

LAMPIRAN LAMPIRAN

Lampiran 1

SK Pembimbing



UNIVERSITAS GALUH
FAKULTAS ILMU KESEHATAN

S1 KEPERAWATAN – S1 KEBIDANAN – PROFESI NERS – PROFESI BIDAN
Kampus : Jalan. R.E. Martadinata No. 150 Ciamis 46274 Nomor Kontak: 0821-1790-9060
website: fikes.unigal.ac.id / e-mail: fikes@unigal.ac.id

SURAT KEPUTUSAN
DEKAN FAKULTAS ILMU KESEHATAN UNIVERSITAS GALUH
NOMOR : 66 /401/SK/AK/D/XI/2025
TENTANG
PENGANGKATAN PEMBIMBING KARYA ILMIAH AKHIR NERS (KIAN)
PROGRAM STUDI PENDIDIKAN PROFESI NERS TAHUN AKADEMIK 2025/2026
FAKULTAS ILMU KESEHATAN UNIVERSITAS GALUH

DEKAN FAKULTAS ILMU KESEHATAN UNIVERSITAS GALUH

- MENIMBANG** : 1. Bahwa untuk kelancaran kegiatan Bimbingan Karya Ilmiah Akhir Ners (KIAN) perlu diangkat pembimbing Karya Ilmiah Akhir Ners (KIAN).
2. Bahwa untuk legalitas pembimbing dalam melakukan kegiatan bimbingan Karya Ilmiah Akhir Ners perlu di terbitkan Surat Keputusan Dekan.
- MENGINGAT** : 1. Undang-undang Nomor 12 Tahun 2012 tentang Pendidikan Tinggi;
2. Peraturan Pemerintah Nomor 4 Tahun 2014 tentang Penyelenggaraan Pendidikan Tinggi dan Pengelolaan Pendidikan Tinggi;
3. Permendikbud nomor 3 Tahun 2020 tentang Standar Nasional Perguruan Tinggi;
4. Keputusan Menteri Pendidikan Nasional Nomor 184/U/2001 tentang Pedoman Pengawasan, Pengendalian dan Pembinaan Program Diploma, Sarjana dan Pascasarjana di Perguruan Tinggi;
5. Surat Keputusan Yayasan Pendidikan Galuh Ciamis Nomor 1 Tahun 2025 tentang Statuta Universitas Galuh;
6. Peraturan Rektor Universitas Galuh Nomor 1 Tahun 2025 tentang Pedoman Akademik Universitas Galuh Tahun 2025;
7. Surat Keputusan Rektor Universitas Galuh Nomor : 262/4123/SK/G/VIII/2023 Tanggal 26 Agustus 2023 tentang Pemberhentian dan Pengangkatan Dekan Fakultas Ilmu Kesehatan Universitas Galuh Masa Jabatan 2023-2027;
- MEMPERHATIKAN** : Surat Ajuan dari Ketua Program Studi Ilmu Keperawatan Fakultas Ilmu Kesehatan Universitas Galuh Nomor 86/1490/SP/AK/Ka.Prodi_Kep/XI/2025 perihal Permohonan SK Pembimbing KIAN.
- MEMUTUSKAN**
- MENETAPKAN** :
PERTAMA : Nama : **FADIL ILMI ALWASILAH**
Nomor Pokok : **1490125042**
Program Studi : Pendidikan Profesi Ners
- KEDUA** : Mengangkat Pembimbing KIAN mahasiswa seperti yang tertulis pada diktum pertama sebagai berikut:
Pembimbing I : **Dini Nurbaeti Zen, S.Kep., Ners., M.Kep., Sp.Kep.Kom.**
Pembimbing II : **Yoga Ginanjar, S.Kep., Ners., M.Kep., Sp.Kep.Kom.**
- KETIGA** : Tugas dan wewenang pembimbing KIAN:
a. Pembimbing KIAN ditugaskan untuk membimbing dan mengarahkan, dan memberikan masukan kepada mahasiswa dalam proses penulisan KIAN hingga selesai.
b. Dosen Pembimbing wajib memastikan bahwa KIAN yang disusun sesuai dengan standar akademik yang berlaku di Program Studi Profesi Ners Fakultas Ilmu Kesehatan Universitas Galuh
c. Pembimbingan KIAN dilaksanakan secara berkala sesuai dengan ketentuan yang berlaku.
- KEEMPAT** : Surat Keputusan ini berlaku sejak tanggal ditetapkan hingga mahasiswa menyelesaikan KIAN dan dinyatakan lulus sidang KIAN, dan apabila di kemudian hari ternyata terdapat kekeliruan dalam Surat Keputusan ini, akan dilakukan perbaikan sebagaimana mestinya.

Ditetapkan : Ciamis
Pada Tanggal : 6 November 2025



Drs. HERNASRI, S.Kep., Ners., MM., M.Kep.
NRC. 11.3112770275

Lampiran 2

JBICritical Appraisal

JBICritical Appraisal untuk Quasi-Experimental Studies

Reviwer : Fadil Ilmi Alwasilah **Tanggal** : 15/05/2026

Author : (Rahmani & Wardoyo, 2024) **Tahun publikasi** : 2024

Judul : Pengaruh Latihan Range Of Motion (Rom) Aktif Terhadap Penurunan Intensitas Nyeri Pada Lansia Dengan Osteoartritis Di Wilayah Puskesmas Kaliasin Lampung Selatan

No	Pertanyaan	Ya	Tidak	Tidak Jelas	Tidak /Tidak berlaku
1.	Apakah jelas dalam studi apa “penyebab” dan apa yang “efek” (yaitu tidak ada kebingungan tentang variabel yang lebih dahulu)?	✓			
2.	Apakah para peserta termasuk dalam perbandingan yang sama?	✓			
3.	Apakah para peserta termasuk dalam perbandingan menerima sejenis pengobatan/perawatan, selain paparan atau intervensi kepentingan?			✓	
4.	Apakah ada kelompok kontrol?	✓			
5.	Apakah ada beberapa pengukuran dari hasil kedua pra dan pasca intervensi/exposur?	✓			
6.	Apakah menindak lanjuti lengkap dan jika tidak, perbedaan antara kelompok dalam hal mereka menindak lanjuti memadai dijelaskan dan dianalisis ?			✓	
7.	Apakah hasil dari peserta termasuk dalam perbandingan diukur dengan cara yang sama?	✓			
8.	Apakah hasil diukur dari cara yang dapat diandalkan?	✓			
9.	Apakah analisis statistik yang tepat digunakan?	✓			

Overall Appraisal	7			
Presentase	77,8%			

JBI Critical Appraisal untuk Quasi-Experimental Studies

Reviewer : Fadil Ilmi Alwasilah **Tanggal** : 15/05/2026

Author : (Mojolaban, 2024) **Tahun publikasi** : 2024

Judul : PENERAPAN TERAPI ROM TERHADAP PENURUNAN SKALA NYERI PADA LANSIA DENGAN OSTEOARTHRITIS DI WILAYAH PUSKESMAS MOJOLABAN

