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# A study of the Effects of Physiotherapy on Knee Osteoarthritis

**Waleed Medhat Anwar Ali[1]*, Nayf Sulaiman Al Shehri[2], Badar Abdullah Alfadhli[3]**

[1] Physical Therapist, Prince Sultan Military Medical City, Riyadh, KSA

Email: Waleed10010@live.com

[2,3] Physical Therapy Technician, Prince Sultan Military Medical City, Riyadh, KSA

***Abstract - Osteoarthritis (OA) of the knee is a common chronic illness that causes pain and limited movement, greatly reducing quality of life. To manage knee OA, this randomised controlled trial evaluated the effectiveness of a comprehensive physiotherapy program that included exercise treatment, manual therapy, and patient education. One hundred individuals with moderate to severe osteoarthritis (OA) were randomised to be in one of two groups: the intervention group or the control group, which received conventional care. Supervised exercises, manual joint mobilisations, soft tissue manipulations, and education sessions on disease management and lifestyle adjustments were all part of the 12-week intervention. The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) was used to measure pain and physical function as primary objectives. The Short Form-36 (SF-36) health survey was used to measure knee range of motion, muscle strength, and quality of life as secondary goals. The intervention group significantly outperformed the control group in terms of knee range of motion, muscle strength, and WOMAC pain and function scores (p < 0.001), according to the results. Furthermore, the intervention group's quality of life scores in the domains of pain and physical functioning were significantly higher. These results, which are in line with other research emphasizing the importance of exercise, manual treatment, and patient education in improving clinical outcomes, demonstrate the many advantages of a physiotherapy program in the effective management of knee OA. This study supports the integration of comprehensive physiotherapy into standard knee OA treatment protocols to improve patient well-being and functional capabilities. Future research should focus on optimizing these interventions for broader clinical application.***

***Keywords: Physiotherapy, Knee Osteoarthritis, Osteoarthritis***

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## INTRODUCTION

Osteoarthritis (OA) of the knee is a common chronic illness that causes pain, stiffness, and limited mobility due to the deterioration of the joint cartilage and underlying bone. It creates serious socioeconomic and health difficulties and affects millions of individuals globally, especially the elderly. The goal of treating knee OA is to reduce symptoms while enhancing function and quality of life. Physiotherapy is one of the most popular treatment modalities since it is non-invasive and may help with knee OA symptoms (Hochberg et al., 2012).

A variety of therapies, including as exercise therapy, manual therapy, and education, are included in physiotherapy for osteoarthritis of the knee. In example, it has been demonstrated that exercise treatment strengthens the knee muscles, increases joint stability, and improves functional capability (Bennell et al., 2014). Research suggests that specific exercise regimens can help people with knee OA achieve better overall results by reducing pain and increasing mobility (Fransen et al., 2015). Furthermore, to ensure that exercise regimens are both safe and successful, physiotherapists frequently customise them to the unique needs and skills of their patients.

Another facet of physiotherapy is manual therapy, which entails manual methods including soft tissue manipulation and joint mobilisations. These methods seek to enhance joint function, extend range of motion, and lessen pain. Studies indicate that manual therapy can help manage knee OA symptoms even more when used in conjunction with exercise (Deyle et al., 2000). This combined approach offers a comprehensive management strategy by addressing the disease's functional and mechanical elements.

A key component of knee OA physiotherapy is education, which provides patients with self-management techniques and information about their ailment. Patients' results can be greatly improved by teaching them the value of controlling their weight, changing their activities, and sticking to exercise regimens (Hinman et al., 2007). Patients can reduce

symptoms and enhance their quality of life by making educated decisions by knowing how lifestyle variables contribute to the development of knee OA.

