THE EFFECT OF *RANGE OF MOTION* ON JOINT RANGE OF MOTION IN POST-STROKE PATIENTS IN THE PHYSIOTHERAPY ROOM OF HJ BUNDA HALIMAH HOSPITAL, BATAM CITY IN 2025

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ABSTRACT

Based on the results of a preliminary survey conducted by researchers at the Hj. Bunda Halimah Batam Hospital, it is known that patient post stroke experience decline range movement joints in the extremities on accompanied by with weakness muscle so that joint No can moved normally and inhibit activity everyday. For overcome condition said, practice *range of motion* used as intervention physiotherapy that maintains and improves flexibility joints patients. The purpose of this study known influence exercise *range of motion* to range movement joints in patients post-stroke in the Physiotherapy Room Hj. Bunda Halimah Batam Hospital Batam City. The research design uses *quasy experiment* with approach *one group pretest- posttest*. The population of this study as many as 138 patients post stroke with The research sample consisted of 48 selected respondents, use technique *purposive sampling* . The research instrument used sheet observation with tool measuring *goniometry*. Data analyzed using the *Paired Sample T-Test Pretest* and *Posttest*. The results of the *Paired Sample T-Test* This show existence average increase in range movement joints *pretest* and *posttest* given exercise *range of motion*, with mark mean *pretest* shoulder flexion 113.54° and extension 108.02°, while the mean *posttest* shoulder flexion 139.38° and shoulder extension 140.83° with The average difference in increase was 25.84° in flexion and 32.81° in extension, respectively. The results were, $p = 0.001 < 0.05$ there was significant influence between exercise *range of motion* to increase range movement joints in patients post- stroke. It is hoped that for health workers, in particular power physiotherapist in apply exercise *range of motion* as one of the intervention therapy routine in patients post stroke for increase range movement joints and prevent stiffness joints patient.

INTRODUCTION

Health is something very important for human, but in reality still many people have not fulfilled standard optimal health. This is caused by various factor like environment that is not healthy, condition poor economy adequate, and style life that is not balanced, start from pattern bad eating, unhealthy habits Healthy until with lack of activity sports. Factors the Can trigger emergence various type diseases, including disease stroke (Fabanyo and Anggreini, 2022).

Stroke is condition emergency medical which is often referred to as attack ischemic transient or disturbance cerebrovascular. This happen when flow blood to brain Blockage. As a result, the brain does not receive the oxygen and nutrients it needs from the blood. Without oxygen and nutrients, brain cells can die within minutes. Furthermore, sudden bleeding in the brain can cause long-lasting damage, disability, or even death. Stroke symptoms can range from mild fatigue to paralysis or numbness on one side of the face or body. Other signs include a sudden and severe headache, sudden weakness, difficulty seeing, and difficulty speaking or understanding what others are saying (National Institute of Health, 2022).

According to data from *World Health Organization* (WHO), stroke contributes Approximately 11% of all deaths worldwide. Each year, 13.7 million new cases of stroke are recorded, and approximately 5.5 million people die from this disease. Approximately 70% of stroke cases and 87% of deaths and disabilities due to stroke occur in low- and middle-income countries. On the other hand, in high-income countries, the incidence of stroke has decreased by 42%. Stroke patients who do not receive immediate medical treatment can experience paralysis and various complications, such as impaired mobility, impaired bodily functions, impaired daily activities, and irreversible disability (WHO, 2024).

The Indonesian Health Survey (SKI) reports that approximately 1.1 million people experience stroke each year. According to doctors' diagnoses, the incidence of stroke in the population aged 15 years and older (per millennium) is 8.3%. By gender, the incidence of stroke in men is 11%, while in women it is 10.9%. These data indicate that stroke is a major challenge for the Indonesian healthcare system (SKI, 2023).

According to data from the Riau Islands Province Health Profile, particularly in Batam City, the incidence of stroke reaches 8.9% of the total population. By age group, strokes are more common in the elderly. The highest number of cases was found in the 55-64 age group (23.6%), followed by the 65-74 age group (35.4%), and those 75 and older (41.3%) (Batam City Health Office, 2022).

