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EFFECTIVENESS OF RANGE OF MOTION TO INCREASE JOINT MOTION RANGE IN STROKE PATIENTS

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ABSTRACT

Background: Stroke patients by 80% experience hemiparesis (partial paralysis on one side of the body). Muscle contractions are influenced by the body's motion system in stroke patients who experience weakness. Range of Motion is a muscle strength training given to increase muscle mass and muscle tone to increase the normal and complete perfection of joint motion. Most of the current research focuses on increasing muscle strength in stroke patients. **Objectives:** literature review aims to determine the effectiveness of Range of Motion there is an increase in muscle strength stroke patients. **Method:** In preparing the Literature review using the PRISMA checklist and PICOS in the selection determine the inclusion criteria. Secondary data obtained from reputable journals both national and international with a predetermined discussion. **Results:** The results of several articles on Range of Motion therapy to increase the range of joint motion in patients with stroke. Effective at least 2 times a day within 5-15 minutes for 8 days in 2 weeks can affect the increase in range of motion in the upper and lower extremity joints.

Keywords: Range Of Motion, Stroke

BACKGROUND

Stroke is a clinical sign that develops rapidly due to local or overall brain disorders with signs that occur for 24 hours or more which can result in death without any other obvious cause but vascular (Wahyuningsih, 2017). In the world, the incidence of stroke is close to 200 per 100,000 people for 1 year in Indonesia, it is estimated that 500,000 people have a stroke each year, of the 500,000 people have a stroke, it is estimated that stroke patients who die reach 125,000 people and others have mild disabilities (Wahyuningsih, 2017).

Blood vessels whose elasticity is reduced and stiff or arteriosclerosis causes narrowing of the blood vessels. Arteriosclerosis can occur because of the accumulation of fat on the walls of the arteries, the deposits of fat in the arteries can damage the walls of the blood vessels and cause an injury that causes the platelets to release enzymes that clot blood in the arteries. There is a narrowing of the

diameter or even complete blockage of the blood vessels due to local blood clots. (Lili Indrawati, 2016). The death of clogged blood vessels due to lack of oxygen and nutrients will affect some neurons. So that stroke sufferers can experience impaired coordination and balance of movement, decreased muscle strength, making it difficult to carry out daily activities (Hartono, 2011).

Range Of Motion is a muscle strength training given to increase muscle mass and muscle tone to improve the perfection of normal and complete joint motion. Most of the current research focuses on increasing muscle strength in stroke patients (Bakara & Warsito, 2016)

METHODS

The method used in the preparation of the literature review uses the PRISMA checklist to determine the selection of studies and uses the PICOS format. The data used are

secondary. Data collection methods using electronic databases include NATURE, EBSCO, SCIENCE DIRECT, LINK, Scholar. In the initial search, you get 437 articles that match the keywords. The search results obtained were then checked for duplications and found that there were 128 similar articles so they were excluded and the remaining 309

articles. The researcher then conducted a screening based on the title (n = 309), abstract (n = 53), and full text (n = 19) which were by following the theme of the literature review. This assessment was carried out based on the eligibility and exclusion criteria, which resulted in 19 articles that could be used in the review literature.