An essential component of the all-encompassing management of osteoarthritis in the knee is physiotherapy. Its multimodal approach covers the different aspects of the condition and includes exercise therapy, manual therapy, and patient education. The relevance of physiotherapy in the treatment plan for knee OA is shown by the data demonstrating its effectiveness in lowering pain, restoring function, and improving quality of life. Further understanding of the best practices and long-term advantages of physical therapy will improve its application and efficacy in treating osteoarthritis in the knee as research advances (Juhl et al., 2014).

## LITERATURE REVIEW

There is a wealth of data demonstrating the positive effects of physical therapy (PT) on pain management and functional enhancement in the treatment of osteoarthritis (OA) of the knee. Deyle et al. (2000) conducted a seminal study assessing the effectiveness of manual physical therapy in conjunction with exercise for patients suffering from osteoarthritis. In comparison to patients who got a placebo, this randomised controlled trial showed that patients who received manual therapy in addition to exercise experienced significant improvements in pain and function. The significance of an integrated physiotherapy approach was underscored by the combination therapy, which treated both the mechanical dysfunctions and muscle deficiencies linked to osteoarthritis in the knee.

In order to manage knee OA, Bennell et al. (2014) carried out a systematic review and meta-analysis. Their research showed that land-based therapeutic exercise improved physical function and reduced pain to a considerable extent. The study underlined the need of consistent exercise that is catered to each person's strengths and limits. According to Bennell et al., exercise therapy may have advantages for patients with knee OA that go beyond improving their physical health and may even improve their psychological health and general quality of life.

A Cochrane systematic review by Fransen et al. (2015) further supported the beneficial effects of exercise on knee OA. With a total of 3,537 participants over 44 trials, their study showed that exercise greatly improved physical function and decreased discomfort. The review emphasised that a variety of exercise regimens, such as aerobic, strengthening, and flexibility activities, were associated with these favourable results. Fransen et al. emphasised the significance of patients adhering to exercise regimens, pointing out that long-term benefits required consistent participation.

The effectiveness of knee taping as a supplement to exercise therapy for knee OA was investigated by Hinman et al. in 2007. Participants who received knee taping in addition to exercise reported much better pain alleviation and functional improvement than those who received exercise alone in their blinded randomised controlled experiment. According to the study, knee tape could improve the overall efficacy of physiotherapy interventions by offering extra mechanical support and proprioceptive input.

Hochberg et al. (2012) presented detailed guidelines for the non-pharmacologic and pharmacologic therapy of osteoarthritis (OA) in another noteworthy study. Their suggestions emphasised how important physiotherapy is to the treatment plan, especially in relation to exercise and weight control. The guidelines stressed that the mainstay of managing knee OA should be non-pharmacologic measures, with pharmacologic treatments utilised as adjuncts if needed. Individualised treatment approaches that take into account the patient's comorbidities, preferences, and general health status are essential, as noted by Hochberg et al.

Juhl et al. (2014) carried out a meta-regression analysis and systematic review with an emphasis on the effects of various exercise regimens and intensities on knee OA outcomes. Higher exercise dosages were linked to larger reductions in pain and impairment, according to their findings. Exercises that targeted strengthening were especially successful, indicating that OA symptoms may be significantly reduced by strengthening the muscles surrounding the knee joint. Exercise regimens for knee OA should be long enough and intense enough, according to Juhl et al., to produce significant clinical effects.

The combined data from these research highlights the many advantages of physical therapy in the treatment of osteoarthritis in the knee. Exercise therapy has demonstrated consistently good impacts on pain and function, especially when customised to meet the demands of each individual patient. When combined with exercise, manual therapy offers more advantages by treating muscle function and joint mechanics. In order to guarantee adherence to physiotherapy interventions and encourage self-management, patient education is essential. The quality of life for people with knee OA will be improved by optimising physiotherapy treatments and incorporating them into comprehensive treatment programs as research advances.

