

# **Effectiveness Of Range Of Motion (ROM) Exercise On Increasing Muscle Strength And Scale Dependence In Patients Of Stroke Ischemic At Dr. Zainoel Abidin Hospital Banda Aceh**

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## **Abstract**

**Background:** The rehabilitation process in ischemic stroke patients has a stroke. The goal of rehabilitation in stroke is to restore normal movement patterns by increasing muscle strength through nursing interventions. In general, there are two methods that are often used in the rehabilitation of stroke who have hemiparesis, namely the Bobath concept and Range Of Motion (ROM). This study aims to see the effectiveness between both to increase muscle strength and reduce the scale of dependence of stroke patients.

**Material and Methods:** This quantitative study uses a Quasi-Experimental design with pre and post test assessments of muscle strength and dependency scales. A total of 60 respondents were involved in this study, and were divided into two groups randomly, 30 respondents in the experimental group and the rest were in the control group. Both of them were given different interventions, the experimental group was given the intervention according to Bobath concept and the control group intervened using ROM.

**Results:** effectiveness analysis after ROM intervention obtained the value of Asymp.Sig. (2-tailed) 0.46 or below 0.05. This showed that ROM effectively increased muscle strength in stroke patients during treatment with six interventions.

**Conclusion:** Bobath Concept and ROM methods can increase muscle strength in stroke patients, but Bobath concept is more effective and recommended with Asymp.Sig values. (2-tailed) 0.000.

**Key words :** ROM, rehabilitation, stroke, muscle strength and dependency scale

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## **I. Introduction**

The rehabilitation process in ischemic stroke patients has a stroke. In accordance with the Australian Government's National Stroke Foundation 'Clinical Guidelines for Stroke Rehabilitation and Recovery which says that "Rehabilitation should begin immediately after the patient has a stroke, rehabilitation is proactive and begins on the first day after the stroke". Rehabilitation programs in stroke patients are aimed at preventing the occurrence of neurological disability and complications caused by prolonged immobilization such as contractures, decubitus ulcers, pneumonia. Rehabilitation aims to retrain the ability to carry out activities of daily living such as eating, dressing, self-care and bathing, retraining ambulation, helping sufferers reintegrate with their environment.. Rehabilitation program that can be used to prevent contractures and atrophy in extremities that experience weakness is Range Of Motion (ROM). ROM is one option in nursing to keep the musculoskeletal system functioning optimally and prevent contractures in the joints and muscle atrophy (Lewis., 2020).

In addition to ROM, another training method that can be applied is the Bobath technique. Gjelsvik (2016), the purpose of bobath exercise is to improve the quality of movement on the paralyzed side so that both sides of the body can work as much as possible harmoniously by reducing spasticity and providing more selective, automatic and volunteer movement training patterns for the preparation of functional skills. Lewis (2020) ROM only keeps the musculoskeletal system functioning optimally and prevents contractures in the joints and muscle atrophy.

From several journal searches related to the ROM, one of them was carried out by Laura et al (2021) Pathak et al (2001), the aim of this study was to evaluate the effectiveness of different type of stretching in reducing post stroke spasticity. There is no conclusive evidence was obtained on the effectiveness of stretching in terms of treating spasticity and range of motion in patients with stroke.

Based on analysis of several literature and journals that researchers found, it is necessary to conduct experimental studies evaluate the effectiveness of Range Of Motion (ROM) on increasing muscle strength and

dependence scale in ischemic stroke patients during treatment. It is hoped that the results of this study can be a reference for hospitals that are centers for stroke patient care in order to apply ROM as a rehabilitation option and discharge planning program for stroke patients.

## **II. Material And Method**

This quantitative study uses a Quasi-Experimental design with pre and posttest assessments of muscle strength and dependency scales. A total of 60 respondents were involved in this study, and were divided into two groups randomly, 30 respondents in the experimental group and the rest were in the control group. Both of them were given different interventions, the experimental group was given the intervention according to Bobath concept and the control group intervened using ROM. But on this occasion researchers explained the effectiveness of ROM on increasing muscle strength and scale dependence in stroke patients. This study was carried out on patients stroke of neurology ward at dr. Zainoel Abidin Hospital Banda Aceh of Indonesia. From 14 March to 20 May 2023. A total respondents are 60 adult (both male and female) Of aged 25 to 75 years old were for in this study.

**Study Design :** Quasi Eksperimental Study

**Study Location :** This study was carried out on patients stroke of neurology ward at dr. Zainoel Abidin Hospital Banda Aceh of Indonesia.

**Study Duration :** 14 Marct to 20 May 2023

**Sample size :** 60 patients

**Sample size Calculation :** the sample size was estimated on basis of a Purposive sampling. The target population from which we randomly selected our sample was 83 person. The sample size actually obtained for this study was 30 patients for each group. We planned to include 60 patients (eksperiment group, control group) with 23 patient drop out.

