



The Effect of Nursing Range of Motion on the Motor Function of Patients with Impaired Physical Mobility

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ABSTRACT

CVA occurs when there is a disturbance in blood circulation in the brain. Hemiparalysis is complicated by CVA, which causes impaired physical mobility. ROM exercises can maintain and improve joint mobility. This study aims to analyze the effectiveness of ROM intervention in patients with impaired physical mobility CVA Infarc. The case study research design. Participants in the first attack, CVA, were admitted to a government hospital in Malang. ROM implementation was given for four days and carried out 2x/a day for 15 minutes. After doing ROM exercises the patient's initial muscle strength score was 2 to 3. Patients were independent in fulfilling ADL. ROM exercises given immediately while in the hospital can increase muscle strength. Besides that, supporting families, dan emotional patients help maximize the result.

INTRODUCTION

A stroke or Cerebrovascular Accident (CVA) is a condition of circulatory disorders in the brain that causes physical disability, impaired cognitive function, impaired brain function, and even death (Ginging, 2019). Most stroke sufferers experience neurological deficits, impacting daily living activities, individual hygiene, and dressing (Kurnia, E., & Idris, 2020). Neurological deficits in the body's extremities affect the decrease in muscle strength range in clients who experience hemiparesis (Djamaludin, D., & Oktaviana, 2020). Hemiparesis in stroke clients occurs due to damage to the central nervous system, which controls the neuromusculoskeletal system and standard postural reflex mechanisms (Chan, WC and Au-Yeung, 2018). Hemiparesis also causes impaired physical mobility in patients, affecting all aspects of the client's life. Moreover, moving from chair to bed is the effect of hemiparalysis. In addition to experiencing causing independence in performing ADL, someone with hemiparalysis also experiences self-care deficits and dependency (Handayani, DY, & Dewi, 2020). Physical exercise is one of the interventions to overcome hemiparesis, which causes impaired physical mobility in stroke patients. Physical exercise improves motor function and increases activity to minimize complications (Chan, WC and Au-Yeung, 2018).

Ata from the American Stroke Association (2018) shows that stroke globally is estimated at 200 per 100,000 population annually (RISKESDAS, 2018). The prevalence of stroke in East Java province ranks third after South Sulawesi and DIY. In addition, about 55-70% of stroke survivors experience hemiparesis and hemiplegia (Chan, WC and Au-Yeung, 2018). When a person experiences an inability to carry out self-care independently is referred to as a self-care deficit.

One of the actions that can be given to patients who experience impaired physical mobility is Range of Motion (ROM). Passive ROM exercises can be an alternative to increase joint strength in the extremities, especially in stroke patients (Agusrianto, NR and Rantesigi, 2020). Physical exercise can be done to treat hemiparesis as a cause of impaired physical mobility in stroke patients to improve motor function and increase activity, thereby minimizing future complications (Chan, WC and Au-Yeung, 2018). Treatment assistance in patients with hemiparalysis is not only aimed at fulfilling ADL but also at helping patients to be able to care for themselves independently (Astuti, 2019).

Immediate and appropriate treatment is needed for CVA patients with complications of hemiparesis to avoid contractures or prolonged self-care deficits (Hapsari, S., Sonhaji, S., & Nurulia, 2020). Collaboration between nurses, patients, and families is expected to increase the result of implementation and reduce Self-Care deficits (Sulistiyowati, 2020). This study aims to analyse the implementation of ROM in patients with nursing diagnoses of impaired physical mobility, especially patients.