## MATERIALS AND METHODS

### Participants and Study Design

The effectiveness of physical therapy therapies for treating osteoarthritis in the knee was assessed in this study using a randomised controlled trial design (OA). From outpatient clinics, a total of 100 patients who met the criteria set by the American College of Rheumatology for knee OA were recruited. Random assignments were made to place participants in the control group, which got conventional care, or the intervention group, which got physiotherapy. Adults

with moderate to severe knee OA between the ages of 50 and 75 were eligible for inclusion; recent knee surgery, other substantial lower limb pathologies, and incapacity to engage in physical activity were excluded.

### Procedure for Intervention

The 12-week program that comprised exercise therapy, manual treatment, and patient education made up the physiotherapy intervention. Exercise therapy entailed supervised sessions that were customised to each participant's ability and focused on strengthening, stretching, and aerobic activities. Physiotherapists with training in manual treatment included soft tissue manipulations and joint mobilisations. Topics including disease management, exercise adherence, and lifestyle adjustments were discussed in the educational sessions. Standard treatment was given to the control group, which included suggestions for general physical activity and guidance on pain management.

### Final Measures

WOMAC, an Osteoarthritis Index developed by Western Ontario and McMaster Universities, was used to measure pain and physical function as primary objectives. A goniometer was used to measure knee range of motion; a dynamometer was used to measure muscle strength; and the Short Form-36 (SF-36) health survey was used to evaluate quality of life. Evaluations were carried out at the beginning of the study, right after the intervention (week 12), and six months later. Exercise logs and attendance records were used to track participants' adherence to the intervention.

### Gathering and Examining Data

To lessen bias, data were gathered by assessors who were blinded. The statistical software SPSS (version 25.0) was used for the analyses. Participant characteristics were summarised using descriptive statistics. Independent t-tests were used for continuous variables and chi-square tests were used for categorical variables for comparing groups. Repeated actions Changes over time within and between groups were evaluated using ANOVA. For every analysis, a significance level of $p < 0.05$ was established. An intention-to-treat analysis was carried out to take non-compliance or dropouts into consideration.

### Ethical Considerations

The study was approved by the institutional review board of the participating medical center. Written informed consent was obtained from all participants before enrollment. Participants were assured of the confidentiality of their data and the right to withdraw from the study at any time without affecting their medical care. The study adhered to the principles of the Declaration of Helsinki and Good Clinical Practice guidelines. All interventions were conducted by licensed physiotherapists, ensuring the safety and well-being of participants throughout the study.

## RESULTS AND DISCUSSION

**Table 1: Baseline Characteristics of Participants**

| Characteristic | Intervention Group (n=50) | Control Group (n=50) |
|---|---|---|
| Age (years) | 62.4 ± 6.5 | 61.9 ± 7.2 |
| Gender (Male/Female) | 22/28 | 24/26 |
| BMI (kg/m²) | 28.3 ± 4.1 | 27.9 ± 4.3 |
| Duration of OA (years) | 6.5 ± 2.8 | 6.8 ± 2.5 |
| WOMAC Pain Score | 10.2 ± 3.1 | 10.5 ± 3.0 |
| WOMAC Function Score | 34.7 ± 8.4 | 35.1 ± 8.2 |

Randomisation was successful in producing comparable groups because the intervention and control groups' baseline characteristics were similar to each other.

**Table 2: Changes in WOMAC Scores from Baseline to Week 12**

| Outcome | Intervention Group (mean ± SD) | Control Group (mean ± SD) | p-value |
|---|---|---|---|
| WOMAC Pain Score | Baseline: 10.2 ± 3.1 | Baseline: 10.5 ± 3.0 | 0.68 |
| | Week 12: 5.7 ± 2.6 | Week 12: 9.8 ± 2.9 | <0.001 |
| WOMAC Function Score | Baseline: 34.7 ± 8.4 | Baseline: 35.1 ± 8.2 | 0.81 |
| | Week 12: 22.1 ± 6.9 | Week 12: 33.8 ± 8.0 | <0.001 |

The intervention group exhibited significant improvements in both pain and function scores at week 12 compared to the control group, suggesting the effectiveness of the physiotherapy program.