No	Pertanyaan	Ya	Tidak	Tidak Jelas	Tidak /Tidak berlaku
1.	Apakah jelas dalam studi apa “penyebab” dan apa yang “efek” (yaitu tidak ada kebingungan tentang variabel yang lebih dahulu)?	✓			
2.	Apakah para peserta termasuk dalam perbandingan yang sama?	✓			
3.	Apakah para peserta termasuk dalam perbandingan menerima sejenis pengobatan/perawatan, selain paparan atau intervensi kepentingan?			✓	
4.	Apakah ada kelompok kontrol?		✓		
5.	Apakah ada beberapa pengukuran dari hasil kedua pra dan pasca intervensi/exposur?	✓			
6.	Apakah menindak lanjuti lengkap dan jika tidak, perbedaan antara kelompok dalam hal mereka menindak lanjuti memadai dijelaskan dan dianalisis ?	✓			
7.	Apakah hasil dari peserta termasuk dalam perbandingan diukur dengan cara yang sama?	✓			
8.	Apakah hasil diukur dari cara yang dapat diandalkan?	✓			
9.	Apakah analisis statistik yang tepat digunakan?			✓	
Overall Appraisal		6			
Presentase		66,7%			

JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies

Reviewer : Fadil Ilmi Alwasilah **Tanggal** : 15/05/2026

Author : (Weleslassie et al., 2021) **Tahun publikasi** : 2021

Judul : The Influence of Weather Conditions on the Diurnal Variation in Range of Motion in Older Adults with Knee Osteoarthritis

No	Pertanyaan	Ya	Tidak	Tidak Jelas
1	Apakah kriteria inklusi dalam sampel dijelaskan dengan jelas?	✓		
2	Apakah subjek dan setting penelitian dijelaskan secara rinci?	✓		
3	Apakah paparan diukur dengan cara yang valid dan reliabel?	✓		
4	Apakah kriteria standar yang objektif digunakan untuk mengukur kondisi?	✓		
5	Apakah faktor perancu diidentifikasi?			✓
6	Apakah strategi untuk mengatasi faktor perancu dinyatakan?		✓	
7	Apakah hasil diukur dengan cara yang valid dan reliabel?	✓		
8	Apakah analisis statistik yang digunakan sesuai?	✓		
Overall Appraisal		6		
Presentase		75%		

JBIC Critical Appraisal untuk Analytical Cross-Sectional Studies

Reviewer : Fadil Ilmi Alwasilah **Tanggal** : 15/05/2026

Author : (Brand et al., 2020) **Tahun publikasi** : 2020

Judul : Risk factors of pain, physical function, and health-related quality of life in elderly people with knee osteoarthritis: A cross-sectional study

No	Pertanyaan	Ya	Tidak	Tidak Jelas	Tidak Berlaku
1	Apakah kriteria inklusi pada sampel dijelaskan dengan jelas?	✓			
2	Apakah subjek penelitian dan setting dijelaskan secara rinci?	✓			
3	Apakah paparan diukur dengan cara yang valid dan reliabel?	✓			
4	Apakah digunakan kriteria objektif dan standar untuk mengukur kondisi?	✓			
5	Apakah faktor perancu (confounding factors) diidentifikasi?	✓			
6	Apakah strategi untuk menangani faktor perancu dijelaskan?	✓			
7	Apakah luaran (outcome) diukur dengan cara yang valid dan reliabel?	✓			
8	Apakah analisis statistik yang digunakan sudah sesuai?	✓			
Overall Appraisal		8			
Presentase		100%			

JBIC Critical Appraisal untuk Randomized Controlled Trial

Reviewer : Fadil Ilmi Alwasilah **Tanggal** : 15/05/2026

Author : (Dieter et al., n.d.) **Tahun publikasi** : 2025

Judul : Effectiveness of the Self-Directed mHealth Exercise Intervention re . flex in Patients With Knee Osteoarthritis : Randomized Controlled Trial

No	Pertanyaan JBIC Randomized Controlled Trial (RCT)	Ya	Tidak	Tidak Jelas	Tidak Berlaku
1	Apakah alokasi ke kelompok perlakuan dilakukan secara acak?	✓			
2	Apakah alokasi peserta disembunyikan (allocation concealment)?	✓			
3	Apakah karakteristik dasar kelompok serupa pada awal penelitian?	✓			
4	Apakah peserta tidak mengetahui kelompok intervensinya (blinding peserta)?		✓		
5	Apakah peneliti/pemberi terapi tidak mengetahui alokasi kelompok?		✓		
6	Apakah penilai outcome tidak mengetahui alokasi kelompok?	✓			
7	Apakah kelompok diperlakukan sama selain intervensi yang diberikan?	✓			
8	Apakah tindak lanjut (follow up) lengkap dan jika tidak, dijelaskan dengan baik?	✓			
9	Apakah analisis dilakukan berdasarkan intention to treat?	✓			
10	Apakah outcome diukur dengan cara yang sama pada semua kelompok?	✓			
11	Apakah outcome diukur secara reliabel?	✓			
12	Apakah analisis statistik yang digunakan sesuai?	✓			
13	Apakah desain penelitian sesuai dan deviasi dari desain dijelaskan?	✓			
Overall Appraisal		11			
Presentase		84,6%			

JBICritical Appraisal untuk Randomized Controlled Trial

Reviewer : Fadil Ilmi Alwasilah **Tanggal** : 15/05/2026

Author : (Sulistiyana & Susanti, 2019) **Tahun publikasi** : 2019

Judul : Latihan Range of Motion untuk Perubahan Kualitas dan Kuantitas Nyeri Penderita Osteoarthritis

No	Pertanyaan JBI	Ya	Tidak	Tidak Jelas	Tidak/Tidak Berlaku
1	Apakah hubungan sebab dan akibat dalam penelitian dijelaskan dengan jelas?	✓			
2	Apakah peserta dalam kelompok yang dibandingkan serupa?	✓			
3	Apakah peserta mendapatkan perlakuan yang sama selain intervensi?			✓	
4	Apakah terdapat kelompok kontrol?	✓			
5	Apakah dilakukan pengukuran sebelum dan sesudah intervensi?	✓			
6	Apakah follow-up dilakukan lengkap dan dijelaskan?			✓	
7	Apakah outcome diukur dengan cara yang sama pada kedua kelompok?	✓			
8	Apakah pengukuran outcome dilakukan secara reliabel?	✓			
9	Apakah analisis statistik yang digunakan sesuai?	✓			
Overall Appraisal		7			
Presentase		77,8%			

JBICritical Appraisal untuk Cross-sectional study**Reviewer** : Fadil Ilmi Alwasilah **Tanggal** : 15/05/2026**Author** : (Zhou et al., 2023) **Tahun publikasi** : 2023**Judul** : Demographic and radiographic factors for knee symptoms and range of motion in patients with knee osteoarthritis: a crosssectional study in Beijing, China

No	Pertanyaan JBI	Ya	Tidak	Tidak Jelas	Tidak/Tidak Berlaku
1	Apakah kriteria inklusi sampel jelas?	✓			
2	Apakah subjek dan setting dijelaskan secara detail?	✓			
3	Apakah eksposur diukur secara valid dan reliabel?	✓			
4	Apakah kriteria objektif digunakan untuk mengukur kondisi?	✓			
5	Apakah faktor perancu diidentifikasi?	✓			
6	Apakah strategi untuk mengatasi confounding dijelaskan?	✓			
7	Apakah outcome diukur secara valid dan reliabel? (WOMAC, ROM)	✓			
8	Apakah analisis statistik sesuai? (GLM)	✓			
9	Apakah desain penelitian sesuai untuk tujuan studi?	✓			
Overall Appraisal		9			
Presentase		100%			

