

IMPLEMENTATION OF RANGE OF MOTION (ROM) EXERCISES TO IMPROVE PHYSICAL MOBILITY IN ELDERLY PATIENTS

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ABSTRACT

Stroke is a disease that occurs when part of the brain cells die due to abnormal blood flow caused by blockage or rupture of cerebral blood vessels. This case study employed the nursing process approach consisting of five stages: assessment, nursing diagnosis, nursing intervention, nursing implementation, and evaluation. The intervention provided was passive Range of Motion (ROM) exercises aimed at improving muscle strength and physical mobility. After three consecutive days of intervention (15–20 minutes per session), the evaluation results in Mrs. M with impaired physical mobility showed an improvement in muscle strength. The findings indicate that the application of passive ROM exercises is effective in enhancing muscle strength in elderly patients with non-hemorrhagic stroke.

Keywords: elderly; mobilization; range of motion; stroke rehabilitation

INTRODUCTION

Cardiovascular diseases continue to increase globally and remain one of the leading causes of death. Stroke is a major contributor to mortality and disability worldwide. According to the World Health Organization (WHO, 2021), more than 4.6 million people die annually due to stroke, with two-thirds of deaths occurring in developing countries. In Indonesia, approximately 15 million people suffer from stroke annually, resulting in significant disability and mortality rates. Stroke is defined as a neurological deficit caused by impaired blood supply to the brain. Non-hemorrhagic stroke, which accounts for approximately 80% of stroke cases, results from vascular occlusion that leads to brain tissue ischemia. One of the most common complications of stroke is impaired physical mobility due to decreased muscle strength, particularly hemiparesis.

In elderly patients, the aging process further contributes to decreased muscle mass, reduced neuromuscular coordination, and increased risk of immobility. Limited mobility may result in complications such as muscle atrophy, joint stiffness, contractures, pressure ulcers, and decreased independence in activities of daily living (ADLs). Range of Motion (ROM) exercises are considered one of the early rehabilitation interventions for stroke patients. ROM exercises aim to maintain joint flexibility, improve circulation, stimulate neuromuscular activity, and prevent contractures. Passive ROM is particularly important for patients who are unable to move independently. Based on clinical observations conducted during an internship program at Inahokai Shinseien, Okinawa, Japan, an elderly patient with non-hemorrhagic stroke experienced right-sided weakness and total dependence in daily activities. Therefore, the researcher conducted a case study entitled: “Implementation of Range of Motion (ROM) Exercises to Improve Physical Mobility in Elderly Patients.”

METHOD

This case study uses a nursing process approach consisting of five stages: assessment, nursing diagnosis, nursing intervention, nursing implementation, and evaluation. The intervention involved the application of range of motion (ROM) to improve muscle strength and mobility. The nursing evaluation of Mrs. M, who had impaired physical mobility, showed an increase in muscle strength after three days of 15-20 minute sessions with the assistance of nurses and family. The application of ROM exercises was proven effective in increasing muscle strength.

RESULT

The patient, identified as Mrs. M, is 79 years old and female and was admitted to Inahokai Shinseien. The doctor diagnosed a non-hemorrhagic stroke. The data were obtained from medical records and family records, specifically Mrs. S, the patient's child, as the person responsible for her care. The patient came to Inahokai Shinseien. On the right side, Mrs. M was also unable to perform basic daily activities independently, such as moving around. The family did not know how to care for Mrs. M so that she could move independently, and the patient appeared weak. Mrs. M's family stated that she had a history of hypertension since 2 months ago before entering the nursing home. The results of the physical examination obtained BP: 170/110 mmHg, Spo2: 91%, temperature: 36 °C, pulse rate: 88x/minute, RR: 25x/minute. Muscle strength of the right hand and leg was 2. From these data, the author has implemented passive ROM (ROM) in patients with non-hemorrhagic stroke. With passive ROM, the patient experienced increased muscle strength. The results of Mrs. M's walking muscle strength before muscle strength 2 (unable to resist movement) and after 4 (able to resist moderately) doing passive ROM exercises. These results indicate that the pathophysiology of passive ROM can increase muscle strength.

DISCUSSION

Based on the case review conducted in this chapter, the author will discuss nursing care for non-hemorrhagic stroke patients in meeting physical mobilization needs through passive ROM interventions at Inahokai Shinseien, Okinawa, Japan, which were conducted over three days in 15-20 minute sessions with the assistance of nurses and family.

