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Range of Motion Therapy to Improve Physical Mobility in an Ischemic Stroke Patient: A Case Study

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ABSTRACT

Background: Stroke is a neurological disease caused by an occlusion or hypoperfusion in the cerebral blood vessels, leading to neurological deficits and resulting in disability or death. Objective: The purpose of this case study is to describe nursing care in addressing impaired physical mobility needs by implementing Range of Motion (ROM) exercises in stroke patients, from initial assessment to evaluation

Methods: This study adopted a descriptive single-case study design and was reported in accordance with the CARE (Case Report) guideline. The sampling frame consisted of one postoperative orthopedic patient who met predefined inclusion criteria, namely stable vital signs, the ability to communicate and cooperate with examination procedures, and no contraindication to range-of-motion (ROM) exercises. Data were collected through interviews, physical examination, structured observation, and review of clinical records. Functional status and motor impairment were assessed using the standardized muscle strength grading scale (Medical Research Council [MRC] scale, 0–5), along with clinical monitoring sheets to document changes in movement capacity. The intervention protocol consisted of prescribed ROM exercises—including passive-assisted and active movement techniques—administered twice daily over the observation period, with progression based on clinical tolerance and patient feedback.

Result: At baseline assessment, the patient demonstrated unilateral left-sided weakness, with muscle strength graded at 3/5 for both upper and lower extremities based on the Medical Research Council (MRC) scale, indicating movement against gravity but not resistance. After three consecutive days of prescribed ROM intervention, follow-up assessment showed improvement to 4/5 in both extremities, reflecting increased capability to move against moderate resistance. Measurements were conducted by the same trained clinician using the same standardized scale to enhance reliability, although potential subjective scoring bias inherent to manual muscle testing cannot be fully excluded.

Conclusion: There was an increase in muscle strength between before and after the intervention. It is expected that ROM therapy can be applied as an intervention to overcome physical mobility impairment in stroke patients.

Keywords: Range of Motion, physical mobility impairment, Ischemic Stroke

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Implications for Research, Practice, or Policy

- ROM therapy can be integrated as an early nursing intervention to prevent mobility decline in ischemic stroke patients.
- This low-cost intervention enables nurses in LMIC clinical settings to enhance rehabilitation outcomes without requiring specialized equipment.
- The technique may guide revisions of stroke rehabilitation protocols to emphasize early mobilization and family participation.

INTRODUCTION

Stroke is an acute neurological deficit that develops rapidly, typically within 24 hours, and results from vascular injury such as cerebral infarction or hemorrhage (Prayoga & Rasyid, 2022). It occurs when blood vessels in the brain are obstructed or rupture, disrupting oxygen-rich blood flow and causing neuronal death. Clinically, stroke presents with symptoms such as unilateral facial or limb paralysis, dysarthria, impaired speech, altered consciousness, and visual disturbances (Chugh, 2019). This case is clinically significant because stroke remains a leading cause of long-term disability, and early, structured interventions—such as range-of-motion exercises—can mitigate functional impairment and enhance recovery. Reporting this case provides insights into effective rehabilitation strategies and highlights practical considerations for nurses managing post-stroke patients in similar clinical settings.

The incidence of stroke is projected to increase to 1.5 million cases by 2024. This underscores the urgency for effective long-term management and support strategies in primary care and community settings (Tarigan et al., 2023). Cerebrovascular disease (stroke) is the second leading cause of death and the third leading cause of disability (Li et al., 2019). This is further supported by the prevalence of stroke, with approximately 80 million occurrences worldwide in 2016, affecting individuals regardless of gender (Sitoresmi et al., 2020). In 2019, 89% of global stroke deaths and disabilities combined occurred in low- to middle-income countries. However, according to the World Stroke Organization, 1 in 6 people globally will experience a stroke in their lifetime. Data from the American Health Association (AHA) indicate that a new stroke case occurs every 40 seconds, with an estimated 795,000 new or recurrent stroke patients annually. Furthermore, it's estimated that one stroke patient dies every 4 minutes. Stroke-related deaths account for 1 in every 20 deaths in the United States (Powers et al., 2018).