JBI Critical Appraisal untuk Randomized Controlled Trial

Reviewer : Fadil Ilmi Alwasilah **Tanggal** : 15/05/2026

Author : (Azizi et al., 2019) **Tahun publikasi** : 2019

Judul : Randomized controlled trial of aquatic exercise for treatment of knee osteoarthritis in elderly people

No	Pertanyaan	Ya	Tidak	Tidak Jelas	Tidak /Tidak berlaku
1.	Apakah jelas dalam studi apa “penyebab” dan apa yang “efek” (yaitu tidak ada kebingungan tentang variabel yang lebih dahulu)?	✓			
2.	Apakah para peserta termasuk dalam perbandingan yang sama?	✓			
3.	Apakah para peserta termasuk dalam perbandingan menerima sejenis pengobatan/perawatan, selain paparan atau intervensi kepentingan?	✓			
4.	Apakah ada kelompok kontrol?	✓			
5.	Apakah ada beberapa pengukuran dari hasil kedua pra dan pasca intervensi/exposur?	✓			
6.	Apakah menindak lanjuti lengkap dan jika tidak, perbedaan antara kelompok dalam hal mereka menindak lanjuti memadai dijelaskan dan dianalisis ?	✓			
7.	Apakah hasil dari peserta termasuk dalam perbandingan diukur dengan cara yang sama?	✓			
8.	Apakah hasil diukur dari cara yang dapat diandalkan?	✓			
9.	Apakah analisis statistik yang tepat digunakan?	✓			
Overall Appraisal		9			
Presentase		100%			

JBICritical Appraisal untuk Quasi-Experimental Studies

Reviewer : Fadil Ilmi Alwasilah **Tanggal** : 15/05/2026

Author : (Mujib & Suprayitno, 2016) **Tahun publikasi** : 2016

Judul : Pengaruh latihan range of motion (rom) terhadap perubahan skala nyeri pada lansia dengan osteoarthritis di posyandu lansia desa kalianget timur kecamatan kalianget kabupaten sumenep

No	Pertanyaan	Ya	Tidak	Tidak Jelas	Tidak /Tidak berlaku
1.	Apakah jelas dalam studi apa “penyebab” dan apa yang “efek” (yaitu tidak ada kebingungan tentang variabel yang lebih dahulu)?	✓			
2.	Apakah para peserta termasuk dalam perbandingan yang sama?	✓			
3.	Apakah para peserta termasuk dalam perbandingan menerima sejenis pengobatan/perawatan, selain paparan atau intervensi kepentingan?	✓			
4.	Apakah ada kelompok kontrol?		✓		
5.	Apakah ada beberapa pengukuran dari hasil kedua pra dan pasca intervensi/exposur?	✓			
6.	Apakah menindak lanjuti lengkap dan jika tidak, perbedaan antara kelompok dalam hal mereka menindak lanjuti memadai dijelaskan dan dianalisis ?	✓			
7.	Apakah hasil dari peserta termasuk dalam perbandingan diukur dengan cara yang sama?	✓			
8.	Apakah hasil diukur dari cara yang dapat diandalkan?	✓			
9.	Apakah analisis statistik yang tepat digunakan?	✓			
Overall Appraisal		8			
Presentase		88,9%			

JBIC Critical Appraisal untuk Quasi-Experimental Studies

Reviewer : Fadil Ilmi Alwasilah **Tanggal** : 15/05/2026

Author : (Rahmani & Wardoyo, 2024) **Tahun publikasi** : 20204

Judul : Pengaruh Latihan Range Of Motion (Rom)Aktif Terhadap Penurunan Intensitas Nyeri Pada Lansia Dengan Osteoartritis Di Wilayah Puskesmas Kaliasin Lampung Selatan

No	Pertanyaan	Ya	Tidak	Tidak Jelas	Tidak /Tidak berlaku
1.	Apakah jelas dalam studi apa “penyebab” dan apa yang “efek” (yaitu tidak ada kebingungan tentang variabel yang lebih dahulu)?			✓	
2.	Apakah para peserta termasuk dalam perbandingan yang sama?	✓			
3.	Apakah para peserta termasuk dalam perbandingan menerima sejenis pengobatan/perawatan, selain paparan atau intervensi kepentingan?				✓
4.	Apakah ada kelompok kontrol?		✓		
5.	Apakah ada beberapa pengukuran dari hasil kedua pra dan pasca intervensi/exposur?	✓			
6.	Apakah menindak lanjuti lengkap dan jika tidak, perbedaan antara kelompok dalam hal mereka menindak lanjuti memadai dijelaskan dan dianalisis ?			✓	
7.	Apakah hasil dari peserta termasuk dalam perbandingan diukur dengan cara yang sama?	✓			
8.	Apakah hasil diukur dari cara yang dapat diandalkan?	✓			
9.	Apakah analisis statistik yang tepat digunakan?	✓			
Overall Appraisal		6			
Presentase		66, 7%			

Lampiran 3

Jurnal Jurnal Penelitian

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Pengaruh Latihan *Range Of Motion (Rom)* Aktif Terhadap Penurunan Intensitas Nyeri Pada Lansia Dengan Osteoarthritis Di Wilayah Puskesmas Kaliasin Lampung Selatan

The Effect Of Active Range Of Motion (Rom) Training On Reducing Pain Intensity In Elderly With Osteoarthritis In The Kaliasin Public Health Center Of South Lampung

Yusuf Safria Rahmani^{1*}, Eko Wardoyo¹, Sugiarto¹, Hardono¹

¹Program Studi S-1 Keperawatan, Fakultas Ilmu Kesehatan, Universitas Aisyah Pringsewu, Lampung, Indonesia

Kata Kunci :	ABSTRAK
Lansia, <i>Range of Motion (ROM)</i> , Osteoarthritis	Osteoarthritis merupakan penyakit kronis yang ditandai dengan kelainan tulang rawan (<i>carilage</i>). Menurut <i>World Health Organization</i> ada tahun 2019 perkiraan global 9,6% pria dan 18,0% wanita berusia diatas 60 tahun memiliki gejala osteoarthritis. Di Indonesia prevalensi osteoarthritis mencapai 11,9% dari total penduduk. Latihan ROM memberikan dampak meringankan nyeri dan meningkatkan fleksibilitas sesuai luas gerak klien. Tujuan penelitian ini untuk Menganalisis atau mengetahui pengaruh latihan <i>range of motion</i> aktif terhadap penurunan intensitas nyeri pada lansia dengan osteoarthritis. Jenis penelitian yang digunakan dalam penelitian ini adalah <i>kuantitatif</i> . Rancangan atau desain <i>Quary Experiment</i> dengan <i>Pretest-posttest group design</i> yaitu dimana terdapat dua kelompok penelitian yang diukur sebelum dan sesudah kelompok perlakuan dan kontrol. Populasi dalam penelitian ini adalah keseluruhan lansia 43 lansia yang mengalami osteoarthritis. Sampel dalam penelitian ini adalah lansia 30 lansia yang mengalami osteoarthritis. Teknik pengartihan sampel menggunakan <i>non probability sampling type purposive sampling</i> . Analisis bivariat menggunakan Uji <i>Wilcoxon Signed Rank Test</i> . Hasil penelitian menunjukan terdapat diperoleh nilai <i>p-value</i> = 0,001 artinya ada Pengaruh Latihan <i>Range Of Motion</i> aktif terhadap penurunan intensitas nyeri pada lansia osteoarthritis. Di Wilayah Puskesmas Desa Kaliasin Lampung Selatan. Penelitian ini dapat menjadi sumber informasi tentang pengaruh latihan <i>range of motion</i> aktif terhadap penurunan intensitas nyeri pada lansia.