**Table 3: Knee Range of Motion (ROM) Improvements**

| Measurement | Intervention Group (mean ± SD) | Control Group (mean ± SD) | p-value |
|---|---|---|---|
| Flexion (degrees) | Baseline: 110.3 ± 15.2 | Baseline: 109.8 ± 14.9 | 0.84 |
| | Week 12: 125.7 ± 13.8 | Week 12: 112.3 ± 14.4 | <0.001 |
| Extension (degrees) | Baseline: -5.4 ± 3.2 | Baseline: -5.6 ± 3.2 | 0.79 |
| | Week 12: -1.2 ± 2.1 | Week 12: -4.9 ± 3.1 | <0.001 |

After 12 weeks, the intervention group's participants showed significantly greater gains in their knee flexion and extension range of motion than the control group.

**Table 4: Muscle Strength Changes (N)**

| Muscle Group | Intervention Group (mean ± SD) | Control Group (mean ± SD) | p-value |
|---|---|---|---|
| Quadriceps Strength | Baseline: 75.2 ± 18.4 | Baseline: 74.7 ± 17.9 | 0.87 |
| | Week 12: 98.5 ± 20.3 | Week 12: 76.3 ± 18.1 | <0.001 |
| Hamstrings Strength | Baseline: 45.6 ± 10.2 | Baseline: 46.1 ± 10.5 | 0.74 |
| | Week 12: 58.3 ± 11.4 | Week 12: 47.0 ± 10.8 | <0.001 |

After the 12 weeks, the intervention group showed significantly greater strength in the quadriceps and hamstrings than the control group.

**Table 5: Quality of Life (SF-36) Scores**

| SF-36 Domain | Intervention Group (mean ± SD) | Control Group (mean ± SD) | p-value |
|---|---|---|---|
| Physical Functioning | Baseline: 45.3 ± 12.5 | Baseline: 44.9 ± 13.0 | 0.88 |
| | Week 12: 65.8 ± 10.7 | Week 12: 48.3 ± 12.6 | <0.001 |
| Pain | Baseline: 42.7 ± 11.9 | Baseline: 43.1 ± 12.1 | 0.83 |
| | Week 12: 67.2 ± 12.3 | Week 12: 45.0 ± 11.8 | <0.001 |

Comparing the intervention group to the control group, the intervention group's SF-36 quality of life ratings significantly improved in the domains of physical functioning and pain, indicating improved overall well-being.

## DISCUSSION

The results of this study show that patients with knee osteoarthritis (OA) have significantly better pain, physical function, knee range of motion, muscle strength, and quality of life when they receive a comprehensive physiotherapy program that includes exercise therapy, manual therapy, and patient education. These outcomes are in line with earlier research that shows the effectiveness of physiotherapy therapies in the treatment of osteoarthritis in the knee. For example, Deyle et al. (2000) found that patients who received manual therapy in addition to exercise experienced significant improvements in pain and function. These findings are consistent with our findings that a multimodal approach to physiotherapy leads to better outcomes.

One important part of the protocol is exercise therapy, which is well-known for helping people with knee OA. Research by Bennell et al. (2014) and Fransen et al. (2015) has shown that therapeutic activities on land can enhance physical function and cause mild pain alleviation. These results are supported by our study, which shows that after 12 weeks, individuals in the intervention group had significant decreases in their WOMAC pain and function scores. Juhl et al. (2014) have highlighted the impact of exercise in improving joint stability and general functional capability, which is further supported by the notable gains in muscle strength and knee range of motion.

Manual therapy techniques, including joint mobilizations and soft tissue manipulation, were also integral to the intervention. The combined approach of manual therapy and exercise in our study produced superior outcomes compared to standard care, which is in line with the results of Deyle et al. (2000). This synergy between manual and exercise therapies addresses both the mechanical dysfunctions and muscle weaknesses associated with knee OA, providing a comprehensive treatment strategy. Moreover, our study observed significant gains in knee flexion and extension, which are critical for daily activities, reinforcing the findings of earlier research on the benefits of manual therapy in improving joint function.

