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Hubungan Close Kinetic Chain Exercise Terhadap Kemampuan Fungsional Pada Penderita Osteoartritis Di Puskesmas Citra Medika Kota Lubuklinggau

The Relationship Of Close Kinetic Chain Exercise To Functional Ability In Osteoarthritis Patients At The Citra Medika Health Center Lubuklinggau City

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ABSTRAK
Kemampuan fungsional mengacu pada kapasitas seseorang untuk melakukan tugas-tugas yang berkaitan dengan aktivitas sehari-hari, yang melibatkan beberapa kelompok sendi dan otot untuk meningkatkan stabilitas. Penelitian ini membahas masalah peningkatan jumlah pasien osteoartritis yang mengalami gangguan fungsional. Tujuan dari penelitian ini adalah untuk mengetahui hubungan antara close kinetic chain exercise dengan disabilitas fungsional pada lansia penderita osteoartritis di wilayah Puskesmas Citra Medika Kota Lubuklinggau. Penelitian ini menggunakan metode kuantitatif dengan desain pre-test dan post-test. Kelompok perlakuan akan mendapatkan terapi latihan theraband. Populasi penelitian ini terdiri dari 253 orang, dengan jumlah sampel sebanyak 10 orang. Jenis data meliputi data primer dan sekunder. Analisis data dilakukan dengan menggunakan statistik paired t-test (uji parametrik) Hasil penelitian menunjukkan bahwa rata-rata skor kemampuan fungsional sebelum intervensi close kinetic chain exercise pada pasien osteoartritis di wilayah Puskesmas Citra Medika Kota Lubuklinggau adalah 54,50. Setelah intervensi, rata-rata skor kemampuan fungsional meningkat menjadi 44,70. Hal ini menunjukkan adanya hubungan yang signifikan antara close kinetic chain exercise dengan kemampuan fungsional pada pasien osteoartritis, dengan nilai p-value sebesar 0,000. Penelitian ini diharapkan dapat memberikan data dan wawasan teoritis yang berharga kepada Puskesmas Citra Medika Kota Lubuklinggau dan para profesional yang terkait untuk meningkatkan kualitas pelayanan asuhan keperawatan pada pasien osteoartritis dengan menerapkan prosedur standar terapi latihan close kinetic chain exercise dalam kegiatan rutin di Puskesmas.

Keywords :
Closed Kinetic Chain Exercise, Functional Ability, Osteoarthritis.

ABSTRACT
Functional ability refers to a person's capacity to perform tasks related to daily activities, which involves multiple joint and muscle groups to enhance stability. The research addresses the issue of increasing numbers of osteoarthritis patients experiencing functional impairments. The objective of this study is to examine the relationship between close kinetic chain exercise and the functional disability of elderly individuals with osteoarthritis in the Citra Medika Health Center area, Lubuklinggau City.This research employs a quantitative method with a pre-test and post-test design. The treatment group will receive theraband exercise therapy. The study's population consists of 253 individuals, with a sample size of 10 people. The data types include both primary and secondary data. Data analysis is conducted using paired t-test statistics (a parametric test).The findings reveal that the average functional ability score before the close kinetic chain exercise intervention for osteoarthritis patients in the Citra Medika Health Center area, Lubuklinggau City, was 54.50. After the intervention, the average functional ability score improved to 44.70. This indicates a significant relationship between close kinetic chain exercise and functional ability in osteoarthritis patients, with a p-value of 0.000.This research is expected to provide the Citra Medika Health Center in Lubuklinggau City, as well as the relevant professionals, with valuable data and theoretical insights to enhance the quality of nursing care services for osteoarthritis patients by implementing standardized procedures for exercise therapy.carrying out closed kinetic chain exercises in the routine activities of the Community Health Center.