Based on data from the Batam City Health Office, there was a significant increase in the number of stroke cases in all hospitals in 2020, namely 2,058 cases, an increase from 937 cases in 2019. Meanwhile, based on the 2022 Batam City Health Office Profile, it shows that stroke ranks 19th out of 27 common non-communicable diseases in Batam City, with the number of cases recorded reaching 481 people in the elderly over 60 years of age (Batam City Health Office, 2022).

Post-stroke patients often experience limited mobility, which is a major challenge in the recovery process. This condition is characterized by the patient's inability to perform joint range of motion independently due to impaired motor function. This impairment can hinder the patient's ability to perform daily activities. Limited joint range of motion can be caused by various factors, including age, gender, contractures, muscle weakness, spasticity, and joint stiffness. Therefore, restoring joint range of motion is crucial in post-stroke rehabilitation

programs, including *Range of Motion exercises* (Patricia A. Potter, 2009).

Range of Motion (ROM) exercises aim to maintain or improve the ability to move joints so they function normally, thereby increasing joint strength and muscle tone. These exercises are divided into two types: active *range of motion* and passive *range of motion*. Active *range of motion* involves using the individual's own energy or strength to move the joints, while passive *range of motion* exercises involve assistance from another person. These exercises are typically performed on patients with decreased consciousness, an inability to perform exercises independently, and patients with extremity paralysis. total (Arovah, 2025).

Based on previous research, it was shown that *range of motion* significantly influences the increase in joint range of motion in post-stroke patients. Research conducted by Daulay and Hidayah (2021) at the Tapanuli Selatan District Hospital found that that passive ROM intervention show influence meaningful in the range movement joints extremities on and lower patient post stroke (*p value* < 0.05 in both extremities). While that, similar research by Hasdiman Samania (2023) at Fakfak Regional Hospital, Papua Province, showed the results are also significant with p value = 0.000 (α = 0.05), indicating existence meaningful differences between condition range movement joints before and after given exercise *range of motion*.

One of facility health in Batam which provides service Rehabilitation physiotherapy for stroke patients are Hj. Bunda Halimah Batam Hospital, where various method the therapy applied for help recovery function motor patient. One of them *range of motion* that makes focus main in the physiotherapy program patient post stroke, based on guidelines

World Health Organization, rehabilitation process post stroke must done in a way comprehensive and needs - focused individual patient. This is covers evaluation comprehensive view of the condition physical and psychological patients, as well as development plan appropriate therapy. The Batam City Health Office also emphasized importance approach multidisciplinary in stroke rehabilitation, which involves doctors, physiotherapists, and other personnel health other (SKI, 2023).

Based on results survey the introduction that has been conducted by researchers at Hj. Bunda Halimah Batam Hospital, results interviews conducted with staff in the room physiotherapy show that patient post stroke experience decline range movement joints in the extremities on and extremities below, accompanied by weakness muscle so that joint No can moved optimally. Record data medical Hj. Bunda Halimah Batam Hospital, recorded as many as 225 cases patient post stroke from January until June 2025, consisting of 102 male patients and 123 female patients. These findings indicate that stroke cases in the region are quite high and require appropriate rehabilitation treatment to restore joint function. Therefore, this study is relevant and important to obtain a comprehensive picture and provide a basis for effective nursing interventions to improve joint range of motion and other functional aspects in post-stroke patients.

RESEARCH METHODS

This research carried out at Hj. Bunda Halimah Batam Hospital 2025, starting from date July 7th – September 12th, 2025. The research design used is *quasy experiment* with use design *one group pretest-posttest*.

Population in this study is all over patient post-stroke patients undergoing physiotherapy as many as 138 respondents, the sample used that is purposive sampling technique and number sample counted use formula Lameshow, so that a total of 48 respondents were obtained. The independent variable in this study is the *range of motion* while the dependent variable is range

movement the research instrument joints used change sheet observation.

Data analysis using analysis univariate for know distribution frequency of independent variables and dependent, and analysis bivariate for see influence between both variables. Data processing is carried out using the SPSS version 26 program *Paired T-Test.* Data collection techniques in this study consists of from three stage namely: stage preparation, stage implementation and stages end.