RESULTS

Title Journal & Author	Year, Volume & Page, Do	Method	Results
<i>Exercise Range Of Motion (ROM) Passive To Increase Joint Range Of Post-Stroke Patients</i> Author: Derison Marsinova Bakara, Surani Warsito (Bakara & Warsito, 2016)	2016, volume VII & pages 12 - 18	Pre Experimental Method with The One Group Pretest-Posttest Design.	There is an increase in the range of motion before and after the Range of motion in stroke patients.
Range Of Motionactive (Cylindrical Grip) On The Extremity Muscle Strength Of Non-Hemorrhagic Stroke Patients Author: Isti Wahyuningsih, Ismonah, Hendrajaya (Wahyuningsih, 2017)	2017 volume 001 Pages 0-15	The research method used was a sampling technique, namely purposive sampling. This type of research is the pre-experimental one-group pretest-posttest design	<i>Range of motion cylindrical grip can increase muscle strength in stroke patients</i>
The Effect Of Giving Rom Therapy (Range Of Motion) On The Healing Of Stroke Disease Author: Adi Didin Setyawan Ani Rosita Nindy Yunitasari (Setyawan Et Al., 2017)	The 2017 year Volume 2 Pages 87 - 90DOI: 10.1177 /088307 381877 6157	<i>systemic nonrandom sampling, the number of samples was 10 respondents and used the Paired t-test statistical test.</i>	The results of the research conducted showed the effect of providing Range Of Motion for healing in stroke
Differences Of Muscle Strength Before And After Training (Mirror Therapy) In Ischemic Stroke Patients With Hemiparesis In	The 2015 year Volume 2	Quasi Experiment method, with One Post Pre-Post test design. using univariate and bivariate analysis. In a bivariate analysis using the Wilcoxon test.	There was an increase in muscle strength in respondents with 5 repetitions a day and performed all 7 days. With the mean value of muscle strength before the intervention of 2.12 (0.45) in the upper limb and 2.12 (0.45) in the

Dr.Hasan Sadikin Hospital, Bandung Author: Hendri Heriyanto, Anastasia Anna (Heriyanto & Anna, 2015)			lower extremities. The mean value after the intervention was 3.83 (0.56) in the upper limb and the value of muscle strength was 4.00 (0.66) in the lower limb.
Pengaruh Range Of Motion Terhadap Kekuatan Otot Padapasien Stroke Iskemik Di Rumah Sakit Umum Hkbp Balige Penulis : Rika Elvriede Hutahaean, Muhammad Taufiq Daniel Hasibuan (Trust Et Al., 2020)	The 2020 year Volume 3 Pages 278 - 282	This study used the one group pretest-posttest method. The data was collected using questionnaires, observations, and interviews, and data testing was carried out using the Wilcoxon test.	There is a difference in muscle strength before and after Range Of Motion is proven by the test results obtained, namely 0.000.
Nursing Actions Training The Range Of Passive Motion Engineering To Reduce Physical Mobility Barriers In Mrs. S With A Non Hemorrhagic Stroke Author: Siswanto , Malikhaturofi'ah Al Mahfudhoh, Evy Tri Susanti	The 2018 year Volume 4 Pages 39 - 44	Descriptive research. Sample 1 respondent, the subject is NY. S, 62 years old, had weakness in his right arm and right leg for 1 day.	Passive Range Of Motion (ROM) measures were performed 2 times a day for 3 days with the help of nurses or independently, but Mrs. S has not been able to lift his right arm and leg. Muscle strength in Mrs. S is still on a scale of 2 and the muscle strength of the right leg is still on a scale of 2, so there has been no change for 3 days.
The Effectiveness Of The Range Of Motion (Rom) On Increasing Muscle Strength In Stroke Suffers Author: Susana Nurtanti, Widia Ningrum (Nurtanti & Ningrum, 2018)	The 2018 year Volume 7 Pages 14 - 18	qualitative research methods with a descriptive case study approach. Review the data analysis, interview data, and observation tests	The result is that all respondents experienced an increase in muscle strength from 2 to 3 on a scale.
The Effect Of Range Of Motion Training On The Extremity Joint Movement Range In Post-Stroke Patients In Makassar Author: Fransiska Anita Henny Pongantung Putri Veni Ada	The 2018 year Volume 3 Pages 97 - 105	Pre Experiment design method using one group pretest-posttest. Samples were taken using a non-probability sampling technique with a consecutive sampling approach. Data were analyzed using statistical tests, namely the Wilcoxon	There is an effect after doing Range of Motion on the range of motion of the upper limb joints with post-stroke patients with the results of the alternative hypothesis value (Ha) is accepted and the null hypothesis (H0) is rejected

