

CASE STUDY: APPLICATION OF ACTIVE RANGE OF MOTION (ROM) EXERCISES TO IMPROVE MUSCLE STRENGTH IN RHEUMATOID ARTHRITIS PATIENT



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ABSTRACT

Introduction: Rheumatoid arthritis is a disease that attacks the joints which can cause a decrease in muscle strength. To avoid a decrease in muscle strength, non-pharmacological treatment can be done by doing Range of Motion (ROM) exercises. **Purpose:** This case study aims to determine the increase in muscle strength in patients with rheumatoid arthritis after active ROM exercises. **Methods:** The method used is a case study using descriptive research. The subject of the study is one patient with rheumatoid arthritis. The focus of this study is on the application of evidence-based nursing in the form of active ROM exercises for 3 times in 3 consecutive days with a movement frequency of 10 times to patient with rheumatoid arthritis. Muscle strength assessment is carried out using Manual Muscle Testing (MMT) to see the results of the pre-test and post-test of the patient's muscle strength. **Discussion:** The results obtained after the patient underwent active ROM exercises were increased muscle strength. Active ROM exercises was able to increase muscle strength from 4/4/3/3 to 5/5/4/4. This shows that ROM exercises can be used as a therapy to increase muscle strength in patients with rheumatoid arthritis. **Conclusion:** Providing active ROM exercises can increase muscle strength in patients with rheumatoid arthritis.

Keywords: Muscle strength, range of motion (ROM), rheumatoid arthritis.

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INTRODUCTION

Rheumatoid arthritis is a disease that is still a problem in Indonesia. Rheumatoid arthritis is a disease that attacks the joints, causing structure or tissue disruption, thus disrupting daily activities (Deane & Holers, 2021). According to the results of the Riskesdas 2018, joint diseases, one of which is rheumatoid arthritis, are among the highest non-communicable diseases suffered by the Indonesian people with a prevalence based on a doctor's diagnosis in the population aged ≥ 15 years in Indonesia of 7.30%. The prevalence of rheumatoid arthritis in Central Java itself reached 6.78% of people (Kemenkes RI, 2018).

People with rheumatoid arthritis often experience joint pain, swelling and redness, cyanosis, and fever. Swelling due to rheumatoid arthritis often occurs in the feet, big toes, ankles, knees, hands, wrists, and

elbows and can cause lumps. Lumps in certain joints of the body can cause excessive pain, affecting movement during activities (Pertiwi et al., 2022). People with rheumatoid arthritis can experience limited mobility, decreased muscle strength, decreased muscle mobility, stiffness and tremors in the hands, feet, head, lower jaw, and others, as well as changes in other musculoskeletal diseases (Adawiyah et al., 2023). A decrease in muscle strength of 25-70% has been observed in patients with rheumatoid arthritis when compared to age-matched healthy controls (Yamada et al., 2017).

In an effort to deal with the problem of movement during activities, especially preventing decreased muscle strength due to rheumatoid arthritis, there are 2 methods that can be done, pharmacological and non-pharmacological therapy. Pharmacological therapy can be applied with drugs. However,

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often rheumatoid arthritis drugs in the DMARDs and NSAIDs groups cause side effects such as nausea, vomiting, and dizziness (Astuti et al., 2023). Therefore, non-pharmacological therapy can be carried out to treat rheumatoid arthritis symptoms with Range of Motion (ROM) exercises (Arisandi, 2023).

ROM or range of motion exercises are exercises that refer to the ability of joints to perform maximum movements. These exercises aim to prevent joint contractures and muscle atrophy, improve blood circulation in the extremities, reduce vascular paralysis, and provide comfort for patients with mobility problems (Uda et al., 2016).

Active ROM exercises have a greater effect than passive ROM exercises. This is because patients can move each joint independently according to their range of motion and avoid pain (Nurbaya et al., 2020). Active ROM exercises can increase muscle strength in patients with rheumatoid arthritis. This is in accordance with research conducted by Nurhayati et al. (2024) which showed that there was an effect of active ROM exercises on increasing muscle strength in the elderly with rheumatoid arthritis.

