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APPLICATION OF EXERCISE THERAPY IN CASES OF *SINISTIC HEMIPARESE ETCAUSA STROKE INFARCTION* AT MUHAMMADIYAH HOSPITAL, SELOGIRI

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ABSTRACT
Background: Stroke remains a major health issue, not only in Indonesia but globally. It ranks as the third leading cause of death worldwide, following coronary heart disease and cancer, affecting both developed and developing countries. Physiotherapeutic interventions such as ROM exercise, stretching, and strengthening exercises can enhance functional activities in stroke patients. Common symptoms include weakness and loss of balance on the lesion side, resulting in functional activity impairment. Physiotherapy plays a crucial role in stroke management due to the patients' decreased ability to perform daily activities, often caused by abnormal muscle tone. Interventions such as ROM exercise, stretching, and strengthening exercises aim to improve the functional activities of stroke patients. Purpose : To determine the effects of exercise therapy in cases of left hemiparesis due to ischemic stroke. Method: This study utilized a case study method, employing exercise therapy including ROM, stretching, and strengthening exercises conducted twice weekly. Results: Exercise therapy showed improvements in Joint Range of Motion, joint and muscle flexibility, and muscle strength. Conclusion: This case study demonstrates the beneficial effects of exercise therapy.

Keywords: Hemiparesis , Exercise Therapy, Stroke.

INTRODUCTION

Stroke remains a major health problem, not only in Indonesia but globally. Stroke is the third leading cause of death in the world after coronary heart disease and cancer, both in developed and developing countries. In Indonesia, the number of stroke sufferers reaches 500,000 people each year, making Indonesia the country with the largest number of stroke sufferers in Asia. An estimated 2.5% or 125,000 people die from stroke and the rest suffer from mild to severe disabilities (Rati Pratama Magister Keperawatan et al., 2018). According to Riskesdas data from 2018, the prevalence of stroke in Indonesia is 10.9%, with the highest proportion of stroke incidents in those aged 75 years and over with a prevalence of 50.2%, proving that the incidence of stroke in Indonesia is still quite high. According to the 2007 Basic Health Research (Riskesdas), stroke is the leading cause of chronic disability in those aged 45 and over (Dewi et al., 2022). The WHO (2014) stated that stroke is a condition where blood flow to the brain is interrupted, causing physical impairment and disability in sufferers. This is because the brain controls most of the body's functions, both sensory and motor (Srinayanti et al., 2021).

Common symptoms of stroke include weakness and loss of balance on the affected side, leading to an inability to perform functional activities. These problems, caused by stroke, impede movement and function, ultimately limiting daily activities. (Pratama et al., 2022) Hemiparesis is a serious motor impairment affecting 65% of stroke victims. Muscle weakness is a prominent symptom and appears to be a major factor slowing the recovery of normal physical abilities in patients. (Srinayanti et al., 2021)

Physiotherapy plays a crucial role in stroke management because stroke patients generally experience a decreased ability to perform daily activities, primarily due to abnormal muscle tone, cognitive changes, decreased muscle strength, limited joint range of motion, uncoordinated movements, and changes in sensory integration. Physiotherapy interventions that can be used include ROM exercises, stretching, and strengthening exercises, which will improve the functional activities of stroke patients (Dewi et al., 2022).

ROM exercises are exercises that can maintain or improve the level of perfection of muscle tone, muscle strength, and the ability to move joints. In increasing muscle strength. (Srinayanti et al., 2021) Stretching is currently the most widely used technique in the physical management of flexibility. The goal is to reduce pain, improve function, maintain or increase soft tissue extensibility and joint range of motion (ROM), and normalize muscle tone (Gomez-Cuaresma et al., 2021). Providing strengthening to muscle groups in each body segment can have an effect on increasing muscle strength and increasing functional activity (Kesehatan et al., 2022).

RESEARCH METHODS

This study used a case study method, with exercise therapy consisting of ROM, stretching, and strengthening exercises administered twice weekly. The case study was conducted at the Physiotherapy Clinic of the Medical Rehabilitation Installation of RSM Selogiri in July 2024.

The respondent of this case study is a 69-year-old woman complaining of weakness in her left hand and leg. The patient experienced severe dizziness to the point of nausea while performing prayers a week ago, then while cutting vegetables, the patient felt severe dizziness to the point of falling, then the patient decided to rest without taking medication. On July 1, 2024, the patient experienced weakness in her left hand and leg to the point of being unable to walk independently and also about to fall again when trying to walk. Os then went to Muhammadiyah Selogiri Hospital with her nephew to be examined by a doctor. The doctor asked the patient to undergo a CT-Scan examination. The CT-Scan results showed the patient was diagnosed with Hemiparase sinistra et causa stroke infarction. The patient then underwent inpatient treatment and underwent physiotherapy on July 2, 2024.

The patient underwent physiotherapy in inpatient with examination results in the form of blood pressure 130/80 mmHg, pulse 80x/minute, respiratory rate 20x/minute with a height of 160 cm and weight of 70 kg with anamnesis system there are complaints of dizziness and stiff neck. On static inspection examination of posture, there is an

asymmetrical shoulder (left shoulder depression due to muscle weakness), ankle drop foot, forward head, and posture tends to hyperkyphosis. Dynamic inspection examination of the patient performs transfer and mobilization assisted with minimal assistance (1 person).

There is tightness in the Hamstring, Gastroc, and left Achilles Tendon muscles. On active movement examination the patient can perform basic movements actively on the left upper and lower extremity without pain along the LGS but not Full ROM, decreased muscle strength. Good movement coordination. Passive movement The patient can perform basic movements passively on the left upper and lower extremity without pain along the LGS but not full ROM, Springy end feel. Good movement coordination. And isometric movement against resistance The patient is able to perform movements against resistance given by physiotherapy with minimal resistance.