RESULTS AND DISCUSSION
1. Research result

Based on research conducted in the month July until September 2025 against 48 respondents who are patient post-stroke in the Physiotherapy Room Hj. Bunda Halimah Batam Hospital with objective for know influence *range of motion* to range movement joints, obtained results as following :

A. Analysis Univariate

Research has been conducted with The title is " The Effect of *Range of Motion* on Joint Range of Motion in Post-Stroke Patients in the Physiotherapy Room of Hj. Bunda Halimah Hospital, Batam City in 2025." Univariate analysis of this research data For to determine the average effect of range of motion on the range of joint motion in post-stroke patients.

Table 4.11
***Pretest of Range of Motion* Exercises in Patients Post- Stroke**

Variables	n	Mean	Elementary School
Pretest Shoulder Flexion	48	113.54	17,009
Pretest Shoulder Extension	48	108.02	18,529

Based on Table 4.1 shows average range results movement joints before range of motion was performed on 48 respondents patient post- stroke at RSHB. Obtained mean pretest value of Shoulder Flexion before range of motion is carried out, namely the average value is 113.54 with an SD (*Standard Deviation*) of 17.009, while shoulder extension before range of motion is carried out , namely The average value is 108.02 with an SD of 18.529. The SD (*Standard Deviation*) value means deviation standard/size data distribution in general common in a sample for see how much far or how far near data values with their averages .

Table 4.22
***Posttest of Range of Motion* Exercises in Patients Post- Stroke**

Variables	n	Mean	Elementary School
Post test Shoulder Flexion	48	139.38	8,790
Post test Shoulder Extension	48	140.83	10,176

Based on Table 4.2 shows average range results movement joints after range of motion was carried out on 48 respondents in patients post- stroke at RSHB. Obtained mean posttest value of Shoulder Flexion

before range of motion is carried out, namely the average value was 139.38 with SD (*Standard Deviation*) of 8.790 while the average shoulder extension after range of motion is carried out, namely the average value is 140.83 with SD (*Standard Deviation*) of 10.176 which means deviation standard/size data distribution in general common in a sample for see how much far or how far near data values with their averages.

B. Analysis Bivariate
Bivariate analysis in research aims for know the influence of range of motion on range movement joints in patients post stroke at Hj. Bunda Halimah Batam Hospital 2025.

Table 4.3
Influence range movement joints
***pretest* and *posttest of range of motion* exercises in patients post-stroke**

Paired Sample Test		Mean	Std. Deviation	p-value
Range of Motion	Flexion Pretest & Shoulder Flexion Posttest	124,958	18,362	.001
	Extension Pretest & Shoulder Extension Posttest	120,927	21,835	.001

Based on Table 4.3 shows that the average value of the 48 respondents studied that is *range of motion* shoulder flexion before and after given intervention with the mean

value was 124.958, while the shoulder extension before and after given intervention with the mean value is 120,927. So that experience improvement value 4.031. Based on mark significance obtained from the paired sample t-test, namely p - value *pretest* and *posttest* is .001 <a = 0.05. If the results of this study show p- value < 0.05 then Ho is rejected which can be interpreted that there is difference difference and influence range movement joints in patients post stroke before and after do *range of motion* .

2. Discussion

A. Joint Range of Motion in Post-Stroke Patients Before Range of Motion Test
Based on research results on 48 sufferers post stroke, obtained average score range movement joints before done intervention in the form of *range of motion* shoulder flexion with mean of 113.54° with SD (*Standard Deviation)* of 17.009 and the average score range movement joints before done intervention shoulder extension *range of motion* with a mean of 108.02° with SD (*Standard Deviation)* of 17.009 and the average score range movement joints before done intervention shoulder extension *range of motion* with a mean of 108.02° with SD (*Standard Deviation)* is 18,529. This value show that part big patient post stroke experience limitations range movement joints in the shoulder, both in movement flexion and extension, before given exercise *range of motion*.