METHOD

This type of research uses a descriptive case study approach compiled from nursing care reports using the nursing process. Based on the implementation of Evidence Based Nursing (EBN) in surgical practice, the case study uses an activity flow based on Polit and Beck (2012) regarding the process of implementing EBN in surgical practice.

In the first stage, the question refers to PICO (Problem/population, intervention, comparison, and outcome), namely "what interventions can be given to increase muscle strength in patients?". In the second stage, a search was conducted using electronic media, Pub Med, Science Direct, and Google Scholar databases.

The journal that is the reference for ROM exercise interventions is Nurhayati et al. (2024) with the title "*Range of Motion (ROM) Aktif Berpengaruh terhadap Peningkatan Kekuatan Otot pada Lansia dengan Rheumatoid Arthritis di Panti Sosial Lanjut Usia Mandalika NTB*". The results of this study showed a significant increase in muscle strength in the elderly with rheumatoid arthritis after active ROM exercises were carried out.

This is also evidenced by the journal that is the reference for ROM exercise interventions, the

journal entitled "*Penerapan Terapi Aktivitas Range of Motion (ROM) dalam Manajemen Hambatan Mobilitas Fisik pada Lansia Penderita Rematik di PSTW Minaula Kendari*". The results of this study indicate that there is an increase in muscle strength in patients after doing ROM exercises for 3 days with 10 repetitions for 5 seconds.

The next stage of implementing EBN in rheumatoid arthritis patients begins by explaining the procedure to the patient and family before the intervention is carried out. Informed consent is carried out verbally to request approval from the patient and family. A comprehensive assessment of the patient is carried out before EBN is implemented. ROM exercise intervention is carried out for approximately 30 minutes. The patient's muscle strength is measured using MMT (Manual Muscle Testing) before and after the procedure for 3 times in 3 consecutive days from April 12-14, 2024. Evaluation is carried out after the 3rd or last intervention.

RESULT

Nursing implementation was carried out once a day for 3 consecutive days starting from April 12-14, 2024. The implementation given was active ROM exercises. The author assessed muscle strength before and after the intervention as evaluation material.

Table 4.1 ROM Exercise Intervention Results

Date	Muscle Strength	
	Pre	Post
12/4/2024	4 4	4 4
	3 3	3 3
13/4/2024	4 4	4 4
	3 3	4 4
14/4/2024	4 4	5 5
	4 4	4 4

Based on the table, it is known that there is an increase in muscle strength after the implementation of ROM exercises. Before implementation, the patient's muscle strength was 4/4/3/3 and the final muscle strength after 3 implementations was 5/5/4/4. These results are in line with research conducted by Setyawati & Retnasari (2024) which stated that providing ROM for 3 times in 3 consecutive days can increase the patient's muscle strength.

DISCUSSION

Physical mobility disorders in patients are the result of joint stiffness due to rheumatoid arthritis experienced by the patient. During the assessment, the patient complained of stiff legs and hands and also decreased muscle strength examination. In

patients with rheumatoid arthritis, the muscles adjacent to the inflamed joints can experience dysfunction. This occurs due to disturbances in nerve and muscle regulation. Inflammation can cause a decrease in the muscle capacity to contract normally so that muscle strength decreases (Yamada et al., 2017). Active ROM exercises can cause stimulation that increases chemical, neuromuscular and muscular activation. Smooth muscles in the extremities contain actin and myosin filaments that have chemical properties and interact with each other. The interaction process is activated by calcium ions, and adenosine triphosphate (ATP), then broken down into adenosine diphosphate (ADP) to provide energy for muscle contractions in the extremities. Stimulation through neuromuscular will increase the stimulation of nerve fibers in the extremity muscles, especially the parasympathetic nerves that stimulate the production of acetylcholine, resulting in contraction. The mechanism through the muscles, especially the smooth muscles of the extremities, will increase metabolism in the mitochondria to produce ATP which is utilized by the smooth muscles of the extremities as energy for contraction and increase the tone of the smooth muscles of the extremities as an indicator of muscle strength (Anggriani et al., 2018).