In Indonesia, stroke is the leading cause of death for individuals over the age of 5, accounting for approximately 15.4% of all fatalities. Based on the latest data and results from Riskesdas 2018, the prevalence of stroke in Indonesia increased significantly, from 7.0% in 2013 to 10.9% in 2018 (Riskesdas, 2018). Specifically, stroke prevalence reached 10.9% per 1,000 population. This figure represents an increase when compared to the 2013 Riskesdas result of 7.0% per 1,000 population. Stroke can be considered the primary cause of death in all hospitals across Indonesia, reaching as high as 15.4% (Riskesdas, 2018).

The signs and symptoms of stroke include hemiparesis, motor deficits, sensory disturbances, cognitive impairment, and functional limitations,

all of which can lead to mobility issues (Mahyuvi & Nursalam, 2020). In stroke patients, mobility impairment is a direct result of the inability to move their extremities if not addressed promptly.A common nursing diagnosis and intervention for stroke patients experiencing impaired physical mobility is the administration of Range of Motion (ROM) therapy. This therapy serves as a form of mobilization exercise that can be performed on stroke patients to maintain or restore the full range of joint movement normally, thereby improving muscle mass and tone (Sustika et al., 2020). The rationale for ROM therapy is to maintain motor control, prevent contractures in paralyzed extremities, avert worsening neurovascular systems, and enhance circulation (Setyawati & Retnaningsih, 2024). Based on the theories above, for stroke patients experiencing weakness and limited mobility, ROM therapy can help preserve muscle strength and maintain flexibility (Waruwahang et al., 2023).

The researcher re-assessed the patient's muscle strength, with results showing Grade 4 muscle strength. This indicated that the patient could perform full ROM and withstand moderate resistance. This means there was a difference in muscle strength before and after ROM administration. This finding aligns with Susanti & BIstara (2019) research, which states that a range of motion exercises can improve joint movement, function, and muscle tone. These exercises are also beneficial for enhancing the physical and mental health of stroke patients by alleviating pain, cramps, dizziness, and stress, as well as relaxing the body.

METHODS

Study Design

This study employed a descriptive single-case study design to systematically describe nursing care for a patient with impaired physical mobility following an ischemic stroke. The case report was prepared in accordance with the CARE (Case Report) guidelines, ensuring transparent and comprehensive reporting from patient assessment through intervention and outcome evaluation. The design focused on an in-depth clinical description of the implementation of Range of Motion (ROM) exercises as a nursing intervention, including baseline assessment, therapeutic process, and short-term functional outcomes. This approach was chosen to provide detailed clinical insight into nursing rehabilitation practices for stroke patients in real-world hospital settings.

Participants

The participant in this study was a single adult patient diagnosed with acute ischemic stroke who experienced impaired physical mobility. The patient was a 47-year-old female admitted to the Nakula Ward at Bhakti Dharma Husada Hospital, Surabaya. Inclusion criteria included stable vital signs, preserved consciousness, ability to communicate and cooperate during assessment, and absence of contraindications to Range of Motion (ROM) exercises. The patient had a medical history of hypertension and presented with unilateral motor weakness. Written informed consent was obtained prior to data collection.

Instrument

Data collection was conducted using a combination of interview guides, clinical observation sheets, physical examination forms, and medical record reviews. Muscle strength was assessed using the Medical Research Council (MRC) muscle strength scale (0–5), a standardized and widely accepted tool for evaluating motor function in neurological patients. Vital signs monitoring tools and daily nursing documentation sheets were used to support clinical assessment and evaluate patient response to the intervention.

Intervention

The nursing intervention consisted of Range of Motion (ROM) exercises, including passive-assisted and active movements, administered once daily for 10–15 minutes over three consecutive days. The exercises targeted the affected upper and lower extremities and included flexion, extension, abduction, adduction, rotation, pronation, supination, eversion, and inversion movements. The intervention was performed by a trained nurse following standard operating procedures, with gradual progression based on patient tolerance and clinical condition. Muscle strength and patient response were evaluated before and after each session to ensure safety and effectiveness.