Assessment

Assessment is the process of collecting data. Data collection involves systematically gathering information about the client to determine the client's problems and nursing and health needs. Information gathering is the initial stage in the nursing process. From the information gathered, baseline data is obtained regarding the problems faced by the client (Basri, 2020). The results of the alloanamnesis assessment of the patient's child revealed that Mrs. M experienced weakness in her right limb. Mrs. M was also unable to perform basic daily activities independently, such as moving around. The family did not know how to care for Mrs. M so that she could carry out activities independently. The patient appeared weak and had a history of hypertension for the previous 2 months. Physical examination results revealed BP: 170/110 mmHg, Spo2: 91%, temperature: 36 °C, pulse rate: 88x/minute, RR: 25x/minute. Muscle strength of the right hand and leg was 2.

The pathophysiological mechanism of muscle weakness in patients with SNH is that partial muscle weakness will experience inhibition of active Ca^{+} transport, resulting in increased Ca^{+} in the sarcoplasmic reticulum. Calcium is pumped from the reticulum and diffuses, then stored in the reticulum. If the calcium concentration outside the sarcoplasmic reticulum increases, the interaction between actin and myosin will cease, and the muscle will weaken. This results in decreased muscle strength, muscle weakness, and the inability to move joints. In more severe cases, contractures can occur.

Nursing Diagnosis

A nursing diagnosis is a clinical assessment of an individual's experience and response to health problems during the life process. A nursing diagnosis is a vital part of determining appropriate nursing care to help clients achieve optimal health (SDKI DPP PPNI Working Group Team, 2018). Based on the theoretical concept of possible diagnoses in clients with non-hemorrhagic stroke, the author established a nursing diagnosis of impaired physical mobility related to decreased muscle strength, knowledge deficit related to lack of exposure to information, and risk of ineffective cerebral perfusion related to decreased blood

circulation to the brain in Mrs. M. Based on data analysis based on the 2019 IDHS (SDKI), with supporting data for diagnosis 1, Mrs. M experienced weakness in her right limbs. Her daily activities were assisted by a nurse. According to Putri (2019), this nursing diagnosis is used as a priority diagnosis in patients with non-hemorrhagic stroke. Impaired physical mobility can cause decreased muscle strength, resulting in weakness, inability to move joints, and contractures.

Nursing Interventions

Nursing interventions are all actions carried out by nurses based on knowledge and clinical judgment to achieve outcomes (SIKI DPP PPNI Working Group Team, 2018). Nursing action planning is carried out after all data collection is complete and problems are prioritized. Based on the results of the patient's nursing assessment, three main problems were identified:

1. Impaired physical mobility related to decreased muscle strength
 2. Knowledge deficit related to lack of exposure to information
 3. Risk of ineffective cerebral perfusion related to the risk of decreased blood circulation to the brain.
- Of these three diagnoses, the primary priority for intervention is impaired physical mobility, as it directly relates to the patient's ability to maintain basic motor function and independence in life.

The primary goal is to increase muscle strength in extremities weakened by stroke, maintain joint range of motion to prevent stiffness or contractures, and increase the patient's mobility independence so that they can perform basic activities such as sitting, transferring, and walking with minimal assistance. Scientifically, this intervention refers to the Indonesian Nursing Outcome Standards (SLKI, 2019), with outcomes of increased physical mobility and improved muscle strength.

The interventions implemented are:

Observing to ensure the patient's physical and psychological readiness before performing ROM exercises. Nurses identify any pain, fatigue, or other physical complaints during the exercises. Observations were also made on vital signs such as blood pressure, pulse rate, respiration, and oxygen saturation (SpO₂). This step is important because elderly stroke patients are susceptible to muscle fatigue and circulatory disorders. Windy (2022) in his research explained that monitoring physiological conditions before and during physical exercise helps prevent muscle spasms and orthostatic hypotension. Furthermore, observations also include the patient's emotional response to exercise. Elderly people who show enthusiasm during exercise have faster muscle strength gains than those who are passive or anxious.

Then, nurses also perform therapeutic actions, this stage is the core of the intervention. The therapeutic actions carried out are passive Range of Motion (ROM) exercises, namely joint movement exercises performed with the assistance of nurses because the patient is not yet able to move their limbs independently. Nurses assist patients in performing various joint movements of the upper and lower extremities, such as: elbow flexion and extension, shoulder abduction and adduction, knee flexion and extension, ankle dorsiflexion and plantarflexion, abduction-adduction of the fingers and toes. Each movement is performed slowly and rhythmically for approximately 15–20 minutes, twice a day (morning and evening), for three consecutive days. The goal is to maintain muscle and ligament elasticity and maintain blood flow and oxygenation of muscle tissue. Reducing the risk of contractures and pressure ulcers due to bed rest, stimulating the peripheral nervous system, and improving neuromuscular connections. According to Irdawati (2019), regular ROM exercises can increase lower extremity muscle strength by 60–70% in non-hemorrhagic stroke patients. This is due to increased blood flow and neuromotor stimulation in the hemiparetic area.