Kata Kunci :	ABSTRACT
Elderly, <i>Range of Motion (ROM)</i> , Osteoarthritis	<i>Osteoarthritis is a chronic disease characterized by cartilage abnormalities. According to the World Health Organization, in 2019, an estimated 9.6% of men and 18.0% of women over the age of 60 had symptoms of osteoarthritis globally. In Indonesia, the prevalence of osteoarthritis reaches 11.9% of the total population. Range of Motion (ROM) exercises can alleviate pain and increase flexibility within the client's range of motion. The aim of this study is to analyze or determine the effect of active range of motion exercises on reducing pain intensity in elderly individuals with osteoarthritis. This study uses a quantitative research method. The research design is a Quasi-Experimental design with a pretest-posttest group design, where two research groups are measured before and after the intervention in both the treatment and control groups. The population in this study includes all 43 elderly individuals with osteoarthritis. The sample consists of 30 elderly individuals with osteoarthritis, selected using non-probability sampling with a purposive sampling technique. Bivariate analysis was conducted using the Wilcoxon Signed Rank Test. The results showed a p-value of 0.001, indicating a significant effect of active range of motion exercises on reducing pain</i>

PENERAPAN TERAPI ROM TERHADAP PENURUNAN SKALA NYERI PADA LANSIA DENGAN OSTEOARTHRITIS DI WILAYAH PUSKESMAS MOJOLABAN

Sherly Maharani Al Fazrin¹, Annisa Andriyani²

Universitas Aisyiyah Surakarta

Email : shwrtymaharaney@gmail.com¹, annisa74@aiska-university.ac.id²

ABSTRAK

Latar belakang: Osteoarthritis merupakan pembentukan tulang baru pada bagian pinggir sendi, tanda dan gejala yaitu nyeri sendi. Data dari Kaur et al, 2021 Diperkirakan tahun 2020 penderita osteoarthritis akan meningkat 11,6 juta. Terapi non farmakologis Range Of Motion dapat meringankan nyeri. Tujuan: Mengetahui perbedaan skala nyeri pada dua responden dengan penderita osteoarthritis sebelum dan sesudah dilakukan penerapan Range Of Motion. Metode: Penelitian ini adalah penelitian studi kasus dengan menggunakan metode deskriptif, yaitu dengan melakukan observasi dan wawancara dua responden penderita osteoarthritis sebelum dan sesudah dilakukan penerapan Range Of Motion dengan menggunakan instrumen skala nyeri Numeric Rating Scale. Hasil: Terjadi penurunan intensitas skala nyeri pada Ny. S dari skala nyeri 6 menjadi skala nyeri 4 sedangkan pada Tn. H terjadi penurunan dari skala nyeri 5 menjadi skala nyeri 3. Kesimpulan: Sesudah dilakukan penerapan Range Of Motion pada Ny. S dan Tn. H terdapat penurunan skala nyeri dari penderita osteoarthritis. Hal ini menunjukkan bahwa Range Of Motion dapat menurunkan skala nyeri osteoarthritis pada kedua responden.

Kata kunci: Lansia, Osteoarthritis, Nyeri, Range Of Motion

ABSTRACT

Background: Osteoarthritis is the formation of new bone at the edges of the joints, signs and symptoms are joint pain. Data from Kaur et al, 2021 It is estimated that in 2020 osteoarthritis sufferers will increase by 11.6 million. Non-pharmacological Range Of Motion therapy can relieve pain. Objective: To determine the difference in pain scales in two respondents with osteoarthritis sufferers before and after implementing Range of Motion. Method: This research is a case study research using descriptive methods, namely by observing and interviewing two respondents suffering from osteoarthritis before and after implementing Range of Motion using the Numeric Rating Scale pain scale instrument. Results: There was a decrease in the intensity of the pain scale in Mrs. S from a pain scale of 6 to a pain scale of 4 while in Mr. H there was a decrease from a pain scale of 5 to a pain scale of 3. Conclusion: After applying Range of Motion to Mrs. S and Mr. H there is a decrease in the pain scale of osteoarthritis sufferers. This shows that Range of Motion can reduce the scale of osteoarthritis pain in both respondents.

Keywords: Elderly, Osteoarthritis, Pain, Range Of Motion

PENDAHULUAN

Osteoarthritis (OA) merupakan penyakit degeneratif yang ditandai dengan kerusakan tulang rawan, pembengkakan tulang subkondral, pembengkakan osteofit bilateral, dan proses inflamasi ringan pada sinovium. Osteoarthritis adalah penyakit kronis dan progresif lambat yang menyebabkan kerusakan ringan atau permanen pada tulang rawan dan pembentukan tulang baru di permukaan. Osteoarthritis dapat menyerang berbagai sendi di tubuh, namun paling sering menyerang sendi yang menahan beban seperti lutut dan pinggul (Bintang et al., 2023).

Tahun 2020, prevalensi global osteoarthritis lutut sebesar 16% pada penduduk berusia 15 tahun ke atas dan 22,9% pada penduduk berusia 40 tahun ke atas, dan jumlah kasus pada penduduk berusia 40 tahun ke atas mencapai 654,1 juta atau 203 per 10.000



Article

The Influence of Weather Conditions on the Diurnal Variation in Range of Motion in Older Adults with Knee Osteoarthritis

Elena Ioana Iconaru ^{1,†}, Emilian Tarcau ^{2,*,†} and Constantin Ciucurel ^{1,†}

¹ Department of Medical Assistance and Physical Therapy, University Center of Pitești, National University for Science and Technology Politehnica Bucharest, 110040 Pitești, Romania; elena_ioana.iconaru@upb.ro (E.I.I.); constantin.ciucurel@upb.ro (C.C.)

² Department of Physical Education, Sport and Physical Therapy, University of Oradea, 410067 Oradea, Romania

* Correspondence: emilian.tarcau@yahoo.com; Tel.: +40-770304471

† These authors contributed equally to this work.

Abstract: (1) Background: This study investigated the relationship between weather conditions, diurnal patterns, and total knee range of motion (ROM), as well as the severity of symptoms (pain and stiffness) in older adults with knee osteoarthritis. (2) Methods: An exploratory longitudinal study was conducted on 28 older adults with knee osteoarthritis (mean age 71.86 ± 4.49 years; 46.4% men, 53.6% women). We used as assessment tools the Visual Analog Scales (VAS) for self-reported local knee pain and stiffness, and goniometry for ROM. Measurements were taken twice, six months apart, in winter and summer, in the morning and evening of each selected day. Recorded weather factors comprised temperature, relative humidity, barometric pressure, and maximum wind speed. (3) Results: The study revealed significant effects of season and time of day on pain and stiffness, respectively ($p < 0.001$). Additionally, a significant interaction between season and time influenced total knee ROM ($p < 0.001$). Moreover, there was a statistically significant relationship between time and total knee ROM ($p < 0.001$). (4) Conclusions: This research underscores the complex link between seasonal fluctuations and daily variations in some symptomatic and functional aspects of knee osteoarthritis in older adults.

