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The Application of Rubber Ball Grip Therapy to Improve Muscle Strength in Non-Hemorrhagic Stroke Patients in the Stroke Unit of RSD Gunung Jati Cirebon

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ABSTRACT

Background & Objective: According to the World Health Organization (WHO), stroke is a clinical syndrome characterized by brain dysfunction symptoms, which may result in death or lasting disability if symptoms persist beyond twenty-four hours. It can cause physical disabilities, loss of function, paralysis, and communication difficulties. This study aimed to analyze nursing care interventions using Rubber Ball Grip Therapy in non-hemorrhagic stroke patients to improve muscle strength. **Method:** The study employed a case study design with one non-hemorrhagic stroke patient experiencing muscle weakness at RSD Gunung Jati Cirebon. Data collection was conducted through anamnesis, physical assessment, direct observation, and documentation. Nursing care was provided for 3 consecutive days. At admission, the patient complained of weakness in the right extremities and numbness since the previous evening, accompanied by headaches. The intervention used was Mobilization Support with evidence-based nursing (EBN) Rubber Ball Grip Therapy, implemented for 15 minutes daily over 3 consecutive days. **Result:** The therapy was found effective as the patient, initially weak, was later able to grip the rubber ball firmly. **Conclusion:** Rubber Ball Grip Therapy was effective in improving muscle strength in a non-hemorrhagic stroke patient. This simple, non-pharmacological intervention can support motor recovery and be applied in nursing care practice.

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Introduction

Non-hemorrhagic or ischemic stroke is a condition in which blood vessels are blocked, causing partial or complete cessation of blood flow to the brain. This is the most common form of stroke pathology, accounting for about 80% of all stroke cases. Non-hemorrhagic stroke consists of three categories: thrombolytic stroke, embolic stroke, and systemic hypoperfusion (Amalia, 2022).

According to the World Stroke Organization (WSO), in 2022 there were 12.2 million new cases of stroke and approximately 6.5 million deaths caused by stroke each year (Feigin, Brainin, Norrving, Martins, Sacco, Hacke, W, & Lindsay, 2022). It is estimated that 9.4 million Americans over the age of 20 have experienced stroke, according to data from the National Health and Nutrition Examination Survey (NHANES) 2017–2020. Based on the 2018 Basic Health Research (Riskesdas), the number of people in Indonesia aged over 15 years who have experienced stroke was 10.9%, or 2,120,362 individuals (Ministry of Health, Republic of Indonesia, 2018).

Stroke therapy includes both pharmacological and non-pharmacological measures. In stroke cases, antihypertensives, antiplatelets, and antihyperlipidemics are commonly given as pharmacological therapy (Khaliri & Waliyanti, 2023). Non-pharmacological therapies for patients who have undergone stroke recovery include mirror therapy and rubber ball grip therapy to improve muscle strength (Christaputri & Anam, 2023; Valentina, Utami, & Fitri, 2021). Therapy using a round, elastic, textured, and squeezable rubber ball is known as rubber ball grip therapy (Kusumaningrum & Wulandari, 2023). The rubber ball, with its soft and textured surface, can stimulate acupressure points, particularly in the hand area, which then transmit signals to the brain (Christaputri & Anam, 2023). Rubber ball grip exercises can also stimulate the contraction of muscle fibers with mild strength (Anggardani et al., 2023). Gripping the rubber ball stimulates fine touch sensations and pressure at the encapsulated receptor endings, which activate upper extremity movement.

Objective

Based on the description above, the researcher was interested in preparing a scientific report on "The Application of Rubber Ball Grip Therapy to Improve Muscle Strength in Non-Hemorrhagic Stroke Patients.".

Method

This study used a qualitative case study design. The subject was a non-hemorrhagic stroke patient with physical mobility impairment in the Stroke Unit of RSD Gunung Jati Cirebon. The study was conducted from February 31 to March 2, 2025.

Data collection involved anamnesis, physical examination, direct observation, and documentation. Data analysis was carried out daily to monitor patient progress, compared with theory, and summarized in the discussion.

Results

The patient, Mrs. R, aged 49, a self-employed worker, was admitted to the stroke unit on February 31, 2025, diagnosed with non-hemorrhagic stroke. She reported numbness on the right side of her face down to her right leg, weakness in her right extremities since the previous evening, and headaches. She had a history of hypertension but had not undergone regular check-ups.