In addition to ROM exercises, nurses also facilitate early mobilization using simple assistive devices such as bed rails or wheelchairs to prevent total immobilization. This physical support is accompanied by verbal guidance to ensure the patient feels safe and confident. Nurses also provide educational aspects focused on increasing patient and family knowledge about the importance of ROM exercises and daily care for the elderly after a stroke. Nurses explain in simple terms how the exercises help prevent muscle stiffness, prevent joint stiffness, and increase muscle strength. The exercise procedures are performed slowly, without force, and are tailored to the patient's abilities. The exercise frequency is twice daily for 15–20 minutes. Warning signs to watch for include severe pain or extreme fatigue. Furthermore, the patient's family is taught how to assist with ROM exercises at home so the program can continue consistently. Yurida (2020) stated that effective education increases the family's ability to provide Range of Motion (ROM) care by up to 85% and significantly accelerates the improvement of muscle strength in stroke patients.

Nursing Implementation

Nursing implementation is a series of activities carried out by nurses to help clients better address their health status issues, reflecting the expected outcome criteria. Researchers implemented the exercises according to a predetermined plan (Hidayat, 2021). This implementation focused on providing passive Range of Motion (ROM) exercises to improve physical mobility in elderly patients with mobility impairments due to non-hemorrhagic stroke. The exercises were carried out for three consecutive days on Mrs. M, a 79-year-old woman with right-sided limb weakness. At the beginning of the procedure, the patient appeared weak, had difficulty moving her right arm and leg, and was unable to perform basic activities such as changing positions without assistance. Before beginning the procedure, the nurse reassessed the patient's general condition, including vital signs, level of consciousness, and muscle strength, to ensure the exercises were safe.

The exercises were carried out in a gradual and structured manner, beginning with explaining the objectives and procedures to the patient and their family so they understood the benefits and could actively participate. Passive ROM exercises were performed by moving the large and small joints in the patient's upper and lower extremities slowly, gently, and rhythmically. The movements included flexion and extension of the elbows and knees, abduction and adduction of the shoulders, and dorsiflexion and plantarflexion of the ankles. Each movement was repeated approximately five to ten times, lasting a total of 15–20 minutes per session, twice daily, in the morning and evening. During the exercises, the nurse continuously monitored the patient's facial expressions for signs of fatigue, pain, or increased blood pressure that could indicate discomfort, so that the exercises could be adjusted to the patient's abilities. On the first day of exercise, the patient still appeared weak and was only able to follow a small portion of the movements given by the nurse. However, the nurse continued to provide verbal support and motivation, and helped adjust his body position to maintain comfort during the exercises.

On the second day, the patient began to show a positive response to the exercises, with muscle strength increasing from grade two to grade three, and blood pressure decreasing from 170/110 mmHg to 150/80 mmHg. The patient appeared more active in the movements, even attempting to perform some of the movements himself with minimal assistance from the nurse. On the third day, the patient showed even more significant progress; The muscle strength of the right extremity increased to grade four, meaning the patient was able to resist light resistance. In addition to ROM exercises, the nurse also trained the patient to move from lying to sitting on the edge of the bed and to maintain balance by supporting his left arm. During the implementation process, the nurse not only focused on physical actions but also provided education and psychological support to the patient and family. The family was explained the

importance of ROM exercises as part of the rehabilitation process and taught how to perform simple movements so they could continue the exercises at home regularly. The nurse also explained that these exercises should not be done hastily or with force, but should be done gradually according to the patient's ability to prevent muscle and joint injuries. This educational approach has been proven to increase the motivation of the patient and family to actively participate in the recovery process. The implementation results showed an increase in the patient's muscle strength and mobility after three days of exercises. The patient was able to move his right arm and leg more strongly, his blood pressure became more stable, and he began to be able to move positions with minimal assistance. The patient's response to the exercises was also very good; he appeared enthusiastic, cooperative, and expressed joy after the exercises were completed. Based on the final evaluation, the nursing problem of "impaired physical mobility related to decreased muscle strength" was deemed partially resolved, as the patient had shown improved mobility, although not yet fully independent.

