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Role of physiotherapy in relieving osteoarthritis knee pain using lysholm score

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ABSTRACT

Background: Knee osteoarthritis (OA) is a prevalent condition that significantly impacts quality of life. While pharmacological interventions are commonly used, non-pharmacological approaches like physiotherapy have gained increasing recognition. In this study, the Lysholm Knee Scoring Scale was used to assess how well physiotherapy worked in reducing knee pain and enhancing functional results for people with OA knee.
Methods: A randomized controlled trial from 1st February 2023 to 31st July 2023 at Department of Orthopaedics, Padmashree Dr. D.Y. Patil Medical College and Hospital, Nerul, Navi Mumbai, Maharashtra, India was conducted with 500 participants diagnosed with knee OA. Participants were randomly assigned to either the physiotherapy group (n=250) or the control group (n=250). The physiotherapy group received a 12-week standardized program consisting of exercise therapy, manual therapy and education. The control group received standard care. The primary outcome was the Lysholm Knee Scoring Scale, assessed at baseline, 12 weeks (post-intervention) and 24 weeks (follow-up). Secondary outcomes included the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), knee range of motion, muscle strength and quality of life.
Results: At baseline, the groups were comparable in terms of age, gender, body mass index and clinical characteristics. The physiotherapy group demonstrated significantly greater improvements in the Lysholm Knee Scoring Scale compared to the control group at 12 weeks (mean difference: 10.2, 95% CI: 7.4, 13.0; $p<0.001$) and 24 weeks (mean difference: 12.2, 95% CI: 9.2, 15.2; $p<0.001$). Similar patterns were observed for secondary outcomes, with the physiotherapy group showing significant improvements in WOMAC pain and function, knee range of motion, quadriceps strength and quality of life (all $p<0.001$).
Conclusions: This study provides evidence that physiotherapy interventions, including exercise therapy, manual therapy and education, are effective in relieving knee pain and improving functional outcomes in individuals with knee osteoarthritis, as measured by the Lysholm Knee Scoring Scale and other relevant clinical measures.

Keywords: Knee osteoarthritis, Knee physical therapy, Modalities exercise therapy, Musculoskeletal manipulations

INTRODUCTION

Osteoarthritis (OA) is a degenerative joint disease characterized by the progressive breakdown of articular cartilage, leading to joint pain, stiffness and functional limitations.[1] Knee osteoarthritis is one of the most prevalent forms of the condition, affecting a significant proportion of the elderly population and posing a substantial burden on healthcare systems worldwide.[2] While pharmacological interventions are commonly employed to manage the symptoms of knee OA, their potential side effects and limited efficacy in addressing the underlying disease process have prompted a growing interest in non-pharmacological approaches, including

physiotherapy.[3] Physiotherapy encompasses a range of interventions, such as exercise therapy, manual therapy and education, aimed at improving joint function, reducing pain and enhancing overall quality of life for individuals with musculoskeletal conditions like osteoarthritis.[4] Among the various outcome measures used to evaluate the effectiveness of physiotherapy interventions in knee OA, the lysholm knee scoring scale has emerged as a widely recognized and validated tool for assessing knee function and symptoms.[5]

The lysholm knee scoring scale is a condition-specific instrument that evaluates eight domains: limp, support, locking, instability, pain, swelling, stair climbing and squatting.[6] With a maximum score of 100 points, this scale provides a comprehensive assessment of knee function, allowing for the accurate monitoring of treatment outcomes and enabling clinicians to tailor interventions accordingly.

This study aims to investigate the role of physiotherapy in relieving knee pain and improving functional outcomes in individuals with osteoarthritis, as measured by the lysholm knee scoring scale. By evaluating the effectiveness of physiotherapy interventions using this validated tool, we hope to contribute to the growing body of evidence supporting the integration of non-pharmacological approaches in the management of knee osteoarthritis.

METHODS

This is Prospective randomized controlled trial design to evaluate the effectiveness of physiotherapy interventions in relieving knee pain and improving functional outcomes in individuals with osteoarthritis, as measured by the Lysholm Knee Scoring Scale.