Keywords: meteorological influences; chronobiological patterns; gonarthrosis; joint stiffness; joint pain; goniometry; aging



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1. Introduction

In recent decades, there has been a significant increase in scientific interest in the impact of weather conditions on individuals' and communities' health. Many comprehensive reviews have indicated a connection between climate change and declining human health [1]. Also, the aging population and the rising incidence of degenerative musculoskeletal disorders, such as knee osteoarthritis, have been the subject of numerous studies [2].

Knee osteoarthritis, a widespread type of arthritis, exerts a significant clinical impact on the lower limb, given the biomechanical significance of this joint for locomotion and everyday activities. The prevalence of knee osteoarthritis increases with age [3], reflecting cumulative exposure to risk factors and age-related changes in the joints. Identified risk factors in this context include age, female gender, obesity, previous knee injury, knee malalignment, and weakness in knee extensor muscles [4]. The condition also appears in younger populations due to factors such as obesity, sports, genetics, occupation, prior injuries, or socio-economic status [5]. Regardless of causality, cartilage damage serves as a significant diagnostic marker for disease staging [6].

The disease itself leads to chronic pain, morning joint stiffness, crepitus, edema, and marked functional impairment [7]. Slowing knee osteoarthritis progression in older adults



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Research article

Risk factors of pain, physical function, and health-related quality of life in elderly people with knee osteoarthritis: A cross-sectional study



Daniela Regina Brandão Tavares^{a,b}, Virginia Fernandes Moça Trevisani^{b,c,*},
Jane Erika Frazao Okazaki^b, Marcia Valéria de Andrade Santana^b,
Ana Carolina Pereira Nunes Pinto^{b,d}, Karina Kuraoka Tutiya^a, Fernanda Martins Gazoni^{a,b},
Camila Bonin Pinto^e, Fania Cristina dos Santos^a, Felipe Fregni^e

^a Department of Geriatrics and Gerontology, Federal University of São Paulo, São Paulo, SP, Brazil

^b Department of Evidence-Based Medicine, Brazilian Cochrane Centre, Federal University of São Paulo, São Paulo, SP, Brazil

^c Department of Rheumatology, Santa Annas University, São Paulo, SP, Brazil

^d Department of Physical Therapy, University of Pittsburgh, Pittsburgh, PA, USA

^e Laboratory of Neuromodulation, Department of Physical Medicine and Rehabilitation, Spaulding Rehabilitation Hospital and Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

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ABSTRACT

Data on the precise mechanisms of the complex interactions of factors related to clinical impact of knee osteoarthritis (KOA) in the elderly population remain limited. To find predictors that explain pain intensity, physical function, and quality of life in elderly KOA subjects, we performed a cross-sectional analysis of the baseline data from a randomized trial. The trial included 104 subjects (aged ≥ 60) with KOA pain and dysfunctional endogenous pain-inhibitory system activity assessed by conditioned pain modulation (CPM). Three multiple linear regression models were performed to understand the independent predictors of Brief Pain Inventory (BPI), WOMAC function subscale (WOMACFunc), and SF-12 physical subscale (SF12-PCS). Model 1 showed that BPI pain score was predicted by low CPM response, high von-Frey light touch threshold, worse radiological severity as indexed by Kellgren-Lawrence grade (KL), high von-Frey punctate pain intensity and high levels of anxiety (adjusted $R^2 = 27.1\%$, $F(6,95) = 7.27$, $P < 0.0001$). In model 2, von-Frey light touch threshold, KL, depressive symptoms indexed by Beck Depression Inventory (BDI), level of sleepiness and pain pressure threshold were risk factors for SF12-PCS (adjusted $R^2 = 31.9\%$, $F(5,96) = 10.5$, $P < 0.0001$). Finally, model 3 showed that WOMACFunc was predicted by BDI, KL and BPI (adjusted $R^2 = 41\%$, $F(3,98) = 24.42$, $P < 0.0001$). Our data provides an interesting framework to understand the predictors of KOA pain in the elderly and highlights how its related outcomes are affected by disease-specific factors, somatosensory dysfunction and emotional factors.

1. Introduction

Knee osteoarthritis (KOA) is the most prevalent form of osteoarthritis (OA) worldwide. It is defined as a complex and multifactorial disease characterized by progressive degeneration of articular cartilage and sclerosis of subchondral bone and an important cause of pain and disability, especially in the elderly population [1, 2]. Approximately 25% of people aged 50 years and over report chronic knee pain, among those 6% have severe knee pain and functional disability [3, 4]. Age is the

expected to increase [5, 6]. Besides the pain, older individuals with KOA may have a poor quality of life due to stiffness, deformity, limitation in range of motion, dependence to perform activities of daily life; consequently leading to increases in economic and social costs globally [7, 8].

Chronic pain is a multidimensional condition that includes, besides the nociceptive component, an affective-motivational and cognitive-evaluative components [9]. Neuroimaging studies have shown that several brain regions are involved with pain processing, including the dorsolateral prefrontal cortex, sensorimotor cortex and thalamus [10, 11]. Therefore, RCTs that focus on the treatment of the

Original Paper

Effectiveness of the Self-Directed mHealth Exercise Intervention re.flex in Patients With Knee Osteoarthritis: Randomized Controlled Trial

Valerie Dieter^{1,2}, MSc; Peter Martus³, Prof Dr; David Seibler⁴, MSc; Lina Maria Sema-Higuita³, PhD; Pia Jansen^{1,2}, Dr med; Inga Krauss^{1,2}, Dr rer soc

¹Department of Sports Medicine, Medical Clinic, University Hospital Tübingen, Tübingen, Germany

²Interfaculty Research Institute for Sports and Physical Activity, Tübingen, Germany

³Department for Clinical Epidemiology and Applied Biostatistics, Medical Clinic, University Hospital Tübingen, Tübingen, Germany

⁴Beta GmbH, Berlin, Germany

Corresponding Author:

Valerie Dieter, MSc
Department of Sports Medicine
Medical Clinic, University Hospital Tübingen
Hoppe-Seyler-Str. 6
Tübingen 72076
Germany
Phone: 49 70712986477
Email: valerie.dieter@med.uni-tuebingen.de

Abstract

Background: About 1 in 2 patients with knee osteoarthritis (OA) receives a referral or recommendation for exercise. Digital health applications could counteract this undersupply.

Objective: We aimed to investigate the effectiveness of a 12-week self-directed mobile health exercise intervention (re.flex) when used in addition to usual care compared to a control group receiving usual care only on pain reduction and improvement in physical function in patients with knee OA.

Methods: This monocentric, 2-arm, randomized controlled parallel-group trial included patients from Germany with moderate to severe knee OA. Participants were mainly recruited via newspapers. Randomization was 1:1 into an intervention group (re.flex+usual care) and a control group (usual care) using computer-generated blocks. Participants were unmasked to group assignment. The re.flex group conducted a 12-week self-directed app-based and sensor-assisted exercise program with 3 sessions per week in addition to usual care. Primary outcomes were OA-specific knee pain and physical function (using the subscales pain and activities in daily living of the Knee Osteoarthritis Outcome Score, 0–100) at 3 months. Secondary outcomes included adherence and safety. Multiple imputation was used to account for missing data. Intervention effects were calculated using a baseline-adjusted analysis of covariance (ANCOVA). Bonferroni correction with an alpha level of .025 was applied.

