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APPLICATION OF RUBBER BALL GRIP THERAPY TO INCREASE UPPER EXTREMITY MUSCLE STRENGTH IN NON HEMORRAGIC STROKE PATIENTS IN A FAMILY CONTEXT: SYSTEMATIC REVIEW

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Abstract

Background: Stroke is the death of brain tissue (cerebral infarction) which occurs due to reduced blood and oxygen flow to the brain. In stroke patients, the main problem that arises is disability, namely paralysis in the limbs, such as in the fingers, which causes a decrease in muscle strength. One effort that can be made to improve motor function of the extremities is rubber ball grip therapy. **Purpose:** The aim of this case study is to describe the application of rubber ball grip therapy in increasing upper extremity muscle strength in non-hemorrhagic stroke patients in a family context. **Method:** This research design uses a descriptive method with a case study approach (case study research). This ball grip therapy method is carried out for 7 consecutive days in the morning, afternoon and evening for 30 minutes. Data collection methods use interview techniques, physical examination, observation, and literature study. **Results:** The participants in this case study are Mrs. S's family, one of whose family members suffered from a stroke with nursing problems involving impaired physical mobility. After being given rubber ball grip therapy intervention for 7 days, it was proven that muscle strength increased from 3 to 4 on the seventh day. **Conclusion:** It was found that the application of rubber ball grip therapy can increase muscle strength. Suggestions for families to continue implementing the therapy that has been taught regularly and regularly to increase muscle strength.

Keywords: Family, Muscle Strength, Stroke, Rubber Ball Handheld Therapy.

1. INTRODUCTION

Stroke is a term used to describe neurological changes caused by disruption of the blood supply to brain. Stroke is the death of brain tissue (cerebral infarction) that occurs due to reduced blood and oxygen flow to the brain [1]. Based on the results of Basic Health Research (Riskesdas) in 2018, The prevalence rate of stroke in Indonesia continues to increase every year the year. The prevalence of stroke cases in Indonesia is based on diagnosis doctors in the population aged over 15 years reached 10.9% per 1,000 resident. East Kalimantan Province, namely 14.7% per 1,000 population, is the province with the highest prevalence. Meanwhile Papua and Maluku has the lowest stroke prevalence, namely 4.1% and 4.6% per 1,000 residents. With specifications for men 11.0% and women 10.9 %. Based on age groups, the prevalence of stroke cases is highest in the age group over 75 years, it is 50.2%. Riskesdas year 2018 also reported stroke prevalence figures in the Islands Province Bangka Belitung is 12.6% with a total of 3,915 cases [2].

The elderly are one of those most at risk had a stroke. Elderly people are more at risk of having a stroke because of this changes in blood vessels in general, such as the condition of the vessels inelastic brain blood and the presence of plaque in the brain arteries lasted for years [3]. One of the signs and symptoms of stroke is a decline muscle strength as a result of client immobilization or incapacity in carrying out movements due to weakness that occurs in the sufferer strokes. Most stroke sufferers tend to experience disorders physical mobility, where the patient is only able to rest in bed and unable to move positions due to limitations. This is what causes nursing problems, namely impaired physical mobility [4].

In stroke patients the main problem that arises is damage or death of brain tissue which can cause decline or even loss of functions controlled by the network. One of the symptoms that occurs is disability, namely paralysis in parts of the body or hemiparesis such as the fingers hand. In this case, the function of the extremities is very important for running daily activities. So if weakness occurs in the extremities it will really hinder and disrupt daily activities [5].

To overcome problems related to stroke, it is necessary to do so intervene as early as possible quickly and precisely, so that it can helps faster and optimal physical recovery. One of interventions that can help improve extremity motor function is by carrying out Range Of Motion (ROM) intervention. One of ROM that can train hand functions, especially fingers, is exercise hold the ball. Ball grip training is a form of therapy useful for optimizing muscle strength by making a fist or holding hands tightly. This exercise can help restores brain control over muscle function [6].

Exercise gripping a rubber ball can increase muscle strength based on the results of previous research, given training grip the rubber ball regularly and continuously causes muscle fibril hypertrophy, so the more exercise, the more muscle fibril hypertrophy occurs which causes an increase muscle strength [7]. Based on the description above, the author is interested in conducted a case study of the Application of Ball Grip Therapy Rubber To Increase Upper Extremity Muscle Strength in Patients Non-Hemorrhagic Stroke in the Family Context : systematic review.