A total of 500 participants were recruited from orthopaedics outpatient department, at Padmashree Dr. D.Y. Patil Medical College and Hospital, Nerul, Navi Mumbai, Maharashtra, India from 1st February 2023 to 31st July 2023. Eligible participants were adults aged 45 years and older, diagnosed with primary knee osteoarthritis according to the American College of Rheumatology criteria.[7] Participants with secondary knee osteoarthritis, recent knee surgery or any contraindications to physiotherapy were excluded from the study. Participants were randomly assigned to either the intervention group or the control group using a computer-generated randomization sequence. The randomization process was stratified by age and severity of knee osteoarthritis to ensure balanced distribution across groups. Participants and outcome assessors were blinded to group allocation to minimize potential biases.

Intervention

The intervention group will receive a standardized physiotherapy program consisting of the components.

Exercise therapy

A combination of range-of-motion, Vastus medialis oblique (VMO) strengthening and aerobic exercises tailored to individual needs and abilities.

Manual therapy

Techniques such as joint mobilization, soft tissue mobilization and patellofemoral joint mobilization.

Education

Comprehensive education on joint protection, activity modification and self-management strategies.

The physiotherapy program will be delivered by licensed physiotherapists and will consist of two supervised sessions per week for 12 weeks, supplemented by a home exercise program.

Control group

Participants in the control group received standard care, which included medication management, general exercise advice and educational materials, as per standard clinical practice.

Outcome measures

The primary outcome measure was the Lysholm Knee Scoring Scale, which was administered at baseline, 12 weeks (post-intervention) and 24 weeks (follow-up). Secondary outcome measures were Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), knee range of motion, muscle strength and quality of life assessments.

Statistical analysis

The data was analyzed using an intention-to-treat approach. Descriptive statistics was used to summarize the baseline characteristics of the participants. The primary analysis involved comparing the change in Lysholm Knee Scoring Scale scores between the intervention and control groups using a linear mixed-effects model, adjusting for potential confounders. Additional analyses were conducted to evaluate the secondary outcome measures and explore potential moderators and mediators of treatment effects.

RESULTS

A total of 500 participants with primary knee osteoarthritis were randomized to either the physiotherapy group (n=250) or control group (n=250). At baseline, the two groups were well-balanced in terms of demographic and clinical characteristics, ensuring that any observed differences in outcomes could be attributed to the physiotherapy intervention rather than confounding

factors (Table 1). The primary outcome measure, the lysholm knee scoring scale, is a validated and widely used instrument for assessing knee function and symptoms in individuals with knee disorders, including osteoarthritis. The physiotherapy group exhibited a marked improvement in their lysholm scores at both the 12-week (post-intervention) and 24 weeks (follow-up) time points, with a mean difference of 10.2 and 12.2 points, respectively, compared to the control group. These differences were statistically significant ($p<0.001$) and clinically meaningful, as a change of 8-10 points on the Lysholm scale is generally considered a substantial improvement. (Table 2). The physiotherapy group showed significant reductions in pain and functional limitations, as measured by the WOMAC (Western Ontario and McMaster Universities Osteoarthritis Index) subscales. These improvements in pain and function are particularly important for individuals with knee osteoarthritis, as they directly impact their quality of life and ability to perform daily activities (Table 3).

Table 1: Baseline characteristics of participants.

		Physiotherapy group (n=250)	Control group (n=250)	P value
Age (in years) (Mean±SD)		62.5±8.2	63.1±7.9	0.405
Gender	Males	105 (42%)	101 (40.4%)	0.716
	Females	145 (58%)	149 (59.6%)	
BMI (kg/m²)		28.4±4.1	27.9±3.8	0.158
Lysholm Score		55.2±12.8	56.1±13.1	0.438
WOMAC pain		8.2±2.5	8±2.7	0.391
WOMAC function		28.6±9.4	27.9±10.1	0.423

Table 2: Change in lysholm knee scoring scale from baseline to follow-up.

Time Point	Physiotherapy group (n=250)	Control group (n=250)	P value
Baseline	55.2±12.8	56.1±13.1	0.438
12 weeks	69.8±11.5	59.6±12.2	<0.001
24 weeks	72.5±10.8	60.3±11.6	<0.001

Table 3: Secondary outcomes at 24 weeks.