Regular passive ROM exercises over several days were able to increase extremity muscle strength in patients with non-hemorrhagic stroke. These exercises work by maintaining muscle elasticity, improving blood circulation, and preventing joint stiffness and contractures resulting from prolonged immobilization. Furthermore, passive ROM exercises stimulate the nervous system and aid neuroplasticity, the brain's ability to adapt and form new connections after stroke damage. Therefore, the nursing implementation of passive ROM exercises in this case proved effective in increasing muscle strength.

Evaluation

After passive range of motion (ROM) exercises were performed for three consecutive days on an elderly patient with non-hemorrhagic stroke, evaluation is the final stage of the nursing process. The goal is to assess the extent to which the planned goals and outcome criteria have been achieved, and to determine whether the nursing problems identified at the beginning of care have been resolved, partially resolved, or not resolved at all. In Mrs. M's case, the evaluation was conducted by observing changes in the patient's physical condition, assessing muscle strength, vital signs, and ability to perform basic daily activities.

On the first day of the intervention, the patient still showed significant weakness. She was unable to actively move her right extremity, and all exercises were performed with full assistance from a nurse. However, after several days of passive ROM exercises, positive changes were observed in the patient's condition. On the second day, the patient was able to perform some ROM movements with minimal assistance, muscle strength increased from grade two to grade three, and her blood pressure, which was initially high (170/110 mmHg), decreased to a more stable (150/80 mmHg). This indicated improved blood circulation and the body's adaptation to the light physical exercise.

A further evaluation was conducted on the third day, during which a more significant improvement in the patient's motor skills was observed. Muscle strength measurements showed an increase from grade two to grade four in the right extremity, indicating the patient was able to resist light resistance and was beginning to move the limb independently. The patient's blood pressure stabilized at 140/90 mmHg, respiration and pulse were within normal limits, and the patient appeared more active and enthusiastic about participating in the exercises. In addition to physical changes, the evaluation also included the patient's psychological response, which indicated increased motivation and participation. The patient appeared happy, cooperative, and took the initiative to try movements without being asked, indicating increased self-confidence and enthusiasm for recovery. From these observations, it can be concluded that the nursing problem of "impaired physical mobility related to decreased muscle strength" was considered

partially resolved. This was because although the patient's muscle strength and motor skills had significantly improved, the patient still required light assistance to change positions and was not yet fully independent in performing activities. Nevertheless, the changes demonstrated that passive ROM exercises had very positive results in the patient's mobility recovery. In addition to the physical aspects, the evaluation also assessed the effectiveness of the education provided to the patient's family. The family understood how to perform ROM exercises correctly, safely, and gradually at home, and demonstrated a commitment to continuing the exercises regularly. This is crucial because continuing the exercises after the treatment period is a key factor in maintaining the achieved results and preventing regression of the patient's physical abilities.

The evaluation results were also supported by scientific data from studies cited in the paper. According to Merdiyanti (2021) and Olivia (2017), a two-degree increase in muscle strength after three days of ROM exercises is consistent with previous research in patients with non-hemorrhagic stroke. Physiologically, regular ROM exercises help increase oxygen and nutrient supply to muscle tissue, stimulate motor nerve activity, and maintain joint and ligament elasticity, thus accelerating the recovery of motor function.

Based on the overall results, the final evaluation showed that the implementation of passive ROM exercises successfully increased muscle strength, lowered blood pressure, improved mobility, and increased patient motivation to move and be active. Therefore, this intervention was deemed effective and suitable for inclusion in nursing protocols for elderly patients with mobility impairments due to non-hemorrhagic stroke. Nurses are advised to continue regular exercise, develop active-assistive exercises as the patient becomes stronger, and continuously involve the family to maintain the achieved results. Therefore, the results of this study demonstrate the success of nursing interventions in a holistic context—including physical, psychological, and educational aspects. The increase in muscle strength from grade two to grade four in a short period of time demonstrates that passive ROM exercises are not only clinically effective but also have a positive impact on the quality of life and independence of elderly post-stroke patients.

CONCLUSION

Passive Range of Motion (ROM) exercises effectively improve physical mobility and muscle strength in elderly patients with non-hemorrhagic stroke. After three days of regular exercise, muscle strength increased from grade two to grade four, accompanied by a more stable physiological condition and increased patient motivation. Passive ROM exercises have been shown to improve blood circulation, prevent joint stiffness, and accelerate the recovery of motor function. Therefore, passive ROM is a simple, safe, and evidence-based nursing intervention that can be implemented to improve the independence and quality of life of elderly patients with impaired physical mobility.

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