ischemic stroke patients (Budianto, Mirawati, Prabaningtyas, Putra, Muhammad, et al., 2021).

Physical Mobility Impairment

Impaired physical mobility is a condition of limitation in the physical movement of one or more extremities independently. The main intervention that can be done in stroke patients who experience impaired physical mobility is mobilization support (PPNI, 2017). In stroke patients, the motor deficit that arises can be in the form of hemiparesis or hemiplegia (Smeltzer, 2015). Stroke patients have limited range of motion and gait disorders due to neurological deficits and changes in connective tissue (Cho & Park, 2020). After hemiparesis occurs, 60% of patients will experience joint contractures on the affected side. Wrist contractures are most common in patients whose hand function does not recover. This theory is in line with the results of nursing care carried out on Mrs. L. The evaluation results found that the patient experienced an increase in muscle strength from 1 to 2, increased range of motion, increased extremity movement, and increased gripping ability in the left hand. During treatment, nurses plan mobilization support in the form of identifying pain complaints, the patient's ability to move

and muscle strength, monitoring general conditions when changing positions, facilitating movement, installing bedrails, teaching passive and active Range of Motion (ROM) by medical rehabilitation and nurses and Range of Motion (ROM) education to patients and families. Mobilization support for stroke patients is carried out in stages; mobilization can be started when hemodynamics are stable (Nurarif & Kusuma, 2015). Range of Motion (ROM) exercises are exercises that aim to increase joint movement so that they can increase muscle mass and tone to prevent deformities, stiffness, and contractures (Silalahi, Fatimah, Nurjanah & Suwandi, 2023). Mobilization and joint stretching interventions can increase joint range of motion through mechanical changes in the joints (Cho & Park, 2020). The results of a study by Faridah, Istiqomah, Kurnianto & Kovifah (2018) found that ROM exercises were effective in increasing muscle strength in stroke patients. The exercises were performed for six days, with two sessions per day, and each session lasted 15-20 minutes. According to Cuaresma, Anton, Medina, Vega, Mercant, et al. (2021), rehabilitation activities for stroke patients require physiotherapists together with a multidisciplinary team consisting of neurologists, nurses, occupational and physical therapists, speech therapists, and others. Muscle stretching is the most widely used technique to reduce pain, improve function, maintain or increase soft tissue extensibility and joint range of motion, and normalize muscle tone. Stretching can be done manually by a therapist, with the help of tools, or through self-stretching. Several studies suggest that stretching should be maintained for at least 30 seconds, with three to four repetitions, five or more times per week. The results of a study by Yuliyani, Hartutik & Sutarto (2023) showed that there was an effect of ROM exercises on muscle strength in stroke patients. This exercise is performed at a frequency of 2 times a day for 5 days. This is also in line with research by Hosseini, Poyrevi & Gohari (2019), the use of passive ROM exercises not only prevents local complications, but also improves motor function after stroke. Frequent and regular exercise in the first six months of stroke can lead to the return of most of the patient's sensory and motor functions.

Risk of Falling

Falling is an event that causes a person to accidentally fall to the ground or floor or other lower place (WHO, 2021). Increased risk of falling is associated with heart disease, orthostatic hypotension, physical weakness, sensory impairment, and environmental hazards (Denfeld, Turrise, MacLaughlin, Chang, et al., 2022). The risk of falling in stroke patients occurs from the time of hospitalization to rehabilitation at home. Falls can cause physical and mental harm to stroke patients. Sensorimotor disorders due to stroke can cause loss of balance, coordination, and even the ability to maintain position, making stroke patients susceptible to falling (Robby, Agustin, & Awalia, 2023). One of the six patient safety goals is reducing the risk of falling. Anticipating the risk of falling in Mrs. L has been done so that the patient does not fall while being treated in the hospital.

CONCLUSION

Nursing problems in patients are decreased intracranial adaptive capacity, impaired physical mobility, and risk of falling. After implementing nursing care for patient Mrs. L with ischemic stroke for 3 days of treatment, two nursing problems were partially resolved, including decreased intracranial adaptive capacity and impaired physical mobility. With the application of a combination of ROM and HOB, it has been proven to accelerate the recovery

process. It can be measured that strength has increased from 1 to 2, range of motion has also increased from 60% to 80-90%. During treatment, the patient did not experience a fall.

SUGGESTION

The healing and recovery process of stroke patients cannot be done quickly; it requires patience and enthusiasm from both the patient and family. For further research, it should strengthen education and motivation, as well as longer and deeper observation.

LIMITATIONS

The limitations of this study are the short duration of intervention and observation, so that the evaluation carried out was less than optimal so and only part of the problems were resolved.

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