To guarantee program adherence and provide participants with self-management techniques, patient education was essential. Kroon et al. (2014) observed that self-management education programs dramatically improved pain and physical function in patients with osteoarthritis (OA) in their knees, demonstrating the relevance of education. Better results and maintained involvement were probably a result of our instructional sessions on illness management, exercise adherence, and lifestyle adjustments in the intervention group. The SF-36 quality of life ratings significantly improved, which highlights the comprehensive advantages of integrating education and physical therapies.

This study contributes to the increasing amount of research that shows physiotherapy is an effective treatment for osteoarthritis in the knee. The considerable gains in function, discomfort, muscle strength, range of motion, and quality of life that we saw in our study are in line with other studies' findings (Hochberg et al., 2012; Hinman et al., 2007). These findings highlight the necessity of a multimodal strategy in physical therapy, combining manual therapy, exercise, and patient education to get the best results. Future studies should carry out more study and develop these therapies to increase their efficacy and suitability for a wider range of patients as our understanding of knee OA and its therapy advances.

## CONCLUSION

In conclusion, the study shows that patients with knee osteoarthritis experience significant improvements in pain alleviation, physical function, knee range of motion, muscular strength, and quality of life when they receive a comprehensive physiotherapy program that includes exercise treatment, manual therapy, and patient education. The significant increases that the intervention group saw in comparison to the control group across these parameters highlight the many advantages of physical therapy. The significance of integrated, patient-centered approaches in the management of knee OA is reinforced by these findings, which are consistent with previous research. Physiotherapy provides a comprehensive approach to treating knee OA patients, addressing the mechanical, muscular,

and educational components of the problem. This approach can result in long-lasting improvements and an enhanced quality of life for patients. Subsequent investigations ought to persist in refining these therapies, guaranteeing their effectiveness and wide-ranging suitability in various medical contexts.

**REFERENCES**

1. Bennell, K. L., Dobson, F., & Hinman, R. S. (2014). Exercise in osteoarthritis: Moving from prescription to adherence. Best Practice & Research Clinical Rheumatology, 28(1), 93-117.

2. Deyle, G. D., Henderson, N. E., Matekel, R. L., Ryder, M. G., Garber, M. B., & Allison, S. C. (2000). Effectiveness of manual physical therapy and exercise in osteoarthritis of the knee: A randomized, controlled trial. Annals of Internal Medicine, 132(3), 173-181.

3. Fransen, M., McConnell, S., Harmer, A. R., Van der Esch, M., Simic, M., & Bennell, K. L. (2015). Exercise for osteoarthritis of the knee: A Cochrane systematic review. British Journal of Sports Medicine, 49(24), 1554-1557.

4. Hinman, R. S., Crossley, K. M., McConnell, J., & Bennell, K. L. (2007). Efficacy of knee tape in the management of osteoarthritis of the knee: Blinded randomised controlled trial. BMJ, 335(7616), 133.

5. Hochberg, M. C., Altman, R. D., April, K. T., Benkhalti, M., Guyatt, G., McGowan, J., & Tugwell, P. (2012). American College of Rheumatology 2012 recommendations for the use of nonpharmacologic and pharmacologic therapies in osteoarthritis of the hand, hip, and knee. Arthritis Care & Research, 64(4), 465-474.

6. Juhl, C., Christensen, R., Roos, E. M., Zhang, W., & Lund, H. (2014). Impact of exercise type and dose on pain and disability in knee osteoarthritis: A systematic review and meta-regression analysis of randomized controlled trials. Arthritis & Rheumatology, 66(3), 622-636.

7. Alnahdi, A. H., Zeni, J. A., & Snyder-Mackler, L. (2012). Muscle impairments in patients with knee osteoarthritis. Sports Health, 4(4), 284-292.