**Subjects & selection methods :** All respondents were patients hospitalized in male and female neurology ward from March 14 to May 20, 2023. Both groups received pretest and post test. each respondent in both groups conducted a pretest was carried out on first day used the form of an assessment of muscle strength “*the Numerical Scale to Record Muscle Strength*” and an assessment of the level of dependence using the “*Barthel Index*” measuring. the post test was carried out after respondents received six interventions (for six days) using the same instrument as the pretest.

### **Inclusion criteria**

1. ischemic stroke who had a first stroke
2. MAP < 130 mmHg
3. Blood glucose >90 mg/dl or < 250 mg/dl
4. Oxygen saturation >95%
5. Compos Mentis
6. Dependency scale during pretest assessment maximum 3
7. Age 25 – 75 years old.

### **Exclusion criteria**

1. stroke with visual impairment
2. hearing loss
3. Aphasia
4. Musculoskeletal disorders

### **Procedure methodology**

This research has gone through ethical tests and received approval from the Health Research Ethics Committee (KEPK) of Dr. Zainoel Abidin General Hospital Banda Aceh with Number 23-02-045. After that, researchers met respondents directly in the neurology inpatient room on the first day the patient was treated and provided an explanation of the purpose, benefits, risks and procedures of the study. Then the patient gives a decision of consent whether to be willing to be part of the study. Patients who agreed to be part of the study were asked to sign a prepared inform consent form.

**Statistic analysis**

All collected data is given to the box and then analyzed using a computerized program. In this study used descriptive analysis for person-type catheteristic variables (age, gender, education and occupation), while the Wilcoxon test was used to determine whether or not there was a significant effect of ROM on increasing muscle strength and dependence scales.

**III. Result**

The average age of respondents was 53.37 years. The oldest age in this group is 75 years. Male gender is the most respondent with 16 people (53.3%). The most comorbital history is hypertension, which is 13 people (43.3%). The highest level of education is high school with 15 (50%). While the profession with the most p is housewives with 12 people (40%). The average value of muscle strength after intervention using ROM got an average value of 2.87 or an increase of 0.14. The average value of the level of dependence of respondents after being given intervention using ROM did not get a decrease in the level of dependence, this is evidenced by the value of post test and pre test has the same value of 2.27.

**Table 1 Age Distribution of respondents**

Group	Characteristics of Respondents	Mean	SD	Minimal – maximum	95% CI
Control (ROM)	Ager	53,37	11,10	29 – 75	49.37 – 57.51

**Table 2. Frequency Distribution of Respondent Characteristics**

Karakteristik Responden	Kontrol (ROM) (n = 30)	
	f	%
<b>Gender</b>		
1. Male	16	53,3
2. Female	14	46,7
<b>Comorbit</b>		
1. Diabetes	6	20
2. Hypertensi	13	43,3
3. Diabetes + hipertensi	2	6,7
4. None	9	30
<b>Pendidikan</b>		
1. Primery School	5	16,7
2. Junior high school	2	6,7
3. High school	15	50
4. Diploma	4	13,3
5. BACHELOR	4	13,3
<b>Pekerjaan</b>		
1. Civil Servants	5	16,7
2. Housewives	12	40
3. Self employed	4	13,3
4. Private Employees	7	23,3
5. Farmer	2	6,7

**Table 3. The Effectiveness of ROM on Increasing Muscle Strength and the Respondent's Dependency Scale**

	Muscle strength		Dependency scale	
	Z	Asymp.Sig. (2-tailed)	Z	Asymp.Sig. (2-tailed)
<b>ROM</b>	-2,00	,046	,000	1

**IV. Discussion**

Descriptive analysis on muscle strength variables before ROM intervention had an average value of 2.73 and after the intervention the average muscle strength of respondents was 2.87 or an increase of 0.14. The results of the effectiveness analysis after ROM intervention obtained the value of Asymp.Sig. (2-tailed) 0.46 or below 0.05. This showed that ROM effectively increased muscle strength in stroke patients during treatment with six interventions.

With a good and consistent exercise method, muscle tone will be well maintained to prevent atrophy and contractures in the joints. Muscle strength is considered very important and affects the patient's ability to meet basic needs independently. The higher the value of muscle strength, the lower the level of dependence. No less important is the risk of complications such as pneumony, pressure ulcers can be avoided, because patients are able to mobilize independently. As for the dependency scale, obtained a value of A Symp.Sig (2-tailed) 1 or

> 0.05, meaning statistically after ROM intervention there was no significant decrease in the scale of dependence on respondents

## V. Conclusion

During treatment with six interventions (six days), Range of Motion (ROM) was effective in increasing muscle strength, but to have an effect on decreasing the scale of dependence in stroke patients still needed more than six days of intervention of ROM.

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