This ROM exercise can reduce pain, restore the ability to move muscles, reduce joint stiffness and muscle weakness so that it can increase physical mobility (Sianipar et al., 2021). Range of Motion (ROM) exercises that are done correctly and routinely will have an impact on muscle strength and joint range of motion (Nindawi et al., 2021). When joints have an optimal range of motion, muscles tend to remain supple and flexible. Flexible muscles are more efficient in carrying out movements and preventing tension that can cause decreased muscle strength (Azkia et al., 2021). ROM exercises can increase blood circulation to muscles and joints. Increasing blood supply and nutrients to muscles helps reduce stiffness and maintain healthy muscle tissue (Abdillah et al., 2022).

ROM exercises in rheumatoid arthritis patients are done slowly and gently. There should be no stressful exercises during acute arthritis. However, each joint should still be moved in ROM at least once a day to prevent contractures. Also avoid putting excessive pressure on the tendons during stretching exercises. Sudden stretching can damage the tendons or joint capsules (Kavuncu & Evcik, 2004). During the acute inflammatory period, ROM exercises can be maintained by doing at least one to two times through full ROM

each day. The number of repetitions can be gradually increased as symptoms subside (Nurbaya et al., 2020). Active ROM exercises have a major influence on efforts to increase muscle strength in rheumatoid arthritis patients. This is in accordance with a study conducted by Nurhayati et al. (2024) that there is an effect of ROM exercises on increasing muscle strength in elderly rheumatoid arthritis at the Mandalika Elderly Social Home, NTB. The results showed that the level of muscle strength in each extremity increased in the good and normal categories. Another study also stated that ROM exercises can increase muscle strength, joint flexibility and mobility ability and indirectly affect the level of patient independence (Pratiwi & Hidayat, 2020).

CONCLUSION

The implementation of nursing in the form of active ROM given to patients with rheumatoid arthritis showed that the exercise could increase muscle strength in Mr. T with an average increase in muscle strength of one point. The patient said that his legs and hands were no longer stiff when moved after doing active ROM and muscle strength also increased from 4/4/3/3 to 5/5/4/4. So it can be concluded that active ROM exercises can increase muscle strength in patients with rheumatoid arthritis.

REFERENCE

- Abdillah, A., Istiqomah, I. N., Kurnianto, S., & Khovifah, N. (2022). The Effectiveness of Range of Motion (ROM) on Increasing Muscle Strength in Stroke Patients: Literature Review. *Nursing and Health Sciences Journal*, 2(2), 137–142. <https://doi.org/https://doi.org/10.53713/nhs.v2i2.118>
- Adawiyah, S. R., Nurwahyuni, E., & Aditama, D. (2023). Efektivitas Terapi ROM (Range Of Motion) Terhadap Peningkatan Kekuatan Otot Pada Pasien Lansia. *Jurnal Ilmiah Multidisiplin Keilmuan Mandira Cendikia*, 1(2), 7–10. <https://journal.mandiracendikia.com/index.php/mdi/article/view/414>
- Anggriani, Zulkarnain, Sulaimani, & Gunawan, R. (2018). Pengaruh ROM (Range of Motion) terhadap Kekuatan Otot Ekstremitas pada Pasien Stroke Non Hemoragic. *Jurnal Riset Hesti Medan Akper Kesdam I/BB Medan*, 3(2),