Viola Hingham (Anita Et Al., 2018)		test with a significance level of = 0.05.	
Factors Related To Range Of Motion (Rom) Training On Improvement Rom Ability In Post Stroke Hemiparage Patients Author: Naziyah Taufiq Dzafar, Yarni (Dzarah Taufik Naziyah, 2020)	The 2020 year Volume 08 Pages 72 – 80 DOI: 10.36858/jkds.v8i1.154	Using a descriptive correlation approach with a cross-sectional design	The results showed that there was a significant relationship between ROM training and an increased range of motion (P-value 0.001 <0.05).
Effects Of Virtual Reality-Based Planar Motion Exercises On Upper Extremity Function, Range Of Motion, And Health-Related Quality Of Life: A Multicenter, Single-Blinded, Randomized, Controlled Pilot Study Author : Mina Park, Myoung Hwan Ko, Sang Wook Oh, Ji Yeong Lee, Yeajin Ham, Hyoseok Yi, Youngeun Choi, Dokyeong Ha, Joon-Ho Shin (Park Et Al., 2019)	The 2019 year Volume 16 Pages 1 – 13 DOI :10.1186/s12984-019-0595-8	using a single-blinded, randomized, and controlled trial method. with 26 respondent stroke patients.	All functional outcome measures (FMA, WMFT, and MBI) showed significant improvement results (p <0.05) in the SB and CON groups on all functional measuring devices (FMA, WMFT, and MBI)
<i>Effect Of Comprehensive Postural Instructions And Range Of Motion Exercises Via Educational Videos On Motor Function And Shoulder Injury In Stroke Patients With Hemiplegia: A Preliminary Study</i> Author : Yu-Chi Huang Chien Yi Chuang Chau Peng Leong Ling Wang Hsiao Lan Chen Chia Wei Chiang	The 2018 year Volume 41 Pages 665 - 671	Regular ROM exercises through educational videos for shoulder hemiplegia for 15 minutes twice a day for 5 days per week while in hospital. Instruments assessed including the presence and severity of pain, motor function, and sonography of the shoulder hemiplegia were assessed.	The results of comprehensive posture instructions and ROM exercises through educational videos during hospitalization for stroke patients can improve motor recovery and limit shoulder injuries in stroke patients with hemiplegia

<p><i>The Effect Of Early Passive Range Of Motion Exercise On Motor Function Of People With Stroke: A Randomized Controlled Trial</i></p> <p>Author : Zahra-Sadat Hosseini Hamid Peyrovi, Mahmoodreza Gohari. (Hosseini Et Al., 2019)</p>	<p>The 2019 year Volume 8 Pages 39 -44 DOI : 10.1517 1/jcs.20 19.006</p>	<p>This study uses a randomized controlled trial method</p>	<p>there was a significant increase in motor function of upper and lower extremities in the first and third periods The greatest increase was observed repeatedly from base to one month in the upper limbs, and bases to the first and first months to the third month in the lower limbs</p>
<p><i>Effects Of Ankle Joint Mobilization With Movement And Weight-Bearing Exercise On Knee Strength, Ankle Range Of Motion, And Gait Velocity In Patients With Stroke: A Pilot Study</i></p> <p>Author : Chang-Man An, PT, MS, Jong-I'm Won, PT, Phd</p>	<p>The 2016 year Volume 39 Pages 348 - 358</p>	<p>This method uses 30 participants with chronic stroke divided into three groups: MWM (n = 12), WBE (n = 8), and control (n = 10). All groups received physical therapy sessions 3 times a week for 5 weeks.</p>	<p><i>knee extensor strength increased significantly in the MWM and WBE groups</i></p>
<p><i>Combination Of Hypnosis Therapy And Range Of Motion Exercise On Upper-Extremity Muscle Strength In Patients With Non-Hemorrhagic Stroke</i></p> <p>Author : Chandra Irawan , Mardiyono, Suharto, Aris Santjaka (Irawan Et Al., 2018)</p>	<p>The 2018 year Volume 4 Pages 104 - 111 DOI : 10.3354 6/bnj.34 7</p>	<p><i>This study uses a quasi-experimental design of the pretest-posttest control group. The paired t-test and Independent t-test are used for data analysis.</i></p>	<p><i>there were statistically significant differences in the mean upper limb muscle strength in the experimental and control groups. Paired t-test obtained the value of p = 0,000,</i></p>
<p><i>The Effectiveness Of Discharge Planning And Range Of Motion (ROM) Training In Increasing Muscle Strength Of Non - Hemorrhagic Stroke Patients</i></p> <p>Author : Mohamat Iskandar , Mardiyono , Hotma Rumahorbo (Martina Et Al., 2018)</p>	<p>The 2018 year Volume 2 Pages 57 - 62</p>	<p><i>This study uses a semi-experimental method with a pre-posttest design. As many as 34 respondents used cluster random sampling techniques, respondents were divided into two groups equally; the intervention group (N = 17) with stroke training and movement information (ROM), the control group (N = 17) received a</i></p>	<p><i>there were an increase in upper and lower limb muscle strength in non - hemorrhagic stroke patients only 2 days after treatment (pretest), and a significant increase was observed until the 14th day.</i></p>

