

**THE EFFECT OF RANGE OF MOTION (ROM) EXERCISES ON
INCREASING MUSCLE STRENGTH IN STROKE PATIENTS
IN BOUGENVILLE ROOM RSUD SAYANG CIANJUR**

Nunung Liawati^{1*}, Yusuf Arifin², Susilawati³, Iin Patimah⁴

^{1,2,3} STIKes Sukabumi

⁴ STIKes Karya Husada

Email: nunungliawati@dosen.stikesmi.ac.id

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Abstract

Stroke is the second leading cause of death and the third leading cause of disability in the world. Stroke occurs when some brain cells die due to lack of oxygen due to obstruction of blood flow to the brain or rupture). The purpose of the study was to determine the effect of (ROM) on increasing muscle strength in stroke patients. Muscle strength of the extremities is still a major problem faced by stroke patients who experience hemiparesis. One of the therapies performed to restore muscle strength in stroke patients is Range Of Motion (ROM). This study used a quasi experimental design or type of research with a One Group Pretest-Posttest approach. The research sample was non-hemorrhagic stroke patients with hemiparesis totaling 17 respondents selected by purposive sampling and accidental sampling techniques. Research instruments: Muscle strength observation sheet (MMST), SOP Range Of Motion (ROM). Data were analyzed with univariate and bivariate. Based on the results of research conducted in the Bougenville Room, Sayang Cianjur Hospital, the results of the analysis with the Wilcoxon test obtained a value of $p = 0.001$ with the accuracy of the value $\alpha = 0.05$ or $p < 0.05$ which means H_0 is rejected and H_a is accepted. Range Of Motion (ROM) exercise has an effect on muscle strength in stroke patients in the Bougenville Room at Sayang Cianjur Hospital, so Range Of Motion (ROM) exercise can be used as a management and treatment to increase muscle strength in stroke patients.

Keywords: Range of Motion, Muscle Strength, Stroke

INTRODUCTION

Stroke is the second leading cause of death and the third leading cause of disability in the world. A stroke occurs when some brain cells die from lack of oxygen due to obstruction of blood flow to the brain or rupture of a blood vessel in the brain. Globally, about 70% of stroke cases and 87% of deaths are caused by stroke (Johnson et al., 2016).

Based on data from World Health Statistics (WHO, 2023), the global mortality rate for stroke, cancer and diabetes patients aged 30 years to 70 years reaches 17.8% per year, and the mortality rate in Indonesia for stroke, cancer and diabetes patients aged 30-70 years reaches 24.8% per year (WHO, 2023). The data according to the Basic Health Research (Riskesdas, 2019) 2018 stroke prevalence based on doctor's diagnosis at the age of ≥ 15 years in Indonesia is 10.9 per 1000 population and has increased from 2013 which is 7 per 1000 population (Suharta & Lungguh Perceka, 2024). According to the Health Research and Development Agency (BPPK), that in West Java the prevalence of stroke is above the national prevalence of 9.3 per 1000 population and based on Riskesdas 2018, the prevalence of stroke in West Java is still

above the national prevalence (Riskesdas, 2019).

Factors that cause stroke according to (Nurarif, 2015) There are modifiable factors such as gender, age and heredity. Unchangeable factors are hypertension, heart disease, high cholesterol, obesity and diabetes mellitus while habitual life factors are smoking, alcohol drinking, drug use and unhealthy activities (Patimah et al., 2023).

Stroke symptoms generally appear suddenly, including loss of strength on one side of the body, changes in consciousness, speech impairment (pelo), vision problems, difficulty walking, headaches, and loss of balance. (Lailatul Mufidah, 2021). Stroke patients will experience loss of motor and sensory function resulting in hemiparesis, hemiplegia, and ataxia. As a result of motor disorders in the brain, the muscles will be rested, causing muscle atrophy. Muscle atrophy causes muscle stiffness, so that the stiff muscles can experience movement limitations in stroke patients (Hosseini et al., 2023).

The impact of stroke is not only in terms of incidence and mortality, but also long-lasting and sometimes permanent disability. Stroke is the third most common

cause of disability, and in those over 65 years of age the impact is accompanied by depression. Disability experienced by stroke clients results in incapacity and dependence. If this is left unchecked, it will lead to behavioral changes that prolong the healing or recovery period, causing physical and psychological disorders and other disease complications. This will reduce the quality of life of stroke patients so that they cannot work and earn income (Awaludin & Perceka, 2019).

Extremity muscle strength is still a major problem faced by stroke patients who experience hemiparesis. Muscle strength is the ability of muscles to perform work that functions to generate tension against a prisoner. Strong muscles can protect the surrounding joints and reduce the possibility of injury due to physical activity. Therefore, the strength of the muscles needs to be trained to have strength. Muscle strength is the ability to use the maximum opposite pressure (Kusuma A & Sara, 2020).