Limitations range movement joints in patients post stroke in general caused by disturbance function nerve motor consequence damage to the area of the brain that regulates movement. Damage This cause increased muscle tone (*spasticity*) and occurs stiffness in the joints, so hinder ability patient for do movement in a way maximum. In practice nursing, condition This influenced Several factors contribute to this: internal factors include the patient's age and illness, while external

factors include a lack of family encouragement to exercise. The combination of these factors can lead to decreased joint range of motion and, potentially, joint contractures.

Contractures in post-stroke patients are caused by paralysis resulting from the loss of nerve supply to the muscles, preventing the brain from moving the extremities normally. This loss of nerve stimulation prevents the muscles from receiving contraction signals, which then leads to atrophy. Muscle atrophy reduces joint activity, leading to loss of synovial fluid and joint stiffness. This combination of muscle shortening and joint stiffness ultimately leads to a decreased range of motion (Helmi, 2016) .

This research in line with (Daulay and Hidayah, 2021) entitled " Passive *range of motion* exercises on range of motion movement joints extremities in patients post-stroke". Before done range of motion intervention with average mark shoulder flexion 24.60 with standard deviation 27.645 while in shoulder extension 17.43 with standard deviation 10.66. The static test results obtained value of 0.000 difference range movement significant joints .

B. Joint Range of Motion in Post-Stroke Patients *Posttest* Conducted *Range of Motion*

Based on research results on 48 patients post stroke, obtained average score range movement joints after done intervention in the form of shoulder flexion *range of motion* with a mean of 139.38° with SD *(Standard Deviation)* of 8.790 and the average score range movement joints after done intervention shoulder extension *range of motion* with a mean of 140.83° with SD *(Standard Deviation)* of 10.176. This result show existence significant increase in range movement joints patient after given exercise *range of motion* in a way regular .

this study in line with research (Sumarni and Yulastri, 2021) which shows that stroke patients who received intervention exercise *range of motion* for 3 weeks consecutive experience mean increase in shoulder flexion from 112° to 146°, and extension from 103° to 150°. Conditions the show that exercise *range of motion* capable increase flexibility muscles and expand corner movement joints in the extremities on stroke patients .

According to (Istichomah, 2020), practice *range of motion* is purposeful exercise move part body For maintain flexibility as well as ability move joints. Usually occurs in patients who do not realize movement limited which is not can do a number of type exercise physique in a way independent. This exercise functioning increase flow blood peripheral and prevent stiffness muscles or joints with move joints more wide. And increase ability For arrange joints normally and completely For help muscle become more strong so that prevent deformity, stiffness, and contractures. This is also important For recovery joints and muscles after operation For prevent complications more carry on .

Besides that, the research results (Fransiska, 2018) in Makassar support findings this, which shows exercise

range of motion in a way regular capable expand range movement joints until approach normal values in patients post-stroke. Exercises performed in a way consistent no only increase function movement, but also plays a role in increase trust self patient in undergo activity everyday. Findings This confirm that intervention *range of motion* give impact significant therapeutic impact on recovery function motor extremities on.

Based on assumptions researchers, it seems that mean range value movement joints after given exercise *range of motion* in a way orderly and directed capable increase range movement shoulder joint in patients post stroke, both in movement flexion and extension. Intervention This proven effective For maintain mobility joints, preventing stiffness, as well as support the rehabilitation process patient going to independence functional.

C. The Effect of Range of Joint Motion on Post-Stroke Patients Pretest and Posttest Conducted Range of Motion

Based on research results on 48 respondents , the average range movement joints before and after given intervention in the form of shoulder flexion range of motion exercises improvement with The mean value is 124.958, the average value of shoulder flexion before 113.54 and shoulder extension 108.02 and so is the average range of movement joints respondents before and after given intervention in the form of range of motion exercises experience improvement with The mean value was 120.927, the average value of shoulder flexion after 139.38 and shoulder extension 140.83. Based on mark significance obtained from the *paired sample t-* test that is mark *p-value range of motion pretest* and *posttest* is 0.001 0.05. The test results show mark *p-value* <0.05 then Ho is rejected . This is signify there is difference significant between the average range movement joints before and after intervention .