2. METHODOLOGY

The design of this scientific paper uses a case study design research, research Quasi Eksperiment, And the subject of this research is a family with one member his family suffered from non-hemorrhagic stroke aged 60-75 years. The intervention that will be carried out is the application of rubber ball grip therapy to increase upper extremity muscle strength in non-hemorrhagic stroke patients.

3. RESULTS

This case study was conducted in January – June 2024. In this case the researcher conducted an assessment for 3 days on March 7-9 2024 and the assessment was carried out at the client's own home. Implementation and evaluation were carried out by researchers during 7 days of home visits, where in one day the ball grasp therapy was carried out three times, namely in the morning, afternoon and evening.

3.1 Characteristics of the Respondent

The subject in this case study is a family with one member his family suffered from non-hemorrhagic stroke who lived in Air Saga Health Center UPT Working Area with the following criteria: inclusion; Clients with an age range of 60-75 years who live together his family, clients diagnosed with non-hemorrhagic stroke, clients with muscle weakness in the upper extremities, clients and their families willing to become case study participants, clients and their families cooperative and able to communicate well. As for exclusion criteria; The client experiences a decrease in consciousness so this must be done intensive care, Client and family withdrew as participants before research has been completed.

The subjects of this research were Mrs. S's family and Mrs. S suffered a stroke approximately 6 months ago with weakness in both upper extremities. The case study subject who suffered a stroke was Mrs. S himself at the age of 74 years, with marital status divorced and dead, Islamic religion, primary school education, and works as a housewife ladder. Mrs.S's address is Tanjung Pendam Village, District Tanjungpandan, Belitung Regency. The family composition consists of: Mrs. S is the head of the family who lives with her one child not married yet.

3.1.1 Assessment of the Respondent

The assessment was carried out for 3 days on 7-9 March 2024 at the client's own home. From the results the study found that Mrs. S's family, especially Mrs. S herself, experienced health problems, namely weakness of the body, especially in both extremities on it. Weakness This has been experienced since approximately 6 months ago until now. He felt this weakness suddenly

after waking up in the morning. Clients too said it was difficult to move his extremities because it felt like stiff, so that movement and daily activities are limited assisted by family. Weakness is felt like numbness so he couldn't grasp things because if he holding it, the object will fall by itself. Mrs. S said that while suffering from this stroke he rarely did anything physical activity, and not doing physiotherapy or even sunbathing he only does it occasionally.

When a physical examination was carried out, the general condition was found composmentis, blood pressure 139/ 75mmHg, pulse 90x/minute, GDS: 178mg/dl, uric acid: 5.8mg/dl. Clients say their daily activities such as eating, drinking, bathing, changing clothes and decorating with the help of her children. The client said he was having difficulty defecating, namely he defecated 1x/ 2-3 days with a hard consistency.

Then the client is examined head to toe from start to finish head, where the client's head is symmetrically round, with hair white, anemic conjunctiva, in the client's visual function said that his vision had been blurry since he reached his 60s, then for the nose, ears, mucosa of the lips, up to the neck and chest, no problems were found, only the client said often feel short of breath after doing activities, especially after bathe. Meanwhile in the upper extremities there are limitations in carrying out activities, weakness appears in both upper extremities with right muscle strength 3 and left 3, where the client is able to lift the extremities but is unable to against resistance, while for the client's lower extremities said his legs were weak with right muscle strength 4 and left 4, so that the client is unable to stand for a long time and there is swelling or edema in the client's left and right legs.

3.1.2 Results of muscle strength measurements after rubber ball gripping therapy

Before carrying out this ball grasping therapy, the researcher provides family education regarding the rubber ball grasping therapy program, and before carrying out therapy the author assesses the muscle strength score first to assess the client's muscle strength. After measuring muscle strength before ball gripping therapy, the results were obtained, namely the client's right and left upper extremity muscle strength (3), namely being able to move the extremities against gravity but not being able to resist the examiner's resistance.