One of the therapies performed to restore muscle strength in stroke patients is Range Of Motion (ROM). Range Of Motion (ROM) is an exercise performed to maintain or improve the ability to move joints perfectly normally and completely to

increase muscle strength as well as muscle tone. In giving ROM exercises, there are several factors that influence the increase in muscle strength including age, gender, and frequency of attacks. Range of Motion (ROM) exercise is a form of rehabilitation process that is considered quite effective in preventing disability in stroke patients. This exercise is also a form of fundamental nurse intervention that can be carried out to determine the success of therapeutic regimens in preventing permanent disability in stroke patients after hospitalization so that it can help reduce the level of patient dependence on the family and increase the self-esteem and coping mechanisms of patients (Daulay & Hidayah, 2021).

Based on the results of the study, it can be concluded that Range Of Motion (ROM) exercises can affect the increase in muscle strength in stroke patients (Nurdini, 2017) As for the results of other studies, Range Of Motion exercises are carried out for 1 week in 1 day, 2 times morning and evening exercises for 15 minutes and the results are the effect of Passive Range Of Motion (ROM) training on increasing muscle strength (Rahayu & Nuraini, 2020) There is an effect of Passive Range Of Motion (ROM) training on increasing muscle strength in non-hemorrhagic stroke patients as

evidenced by the results showing the effect of Range Of Motion (ROM) training exercises on muscle strength in stroke patients as well as research (Susanti et al., 2019) from the following literature, it is proven that Range Of Motion (ROM) exercises have an influence on the ability of muscle strength in stroke patient

RSUD Sayang Cianjur is one of the hospitals that provide inpatient services to stroke patients, and stroke is the flagship program of RSUD Sayang Cianjur, annual report data from the medical records section of RSUD Sayang Cianjur, in 2023 stroke was ranked third out of the top ten most common diseases reaching 6343 visits. The number of stroke patients in general (non-hemorrhagic stroke and hemorrhagic stroke) treated in the inpatient room is 851 people, while stroke patients treated in the Bougenville room are 411 patients.

RESEARCH METHODS

This study uses a design or type of quasy experimental research using the One Group Pretest-Posttest design form. In this study, the first observation (pretest) was carried out before the intervention was given. After the intervention is given, then a posttest

(final observation) is carried out (Notoatmodjo, 2018).

Where carried out, the pre test (01) first followed by intervention (X) after some time, the post test (02) is carried out.

The research location was carried out in the inpatient room of the neurological section, namely the Bougenville room at Sayang Cianjur Hospital for stroke patients. This research was conducted in May - June 2024.

The population in this study were all stroke patients treated in the Bougenville room at Sayang Cianjur Hospital. The number of patients treated with stroke in the neurology department of Sayang Cianjur Hospital in the last 3 months (January 2024- March 2024) was 283 patients, an average of 94 patients per month. The estimated population size is 94. The sample in this study were some stroke patients in the Bougenville Room at Sayang Cianjur Hospital, namely 17 respondents based on inclusion criteria. The sampling technique in this study used a non-probability sampling method with purposive sampling technique is a sampling technique with certain considerations and accidental sampling, namely anyone who happens to meet the researcher can be used as a sample.

The research instrument used to collect data is through observation sheets. Where the

researcher records the results of the assessment of the degree of muscle strength before and after being given ROM (Range Of Motion) using the muscle strength scale assessment (MMT).

RESULT AND DISCUSSION

This research was conducted in the Bougenville Room of Sayang Cianjur Hospital, on May 22, 2024 to June 20, 2024. The sampling technique was carried out with a random sampling technique which was carried out randomly without regard to the strata in the population with a total sample of 17 respondents.

The data collection instrument used was an observation sheet, where before Range Of Motion therapy was carried out direct observation of the upper ROM on 17 respondents and after range of motion therapy. Data processing uses the SPSS version 21 computer program, where the data is analyzed using the Wilcoxon test. With a significance level of $\alpha = 0.05$.

Table 1. Characteristics Based on Age

Age	Frequency	Presentation (%)
25-59	10	59
60-90	7	41
Total	17	100

Based on the table 1, it shows that most of the respondents were in the age range of 25-59 years, namely 1 person or 59%, while a small proportion of respondents were in the age range of 60-90 years as many as 7 people or 41%.

Table 2. Characteristics Respondent Based on Gender

Gender	Frequency	Presentation (%)
Perempuan	9	53
Laki-laki	8	47
Total	17	100

Based on the table 2, it shows that most of the respondents based on gender are female as many as 9 people or 53% while a small proportion of male respondents are 8 people or 47%.

Table 3. Characteristics of Respondents Based on Causal Factors

Causal Factors	Frequency	Presentation (%)
Diabetes Melitus	5	29
Hipertensi	9	53
Hiperkolesterol	3	18
Total	17	100

Based on the table 3, it shows that most of the respondents based on causative factors

were hypertension as many as 9 people or 53%. While a small portion is dyslipidemia as many as 3 people or 18%.

Table 4. Distribution of muscle strength before ROM in Bougenville Room, Sayang Cianjur Hospital

Muscle Strength	Frequency	Presentation (%)
2	10	59
3	6	35
4	1	6
Total	17	100

Based on the table 4 of muscle strength before ROM, most of the muscle strength is 2 there are 10 people or 59%, while the smallest muscle strength is 4 people or 6%.