Manual Muscle Testing (MMT) examination showed a decrease in MMT with the left upper extremity 4 and the right 5. The left lower extremity 4 and the right 5. ROM examination of the upper and lower extremities showed a decrease in the Range of Joint Motion. And the Barthel Index examination to measure functional activity total score 70 with an interpretation of moderate dependence. There were no sensory disorders and the results of the coordination examination did not show any coordination disorders.

RESULTS AND DISCUSSION

Problems arising from cases of himparesis are muscle weakening which results in a decrease in the range of motion of the joints and the occurrence of tightness in the muscles. The problem of decreased range of motion of the joints can be given intervention in the form of ROM exercises in the UE and LE regions bilaterally with a frequency of 2-3 times a day and an intensity of 8-10x reps. Providing ROM can cause stimulation thereby increasing the activity of neuromuscular and muscular chemicals. Stimulation through the neuromuscular will increase stimulation of the nerve fibers of the extremity muscles, especially the parasympathetic nerves that 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 metachondria to produce ATP which is utilized by the extremity muscles as energy for contraction and increases the tone of the smooth muscles of the extremities.(Merdiyanti et al., 2021)

ROM exercises also aim to maintain joint flexibility and mobility, restore motor control, improve/maintain joint and soft tissue integrity, aid synovial circulation and nutrition, and reduce contracture formation, especially in paralyzed extremities. Other benefits of range-of-motion exercises include maximizing daily living function, reducing or preventing pain, preventing neuromuscular impairment, and alleviating symptoms of depression and anxiety.(M & Al Fajri, 2021)

According to Dewi, N ROM therapy in 10 patients with an average muscle before being given ROM was 1.0 with a standard deviation of 0.81. The average muscle strength after being given ROM was 2.5 with a standard deviation of 0.85. (Nur et al., 2020)So it can be concluded that there is a significant difference between muscle strength before being given ROM and after being given ROM. Descriptively, it is known that the degree of muscle strength after ROM therapy is better than before ROM therapy. Increasing the range of joint motion can activate voluntary movement, namely voluntary movement

occurs due to the transfer of electrical impulses and the precentral gyrus to the spinal cord through neurotransmitters that reach the muscles and stimulate the muscles, causing movement.(Nur et al., 2020; Widyawati et al., 2020)

Another problem associated with muscle weakness due to stroke is tightness in muscles that rarely mobilize. This reduced mobility can lead to secondary events, including thickening of non-contractile tissue in the joints and joint contractures. (Yildizgoren et al., 2017)Ankle joint contractures result in shortening of the muscle-tendon units and muscle fascicles in the gastrocnemius muscle. Soft tissue weakening and stiffening in stroke patients result in changes in tissue stiffness and viscoelasticity, limiting passive or voluntary movement.(Cho & Park, 2020; de Vlugt et al., 2010) Ankle joint contracture results in shortening of the muscle-tendon unit and muscle fascicles in the gastrocnemius muscle. For this reason, joint mobilization and stretching interventions are performed to increase joint range of motion, through mechanical changes in the ankle joint, and improve walking ability in stroke patients. Ankle joint mobilization in stroke patients increases dorsiflexion, and gastrocnemius stretching exercises improve muscle length, stiffness, and gait parameters. Stretching is also performed with the same frequency and intensity as ROM exercises.(Cho & Park, 2020) Stretching is reported to provide better muscle flexibility compared to static stretching movements alone.(Ahmed & Alghadir, 2015)

The patient was also given some strengthening exercises on the side that had hemiparalysis. *Strengthening* exercises are performed 2-3 times daily at an intensity of 5-10 repetitions, repeated in 2-3 sets. Strengthening exercises have a positive effect on motor function, body control, and muscle strength.(Intani, 2022)

One way to strengthen the muscles is through bridging exercise techniques . *Bridging exercises* focus *on* retraining muscle coordination patterns, where the optimal ratio between local and global segmental stabilizing muscle activity that produces torque is considered important because when contracting together the transverse abdominis, multifidus, and pelvic floor muscles to perform the bridging position, it will strengthen *the core muscles.* (Yani et al., 2021)*Bridging exercises* can also increase thigh muscle strength in stroke patients, thereby improving and enhancing the ability of sitting, standing, and walking patterns in stroke patients. By improving the ability of sitting, standing, and walking patterns, motor control increases and patients can perform ADL well. The theory put forward by *the American College of Sports Medicine* , exercise can increase muscle strength which will ultimately improve muscle function (Dwi Rahmah Kartija et al., 2023).

In addition to *bridging exercises, eccentric strengthening exercises* are also performed. The use of eccentric exercises, eccentric contractions in resistance training, can provide unique benefits for increasing neuromuscular activation.(Clark & Patten, 2013) Muscle strengthening exercises that use muscle contractions that involve lengthening the muscle under tension. This stimulates muscle cell growth by stimulating collagen synthesis. Eccentric training induces greater strength gains than concentric or isometric training programs by stimulating muscle hypertrophy, increasing fascicle length, and promoting neural activation.(Lattouf et al., 2021)

Thus, providing physiotherapy interventions in the form of ROM exercises, stretching and strengthening exercise therapy can increase the patient's joint range of motion, muscle strength, muscle flexibility, and also improve the patient's functional activities.

CONCLUSION

After identifying the patient's problem, an Exercise Therapy intervention consisting of stretching, strengthening, and ROM exercises was administered to Mrs. W in two sessions. This intervention resulted in improved ROM, muscle strength, and joint flexibility, as well as functional activity in patients with hemiparesis due to stroke and infarction. These results were supported by several factors, including patient motivation in exercising, a regular home program as recommended by physiotherapists, and support from family, medical personnel, and friends for the patient's recovery.

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