Outcome	Physiotherapy group (n=250)	Control group (n=250)	P value
WOMAC pain	4.1±2.8	7.2 ±3.1	<0.001
WOMAC function	19.2±9.6	25.8±10.2	<0.001
Knee flexion range (degrees)	118.5 ±12.3	109.8±11.9	<0.001
Quadriceps strength (Nm)	82.4±16.8	72.6±15.4	<0.001
Quality of life score	71.8±12.1	63.5±11.7	<0.001

DISCUSSION

The present study demonstrates the efficacy of a comprehensive physiotherapy program in relieving knee pain and improving functional outcomes in individuals with osteoarthritis, as assessed by the Lysholm Knee Scoring Scale and other relevant clinical measures. These findings are consistent with and build upon previous research supporting the role of physiotherapy in the management of knee osteoarthritis.

Several systematic reviews and meta-analyses have reported significant benefits of exercise therapy, a key component of physiotherapy, in reducing pain and improving physical function in individuals with knee osteoarthritis.[4,8] The current study adds to this body of evidence by incorporating exercise therapy within a multi-modal physiotherapy intervention and utilizing the lysholm knee scoring scale as a disease-specific outcome measure. The observed improvements in knee range of motion and quadriceps strength in the physiotherapy group are in line with previous studies investigating the effects of exercise and manual therapy interventions in knee osteoarthritis patients.[9,10] Strengthening the muscles surrounding the knee joint and improving joint mobility can contribute to reduced joint stress, improved stability and alleviation of pain and functional limitations.[11]

Notably, the physiotherapy intervention in this study also led to significant improvements in quality of life, as measured by a validated quality of life instrument. This finding is consistent with previous research demonstrating the positive impact of physiotherapy interventions on quality of life in individuals with knee osteoarthritis.[12] By addressing physical symptoms and functional limitations, physiotherapy can enhance overall well-being and participation in daily activities, ultimately improving

quality of life. While the current study focused on the lysholm knee scoring scale as the primary outcome measure, the observed improvements in secondary outcomes, such as the WOMAC (Western Ontario and McMaster Universities Osteoarthritis Index) subscales, further corroborate the findings of previous studies employing these widely used measures.[13,14] It is important to note that the present study employed a multi-modal physiotherapy intervention, comprising exercise therapy, manual therapy and patient education. This comprehensive approach aligns with current clinical practice guidelines and recommendations for the non-pharmacological management of knee osteoarthritis.[15,16] The synergistic effects of these various components may have contributed to the significant improvements observed in the physiotherapy group.

Compared to previous studies exploring the role of physiotherapy in knee osteoarthritis, the current study's strengths lie in its relatively large sample size, the use of a validated disease-specific outcome measure (Lysholm Knee Scoring Scale) and the inclusion of a comprehensive physiotherapy program incorporating multiple modalities. Despite these strengths, certain limitations should be acknowledged. First, the study did not investigate the relative contributions of individual components (exercise therapy, manual therapy and education) within the physiotherapy intervention. Future research could explore the effectiveness of these components individually or in different combinations. Additionally, the long-term durability of the observed benefits beyond the 24 weeks follow-up period remains to be explored.

Overall, the findings of this study provide strong evidence supporting the integration of physiotherapy interventions in the comprehensive management of knee osteoarthritis. By addressing pain, functional limitations and quality of life, physiotherapy can play a crucial role in improving patient outcomes and reducing the burden associated with this prevalent condition.

CONCLUSION

The results of this randomized controlled trial demonstrate that a comprehensive physiotherapy program comprising exercise therapy, manual therapy and patient education is effective in relieving knee pain and improving functional outcomes in individuals with osteoarthritis, as measured by the lysholm knee scoring scale and other relevant clinical measures.

These findings provide strong evidence supporting the integration of physiotherapy interventions in the management of knee osteoarthritis and highlight the potential of non-pharmacological approaches in addressing this prevalent condition. Further research is warranted to explore the long-term durability of the observed benefits and investigate the relative contributions of individual components within the physiotherapy program.

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