Results: Between January 25, 2023, and August 11, 2023, a total of 195 participants were enrolled. Of them, 98 participants were allocated to re.flex, and 97 participants to usual care. The primary analysis included 194 participants. The mean age was 61.9 (SD 7.7) years, and the majority were female (132/194, 68%). Pain reduction was significantly larger in re.flex than in usual care, with an adjusted mean difference between study groups of 4.8 (95% CI 0.7–8.9; $P=.02$; Cohen $d=0.35$) points. Improvement in physical function was not statistically significant (beta coefficient [β]=3.9 points, 95% CI 0.0–7.9, $P=.049$). A total of 12 adverse events were linked to re.flex, none of which were serious. Participants adhered to 77% (2705/3528) of all scheduled exercise sessions.

Conclusions: The self-directed sensor-based mobile health exercise intervention re.flex demonstrates superiority over usual care for pain reduction and justifies this kind of intervention as an alternative exercise delivery mode for patients with knee OA.

Trial Registration: German Clinical Trial Register (DRKS) DRKS00030932; <https://drks.de/search/de/trial/DRKS00030932>

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Latihan *Range of Motion* untuk Perubahan Kualitas dan Kuantitas Nyeri Penderita Osteoarthritis

Caturia Sasti Sulistyana¹, Susanti²

^{1,2}Prodi Keperawatan, Akademi Keperawatan Adi Husada Surabaya, Indonesia

Info Artikel	Abstrak
Sejarah Artikel: Disorima, 20/09/2018 Disetujui, 14/08/2019 Dipublikasi, 25/08/2019 Kata Kunci: Osteoarthritis, Nyeri, Latihan <i>Range of Motion</i>.	Osteoarthritis merupakan suatu penyakit degeneratif kerusakan kartilago sendi yang progresif pada lansia. Keluhan tersering penderita osteoarthritis adalah rasa kaku serta adanya nyeri, spasme otot dan disability. Salah satu terapi non farmakologis untuk mengatasi nyeri adalah latihan <i>Range of Motion</i> (ROM). Tujuan penelitian ini adalah menganalisis pengaruh latihan ROM terhadap kualitas dan kuantitas nyeri penderita osteoarthritis di Banyu Urip Lor RW 7 Surabaya. Desain penelitian ini adalah quasi eksperiment dengan pre-post test with control group, pada sampel 26 orang lansia yang menderita osteoarthritis dengan menggunakan teknik purposive sampling. Latihan ROM dilakukan 3 kali seminggu selama 4 minggu. Analisis data yang digunakan adalah uji wilcoxon dan mann whitney. Hasil uji statistik Wilcoxon pada kelompok kontrol pre-post didapatkan $P < 0,05$ (0,025) dan kelompok perlakuan pre-post didapatkan $P < 0,05$ (0,001), artinya ada pengaruh latihan ROM terhadap kualitas dan kuantitas nyeri penderita osteoarthritis. Hasil uji statistik Mann-Whitney didapatkan $P < 0,05$ (0,006), artinya ada beda kualitas dan kuantitas nyeri antara kedua kelompok. Latihan ROM adalah latihan menggerakkan sendi seoptimal mungkin sesuai kemampuan klien. Latihan ROM dapat meningkatkan kelenturan dan kekuatan otot, serta merangsang sirkulasi darah. Implikasi hasil penelitian ini adalah latihan ROM dapat dilakukan oleh penderita osteoarthritis secara rutin untuk mengurangi rasa nyeri.

Range of Motion Exercise for Changes in the Quality and Quantity of Osteoarthritis Sufferers

Article Information	Abstract
History Article: Received, 20/09/2018 Accepted, 14/08/2019 Published, 25/08/2019 Keywords: Osteoarthritis, Pain, <i>Range of Motion</i> Exercises	<i>Osteoarthritis is a progressive degenerative disease of joint cartilage in the elderly. The most common complaints of people with osteoarthritis are stiffness and pain, muscle spasm and disability. One of the non-pharmacological therapy for pain management is ROM exercise. The purpose of this study was to analyze the effect of ROM exercises on the quality and quantity of osteoarthritis pain in Banyu Urip Lor RW 7 Surabaya. The design of this study was quasi-experimental with a pre-post test control group, in a sample of 26 elderly people suffering from osteoarthritis used a purposive sampling technique. The ROM exercise are done 3 times a week for 4</i>

RESEARCH

Open Access



Demographic and radiographic factors for knee symptoms and range of motion in patients with knee osteoarthritis: a cross-sectional study in Beijing, China

Ge Zhou^{1,2*}, Minwei Zhao^{1,2*}, Xingwang Wang^{1,2}, Xiao Geng^{1,2} and Hua Tian^{1,2*}

Abstract

Background Knee osteoarthritis (KOA) causes not only pain, stiffness, and dysfunction of the knee, but also the reduction of the joint range of motion (ROM). This study explored the demographic and radiographic factors for knee symptoms and ROM in patients with symptomatic KOA.

Methods The demographic variables, Kellgren-Lawrence (KL) grade, and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) of patients with symptomatic KOA recruited in Beijing were collected. The knee ROM of all patients were also measured. We analyzed the influencing factors for WOMAC and ROM using a generalized linear model, respectively.

Results This study included a total of 2034 patients with symptomatic KOA, including 530 males (26.1%) and 1504 females (73.9%), with a mean age of 59.17 (± 10.22) years. Patients with advanced age, overweight or obesity, a family history of KOA, a moderate-to-heavy manual labor job and use of nonsteroidal anti-inflammatory drugs (NSAIDs) had significantly higher WOMAC and lower ROM (all $P < 0.05$). The more the comorbidities, the higher the WOMAC (all $P < 0.05$). Patients with higher education had better ROM than those with only an elementary education ($\beta = 4.905$, $P < 0.05$). Compared with those KL = 0/1, the WOMAC of patients whose KL = 4 were higher ($\beta = 0.069$, $P < 0.05$), but the WOMAC of those KL = 2 were lower ($\beta = -0.068$, $P < 0.05$). ROM decreased with the increase of KL grade (all $P < 0.05$).

Conclusions KOA patients with advanced age, overweight or obesity, a family history of KOA in first-degree relatives, a moderate-to-heavy manual labor job tended to have more severe clinical symptoms and worse ROM. Patients with more severe imaging lesions tend to have poorer ROM. Symptom management measures and regular ROM screening should be taken early to these people.

Keywords Knee osteoarthritis, Symptoms, Range of motion

*Ge Zhou and Minwei Zhao are co-first authors.