- 64–72.
<https://doi.org/https://doi.org/10.34008/jurhesti.v3i2.46>
- Arisandi. (2023). *Buku Keperawatan Gerontik*. PT Nasya Expanding Management.
- Astuti, N. N. W. P., Kurniawati, D., & Mustaqimah. (2023). Studi Kejadian Efek Samping Pengobatan Rheumatoid Arthritis Pasien Rawat Jalan Di Rumah Sakit Ulin. *Jurnal Farmasi Syifa*, 1(2), 91–97.
<https://doi.org/https://doi.org/10.63004/jfs.v1i2.229>
- Azkia, Z., Setiyani, R., & Kusumawardani, L. H. (2021). Balance Strategy Exercise Versus Lower Limb-Rom Exercise for Reducing the Risk of Falls Among Older People. *Nurse Media Journal of Nursing*, 11(1), 114–123.
<https://doi.org/https://doi.org/10.14710/nmjn.v11i1.33229>
- Deane, K. D., & Holers, V. M. (2021). Rheumatoid Arthritis Pathogenesis, Prediction, and Prevention: An Emerging Paradigm Shift. *Arthritis and Rheumatology*, 73(2), 181–193.
<https://doi.org/10.1002/art.41417>
- Kavuncu, V., & Evcik, D. (2004). Physiotherapy in Rheumatoid Arthritis. *Medscape General Medicine*, 6(2).
- Kemendes RI. (2018). *Hasil Riset Kesehatan Dasar Tahun 2018*.
[https://repository.badankebijakan.kemkes.go.id/id/eprint/3514/1/Laporan Riskedesdas 2018 Nasional.pdf](https://repository.badankebijakan.kemkes.go.id/id/eprint/3514/1/Laporan_Riskedesdas_2018_Nasional.pdf)
- Nindawi, N., Susilawati, E. F., & Iszakiyah, N. (2021). Efektifitas Latihan Range Of Motion (ROM) Aktif terhadap Tonus Otot Ekstrimitas bawah dan Rentang Gerak Sendi pada Lansia. *Wiraraja Medika : Jurnal Kesehatan*, 11(1), 1–9.
<https://doi.org/https://doi.org/10.24929/fik.v11i1.1246>
- Nurbaya, S., Mutmainna, A., Isa, W. M. La, & Sumi, S. S. (2020). Pelatihan Range of Motion (ROM) pada Pasien Reumatoid Atritis di Desa Taraweang Kabupaten Pangkajene dan Kepulauan. *Indonesian Journal of Community Dedication*, 2(2), 54–58.
<https://jurnal.stikesnh.ac.id/index.php/community/article/view/343>
- Nurhayati, Atmojo, N. F. D., Ramli, R., Adhi, I. G. A. M., Ilmi, N., Putra, A. A., Udayani, N. W., & Sulistiyani, E. (2024). Range of Motion (ROM) Aktif Berpengaruh terhadap Peningkatan Kekuatan Otot pada Lansia dengan Rheumatoid Arthritis di Panti Sosial Lanjut Usia Mandalika NTB. *Jurnal Ilmiah Ilmu Kesehatan*, 10(1), 232–238.
- Pertiwi, K. A., Hidayat, C. T., & Dewi, S. R. (2022). Hubungan Nyeri Rheumatoid Arthritis dengan Aktivitas Fisik pada Lansia di Puskesmas Rogotrunan Lumajang. *Repository Unmuh Jember*.
- Pratiwi, J., & Hidayat, F. . (2020). Literature Review: Pengaruh Terapi Range of Motion (ROM) terhadap Kemandirian Lansia dalam Melakukan ADL di Panti Werdha. *Borneo (BSR)*, 2(1), 34–40.
<https://journals.umkt.ac.id/index.php/bsr/article/view/1425>
- Setyawati, V. Y., & Retnasari, D. (2024). Penerapan Range of Motion pada Pasien Stroke Non Hemoragik dengan Gangguan Mobilitas Fisik. *Jurnal Manajemen Asuhan Keperawatan*, 8(1), 18–24.
<https://doi.org/https://doi.org/10.33655/mak.v8i1.179>
- Sianipar, N., Resmi, P., & Jemaulana, T. (2021). Pemenuhan Kebutuhan Aktivitas pada Lansia dengan Rheumatoid Rrthritis (RA) di UPT Pelayanan Lanjut Usia Binjai. *Malahayati Health Student Journal*, 1(3), 270–283.
- Uda, H. D. H., Muflih, & Amigo, T. A. E. (2016). Latihan Range of Motion Berpengaruh Terhadap Mobilitas Fisik pada Lansia di Balai Pelayanan Sosial Tresna Werdha Unit Abiyoso Yogyakarta. *Jurnal Ners Dan Kebidanan Indonesia*, 4(3), 169–177.
[https://doi.org/http://dx.doi.org/10.21927/jnki.2016.4\(3\).169-177](https://doi.org/http://dx.doi.org/10.21927/jnki.2016.4(3).169-177)
- Yamada, T., Steinz, M. M., Kenne, E., & Lanner, J. T. (2017). Muscle Weakness in Rheumatoid Arthritis: The Role of Ca²⁺ and Free Radical Signaling. *EBioMedicine*, 23, 12–19.
<https://doi.org/10.1016/j.ebiom.2017.07.023>