INTRODUCTION

Osteoarthritis (OA) is a degenerative joint disease characterized by the progressive erosion of joint cartilage, joint inflammation, osteophyte formation, and damage to the subchondral bone. This condition causes pain, decreased physical activity, and a reduced quality of life (Samosir et al., 2020).According to the World Health Organization (WHO) in 2019, osteoarthritis is one of the most common causes of disability in developed countries. Globally, it is estimated that 9.6% of men and

18% of women over the age of 60 suffer from osteoarthritis, with approximately 80% of them experiencing movement limitations.In Indonesia, the primary causes of knee osteoarthritis can be categorized into two major risk factors: predisposing factors and biomechanical factors. Several factors that increase a person's risk of developing osteoarthritis (OA) include age, gender, genetic predisposition, ethnicity, and obesity. On the other hand, biomechanical factors are more related to mechanical aspects or body movements that place stress or pressure on the knee joints, such as a history of knee trauma, anatomical abnormalities, and intense physical activity, which can increase the risk of OA (Djawas, 2020).The government is making efforts to minimize the risk of osteoarthritis by promoting a healthy lifestyle as a primary preventive measure. This includes improving dietary habits, engaging in regular exercise, and consulting healthcare professionals for treatment options that can help reduce joint inflammation.In Lubuklinggau City, data from Puskesmas Citra Medika indicate that the number of osteoarthritis cases has increased over the past three years. In 2021, 152 individuals were reported to have osteoarthritis. This number rose to 216 in 2022. Data for 2023 has not yet been fully disclosed, but the number of cases increased to 253 individuals diagnosed with osteoarthritis.One of the common musculoskeletal symptoms encountered is the decline in functional ability, which makes it difficult for the elderly to perform daily activities. They experience limited knee joint mobility, as well as difficulty in ambulation and walking. Therefore, interventions are needed to address these issues to enhance and maintain independence in daily activities.Close Kinetic Chain Exercise (CKCE) is a type of active movement exercise where the soles of the feet remain in contact with the ground, allowing multiple muscle groups and joints to engage simultaneously, thereby improving stability and strength. CKCE movements resemble functional daily activities, making them safer and easier for the elderly to perform.The CKCE exercises applied in this study include Mini Squats, Quadriceps Setting Exercises, and Step Up Step Down. These exercises help reduce pain, strengthen the lower limb muscles, and improve functional ability (Djawas & Isna, 2020).The primary goal of active movement exercise or Closed Kinetic Chain Exercise is to enhance joint stability and strengthen the muscles surrounding the knee. These repetitive movements promote increased muscle activation around the joint. This process helps eliminate metabolic waste through blood circulation, thereby improving the functional ability of the elderly (Prio, Misbah, & Wijayati, 2017).

RESEARCH METHODS

This study used a pre-experimental design with a pre-test and post-test approach. In this design, the treatment group received an intervention consisting of closed kinetic chain exercises twice a week for two weeks, followed by an evaluation to measure improvements in functional ability.The study was conducted at Puskesmas Citra Medika Lubuklinggau from May 31 to June 13, 2024. Each participant underwent closed kinetic chain exercises, performed using assistive tools such as mats and chairs, and followed the Standard Operating Procedures (SOP) for the exercises.During the study, the intervention involved the implementation of closed kinetic chain exercises. Observations were conducted using an observation sheet to assess the reduction in functional limitations among participants. The evaluation was performed using the WOMAC (Western Ontario and McMaster Universities Osteoarthritis Index), which is used to measure knee function in osteoarthritis patient.

RESULTS

Table 1 Functional Ability Before The Implementation Of Closed Kinetic Chain Exercise In Osteoarthritis Patients.

Variable	N	Mean	Std.D	Min	Max
Before CKCE	10	28,10	1,370	26	31

Based on Table 1, the functional ability of osteoarthritis patients before closed kinetic chain exercise is 28.10, with a standard deviation of 1.370. This shows the level of functional ability of patients before osteoarthritis interve got the highest value is 31 and the lowest is 26.

Table 2 Functional Ability After The Implementation Of Closed Kinetic Chain Exercise In Osteoarthritis Patients.

Variable	N	Mean	Std.D	Min	Max
After CKCE	10	20,90	1,197	19	23

Based on Table 2, the functional ability of osteoarthritis patients after performing closed kinetic chain exercise is 20.90, with a standard deviation of 1.197. Functional ability values after intervention ranged from the highest value of 23 and the lowest value of 19.From these results, it can be

concluded that closed kinetic chain exercise has a positive effect on the functional ability of osteoarthritis patients, with a decrease in the average functional ability value from 28.10 before training to 20.90 after training.

