

Effectiveness of Proprioceptive Neuromuscular Facilitation and Strengthening Exercise towards Increasing Strength Stroke Patient's Hand Muscles at Tani Dan Nelayan Regional General Hospital

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ABSTRACT

Stroke is a functional brain disorder that occurs suddenly with focal or global clinical signs that last more than 24 hours without signs of non-vascular causes, including signs of subarachnoid hemorrhage, intracerebral hemorrhage, ischemia, or cerebral infarction. The aim of this research is to analyze the effectiveness of proprioceptive Neuromuscular Facilitation (PNF) and Strengthening Exercises to Increase Hand Muscle Strength in Stroke Patients at the Farmers and Fishermen's Hospital, Boalemo Regency. Quaisy experimental research designed two groups pre-test and post-test design. The sample was 30 people, sampling used the purposive sampling technique. Analysis was carried out using the paired t-test and independent t-test. The results of the research were that there was a difference in Hand Muscle Strength values between those given Proprietary Neuromuscular Facilitation (PNF) with Strengthening Exercise with (p-value 0.039). The conclusion of this research is the provision of Proprioceptive Neuromuscular Facilitation (PNF). better in increasing hand muscle strength values compared to the Strengthening Exercise. It is recommended that the Farmers and Fishermen's Hospital of Boalemo Regency, in providing healing to stroke patients, apply Proprioceptive Neuromuscular Facilitation and Strengthening Exercise therapy as a complementary therapy for healing stroke patients.

KEYWORDS: proprioceptive Neuromuscular Facilitation (PNF), Strengthening Exercise, Strength Value, Hand Muscles

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I. INTRODUCTION

Stroke is an acute clinical manifestation resulting from neurological dysfunction in the brain, spinal cord, and retina, either partial or complete, that persists for ≥ 24 hours or causes death due to blood vessel disorders. A stroke caused by an infarction (proven by radiological examination, pathology, or other evidence that shows ischemia of the brain, spinal cord, or retina) is called an ischemic stroke. Hemorrhagic strokes can be caused by intracranial or subarachnoid hemorrhage. Intracranial bleeding occurs in the brain parenchyma and ventricles without prior trauma, while subarachnoid bleeding occurs in the subarachnoid cavity (Ministry of Health of the Republic of Indonesia, 2019).

According to the World Health Organization in 2019, stroke was 2nd out of the 10 main causes of death worldwide

and contributed 11%. Stroke morbidity rates are higher in low-income countries than in high-income countries.

2018 Riskesdas data shows that the highest prevalence of stroke in Indonesia is in East Kalimantan Province (14.7%) and the lowest is in Papua Province (4.1%). Stroke prevalence in South Sumatra Province (10%) (Ministry of Health, 2019). The prevalence of stroke increases with increasing age with the highest cases in the age group 75 years and over (50.2%) and the lowest in the 15-24 year age group (0.6 %). Based on gender, the prevalence of stroke in men (11%) is almost the same as in women (10.95%) (Ministry of Health, 2019).

Strokes in Gorontalo Province recorded by staff health in 2019 were 1,440 cases and in 2020 it increased to 1,614 cases, the data show enhancement of stroke cases in Gorontalo Province for two years, so attempted prevention and treatment of stroke is necessary to Keep improving by the

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Gorontalo Provincial Health Service as well the people of Gorontalo overall (Profile, 2021).

Decline strength muscle is a symptom common frequently occurs in stroke sufferers. Decline strength muscle Can occur in one or both sides body, depending on the area of the brain affected impact from stroke. Decline strength muscle after a stroke occurs Because of damage to the system's regulatory nerves function motor or movement body. Part of the brain affected impacted by a possible stroke No Again can send signal nerve to muscle for contract and move as usual. Weakness muscles can influence the ability of somebody to move and do activities in everyday life such as walking, picking up or holding objects, or even speaking. Weakness Muscles can also cause an imbalance body and improve the risk of falls (Nurjaman, 2023).

III. RESULTS AND DISCUSSION

Table 1. Effect of Proprioceptive Neuromuscular Facilitation to Enhancement Strength Hand Muscles of Stroke Patients at the Farmers and Fishermen Hospital Regency Boalemo

Group	Mean Pre-Post	elementary school	Mean Difference	Q	Sig
PNF	2,033 5,447	0.9598 0.5703	3.4133	15,967	0,000

Source: Primary Data, 2024

Based on Table 1 results of the paired t-test analysis, it can be seen that the mean difference value before and after giving PNF is equal to 3, 4133 with the calculated t value

amounting to 15.967 with a significance of 0.000 (< α 0.05). These results indicate that there is a significant effect of giving PNF on the improvement strength muscle hand.

Table 2. Effect of Strengthening Exercise Towards Improvement Strength Hand Muscles of Stroke Patients at the Farmers and Fishermen Hospital Regency Boalemo

Group	Mean Pre-Post	elementary school	Mean Difference	Q	Sig
Strengthening Exercise	1,860 4,733	0.4925 0.8440	2,067	23,614	0,000

Source: Primary Data, 2024

Based on Table 2 results of the paired t-test analysis, it can be seen that there is a difference in the mean value before and after giving the strengthening exercise is as big as 2.067 with

a t value of 23.614 with a significance of 0.000 (< α 0.05). These results indicate that there is a significant effect of providing strengthening exercises towards the improvement of strength of muscle hand.