8. Fransen, M., McConnell, S., Hernandez-Molina, G., & Reichenbach, S. (2014). Exercise for osteoarthritis of the hip. Cochrane Database of Systematic Reviews, (4), CD007912.

9. Goh, S. L., Persson, M. S. M., Stocks, J., Hou, Y., Lin, J., Hall, M. C., & Arden, N. K. (2019). Relative efficacy of different types of exercise for treatment of knee and hip osteoarthritis: A network meta-analysis. Sports Medicine, 49(5), 743-761.

10. Hunter, D. J., & Bierma-Zeinstra, S. (2019). Osteoarthritis. The Lancet, 393(10182), 1745-1759.

11. McAlindon, T. E., Bannuru, R. R., Sullivan, M. C., Arden, N. K., Berenbaum, F., Bierma-Zeinstra, S. M., & Yang, K. G. (2014). OARSI guidelines for the non-surgical management of knee osteoarthritis. Osteoarthritis and Cartilage, 22(3), 363-388.

12. Messier, S. P., Mihalko, S. L., Legault, C., Miller, G. D., Nicklas, B. J., DeVita, P., & Williamson, J. D. (2013). Effects of intensive diet and exercise on knee joint loads, inflammation, and clinical outcomes among overweight and obese adults with knee osteoarthritis: The IDEA randomized clinical trial. JAMA, 310(12), 1263-1273.

13. Roddy, E., Zhang, W., Doherty, M., Arden, N. K., Barlow, J., Birrell, F., & Peat, G. (2005). Evidence-based recommendations for the role of exercise in the management of osteoarthritis of the hip or knee—the MOVE consensus. Rheumatology, 44(1), 67-73.

14. Roos, E. M., & Juhl, C. B. (2012). Osteoarthritis 2012 year in review: rehabilitation and outcomes. Osteoarthritis and Cartilage, 20(12), 1477-1483.

15. Skou, S. T., & Roos, E. M. (2017). Physical therapy for patients with knee and hip osteoarthritis: Supervised, active treatment is current best practice. Clinical Orthopaedics and Related Research, 475(10), 2294-2297.

16. Smith, S. M., Sumar, B., & Dixon, K. A. (2014). Musculoskeletal pain in overweight and obese children. International Journal of Obesity, 38(1), 11-15.

17. Tanaka, R., Ozawa, J., & Kito, N. (2013). Efficacy of strengthening or aerobic exercise on pain relief in people with knee osteoarthritis: A systematic review and meta-analysis of randomized controlled trials. Clinical Rehabilitation, 27(12), 1059-1071.

18. Thomas, K. S., Muir, K. R., Doherty, M., Jones, A. C., O'Reilly, S. C., & Bassey, E. J. (2002). Home based exercise programme for knee pain and knee osteoarthritis: Randomised controlled trial. BMJ, 325(7367), 752.

19. van der Esch, M., Steultjens, M. P. M., Harlaar, J., Knol, D. L., & Dekker, J. (2011).

Joint laxity and the relationship between muscle strength and functional ability in patients with osteoarthritis of the knee. Arthritis Care & Research, 63(10), 1521-1526.

20. Zhang, W., Nuki, G., Moskowitz, R. W., Abramson, S., Altman, R. D., Arden, N., & Tugwell, P. (2010). OARSI recommendations for the management of hip and knee osteoarthritis, Part II: OARSI evidence-based, expert consensus guidelines. Osteoarthritis and Cartilage, 18(4), 476-499.

21. Zochling, J., March, L. M., Lapsley, H., Cross, M. J., Tribe, K. L., Parker, D., & Brooks, P. M. (2004). Use of complementary medicines for osteoarthritis—a prospective study. Annals of the Rheumatic Diseases, 63(5), 549-5

**Corresponding Author**

**Waleed Medhat Anwar Ali***

Physical Therapist, Prince Sultan Military Medical City, Riyadh, KSA

Email: Waleed10010@live.com