Table 3 Improvement In The Functional Ability Of Patients After Following The Exercise Program.

Functional Ability	Mean	*P value*
Pre-Post Functional Ability	7,200	0,000

Based on Table 3, it shows that the functional ability of osteoarthritis patients after performing closed kinetic chain exercise has a p value = 0.000, which means p < 0.05 (α). This indicates that there is a significant effect of this exercise on the functional ability of osteoarthritis patients at the Citra Medika Health Center Lubuklinggau City.

DISCUSSION

Functional Ability Before Closed Kinetic Chain Exercise in Osteoarthritis Patients

Based on the research findings, the average functional ability of osteoarthritis patients before undergoing closed kinetic chain exercise was 28.10, with a standard deviation of 1.370. The functional ability scores before the intervention ranged from 31 (highest value) to 2 (lowest value). Functional ability is defined as a person's capacity to perform specific tasks related to daily activities.The lowest recorded score of 2 may indicate extreme cases with severe functional impairment, while the highest score of 31 suggests patients with relatively better functional ability before the intervention. This variation highlights the differences in osteoarthritis severity among patients.

Functional Ability After Closed Kinetic Chain Exercise

After performing closed kinetic chain exercise, the average functional ability of the patients improved to 20.90, with a standard deviation of 1.197. The functional ability scores after the intervention ranged from 19 (lowest value) to 23 (highest value). The decrease in the average functional ability score from 28.10 before exercise to 20.90 after exercise indicates a significant improvement in the patients' capacity to perform daily activities.Overall, these findings support the conclusion that closed kinetic chain exercise is effective in enhancing functional ability in osteoarthritis patients. This result aligns with previous studies demonstrating that such exercises can reduce pain, strengthen the lower limb muscles, and improve joint function.In osteoarthritis, knee joint pathology often hinders individuals from performing daily functional tasks. Closed kinetic chain exercises help improve joint function and enhance stability, allowing patients to regain better mobility and reduce limitations caused by osteoarthritis.Closed kinetic chain exercise enables osteoarthritis patients to perform daily activities more effectively, such as standing up from a seated position, squatting, standing, kneeling, walking, and climbing stairs. This exercise is effective in addressing activities that place a burden on the knee joint and require weight-bearing.

Research indicates that osteoarthritis is a common disorder in old age or a disease frequently affecting the elderly. This condition typically develops due to excessive physical activity over time, leading the body to adapt accordingly. Over time, the progression of osteoarthritis can result in pain and reduced functional ability in daily activities.Osteoarthritis is commonly found in elderly patients, particularly women. Several factors contribute to this, including female hormones that can promote the growth of purines and keratin. Additionally, older women often experience weight gain due to a sedentary lifestyle throughout their lives, further increasing the risk of osteoarthritis.

Functional Ability After Closed Kinetic Chain Exercise

Based on the study results, the average functional ability of osteoarthritis patients after undergoing closed kinetic chain exercise was 20.90, with a standard deviation of 1.197. Following the intervention, functional ability scores ranged from 19 (lowest value) to 23 (highest value).This change indicates an improvement in the patients' functional ability after completing the exercises. Closed kinetic chain exercise is an active movement technique involving multiple muscle groups and joints without significantly engaging proximal muscle movement. This exercise focuses on movements where a single joint remains stable, helping to increase strength and joint stability without adding excessive stress to the joint.Researchers have found that closed kinetic chain exercise can enhance functional activity in patients with knee osteoarthritis through various mechanisms. These exercises improve proprioceptive stimulation in the knee joint, which in turn enhances joint stability. As joint

stability increases, knee pain decreases, and coordination and movement perception of the joint improve.During closed kinetic chain exercise, muscle contractions stimulate the Golgi tendon organs, which send mechanical change information through afferent fibers. This mechanism helps the body adapt and effectively improve joint function.Researchers also emphasize that closed kinetic chain exercise therapy should be performed gradually according to the patient's ability and must be conducted regularly to achieve optimal results.The duration of therapy does not show a significant difference. The most important factor in performing closed kinetic chain exercises is gradually adjusting the intensity based on the patient's ability. Regular exercise increases each patient's mobility and has the potential to improve range of motion.The duration of therapy also depends on the patient's ability to tolerate movements. Therefore, it is expected that the exercises can be progressively increased over time, adjusting to the patient's capabilities. This ensures that the therapy duration is tailored individually to maximize its benefits and effectiveness.

