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Original research article

Effectiveness of hamstring strengthening exercises in reducing pain and improving functional ability in patients with non-specific knee pain: Pre and Post intervention analysis

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Abstract

The purpose of this study was to see how effective hamstring strengthening exercises were in reducing pain and improving functional abilities in patients with non-specific knee pain. Pre and post-intervention evaluations were performed on fifteen participants using the Visual Analogue Scale (VAS) for pain levels and the Lower Extremity Functional Scale (LEFS) for functional abilities. The results showed a considerable reduction in pain levels and a significant increase in functional abilities following the intervention. These data suggest the use of hamstring strengthening exercises as an effective intervention for treating knee pain and improving functional outcomes in non-specific knee pain patients.

Keywords: Visual Analogue Scale (VAS), Lower Extremity Functioning Scale (LEFS), Vastus Medialis Oblique (VMO), Straight Leg Raising (SLR), Range of Motion (ROM)

Introduction

Non-specific knee pain is a common musculoskeletal condition that affects individuals of various age groups and can significantly impact their functional ability and quality of life. One of the leading causes of knee pain is osteoarthritis, a degenerative joint disease characterized by the progressive deterioration of articular cartilage. Osteoarthritis of the knee often leads to muscle weakness and altered coordination, particularly in the quadriceps and hamstrings muscles [1, 2].

Muscular deficits, such as reduced muscle strength and impaired coordination, play a crucial role in the development and progression of knee osteoarthritis [3]. These deficits can further exacerbate joint instability and increase the mechanical load on the knee joint, contributing to pain and functional limitations [4]. Consequently, interventions that aim to improve muscle strength and coordination are commonly recommended for individuals with knee osteoarthritis [5].

Hamstring strengthening exercises have shown promise in addressing knee pain and improving functional ability in individuals with non-specific knee pain, including those with osteoarthritis (6) The hamstring muscles play a vital role in providing dynamic stability and controlling joint forces around the knee joint. Therefore, targeting hamstring strength may have a beneficial impact on pain reduction and functional improvement in patients with knee osteoarthritis [7].

Previous studies have explored the relationship between muscle strength, radiological grading, functional performance and quality of life in individuals with knee osteoarthritis [8, 9]. However, there is limited research specifically investigating the effectiveness of hamstring strengthening exercises in reducing pain and improving functional ability in patients with non-specific knee pain. Therefore, this study aims to examine the effectiveness of hamstring strengthening exercises as an intervention for reducing pain and improving functional ability in patients with non-specific knee pain.

By conducting a pre and post-intervention analysis, this study aims to provide valuable insights into the potential benefits of hamstring strengthening exercises for individuals with non-specific knee pain. The findings of this study may contribute to the development of evidence-based interventions and rehabilitation programs that can optimize the management of knee pain and improve functional outcomes in this population.

Aims and Objective

1. To assess the effectiveness of hamstring strengthening activities in lowering pain levels in

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individuals with non-specific knee pain.
2. To determine the effect of hamstring strengthening activities on increasing functional capacity in people with non-specific knee pain.

Materials and Methodology

The cross-sectional research design was used in this study. A cross-sectional study is a sort of observational research in which data is collected at a single moment in time to evaluate the relationship between variables. This study used randomized sampling as its sample design. The study participants were those who had non-specific knee discomfort. These people were involved in the study to see how hamstring strengthening activities affected their condition.

Sample Size: For this investigation, the sample size was 15 people. These individuals were chosen at random from the research population to guarantee representativeness and adequate data for analysis. Five times a week for six weeks, individuals in a clinical environment had therapy as part of the study in Pacific College of Physiotherapy, Pacific Medical University (Udaipur), after obtaining ethical approval dated 29/08/2022, PMU/PMCH/IEC/223/2022. All participants completed information and consent form at recruitment.

Study duration: the research was carried out over a six-week period. This time frame allowed for evaluation of the participants' responses to the therapy as well as any changes in their knee pain levels. Each therapy session was scheduled for 20 to 30 minutes each sitting. This time window was set aside to ensure that the participants had enough time to execute the hamstring strengthening exercises correctly. Paper and pencil for data recording, chairs for participants to sit on during assessments, a treatment couch for participants to perform exercises on, pens for documentation purposes, towels for comfort and hygiene, and a ballster (possibly a typo or specific device) for specific exercises or support were all used in the study.

Results

Table 1: Gender Distribution of Patients

Sex	(Number of Patients)	Percentage of Total
Male	8	53.3%
Female	7	46.7%
Total	15	100%

The gender distribution among the 15 patients included in the study revealed that 8 were male, accounting for 53.3% of the overall sample. In contrast, 7 cases were female, accounting for 46.7% of the overall sample.
As a result, male patients made up 53.3% of the study population, compared to 46.7% of female patients.