Normality test results show existence average increase in the range movement shoulder joint, both in movement flexion and extension, after giving exercise *range of motion*. Before intervention, the average shoulder flexion was 113.54° and shoulder extension was 108.02°. After the intervention, the mean the increase to 139.38° for shoulder flexion and 140.38° for shoulder extension. With This, there are difference improvement of 25.84° in shoulder flexion and 32.81° in shoulder extension after done exercise *range of motion.*

Improvement range movement joints This in accordance with theory that states that exercise *range of motion* effective in maintain flexibility joints, preventing contracture, smooth circulation blood, and increase elasticity network muscles. With This, *range of motion* play a role important as intervention non-pharmacological in rehabilitation patient post stroke.

The results of this study are also in line with research conducted by Daulay and Hidayah (2021) at the UPT. RSUD Kab. South Tapanuli, which showed influence significant exercise *range of motion* passive to range movement joints extremities top and bottom with

p- value < 0.05. Similar thing was also found by Hasdiman Samania (2023) at the Fakfak Regional Hospital, Papua Province , with p value = 0.000 (a = 0.05) which shows existence difference meaningful between movement joints before and after exercise *range of motion.*

Besides increase function joints, exercise *range of motion* also contributes in speed up the rehabilitation process in a way overall. According to research by Widjaja & Nurjannah (2020)**,** giving *range of motion* passive and active can repair ability functional patient, lowering dependence in activity everyday, as well as increase quality life patient post- stroke. Therefore that , *range of motion* no only focus on aspects physical, but also has impact positive towards aspects psychosocial patient.

In a way physiological, exercise *range of motion* help repair flow blood to network muscles and joints, improving diffusion oxygen, as well as reduce accumulation sour lactate which causes stiffness. Regular movement during exercise also helps stimulate fluid functional synovial lubricate joints . *Range of motion* is also a therapy rehabilitative simple, easy implemented and effective for increase function motor patient. Therefore that, *range of motion* program need implemented in a way sustainable in space physiotherapy or at home with guidance power health so that the benefits can be optimal.

CONCLUSION AND SUGGESTIONS
A. Conclusion
Based on research results conducted Regarding " The Effect of *Range of Motion* on Joint Range of Motion in Post-Stroke Patients in the Physiotherapy Room of Hj Bunda Halimah Hospital, Batam City in 2025 "
1. Average range movement joints patient post stroke before given exercise *range of motion* with mean value obtained is shoulder flexion of 113.54° and shoulder extension of 108.02°.
2. After being given intervention exercise *range of motion,* average range movement joints increase to 139.38° for shoulder flexion and 140.38° for shoulder extension .
3. There is influence significant to the average range movement joints before and after intervention. The mean value for shoulder flexion reached 124.958, while mean value for shoulder extension of 120,927, with total increase of value 4.031. The results of the *paired t-test statistical test* (*paired test*) show mark *p-value* shoulder flexion .001<0.05 and shoulder extension 0.001<0.05, so that prove existence significant difference before and after exercise *range of motion.*

B. Suggestion
1. For Hospital
The results of this study expected can become information and materials evaluation for power health in the work area specifically Hj. Bunda Halimah Hospital Batam City For improve prevention and treatment programs problem patient post stroke.
2. For respondents
Respondents expected play a role active in follow a physiotherapy program provided by a Home Health facility Sick, because proven can help control and improve range movement joints when done in a way routine with duration 15-30 minute workout can done a week once during three week. Besides that,

patients and families are also expected continue exercise *Range of Motion* in a way independent at home in accordance directions power health. Involvement family in accompany it is very important for the patient to practice done in a way regular, so that can speed up recovery function motor skills, improve independence, as well as repair quality life patient.

3. Research
This can become addition literature about non-pharmacological interventions, in particular in physiotherapy as alternative for increase range movement joints in patients post-stroke findings this can also made into student research materials, development theory and knowledge for readers. Besides that, this research is also useful as material learning, especially in subjects studying nursing medical-surgical and physiotherapy, and can developed become module practice exercise *Range of motion* so that increase skills student in give interventions on patients post stroke.

4. Researchers next recommended For use sample more size and time intervention longer for results more valid. Besides that, researcher next can also use group control as well as add other variables, such as independence activity, quality life, or condition psychological patient post stroke.

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