The Impact of Closed Kinetic Chain Exercise on Functional Ability in Osteoarthritis Patients

The research findings indicate a positive impact on the functional ability of osteoarthritis patients at Puskesmas Citra Medika, Lubuklinggau City. Physiologically, closed kinetic chain exercise has the following characteristics:

1. Number of Axes of the Moving Joint: Typically involves a single joint axis.
2. Nature of the Moving Joint Segment: Only one joint moves while the others remain stable.
3. Number of Moving Joints: Involves an isolated joint in motion.
4. Range of Motion: The exercise operates within a single plane of movement.
5. Muscles Involved: Engages muscle groups, isolated muscles, and contracting muscles during exercise.

With these characteristics, closed kinetic chain exercise focuses on joint stability and strengthening supportive muscles, ultimately enhancing functional ability in osteoarthritis patients while reducing pain and improving quality of life.This process ensures that movements are performed correctly and according to visual instructions, maximizing the effectiveness of the exercise in improving joint function and alleviating pain.

CONCLUSIONS AND RECOMMENDATIONS

1. Before Therapy: The average functional ability of osteoarthritis patients at Puskesmas Citra Medika Lubuklinggau City before closed kinetic chain exercise is 28.10.
2. After Therapy: The average functional ability of osteoarthritis patients after closed kinetic chain exercise at Puskesmas Citra Medika Lubuklinggau City is 20.90.
3. Effect of Therapy: There is a significant effect of closed kinetic chain exercise on the functional ability of osteoarthritis patients at Puskesmas Citra Medika Lubuklinggau City, with a p value of 0.000.

REFERENCES

Djawas, Faizah Abdullah, and Wafa Rachmalillah Isna. 2020. "Closed Kinetic Chain Exercise Efektif Dalam Meningkatkan Kemampuan Fungsional Pada Osteoartritis Lutut." Jurnal Ilmiah Fisioterapi 3(2): 1–7.

Ismunandar, Helmi,Rani Himayani, and Rasmi Zakiah Oktarlina. 2019. "Pada Masyarakat Desa Branti Raya kampung Selatan." Jurnal Penelitian 2: 1–4.

Notoadmojo. 2012. Metodologi Penelitian Kesehatan. Jakarta: Rineka Cipta.

Prio, Asminarsih Zainal, Sitti Rachmi Misbah, and Fitri Wijayati. 2017. "PengaruhLatihanGerak Aktif Kaki Dengan Teknik Kinetic Chain Exercise Terhadap Penurunan Intensitas Nyeri Pada LansiaDengan Nyeri Sendi Osteoartritis Dan Rheumatoid." Health Information: Jurnal Penelitian 9(1): 15–25.

Ridha, M. Rasyid, and Miko Eka Putri. 2015. "Pengaruh Latihan Range Of Motion (ROM) Aktif Terhadap Kekuatan Otot Ekstremitas Bawah Pada Lansia Dengan Osteoarthritis Di Wilayah Kerja Puskesmas Koni Kota Jambi." Jurnal Akademika Baiturrahim 4(2): 45–52.

Samosir, Renti Kusumaningrum, Emeraldha Theodorus, Debby Cinthya Damiri Valentina, and Theodora Agverianti. 2020. "Potensi Aktivitas Supresi Respon Imun Sinovial Sebagai JNK Pathway InhibitorDalam Tatalaksana Osteoartritis." JIMKI: Jurnal Ilmiah Mahasiswa Kedokteran Indonesia 8(2): 88–94.

Notoatmodjo, S. 2018. Metodologi Penelitian Kesehatan. Jakarta: Rineka Cipta.