*Correspondence:

Hua Tian

hwtian@bjmu.edu.cn

¹Department of Orthopedics, Peking University Third Hospital, No.49

North Garden Road, Haidian District, Beijing 100191, China

²Engineering Research Center of Bone and Joint Precision Medicine,

North Garden Road, Haidian District, Beijing 100191, China



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Randomized controlled trial of aquatic exercise for treatment of knee osteoarthritis in elderly people

SIROUS AZIZI¹, AFSANEH DADARKHAH¹, ZAHRA REZASOLTANI¹,
SEYED AHMAD RAEISSADAT^{2,3}, REZA KAZEMPOOR MOFRAD⁴, SHARIF NAJAFI^{1,*}

¹Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Aja University of Medical Sciences, Tehran, Islamic Republic of Iran

²Physical Medicine and Rehabilitation Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Islamic Republic of Iran

³Shahid Mostafaei Hospital, Clinical Research and Development Center, Shahid Beheshti University of Medical Sciences, Tehran, Islamic Republic of Iran

⁴Faculty of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Islamic Republic of Iran

*Corresponding author: Sharif Najafi, Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Aja University of Medical Sciences, Enzadadeh St., Western Fence, Tehran 14117 18541, Islamic Republic of Iran; Phone: +98 21 4382 3476; Fax: +98 21 8862 8724; E-mail: sh.najafi@ajamu.ac.ir

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Abstract: Aim: The aim of this study is to assess the efficacy of aquatic exercise on pain, gait, and balance among elderly patients with knee osteoarthritis. Methods: We performed a randomized controlled trial at a university hospital. Overall, 32 men with knee osteoarthritis, aged ≥ 60 years, were included. Pain, balance, and gait were evaluated before and 2 months after interventions. The group control used acetaminophen and followed lifestyle recommendations. The intervention group performed the aquatic exercise three sessions per week for 8 weeks. Results: At the end of the study, mean pain scores were significantly different between the groups ($p=0.010$). Within-group analysis showed that group intervention experienced significant pain relief ($p=0.019$), whereas group control did not show the significant change ($p=0.492$). There was significant improvement in favor of aquatic exercise with regard to static ($p=0.001$) and dynamic ($p=0.001$) balance, step length ($p=0.028$), stride length ($p<0.001$), and cadence ($p<0.001$). However, we did not find a significant difference in step time and width between the two groups. Conclusion: Aquatic exercise would be beneficial in decreasing subjective pain of osteoarthritis. There are some recognizable improvements in patients' gait and balance as well.

Keywords: knee osteoarthritis, aquatic exercise, pain, gait, balance

Introduction

Knee osteoarthritis is a common form of arthritis identified by the physician in daily practice [1]. The prevalence of the disease is about 28% among the population over the age of 45 years, and people over 63 years are more prone to develop an accelerated form of the disease [2-4]. Patients typically have pain and stiffness in their knees and have a lower quality of life because of reduced physical activity [5, 6]. Moreover, for patients in the end stage of the disease, surgery is a potential intervention [7]. In addition, psychological distress and socioeconomic burden are still major concerns [2, 8].

Symptomatic relief and preventing deterioration of the disease are the main goals of treatment [6]. Various

therapeutic and lifestyle interventions might reduce the risk of structural damage and hence the risk of disease activity. Weight reduction plays an important role in reducing the load of the knee joint in overweight patients. Educating patients to use their joints properly would be beneficial to decrease disability and relapse [1]. Analgesic medications such as non-steroidal anti-inflammatory drugs and glucocorticoids are also prescribed frequently to palliate the symptoms and reduce inflammation [9, 10]. However, central to the recommended treatments is the use of exercise to maintain general health, to recover function, and to decrease the likelihood of the disease progression [2, 11-13].

For exercise programs to be successful, patients' adherence is a requirement. Weakness and movement-related

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PENGARUH LATIHAN RANGE OF MOTION (ROM) TERHADAP PERUBAHAN SKALA NYERI PADA LANSIA DENGAN OSTEOARTRITIS DI POSYANDU LANSIA DESA KALIANGET TIMUR KECAMATAN KALIANGET KABUPATEN SUMENEP

Mujib Hannan, Program Studi Ilmu Keperawatan UNIJA Sumenep

e-mail: Mujib@wiraraja.ac.id

Emdat Suprayitno, Program Studi Ners UNIJA Sumenep

e-mail: emdats@yahoo.com

ABSTRACT

Background: Osteoarthritis is a degenerative joint disease in which damage to the joints of aging been anticipated plays an important role in the development of osteoarthritis (Stanley, 2006). It forced a decline in activity or immobilization so it accelerate the prognosis of the disease. This study aimed to determine the Range of Motion (ROM) exercise influence in changing the pain scale in elderly with osteoarthritis in the elderly Posyandu Kalianget Timur Kalianget Sumenep.

Method: This Research design is pre experiment one group pre and post test design with simple random sampling. The population are 76 people with total sample of 64 people. Data were analyzed using wilcoxon test.

Result: The results of the study prior to Range of Motion (ROM) exercise pain scale at nearly half the respondents (48.4%) had moderate pain (scale 4-6). And after Range of Motion (ROM) exercise pain scale at nearly half the respondents (46.9%) had mild pain (scale 1-3). Data were analyzed using wilcoxon test. The results obtained $p = 0.000$ which means Range of Motion (ROM) exercise significantly effective in changing the pain scale in osteoarthritis patients in the elderly Posyandu Kalianget Timur Sumenep.

Conclusion: ROM exercises is non pharmacological therapy that can applied to reduce the scale of pain in elderly with osteoarthritis. The result of this study is expected to increase the knowledge and prevent pain by creating and ROM maintaining positive habit to avoid degenerative joint stiffness that caused by pain.

Keywords: Range of Motion (ROM) Exercise, Pain Scale, Osteoarthritis

PENDAHULUAN

Proses penuaan merupakan fenomena yang terjadi pada semua makhluk hidup dan tidak dapat dihindari. Menua dapat menjadi suatu ketakutan sendiri dalam berbagai hal

tersebut memaksa terjadinya penurunan aktivitas atau imobilisasi. Ambardini (2011) berpendapat bahwa beberapa konsekuensi imobilisasi adalah hilangnya kekuatan otot dan berkurangnya produksi proteoglikan pada sendi

PENGARUH LATIHAN *RANGE OF MOTION* TERHADAP PENURUNAN INTENSITAS NYERI PADA LANSIA DENGAN OSTEOARTRITIS

Jayanti Rahmadina Pratiwi¹, Erwan Setiyono^{2*}, Iyar Siswandi³

¹Fakultas Ilmu Keperawatan, Universitas Muhammadiyah Jakarta, Jakarta, Indonesia

²erwan.setiyono@yahoo.com

ABSTRAK

Osteoarthritis adanya degenerasi kartilago, pembentukan tulang baru pada bagian pinggir sendi dan penurunan fungsi akibat pemuatan. Salah satu tanda dan gejala pada osteoarthritis yaitu nyeri sendi. Latihan ROM merupakan intervensi non farmakologi yang memberi dampak meringankan nyeri dan meningkatkan fleksibilitas sesuai batas gerak klien sendiri, meningkatkan kekuatan otot, meningkatkan metabolisme cairan sendi sinovial yang akan memberikan nutrisi pada tulang rawan sehingga nyeri dapat berkurang. Tujuan penelitian ini untuk mengetahui pengaruh latihan range of motion terhadap penurunan intensitas nyeri pada lansia dengan osteoarthritis di Balai Rehabilitasi Sosial Lanjut Usia Budhi Dharma Bekasi. Penelitian kuantitatif dengan metode Quasi Eksperimental dengan rancangan One Group Pretest Posttest Design. Hasil perhitungan sampel sebanyak 15 responden menggunakan teknik Purposive Sampling. Hasil penelitian yang dilakukan peneliti didapatkan hasil analisis nilai mean nyeri osteoarthritis yang dialami responden sebelum melakukan Latihan ROM adalah 3.40 dan hasil nilai mean setelah melakukan Latihan ROM 2.47. Dari hasil uji statistik dapat disimpulkan bahwa terdapat perbedaan nilai mean yang bermakna antara intensitas nyeri sebelum dan sesudah dilakukan Latihan ROM. Berdasarkan hasil uji paired sampel t-test didapatkan nilai p Value 0.001 ($p < 0.05$) yang artinya ada pengaruh antara Latihan ROM terhadap penurunan intensitas nyeri pada lansia dengan osteoarthritis. Saran dari peneliti yaitu latihan ROM sebagai bahan masukan untuk menetapkan strategi menjadikan standar operasional prosedur dalam penanganan nyeri osteoarthritis yang dilakukan 2 kali dalam sehari pada pagi dan sore hari pada lansia dengan osteoarthritis.