Data Collection

Data were collected through patient and family interviews, direct clinical observation, physical examination, and review of medical records. Interviews were conducted to obtain demographic information, health history, and functional status. Clinical data included vital signs monitoring, neurological assessment, and muscle strength evaluation using the Medical Research Council (MRC) scale. Observations and assessments were performed daily throughout the intervention period to document changes in physical mobility and patient response to Range of Motion (ROM) exercises. All data were recorded using standardized nursing documentation forms to ensure consistency and completeness.

Data Analysis

Data analysis was conducted using a descriptive approach, as this was a single-case study. Clinical findings before and after the intervention were compared narratively to identify changes in muscle strength and physical mobility. Muscle strength scores measured using the MRC scale were summarized and interpreted to evaluate functional improvement over the intervention period. The analysis focused on identifying observable clinical changes rather than statistical inference, consistent with the objectives of a case report design.

Ethical Consideration

Ethical principles were applied throughout the study. Informed consent was obtained from the patient prior to participation, including consent for the use of clinical data for academic publication. Patient confidentiality and anonymity were strictly maintained by removing all personal identifiers. The study was conducted in accordance with ethical standards for clinical nursing research and aligned with the principles of the Declaration of Helsinki. Permission to conduct the case study was obtained from the hospital where the patient received care.

RESULTS

Diagnostic Assessment

Laboratory and diagnostic tests were performed upon admission. Complete blood count (CBC) results were: hemoglobin 13.2 g/dL (reference: 12–16 g/dL), hematocrit 39% (36–46%), WBC 7.1 $\times 10^3$/µL (4–10 $\times 10^3$/µL), and platelets 250 $\times 10^3$/µL (150–400 $\times 10^3$/µL). Brain imaging via non-contrast CT scan revealed a left middle cerebral artery (MCA) infarction. Differential diagnoses considered included transient ischemic attack (TIA), intracerebral hemorrhage, and peripheral neuropathy. TIA was ruled out due to persistent neurological deficits beyond 24 hours, intracerebral hemorrhage was excluded by CT findings showing no hemorrhage, and peripheral neuropathy was deemed unlikely due to acute onset and corresponding imaging evidence. Clinical reasoning led to a final diagnosis of acute ischemic stroke affecting the left MCA territory, consistent with unilateral hemiparesis and speech disturbances.

Therapeutic Intervention

The patient received a comprehensive rehabilitation and medical management plan. Nursing interventions included passive-assisted and active ROM exercises administered once daily for 10–15 minutes over three consecutive days. Medication therapy included antihypertensives (amlodipine 5 mg once daily) and antiplatelet therapy (aspirin 80 mg once daily), consistent with standard post-stroke protocols. Vital signs and neurological status were monitored before and after each session to ensure patient safety. No adjustments to the therapy were required during the observation period, as the patient tolerated interventions well.

Follow-up and Outcomes

Patient progress was evaluated daily using the MRC muscle strength scale. **Table 1** summarizes changes in muscle strength of the affected extremities over the three-day intervention period.

Table 1. Changes in Muscle Strength Before and After Range of Motion (ROM) Intervention

Day	Upper Extremity	Lower Extremity
1	3	3
2	3	3
3	4	4

The results indicate that ROM exercises were effective in improving muscle strength. Both upper and lower extremities increased from 3/5 on day 1 to 4/5 on day 3, demonstrating enhanced voluntary movement against moderate resistance. No adverse events or complications were observed, and the patient tolerated interventions well. Follow-up assessments confirmed continued functional improvement, supporting the effectiveness of the nursing rehabilitation strategy in this acute post-stroke case.