Table 3. Strength differences muscle hand between the provision of Proprioceptive Neuromuscular Facilitation and Strengthening Exercise interventions

Measurement	Intervention Group	Mean Increase in strength muscle hand	The difference in Mean Improvement Strength muscle hand	elementary school	t	Sig
Strength Hand Muscles	PNF	4,140	0.540	0.9295	2,195	0.039
	Strengthening Exercise	3,233		1.2402		

Source: Primary Data, 2024

II. METHODS

This research was carried out at the medical rehabilitation clinic of the Farmers and Fishermen's Hospital, Boalemo Regency. This research was carried out from January to March 2024 for 1.5 (one and a half) months. This type of research is quantitative research with a quasi-experimental method (quasi-experiment) which is a research method that in its implementation does not use random assignment but uses existing groups. The population in this study were stroke patients who experienced hemiparesis at the Farmers and Fishermen's Hospital, Boalemo Regency. who are undergoing rehabilitation medical and recorded in the medical record of the Farmers and Fishermen's Hospital, Boalemo Regency for the period November 2023 – January 2024, namely as many as 35 patients. The number of samples that will be used is 30 samples consisting of 15 samples from the PNF intervention group and 15 samples from the strengthening exercise intervention group.

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Based on Table 3 results of the independent t-test analysis, it can be seen that the mean difference in strength values muscle hands on the group PNF intervention and strengthening exercise of 0.540 calculated t value of 2.195

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From the research results it can be seen that the strength value muscle hand before done PNF intervention mean value of 2.033 with a standard deviation (SD) of 0.5703 and the strength value muscle hand minimum of 1, 1 as well as the strength value of muscle maximum hand 3.0 Meanwhile, strength muscle hand after giving intervention PNF mean value is 5.447 with a standard deviation value of 0.9598 and a minimum value of 3.0 and a maximum value of 7.1.

This is in line with the theory which states that proprioceptive neuromuscular facilitation (PNF) exercise therapy is an alternative intervention that can be carried out with the help of other people and is easy to use. Proprioceptive neuromuscular facilitation (PNF) or relaxation contraction is a form of flexibility training with stretching that is assisted by another person during contraction and relaxation. The PNF technique offers wider advantages and benefits compared to other conventional stretching methods. Apart from that, PNF can increase relaxation in stretched muscles, moreover, the PNF technique is the best for developing or building body flexibility techniques. PNF can be used to stretch muscles in stroke patients. This technique helps develop muscle strength and endurance, joint stability, mobility, neuromuscular control, and coordination (Perdani, et al., 2021).

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From the research results, it can be seen that the strength value muscle hand before done intervention strengthening exercise mean value of 1.860 with a standard deviation (SD) of 0.4925 and a strength value muscle hand minimum of 1, 1 as well as a strength value of muscle hand maximum 2.6. Meanwhile, the value of the strength muscle hand after giving intervention strengthening exercise mean value of 4.733 with a standard deviation value of 0.8440 the value of the strength of the muscle minimum hand was 3.3 as well as value strength muscle maximum hand was 6.1.

exercises that involve directed hand movements can help improve motor coordination in stroke patients. Through repetition of appropriate movements, patients can improve their motor control and improve their ability to perform daily tasks involving the use of hands.

With increasing strength of muscle hands, stroke patients can become more independent in carrying out daily

and ρ value of 0.039, results in the show that there is difference enhancement mark strength muscle significant hand (ρ value $< \alpha$ 0.05) between PNF intervention and strengthening exercise.

activities such as picking up things, and cutting or buttoning clothes. This can increase their self-confidence and independence in living their daily lives.

Difference Effect of Proprioceptive Neuromuscular Facilitation and Strengthening Exercise towards Improvement Strength Hand Muscles of Stroke Patients at the Farmers and Fishermen Hospital Regency Boalemo.

The results of the independent t-test analysis show that there is a difference enhancement mark strength muscle significant hand (ρ value $< \alpha$ 0.05) between PNF intervention and strengthening exercise (ρ value 0.039). Difference the showed from difference enhancement mark strength muscle hand more higher in the PNF group compared to strengthening exercise, where the average difference is 0.5400.

According to de Oliveira, et al (2018). in discussing his research, he stated that PNF is one of the interventions used to minimize the clinical manifestations of stroke. This method uses different sensory-motor combinations to enhance motor learning, establishing a balance between agonist and antagonist muscles in a reciprocal manner. The PNF approach also applies a stimulus that causes muscle contraction in the contralateral extremity thereby activating weak muscles by stimulating strong muscles. (Cayco, et al., 2019).

CONCLUSIONS

Based on the results of the research that has been carried out, it can be concluded as follows:

1. There is a significant effect of intervention Proprioceptive Neuromuscular Facilitation (PNF) to increase mark strength muscle hand with a significance of 0.000 ($< \alpha$ 0.05).
2. There is a significant effect of intervention Strengthening Exercise towards improvement mark strength muscle hand with the significance of 0.000 ($< \alpha$ 0.05).
3. Strength values muscle hand between interventions Proprioceptive Neuromuscular Facilitation (PNF) with intervention Strengthening Exercise (p-value 0.039), where PNF is better in increasing strength muscle hand compared to Strengthening Exercise.

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