Table 1. *Results of Evaluation of Muscle Strength Measurements Pre (Before) and Post (After) Rubber Ball Grasping Therapy*

Result Table	Before	After
Day 1	3	3
Day 2	3	3
Day 3	3	3
Day 4	3	3
Day 5	3	3
Day 6	3	3
Day 7	3	4

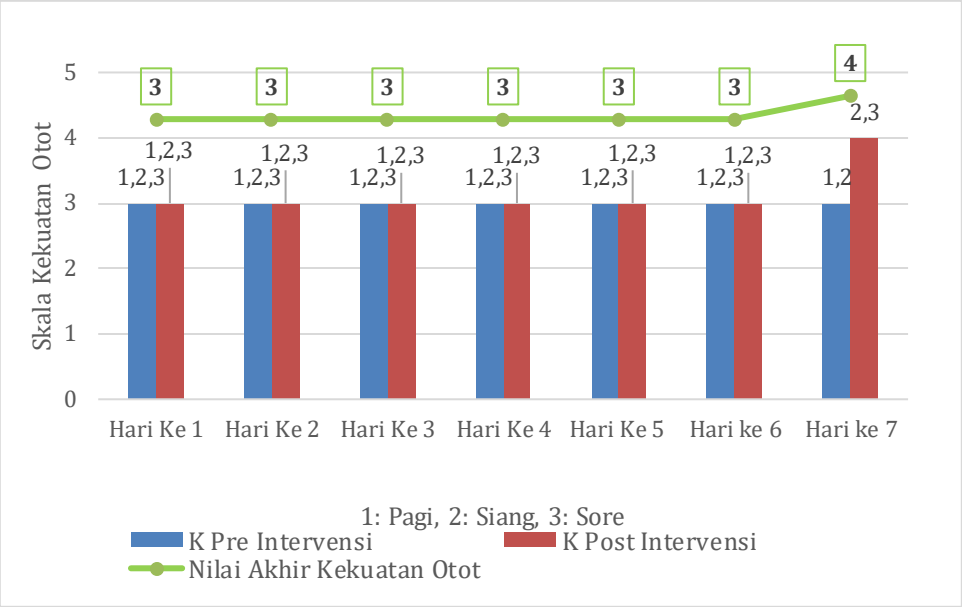

Figure 1. *Result Graphic*

3.1.3 Results of upper limb muscle strength measurements after rubber ball grasping therapy

After the intervention was carried out for 7 days of home visits, the client's muscle strength began to increase on day seven, precisely at intervention carried out at 13.00, where upper extremity muscle strength before ball grasp therapy: right (3) left (3) and post ball grasp therapy muscle strength right (4) and left (4), namely the client is able to move the extremities and is able to resist the examiner's resistance. extremities and able to resist examiner resistance but still weak and shaking. This means that there is an increase in muscle strength worth 1.

3.1.4 Results Of The Intervention Obtained From The Literature Study

Based on research [7] This research involved 20 respondents with the average muscle strength is a given scale of 3 intervention for 7 consecutive days within two minutes every workout. Based on research, test results were obtained Wilcoxon signed ranks test statistics p-value 0.005 (<α 0.05) which means there is an influence from rubber ball grip therapy

This affects the increase in muscle strength in post-stroke patient's intervention group, while in the control group Just doing therapy from the community health center makes no difference muscle strength before and after therapy. Based on research conducted by [8] that ball grip therapy can increase muscle strength in elderly people who have had a stroke so that patients can apply this therapy independently. This is because of therapy holding the ball is easy to do, the ball is used

It's also easy to get and light, making it easy to use Take it everywhere, so it can be used at any time required.This ball grip therapy can be done regularly to repair, maintain and restore muscle strength by stimulating the hand to make movements in the form of grip so that it can help in recovery motor function. Based on existing implementation carried out on clients for 4 days, the results were obtained the client's muscle strength has increased.

In research conducted by [9] researchers involved 2 respondents who have physical mobility problems and are given training hold a rubber ball for 6 days. This shows changes in the same muscle strength values. As for the strength value patient I's muscle before the procedure was 1 and after it was given ball grip therapy became 3. Meanwhile, in patient II with the muscle strength value before is 2 and after given ball grasp therapy became 4. This shows there is the same increase, namely 2 or respectively by 50%. The increase in muscle strength itself is not immediately significant but increasing every day because it needs gradual practice and over time strength these muscles can increase.

4. CONCLUSIONS

Based on the results of case studies that have been carried out regarding therapy hold a rubber ball to increase upper extremity muscle strength in non-hemorrhagic stroke patients, it can be concluded that administration rubber ball grip therapy in post-stroke cases can improve muscle strength as evidenced by an increase in muscle strength patient's upper extremities from 3 to 4.

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