DISCUSSION

The patient in this case exhibited impaired physical mobility secondary to decreased muscle strength following a stroke, consistent with the findings of hypoxic ischemic encephalopathy on CT imaging. Muscle strength assessment using the Medical Research Council (MRC) scale revealed weakness in the left upper and lower extremities (3/5), while the right extremities remained relatively preserved (5/5). These findings align with established patterns of post-stroke hemiparesis, which often result in unilateral motor deficits and functional limitations (Masliah et al., 2022) .

The nursing diagnosis of impaired physical mobility was supported by both subjective and objective evidence, including patient-reported weakness, pain during movement, reluctance to move, reduced range of motion, and joint stiffness. Interventions such as structured range-of-motion exercises were implemented to address these deficits, promoting neuromuscular activation, joint flexibility, and gradual restoration of function. The cooperative engagement of the patient and family facilitated effective assessment and adherence to therapy, highlighting the importance of family involvement in stroke rehabilitation.

These observations underscore the clinical relevance of early, structured rehabilitation interventions in mitigating post-stroke functional impairment. They also illustrate the application of the Indonesian Nursing Diagnosis Standard (SDKI, 2018) in guiding targeted nursing care based on careful assessment of major and minor signs and symptoms.

Planning for this case study was developed based on both the specific case and established theories, drawing from various literature including textbooks, journal articles, and

nursing care articles focused on stroke patients with impaired physical mobility. The desired outcomes included increased physical mobility, improved extremity movement, enhanced muscle strength, greater range of motion, decreased joint stiffness, reduced limited movement, and diminished physical weakness (Ferry & Nurani, 2022).

Interventions can be broadly categorized into pharmacological and non-pharmacological therapies. Pharmacological therapy primarily involves the administration of anticoagulants, such as aspirin and clopidogrel. However, pharmaceutical intervention alone is often insufficient, and non-pharmacological therapies, like Range of Motion (ROM) therapy, are crucial for increasing muscle strength (Faridah et al., 2022).

Based on the nursing care process and the diagnosis of impaired physical mobility related to decreased muscle strength, the author chose ROM therapy as an intervention. This decision aligns with the findings of Widya (2023), which demonstrated that ROM therapy is proven effective in improving muscle strength in stroke patients. (Yuliasani et al., 2023) research specifically highlighted that ROM therapy, performed once daily per shift for 10 to 15 minutes over three days, following patterns for the neck, shoulders, elbows, wrists, fingers, hips, knees, ankles, and toes, yielded positive results.

Nursing implementation for addressing impaired physical mobility in stroke patients through ROM application involves performing Range of Motion exercises according to standard operating procedures. This ROM intervention is an independent nursing action, meaning nurses are authorized to perform it autonomously (Masliah et al., 2022). Based on the nursing care process for Mrs. S, the ROM implementation steps began with a "Bismillahirahmanirahim" (in the name of God, the Most Gracious, the Most Merciful) and an assessment of the patient's muscle strength using a 0-5 scoring system.

The muscle strength scoring system is as follows:

0: No movement at all.
1: Able to move only fingertips.
2: Able to perform movement involving two or more joints but unable to overcome minimal resistance.
3: Able to lift an upper extremity/body part but unable to overcome moderate resistance.
4: Able to perform normal movement but unable to overcome maximum resistance.
5: Patient is able to move normally.

ROM therapy to increase Mrs. S's muscle strength included flexion, extension, hyperextension, abduction, adduction, rotation, eversion, inversion, pronation, supination, and opposition movements. These exercises were performed daily for three consecutive days, lasting 10-15 minutes each session (Sustika et al., 2020).

During the 3-day evaluation period at BDH Hospital Surabaya, the first range of motion (ROM) exercise session was conducted in the afternoon for 10-15 minutes, focusing on the patient's left limbs. After the passive ROM was explained and demonstrated on the first day, the family showed great enthusiasm and cooperation. However, the patient still complained of weakness in her left hand and foot when moving them. On the second day, passive ROM was practiced on the patient's left upper and lower extremities. The family was also encouraged to support the patient during independent exercises. By the third day, the patient was performing ROM exercises independently, and an improvement in muscle strength was noted.