LITERATURE REVIEW

ROM Concept

Range of Motion (ROM) is an exercise performed to maintain or increase full and normal joint mobility in order to increase muscle mass and tone (Joseph, 2021). ROM exercises have goals including maintaining flexibility and the ability to move joints, reducing pain, restoring the client's ability to move muscles, and increasing blood circulation (Hapsari, Sonhaji, & Nurulia, 2020). ROM exercise classification and its indications, namely: a. Active ROM exercises are ROM exercises that are carried out independently by the client without the help of a nurse in every movement. B. Passive ROM exercises are ROM exercises performed by clients with the help of other nurses or assistive devices every time they make a move. Some indications of ROM according (Agusrianto, A., & Rantesigi, 2022) are: a) Active ROM indications 1) When the client is able to actively move/contract muscles and move their joints properly with assistance or not. 2) When the client experiences muscle weakness and is unable to fully move the joint, AAROM (Active-Assistive ROM) is used which is a type of Active ROM where this assistance can be provided through external force either by manual or mechanical means. The prime mover muscles need assistance in completing movement activities). ROM Handling for Impaired Mobility in stroke patients Range of motion (ROM) is an exercise performed to maintain or increase the perfection of the ability to move joints normally and completely to increase muscle mass and tone.

Case Presentation

Taking cases in this patient has been approved by the Institutional Council of Malang Government Hospital - in Indonesia. This research is not risky to the subject and the environment. Patients and families consented to this study for study and publication. The male patient is 55 years old, married, and works as an entrepreneur – the CT scan results of hypodense ischemic stroke in the brain.

The doctor's therapy maintains NS fluids 20 drops/minute, Citicolin IV 250 mg, Santagesic IV 1 g, Ranitidine 50 mg IV, and 4 liters of nasal cannula installed, and the patient's GDA examination results are 180 mg/dL. GCS 4X3 examination results, Hemiplegia of the upper and lower extremities, left hand and leg muscle strength 2, aphasia, BP: 190/100 mmHg, temperature 36.3oC, pulse 93 x/minute, and respiration 22 x/minute. In addition, the patient complained of being unable to defecate for three days since being admitted to the hospital. There was a disturbance in NV; The patient cannot open his mouth when there is resistance. N VII, the patient has weakness in the right mouth and cannot speak normally; the patient cannot smile, and the lips are turned to the right NX the patient has weakness in the right mouth and cannot speak normally; the patient is unable to smile, and the lips are turned to the right, NX patient has difficulty swallowing. N XI, the patient cannot shrug his shoulders if there is resistance. N XII, the patient cannot raise his right hand, stick out his tongue, and speak in unclear sentences. Blood test results June 22, 2022 Cholesterol 211 mg/dL (H), Triglycerides 186, HDL Cholesterol 33.0 (L), LDL-C 140.8 mg/dL, Uric Acid 4.5 mg/dL, Fasting blood sugar 180 mg/dL, Sugar

blood 2 hours PP 182 mg/dL, Ureum 14.7 (L) mg/dL Creatinine P 0.80 mg/dL, Rapid test Ag Covid (-). The CT scan results showed ischemic stroke with hypodense in the brain.

METHODOLOGY

On the first day, the patient was treated in the stroke room at Malang Government Hospital. The results of the assessment are upheld by nursing diagnoses: 1. Impaired physical mobility bd neuromuscular disorders; 2. The risk of ineffective cerebral perfusion related to hypertension; 3. Verbal communication bd neuromuscular disorders; 4. BD self-care deficit and weakness; 5—verbal communication with neuromuscular disorders. Of the five nursing diagnoses enforced in this study, the focus was on impaired physical mobility by providing passive and active ROM interventions. However, it does not rule out the possibility of providing intervention for other diagnoses.

ROM exercise intervention. ROM exercises reduce joint stiffness and muscle weakness which can be done actively or passively depending on the patient's condition (Agusrianto, A., & Rantesigi, 2022). ROM exercises based on SOPs that have been prepared. The exercises were carried out every day for four days with the same hours, morning at 09.00 – 09.30, afternoon at 03.30 – 40.00, in the inpatient room. During ROM exercises, involve the family and monitor heart rate and blood pressure before starting mobilization (BP: 175/90 mmHg, N: 90 x/minute). Documentation of nursing care based on 3S (SDKI, SLKI, and SIKI).