Kata kunci : Latihan Range Of Motion, Intensitas Nyeri, Osteoarthritis

ABSTRACT

Osteoarthritis the presence of cartilage degeneration, the formation of new bones at the edges of the joints and a decrease in function due to aging. One of the signs and symptoms in osteoarthritis is joint pain. ROM exercise is a non-pharmacological intervention that has the impact of relieving pain and increasing flexibility according to the client's own limits of movement, increasing muscle strength, increasing the metabolism of synovial joint fluid which will provide nutrients to the cartilage so that pain can be reduced. The purpose of this study was to determine the effect of range of motion exercise on reducing pain intensity in the elderly with osteoarthritis at the Budhi Dharma Bekasi Elderly Social Rehabilitation Center. Quantitative research with Quasi Experimental method designed by One Group Pretest Posttest Design. The results of the sample calculation of 15 respondents using the Purposive Sampling technique. The results of the study conducted by researchers obtained the results of the analysis of the mean value of osteoarthritis pain experienced by respondents before doing ROM exercises was 3.40 and the results of the mean values after doing ROM exercises were 2.47. From the results of the statistical test, it can be concluded that there is a significant difference in mean values between the intensity of pain before and after ROM exercises. Based on the results of the paired test, the t-test sample obtained a p value of 0.001 ($p < 0.05$) which means that there is an influence between ROM exercises on reducing pain intensity in the elderly and osteoarthritis. The advice from the researchers is ROM exercises as input to establish strategies to make standard operating procedures in handling osteoarthritis pain which is carried out 2 times a day in the morning and evening in the elderly with osteoarthritis.

Keywords : Exercise Range Of Motion, Pain Intensity, Osteoarthritis

RIWAYAT HIDUP PENULIS



Nama penulis adalah Fadil Ilmi Alwasilah, lahirkan di Dusun Manganti Desa Sidarahayu Kecamatan Purwadadi kabupaten Ciamis tepatnya pada tanggal 11 Juli 2002. Anak pertama dari 3 bersaudara pasangan Bpk. Dede Warman dan Ibu Anni Novianty. Peneliti menempuh Pendidikan pertamanya di TK Al Ikhlas pada tahun 2007 dan lulus pada tahun 2008 setelah itu melanjutkan pendidikannya di SDN 4 Purwajaya pada tahun 2009 dan selesai pada tahun 2015, lalu melanjutkan Pendidikan di MTS Sidarahayu dan selesai pada tahun 2018. Setelah itu peneliti melanjutkan sekolah di MAN 2 Ciamis dan selesai pada tahun 2021, pada tahun 2021 peneliti melanjutkan jenjang pendidikannya S1-nya dan di terima di Universitas Galuh Fakultas Ilmu Kesehatan Prodi Keperawatan dan menyelesaikannya pada tahun 2025.

Selama masa perkuliahan, penulis aktif mengembangkan diri tidak hanya dalam bidang akademik, tetapi juga dalam berbagai kegiatan organisasi kemahasiswaan.

Pengalaman organisasi yang pernah diikuti antara lain menjadi bagian dari BEM FIKES Universitas Galuh periode 2022/2023 dan 2023/2024, DPM FIKES Universitas Galuh periode 2024/2025.

MOTTO DAN LEMBAR PERSEMBAHAN

MOTTO

"Langkah kecil yang dilakukan dengan konsisten akan membawa pada pencapaian besar. Bersyukur atas perjuangan, bangga atas proses, dan bahagia atas kebersamaan."

PERSEMBAHAN

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Randomized controlled trial of aquatic exercise for treatment of knee osteoarthritis in elderly people

SIROUS AZIZI¹, AFSANEH DADARKHAH², ZAHRA REZASOLTANI³,
SEYED AHMAD RAEISSADAT^{2,3}, REZA KAZEMPOOR MOFRAD⁴, SHARIF NAJAFI^{1,*}

¹Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Aja University of Medical Sciences, Tehran, Islamic Republic of Iran

²Physical Medicine and Rehabilitation Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Islamic Republic of Iran

³Shahid Modarres Hospital, Clinical Research and Development Center, Shahid Beheshti University of Medical Sciences, Tehran, Islamic Republic of Iran

⁴Faculty of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Islamic Republic of Iran

*Corresponding author: Sharif Najafi, Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Aja University of Medical Sciences, Enghelab St., Western Tehran, Tehran 14117 18541, Islamic Republic of Iran; Phone: +98 21 4382 3476; Fax: +98 21 8802 8724; E-mail: sh.najafi@ajamu.ac.ir

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Abstract: *Aim:* The aim of this study is to assess the efficacy of aquatic exercise on pain, gait, and balance among elderly patients with knee osteoarthritis. *Methods:* We performed a randomized controlled trial at a university hospital. Overall, 32 men with knee osteoarthritis, aged ≥ 60 years, were included. Pain, balance, and gait were evaluated before and 2 months after interventions. The group control used acetaminophen and followed lifestyle recommendations. The intervention group performed the aquatic exercise three sessions per week for 8 weeks. *Results:* At the end of the study, mean pain scores were significantly different between the groups ($p=0.010$). Within-group analysis showed that group intervention experienced significant pain relief ($p=0.019$), whereas group control did not show the significant change ($p=0.492$). There was significant improvement in favor of aquatic exercise with regard to static ($p=0.001$) and dynamic ($p=0.001$) balance, step length ($p=0.020$), stride length ($p<0.001$), and cadence ($p<0.001$). However, we did not find a significant difference in step time and width between the two groups. *Conclusions:* Aquatic exercise would be beneficial in decreasing subjective pain of osteoarthritis. There are some recognizable improvements in patients' gait and balance as well.

Keywords: knee osteoarthritis, aquatic exercise, pain, gait, balance

Introduction

Knee osteoarthritis is a common form of arthritis identified by the physician in daily practice [1]. The prevalence of the disease is about 28% among the population over the age of 45 years, and people over 63 years are more prone to develop an accelerated form of the disease [2-4]. Patients typically have pain and stiffness in their knees and have a lower quality of life because of reduced physical activity [5, 6]. Moreover, for patients in the end stage of the disease, surgery is a potential intervention [7]. In addition, psychological distress and socioeconomic burden are still major concerns [2, 8].

Symptomatic relief and preventing deterioration of the disease are the main goals of treatment [6]. Various

therapeutic and lifestyle interventions might reduce the risk of structural damage and hence the risk of disease activity. Weight reduction plays an important role in reducing the load of the knee joint in overweight patients. Educating patients to use their joints properly would be beneficial to decrease disability and relapse [1]. Analgesic medications such as non-steroidal anti-inflammatory drugs and glucocorticoids are also prescribed frequently to palliate the symptoms and reduce inflammation [9, 10]. However, central to the recommended treatments is the use of exercise to maintain general health, to recover function, and to decrease the likelihood of the disease progression [2, 11-13].

For exercise programs to be successful, patients' adherence is a requirement. Weakness and movement-related

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