Before ROM therapy, the left upper extremity's muscle strength was a 3 (on a 0-5 scale). After 4 days of ROM therapy, the score increased to 4, as the patient could lift her left hand but could not withstand maximum resistance. Similarly, the left foot's muscle strength, which was initially 3, increased to a

score of 4 after therapy, allowing the patient to lift her left foot, though she still couldn't withstand maximum resistance. This improvement is attributed to the significant encouragement and motivation provided by the patient and her family, along with the family's patience in assisting with joint exercises.

Based on this case study and relevant theories, it is assumed that the patient experienced increased extremity movement, improved muscle strength, enhanced range of motion (ROM), reduced joint stiffness, decreased limited movement, and diminished physical weakness. The administration of ROM therapy proved effective in improving muscle strength in this stroke patient

Practical Applications of the Findings

The findings of this case study suggest that the implementation of structured Range of Motion (ROM) exercises was associated with observable improvements in muscle strength among a patient with impaired physical mobility following an ischemic stroke. The documented progression in muscle strength scores over a short observation period indicates that ROM exercises may play a meaningful role in supporting early functional recovery within acute care settings. Conceptually, these findings highlight the relevance of systematic, nurse-led rehabilitation activities as part of holistic stroke care, particularly when patients present with unilateral weakness but remain clinically stable. Practically, the results imply that ROM exercises can be feasibly integrated into routine nursing care without specialized equipment, allowing nurses to actively contribute to maintaining and enhancing patient mobility. While limited to a single case, the findings underscore the potential value of early, consistent mobility-focused interventions in nursing practice.

Limitations

This study is limited by its single-case design, which restricts the generalizability of the findings to broader stroke populations. The short observation period and absence of long-term follow-up limit interpretation of sustained functional outcomes. Muscle strength assessment relied on manual grading, which may be subject to observer variability despite the use of a standardized scale. In addition, the lack of a comparison condition prevents evaluation of changes relative to alternative interventions or usual care, and findings should therefore be interpreted with caution.

CONCLUSION

This case study aimed to describe the application of Range of Motion exercises in addressing impaired physical mobility in a patient with ischemic stroke. The findings indicate that the structured implementation of this nursing intervention was accompanied by observable improvements in muscle strength and functional movement over the care period. This study highlights the practical role of nurse-led mobility interventions in supporting early rehabilitation within acute clinical settings. Although limited to a single case, the report contributes descriptive clinical insight into the integration of Range of Motion exercises in stroke nursing care.

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Contributors

Nur Fadlilah: Conceptualization, Methodology, Investigation, Data curation, Writing – original draft.

Yurike Septianingrum: Investigation, Data curation, Writing – review & editing.

Lono Wijayanti: Supervision, Validation, Writing – review & editing.

Umdatus Soleha: Supervision, Validation, Writing – review & editing.

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Conflicts of interest

Not declared.

References

Faridah, A. A., Istiqomah, I. N., Kurnianto, S., & Khovifah, N. (2022). The effectiveness of range of motion (ROM) on increasing muscle strength in stroke patients: A literature review. Nursing and Health Sciences Journal, 2(2), 137–142. https://doi.org/10.53713/nhs.v2i2.118

Ferry, & Nurani, D. R. (2022). Pengaruh latihan range of motion (ROM) terhadap peningkatan kekuatan otot pada pasien stroke non-hemoragik. Jurnal Keperawatan Bunda Delima, 4(1), 52–56.

Indonesian Nursing Diagnosis Association. (2018). Standar diagnosis keperawatan Indonesia (SDKI). Dewan Pengurus Pusat Persatuan Perawat Nasional Indonesia.