Table 2: Age Distribution of Patients

Age Group (In Years)	(Number of Patients)	Percentage of Total
20-30	3	20%
30-40	3	20%
40-50	3	20%
50-60	2	13.3%
60-70	3	20%
70-80	1	6.7%
Total	15	100%

The study comprised 15 individuals suffering from non-specific knee pain who were subjected to hamstring strengthening exercises. The age distribution indicated that the age groups of 20-30, 30-40, and 40-50 (each with 20% of the sample) had a larger representation, while the age group of 70-80 had the lowest representation (6.7%). These data imply that younger people were more actively seeking therapy, whereas older age groups were less active.

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Table 3: Pre and Post Intervention Comparison of Pain and Functional Ability in Patients with Non-Specific Knee Pain

No. of Patients (n = 15)	Pre-Test Mean ± SD	Post Test Mean ± SD
VAS	7.2 ± 1.3	2.6 ± 1.0
LEFS	49.6 ± 10.0	74.8 ± 3.1

The findings from Table 3 indicate the pre-test and post-test results of 15 patients who underwent hamstring strengthening exercises. The Visual Analog Scale (VAS) was used to measure pain levels, while the Lower Extremity Functional Scale (LEFS) assessed functional ability.

Before the intervention, the patients had an average VAS score of 7.2 ± 1.3, indicating moderate to severe pain. However, after the intervention, the average VAS score significantly decreased to 2.6 ± 1.0, suggesting a substantial reduction in pain levels.

Regarding functional ability, the patients had an average LEFS score of 49.6 ± 10.0 before the intervention, reflecting limitations in daily activities. However, after the intervention, the average LEFS score improved significantly to 74.8 ± 3.1, indicating a notable enhancement in functional ability.

Overall, the findings suggest that the hamstring strengthening exercises led to a significant reduction in pain levels and improvement in functional ability among the patients with non-specific knee pain. These results highlight the potential effectiveness of this intervention in managing knee pain and enhancing functional outcomes.

Conclusion

In conclusion, this study demonstrated that hamstring strengthening exercises effectively reduced pain and improved functional ability in patients with non-specific knee pain. Following the intervention, there was a significant decrease in pain levels, as evidenced by the lower VAS scores. Additionally, functional ability showed a notable improvement, as indicated by the higher LEFS scores. These findings suggest that incorporating hamstring strengthening exercises can be an effective approach for managing knee pain and enhancing functional outcomes in individuals with non-specific knee pain.

References

1. Hayes KW, Falconer J. Differential muscle strength decline in osteoarthritis of the knee. A developing hypothesis. Arthritis Care Res. 1992;5:24-28.
2. Zeni JA, Rudolph K, Higginson JS. Alterations in quadriceps and hamstrings coordination in persons with medial compartment knee osteoarthritis. J Electromyogr Kinesiol. 2010;20:148-154.
3. Lloyd DG, Buchanan TS. Strategies of muscular support of varus and valgus isometric loads at the human knee. J Biomech. 2001;34:1257-1267.
4. Lloyd DG, Buchanan TS, Besier TF, *et al.*: Neuromuscular biomechanical modeling to understand knee ligament loading. Med Sci Sports Exerc. 2005;37:1939-1947.
5. Fransen M, McConnell S, Bell M. Exercise for osteoarthritis of the hip or knee. Cochrane Database Syst Rev. Cochrane Libr. 2003;3:CD00-4286.
6. Lee JH, Jang KM, Kim E, Rhim HC, Kim HD. Effects of Static and Dynamic Stretching with Strengthening Exercises in Patients with Patellofemoral Pain Who Have Inflexible Hamstrings: A Randomized Controlled Trial. Sports Health. 2021 Jan/Feb;13(1):49-56. Doi: 10.1177/1941738120932911. Epub 2020 Aug 13. PMID: 32790575; PMCID: PMC7734366.
7. Al-Johani AH, Kachanathu SJ, Ramadan Hafez A, Al-Ahaideb A, Algarni AD, Meshari Alroumi A, *et al*. Comparative study of hamstring and quadriceps strengthening treatments in the management of knee osteoarthritis. J Phys Ther Sci. 2014 Jun;26(6):817-20. Doi: 10.1589/jpts.26.817. Epub 2014 Jun 30. PMID: 25013274; PMCID: PMC4085199.
8. Brandt KD. Neuromuscular aspects of osteoarthritis: a perspective. Novartis Found Symp. 2004;260:49-58, Discussion 58-63, 100-104, 277-279.
9. Madsen OR, Bliddal H, Egsmose C, *et al.*: Isometric and isokinetic quadriceps strength in gonarthrosis; inter-relations between quadriceps strength, walking ability, radiology, subchondral bone density and pain. Clin Rheumatol. 1995;14:308-314.
10. Hafez AR, Al-Johani AH, Zakaria AR, Al-Ahaideb A, Buragadda S, Melam GR, *et al*. Treatment of knee osteoarthritis in relation to hamstring and quadriceps strength. Journal of physical therapy science. 2013;25(11):1401-5.