On admission, vital signs were: BP 160/90 mmHg, RR 20x/min, HR 85x/min, Temp 36°C, SpO_2 98%. The main nursing diagnosis was Impaired Physical Mobility related to decreased muscle strength.

Day 1: Patient was weak, unable to grip the ball firmly. Therapy involved instructing her to repeatedly grip and release a rubber ball for 15 minutes. Education was also provided to the patient and family.

Day 2: Patient reported slight improvement, able to grip weakly. BP improved to 135/80 mmHg. Therapy continued with gradual progress.

Day 3: Patient reported further improvement, could grip more firmly. BP improved to 130/80 mmHg. Mobility and strength were partially restored, and patient was instructed to continue therapy at home.

In addition to grip therapy, passive Range of Motion (ROM) exercises were performed on lower extremities. By day 3, the patient and family showed motivation and cooperation, and the patient was able to move her fingers and partially lift her arm with assistance.

Discussion

The assessment results showed that Mrs. R, 49 years old, was admitted to the Stroke Unit of RSD Gunung Jati on February 31 due to weakness in the right extremities and numbness since the previous evening, accompanied by headaches.

Day 1: On the first day, with the nursing diagnosis of Impaired Physical Mobility, the nurse identified pain and other physical complaints. The patient reported weakness on the right side of her body from head to foot and had difficulty gripping. The nurse assessed physical tolerance to movement, noting that the patient was still weak. Before mobilization, the nurse monitored heart rate and blood pressure, which was 160/90 mmHg. The nurse then facilitated mobilization using a rubber ball by placing it in the patient's weak hand and instructing her to grip and release it repeatedly for 15 minutes. The nurse explained the purpose of the therapy and taught the patient and her family how to perform it.

Day 2: On the second day, the nurse again assessed for pain or other physical complaints. The patient still felt weakness on the right side but was now able to grip the ball slightly. The nurse noted that although the patient remained weak, she could start gripping little by little. Blood pressure improved to 135/80 mmHg. The nurse facilitated mobilization again with the rubber ball for 15 minutes and reinforced teaching to the patient and family.

Day 3: On the third day, the nurse reassessed and found that weakness had lessened. The patient reported improvement and was able to grip more firmly. The nurse noted that she was no longer too weak and could grip strongly. Blood pressure improved further to 130/80 mmHg. With rubber ball therapy, the patient could finally grip tightly without weakness.

Evaluation of Impaired Physical Mobility Diagnosis:

- Day 1: The patient reported numbness from the right side of the face to the right leg, weakness, and headaches, with a history of hypertension. Vital signs: BP 160/90 mmHg, RR 20x/min, HR 85x/min, Temp 36°C, SpO_2 98%. Reflexes were weak on the right side; muscle tone was reduced. Impaired mobility was unresolved, and intervention was continued.
- Day 2: The patient reported weakness but was able to grip slightly. Objectively, she remained weak but improved slightly, with BP 135/80 mmHg. Mobility was partially resolved.
- Day 3: The patient reported further improvement. Objectively, she was less weak, able to grip better, and BP was 130/80 mmHg. Impaired mobility was partially resolved. She was instructed to continue rubber ball grip therapy at home as taught by the nurse.

Range of Motion (ROM) Therapy:

Passive ROM exercises were performed, with the nurse assisting the patient to move weakened joints since she could not do so independently. ROM exercises were carried out for 3 days on the lower extremities. On the first day, after explanation and training, Mrs. R and her family were cooperative and enthusiastic. She still complained that her arms felt heavy when moved. By the third day, after repeated passive ROM practice and encouragement to continue exercises at home, Mrs. R was able to move her fingers slowly on her own and lift her arm with family assistance. She expressed feeling happy and motivated to practice independently so she could recover and be discharged. Mrs. R and her family stated that they would continue practicing regularly since they had learned the correct ROM exercises and noticed improvements in muscle strength.

Conclusion

Based on the study, it was found that the patient experienced weakness in the left extremities, was bedridden, and required full assistance from family and nurses for daily activities. Nursing care was planned and implemented for three consecutive days using evidence-based nursing (EBN) through rubber ball grip therapy. The evaluation showed partial improvement, with increased muscle strength and enhanced Range of Motion (ROM).

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