Table 5. Distribution of muscle strength after ROM in Bougenville Room, Sayang Cianjur Hospital

Muscle Strength	Frequency	Presentation (%)
2	2	12
3	8	47
4	6	35
5	1	6
Total	17	100

Based on the muscle strength table after Range Of Motion, most of the muscle strength 3 there are 8 people or 47% (65%), while the smallest muscle strength 5 is as many as 1 person or 6%.

Table 6. Distribution of muscle strength before intervention and after intervention in stroke patients in Bougenville Room, RSUD Sayang Cianjur.

Muscle Strength	N	Presentation (%)	P	z
Post Int. < Pre Int	0	0	0.001	-3.217
Post Int > Pre Int	12	71		
Post Int = Pre Int	5	29		
Total	17	100		

In this study, bivariate analysis was conducted to determine the effect of Range Of Motion exercises on muscle strength of stroke patients in the Bougenville Room of Sayang Cianjur Hospital. From the statistical test using the Wilcoxon difference test, the p value = 0.001 where the α value = 0.05. this shows that the p value < α , then the null hypothesis (H0) is rejected and the hypothesis (H1) is accepted, thus meaning that there is an effect of Range Of Motion exercise on the muscle strength of stroke patients in the Bougenville Room at Sayang Cianjur Hospital.

DISCUSSION

Based on the results of research conducted in the Bougenville Room of the Sayang Cianjur Hospital, the p value = 0.001 with the accuracy of the α = 0.05 value or p <

0.05, which means that H_0 is rejected and H_a is accepted, namely there is an effect of Range Of Motion training on muscle strength in stroke patients in the Bougenville Room of the Sayang Cianjur Hospital

Range Of Motion (ROM) is an activity to move joints both actively and passively. Range of Motion (ROM) exercise is a type of exercise performed to maintain or improve the ability to move joints normally and completely with the aim of increasing muscle mass.

The maximum movement possible in a joint is called Range Of Motion (ROM). The radius of movement of a joint varies from person to person and is determined by gender, age, health status and amount of normal exercise (Surayani et al., 2023).

Extremity muscle strength is still a major problem faced by stroke patients who experience hemiparesis. Muscle strength is the ability of muscles to perform work that functions to generate tension against a prisoner. Strong muscles can protect the surrounding joints and reduce the possibility of injury due to physical activity. Therefore, the strength of the muscles needs to be trained to have strength. Muscle strength is the ability to use the maximum opposite pressure (Kusuma A & Sara, 2020).

The results of this study are in line with several previous related studies, although the time and length of the study are different, there will still be an effect of Range Of Motion training on muscle strength in stroke patients. Among the studies based on the results of the study it can be concluded that Range Of Motion (ROM) exercise can affect the increase in muscle strength in stroke patients (Nurdini, 2017) As for the results of other studies, Range Of Motion exercises are carried out for 1 week in 1 day, 2 times morning and evening exercises for 15 minutes and the results are the effect of Passive Range Of Motion (ROM) training on increasing muscle strength (Rahayu & Nuraini, 2020).

There is an effect of Passive Range Of Motion (ROM) training on increasing muscle strength in non-hemorrhagic stroke patients as evidenced by the results showing the effect of Range Of Motion (ROM) training exercises on muscle strength in stroke patients as well as research (Susanti et al., 2019) From the following literature, it is proven that Range Of Motion (ROM) exercises have an influence on the ability of muscle strength in stroke patients. From the results of this study there were 5 respondents who did not experience an increase in muscle strength. This is due to several factors including age, gender, general

condition, and psychological condition of the patient. there are also patients who do not experience an increase in muscle strength, all of them are in the elderly age group, namely 70 years, 67 years, 68 years, 66 years, 67. Attributed to the theory according to (Potter, PA & Perry, A.G, 2016) until the age of puberty, the speed of development of male muscle strength is the same as that of women. Both men and women reach a peak at the age of less than 25 years, then will decrease by 65% - 70% at the age of 65 years).

Based on the above researchers, it can be concluded that stroke is a serious illness that occurs when the blood supply to the brain is disrupted suddenly, causing a lack of oxygen levels in the brain cells. The impact can be devastating as in just a few minutes, brain cells can suffer permanent damage, which in turn affects the bodily functions controlled by the affected area of the brain. This results in neurological disorders as cerebral blood flow is disrupted, which can damage blood vessels in the brain (Perceka et al., 2022). This condition, if not addressed quickly, can lead to brain damage that lasts for 24 hours or more. Hence, it is important to understand the symptoms and risk factors of stroke and seek immediate medical attention if signs of the disease occur.

CONCLUSIONS

Based on the collection and processing of research data conducted on 17 respondents on May 22 to June 20, 2024 in the Bougenville Room of the Sayang Cianjur Hospital, it was concluded that: The degree of muscle strength before Range Of Motion is mostly at degree 2, namely with the patient's ability to move but cannot fight gravity. The degree of muscle strength after Range Of Motion is performed, most at degree 3, namely there is normal movement, but can only fight gravity. There is an effect of Range Of Motion exercise on muscle strength in stroke patients in the Bougenville Room at Sayang Cianjur Hospital.

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