		<i>standard release plan available at the hospital</i>	
Pengaruh Range Of Motion Terhadap Kekuatan Otot Pada Pasien Stroke Author : Susanti Difran Nobel Bistara (Susanti Et Al., 2019)	The 2019 year Volume 4 Pages 112 - 117 DOI:10.22146/jkesvo.44497	Menggunakan metode pra Eksperimental One-Group Pre-Post Test Design dengan analisa data menggunakan statistik wilcoxon sign rank test	Terdapat peningkatan kekuatan otot pada pasien stroke yang dilakukan latihan <i>Range Of Motion</i>
<i>Effect Of Counseling To Self Efficacy In Exercise Range Of Motion (ROM) On Stroke Patients In Work Area UPTD Puskesmas Bendo Pare Kediri</i> Author : Linda Ishariani (Ishariani, 2018)	2018 year Volume 2 Pages 485 - 488	<i>The design of this study was a pretest and posttest design in this research design was a pretest and posttest design in a group. The independent variable is counseling while the dependent variable is self - efficacy in conducting Range of Motion training with a sample of 9 respondents. Purposive sampling technique Using a ranking test formula marked with Wilcoxon with = 0.05.</i>	<i>The results of the pre-counseling study were that most respondents (77.7%) had lower levels of self-efficacy, post-counseling provided that most of the respondents (55.6%) had moderate levels of self-efficacy. The result of Statistical tests shows Sig (p) = 0.016 <0.05 (a) that counseling is effective for improving self-efficacy in stroke patients in ROM activity.</i>
The Effectiveness Of ROM Exercises On Increasing Muscle Strength In Stroke Patients Author: Wahdaniyah Eka Pratiwi Syahrin Maria Ulfah Azhar Risnah (Syahrin Et Al., 2019)	The 2019 year Volume 3 Pages 186 - 191 DOI: 10.1119 /1.2218359	<i>This research method uses the Study Systematic Review</i>	<i>There is an increase in muscle strength in Range Of motion training 2 times per da</i>
The Effect Of Monkey Chair And Band Exercise System On Shoulder Range Of Motion And Pain In Post-Stroke Patients With Hemiplegia Author : Hyun-Ju Jeon, Phd Sangjoon An, Phd Jinwoo Yoo	The 2016 year Volume 28 Pages: 2232 - 2237 DOI: 10.1589	<i>using a visual analog scale (VAS) score for pain and a modified motor assessment scale (MMAS) for motor assessment</i>	<i>there was a progressive increase in the VAS pain score and there was a significant increase in the MMAS motor score (Jeon et al., 2016)</i>

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DISCUSSION

Respondents in this literature review were all stroke patients with a decreased range of motion in Indonesia and other countries. In this study, the factors that influence strokes, such as age, gender, education, and diet, have been mentioned. Respondents in this study were in the range of 30-80 years. Gender characteristics in respondents are almost the same between men and women because the study is comprehensive with various levels of education.

Stroke is a local, and global neurological dysfunction, which appears suddenly, quickly, and progressively and attacks the brain. Non-traumatic circulatory disorders can cause nerve function disorders in stroke. Unclear speech (pelo), paralysis of the face or limbs, speech is not fluent, visual disturbances, maybe changes in consciousness, visual disturbances, etc. are symptoms that arise due to nervous disorders (Bakara & Warsito, 2016)

Risk factors that affect stroke include a history of the disease. History of diseases that affect stroke includes hypertension, diabetes mellitus, history of heart disease, dyslipidemia, and obesity. Other risk factors that affect stroke are physical inactivity that results in strokes and heart attacks, which is characterized by a buildup of fat, cholesterol, calcium, and other elements that affect the blood supply to the brain and heart muscle, which results in decreased blood flow to the brain and heart (Wayunah & Saefulloh, 2017). High levels of triglycerides ≥ 200 mg/dl are caused by consuming foods that contain fat such as satay, meatballs, coconut milk, and fried foods that can trigger a stroke (Susilawati & SK, 2018).