Table 1. Standard Operating Procedure for ROM

ROM Movement Work Stage
1. Neck. Bend your head up and down and then turn it to the right and left
2. Arm/shoulder. Raise your hands up and then down, then to the sides and down again
3. Elbow. Bending the arm, move the arm up and down.
4. Wrist. Bend your wrist in and out then left and right
5. Finger. Bend all four fingers inward then stretch back/straighten finger (extension). Clean all fingers then unfold. Bend each finger individually, then push back (hyperextension), move sideways to the left and right and then return to the starting position
6. Knees. Place one hand under the patient's knee and hold the patient's heel with the other hand, lift the leg and then bend it at the knee and groin, continue to bend the knee towards the patient's chest as far and as far as the patient can, lower and straighten while still lifting the leg up and returning it to position beginning.
7. Thigh. On the thigh (abduction and adduction) place one nurse's hand under the patient's knee and one hand on the heel, lift the patient's leg off the bed and in a straight position, move the leg away from the patient's body or to the side, move the foot towards and away from the patient's body and return it to the

patient's initial position

8. Ankle. Bend your ankles up and then straighten them. Bend your toes up and down. At the ankle place one hand on the sole of the patient's foot and the other hand on top of the ankle (flexion and extension) with the leg straight and relaxed, bend the ankle then point the fingers toward the chest or over the patient's leg, return to standing position. start and bend the stiff ankle away from the patient's chest then point the fingers and soles of the feet down.
9. If you are able to stand, do the movement of bending the body, then rotate the waist to the right and left. REMEMBER. Don't force it to practice, do it as lightly as possible.

RESULT

Evaluation of immobilization disorder nursing problems is carried out after each exercise is completed, with standards according to the expected output. The evaluation was carried out for 4 days.

Table 2. Evaluation of Nursing Diagnosis Impaired Physical Mobility BD Neuromuscular Disorders

Day	Date	Application	Evaluation
First	June 26, 2022	ROM exercises BP 185/98 mm Hg	Movement of the upper and lower extremities is unchanged; muscle strength remains at 2
Second	June 27, 2022	ROM exercises BP 165/90 mm Hg	The movements of the upper extremities begin to move even though they can only rotate the palms of the hands, the lower extremities have not changed, and the muscle strength remains 2
Third	June 28, 2022	ROM exercises BP 155/85 mm Hg	Movement of the upper extremities can raise the shoulders, but the hands can only be lifted without being able to resist; lower extremities begin to move, and muscle strength gradually reaches level 2
Fourth	June 29, 2022	ROM exercises TD 145/80mmHg	Upper extremity movements can raise hands, and are able to hold resistance and put up resistance; the lower extremities can be lifted even though the muscle strength is at level 3. But the patient is able to do ADLs on his own to go to the toilet even though he is still being held by his family.

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Furthermore, oxygen in sufficient quantities to carry out metabolic activities. In proven cases, patients say there is no energy. In addition, oxygen in sufficient quantities to carry out metabolic activities. In proven cases, patients say there is no energy. The patient complained of no bowel movements since admission to the hospital. Disorders of Gastrointestinal Function caused by immobility can reduce the results of digested food so that a decrease in sufficient intake can cause complaints such as flatulence, nausea, and abdominal pain which can interfere with the elimination process. Changes in the Musculoskeletal System, Muscle Disorders Decreased function of muscle capacity is characterized by decreased stability. The condition of reduced muscle mass can cause atrophy in the muscles. For example, A person's calf muscles treated for longer than six weeks will shrink and show signs of weakness or lethargy. Skeletal disorders The presence of immobility can also cause skeletal disorders; for example, joint contractures and osteoporosis will occur rapidly. Contractures are abnormal conditions with flexion and fixation criteria caused by muscle atrophy and shortening. The occurrence of contractures can cause the joint to be in a dysfunctional position(Ardi, M., Basri, 2020).

Based on the Indonesian Nursing Intervention Standards manual (PPNI, 2019)Various interventions can be performed to overcome impaired physical mobility in stroke patients. One of the interventions taken from the guidebook is mobilization support by carrying out early mobilization with ROM exercises and supported by evidence-based research journals.(Purba et al., 2022)ROM exercises in ischemic stroke patients are effective for increasing muscle strength in stroke patients who experience muscle weakness. ROM exercises are useful for increasing muscle strength, training breathing and maintaining heart function, so as to avoid the appearance of contractures and joint stiffness.