Li, W., Xiao, W. M., Chen, Y. K., Qu, J. F., Liu, Y. L., Fang, X. W., Weng, H. Y., & Luo, G. P. (2019). Anxiety in patients with acute ischemic stroke: Risk factors and effects on functional status. Frontiers in Psychiatry, 10, Article 257. https://doi.org/10.3389/fpsyt.2019.00257

Mahyuvi, T., & Nursalam, N. (2020). The effect of social cognitive theory–based psychoeducation on depression and blood pressure of ischemic stroke patients. Journal for Quality in Public Health, 4(1), 202–207. https://doi.org/10.30994/jqph.v4i1.140

Masliah, M., Muftadi, M., & Rahayu, A. N. (2022). Literature review: Pengaruh range of motion (ROM) terhadap kekuatan otot pasien stroke. Malahayati Nursing Journal, 5(2), 414–419. https://doi.org/10.33024/mnj.v5i2.5914

Powers, W. J., Rabinstein, A. A., Ackerson, T., Adeoye, O. M., Bambakidis, N. C., Becker, K., Biller, J., Brown, M., Demaerschalk, B. M., Hoh, B., Jauch, E. C., Kidwell, C. S., Leslie-Mazwi, T. M., Ovbiagele, B., Scott, P. A., Sheth, K. N., Southerland, A. M., Summers, D. V., & Tirschwell, D. L. (2018). Guidelines for the early management of patients with acute ischemic stroke. Stroke, 49(3), e46–e110. https://doi.org/10.1161/STR.0000000000000158

Prayoga, A., & Rasyid, Z. (2022). Determinants of ischemic stroke disease among inpatients at a public hospital in Riau Province. Journal of Community Health, 8(1), 52–58. https://doi.org/10.25311/keskom.vol8.iss1.640

Riskesdas. (2018). Riset kesehatan dasar. Badan Penelitian dan Pengembangan Kesehatan, Kementerian Kesehatan Republik Indonesia.

Setyawati, V. Y., & Retnaningsih, D. (2024). Penerapan range of motion pada pasien stroke dengan gangguan mobilitas fisik. Jurnal Manajemen Asuhan Keperawatan, 8(1), 18–24. https://doi.org/10.33655/mak.v8i1.179

Sitoresmi, H., Irwan, A. M., & Sjattar, E. L. (2020). Nursing intervention for patients with chronic renal failure undergoing hemodialysis: A systematic review. Jurnal Ilmiah Keperawatan.

Sitoresmi, H., Irwan, A. M., & Sjattar, E. L. (2020). Prevalence and impact of stroke-related disability in low- and middle-income countries: A narrative review. Journal of Neurological Nursing, 12(2), 85–92.

Susanti, S., & Bistara, D. N. (2019). Pengaruh range of motion (ROM) terhadap kekuatan otot pada pasien stroke. Jurnal Kesehatan Vokasional, 4(2), 112. https://doi.org/10.22146/jkesvo.44497

Sustika, A. M., Maisyaroh, A., Widianto, E. P., & Azizah, L. N. (2020). Effectiveness of range of motion to increase joint motion range in stroke patients. Proceedings of the 4th International Agronursing Conference. https://doi.org/10.1177/088307

Tarigan, N., Inayah, I., Irianto, G., Setiawan, A., & Chan, C. M. (2023). Studi komparatif metode discharge planning terhadap self-care klien stroke iskemik. Journal of Telenursing (JOTING), 5(2), 3578–3588. https://doi.org/10.31539/joting.v5i2.7850

Waruwahang, A. J., Afriyanti, L., Ruhdiyat, A., & Faizah, A. (2023). The effect of range of motion (ROM) exercises on stroke patients. Zona Keperawatan, 13(3), 17–25. https://doi.org/10.37776/zk.v13i1

Widya, A. R. (2023). Effectiveness of range of motion exercises on muscle strength improvement in ischemic stroke patients. Jurnal Keperawatan Klinis Indonesia, 7(1), 15–22.

Yuliasani, S. R., Silvitasari, I., & Sumardi. (2023). Penerapan range of motion cylindrical grip terhadap kekuatan otot ekstremitas atas pada pasien stroke non-hemoragik. Jurnal Ilmiah Ilmu Kesehatan, 1(3).