Stroke patients account for 80% of hemiparesis (partial paralysis of one side of the body). Muscle contraction is influenced by the body movement system in stroke patients who experience weakness. The lack of muscle contraction is caused by a lack of blood supply to the brain, which causes the

brain to experience a lack of oxygen supply, and the delivery of the main pathways between the spinal cord and the brain is obstructed (Setyawan et al., 2017). From the results of the research conducted by researchers, it was found that a significant increase in muscle strength before and after the action. This proves that the range of motion has a great influence on muscle strength in stroke patients with muscle strength of at least 3 (Trust et al., 2020).

In the study (Susanti et al., 2019) all respondents experienced an increase in muscle strength after doing range of motion exercises for 10 - 15 minutes at least 2 times a day. Just like Penian (Syahrim et al., 2019), it was concluded that ROM training was effective in increasing muscle strength. By giving exercises, namely at least 2x a day every morning and evening with a time of 15-35 minutes and carried out at least 4 times each movement. In a study (Trust et al., 2020) on 30 respondents who carried out Range Of Motion, it affected increasing the extreme muscle strength of the respondents. In the study (Bakara & Warsito, 2016), 30 respondents for 6 months experienced hemiparesis doing Range Of Motion exercises, there was an increase in the range of motion of the joints in the extremities.

Range Of Motion exercise

Range of motion (ROM) is a muscle strength training that is carried out to maintain or improve muscle tone and mass for the level of ability to move joints normally and completely (Wahyuningsih, 2017) The results of the analysis show that stroke patients undergoing Range Of Motion therapy can increase the range of the joints, where during the movement of the joint area that is suffering from paralysis there is stretching of muscle fibers and an increase in blood flow so that the range of motion of the joints in the lower and upper extremities and large joints increases. . So that Range Of Motion is an alternative exercise to increase the range of

motion of joints in stroke patients (Bakara & Warsito, 2016) Based on research by (Anita et al., 2018) Range of motion exercises will be carried out at least 2 times a day for 5 - 10 minutes for 8 days in 2 weeks can affect the increase in the range of motion of the upper and lower limb joints. The range of motion exercises can be done at 9:00 a.m. and 3:00 p.m. In the study (Trust et al., 2020). The range of Motion affects increasing the range of motion of the respondent when done with a frequency of twice a day with 10-15 minutes in one exercise for 6 days.

The use of combined interventions or a combination of Range of Motion with other methods can significantly increase the range of motion of the joints as in research (Irawan et al., 2018) using a hypnosis combination can significantly increase the range of motion of the joints in the upper extremities. In research (Ishariani, 2018), counseling can increase the willingness of stroke sufferers to do Range Of Motion. In the study (Jeon et al., 2016) there was an increase in motor movement in stroke patients with the combination Monkey Chair.

CONCLUSION

The conclusions from the above review literature are:

1. Stroke is a dangerous disease, which causes disabilities in sufferers, which can hinder patient productivity. Stroke ranks the third disease that causes death after cancer and heart disease.
2. The results of several articles regarding the Range of Motion therapy to increase the range of motion of joints in patients. Stroke is effective at least 2 times a day for 5 - 15 minutes for 8 days in 2 weeks can affect the increase in range of motion in the joints of the upper and lower extremities.
3. Range of motion can be performed on stroke patients with decreased muscle strength with minimum muscle strength 3. After 2 weeks of Range Of Motion exercises with a frequency of 2 times a day, the muscle strength will increase to 4 to 5.
4. The existence of a combined intervention or a combination of the range of motion with

exercises or other methods can significantly increase the range of motion of the upper and lower limbs.

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