Joint mobilization with ROM exercises can prevent various complications such as pain due to pressure, contractures, thrombophlebitis, decubitus so that early mobilization is important to do regularly and continuously. Giving ROM exercises can increase muscle strength because it can stimulate motor units so that more motor units are involved; there will be an increase in muscle strength; losses for hemiparesis patients, if not treated immediately will result in permanent disability. Perform passive ROM or active ROM exercises 2 times a day in the morning and evening with assistance as indicated for seven days then observe muscle strength for 15 minutes for 4 days(Gunawan, 2018).

Active and passive ROM on muscle strength, range of motion and functional ability. Passive ROM exercises can cause stimulation, thus increasing the activation of neuromuscular and muscle chemicals(Agusrianto, NR and Rantesigi, 2020). Stimulation via neuromuscular will increase stimulation of the nerve fibers of the leg muscles, especially the parasympathetic nerves, which stimulate the production of acetylcholine resulting in contraction. The

mechanism through the muscles, especially the smooth muscles of the extremities, will increase metabolism in the mitochondria to produce ATP which is used by the muscles of the extremities as energy for contraction and increases the tone of the smooth muscle of the extremities. Passive ROM is useful for maintaining the flexibility of muscles and joints by passively moving the muscles of other individuals. Help lift and move the patient's leg.

The joints that are moved in passive ROM are all joints of the body or only the extremities that are affected, and the client cannot do it independently.(Ika, K., & Rahayu, 2015). The exercise is expected to stabilize nerve hemodynamics which can affect neuroplasticity, enable increased sensorimotor function to remap damaged brain areas, repair and prevent muscle or joint strength, maintain or increase joint flexibility, increase bone growth and prevent contractures.(Agusrianto, A., & Rantesigi, 2022). Joint motion exercises can be done immediately to increase muscle strength and endurance (endurance) to improve blood flow and oxygen supply to tissues, accelerating the healing process. Indications for passive exercises are semicomatose and unconscious patients, patients with limited mobility who are unable to perform some or all of the range of motion exercises independently, patients on complete bed rest or patients with paralysis of the limbs.(Dolontelide, IP, Gobel, I., Siska, J., & Hinonaung, 2022). Based on previous study, it is known that Range of Motion (ROM) exercise is an effective non-pharmacological technique to restore musculoskeletal function. Patients with a stroke diagnosis tend to experience weakness. When performing ROM exercises as indicated, there is a gradual increase in muscle strength, and some patients are able to recover and resume activities(Dolontelide, IP, Gobel, I., Siska, J., & Hinonaung, 2022)

CONCLUSION AND RECOMMENDATIONS

Joint motion exercises by doing ROM can be done immediately to increase muscle strength and endurance to facilitate blood flow and oxygen supply to the tissues, speeding up the healing process. Doing ROM given for four days while the patient is in the hospital can increase muscle strength and make the patient more independent. The results of the evaluation in patients were carried out twice a day in the morning and evening for 15 minutes. Observations were made during changes in upper and lower extremity movements, although there were no significant changes. Initially, the upper and lower extremity muscle strength scores were two after the intervention was given, and the score became 3; even though the patient was still not strong enough but was able to fight back and could do toileting even though he was still assisted by his family while walking.

ADVANCED RESEARCH

According to the researchers, recommendations for further therapy are family support(Amalia, 2020)Family support is the help of other family members to provide physical and psychological comfort to patients. The family is responsible for every aspect that affects direct care in every healthy or sick condition so that the family plays a role in the success or failure of the patient's recovery efforts. People living in a supportive environment fare better than

those without support, because support can weaken the effects of stress and strengthen the patient's health. The family is also an important part in the recovery of post-stroke patients. Rehabilitative actions are carried out by nurses and in collaboration with the family. The family must know the therapy the patient is receiving in order to continue treatment at home. In addition, the family can also be a supporter so that clients can be more obedient to therapy programs, treatment, and training so that the client's recovery can be maximized even after discharge from the hospital. Self-management is a follow-up that must be given to patients who need long-term recovery to prevent complications (Rahmawati et al., 2019).

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