

A Comparative Study on Effectiveness and Patient Satisfaction: Telehealth Rehabilitation Versus Traditional In-Clinic Therapy for Knee Osteoarthritis

Original Article

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Abstract

Background: With the growing integration of telehealth into therapeutic settings, particularly for chronic conditions like knee osteoarthritis, there is an increasing need to compare its effectiveness against traditional in-clinic therapy modalities. Telehealth offers a promising alternative for delivering rehabilitation services, especially when geographical or mobility constraints limit access to traditional care.

Objective: This study aimed to compare the effectiveness and patient satisfaction between telehealth rehabilitation and traditional in-clinic therapy in the treatment of knee osteoarthritis.

Methods: A total of 64 patients with knee osteoarthritis were randomly assigned into two groups: RehabGroup1 (n=32, 18 males, 14 females) received telehealth rehabilitation, and ClinicalGroup2 (n=32, 22 males, 10 females) underwent traditional in-clinic therapy. The intervention lasted for six weeks, with outcomes measured in terms of knee extensor strength, knee range of motion, and stair climbing performance. Data were collected at baseline and after the intervention period, with changes analyzed using ANOVA.

Results: Both groups showed significant improvements from baseline to the 6th week. RehabGroup1 exhibited an increase in knee extensor strength from 45.2 (± 5.6) to 49.7 (± 5.8), knee range of motion from 100.5 (± 10.2) degrees to 105.3 (± 10.0) degrees, and a decrease in stair climbing time from 18.6 (± 2.4) seconds to 17.1 (± 2.1) seconds. ClinicalGroup2 showed similar improvements, with knee extensor strength increasing from 45.0 (± 5.8) to 49.5 (± 5.7), knee range of motion from 100.3 (± 10.5) degrees to 105.0 (± 9.8) degrees, and stair climbing time decreasing from 18.7 (± 2.5) seconds to 17.2 (± 2.2) seconds. The statistical analysis revealed no significant differences between the two groups ($p > 0.05$).

Conclusion: The study concluded that telehealth rehabilitation is as effective as traditional in-clinic therapy in improving functional outcomes for patients with knee osteoarthritis. This supports the potential for telehealth to be a viable alternative to traditional therapy, offering comparable benefits.

Keywords: Knee osteoarthritis, Patient satisfaction, Rehabilitation, Stair climbing, Telehealth, Therapy comparison, Traditional therapy, Treatment outcomes, Telemedicine

INTRODUCTION

In the evolving landscape of healthcare, the integration of telehealth into rehabilitation services presents a promising avenue for enhancing patient access to care, particularly for those suffering from chronic conditions such as knee osteoarthritis (1). This condition, characterized by the degeneration of knee cartilage and the resultant pain, significantly impairs quality of life and increases healthcare costs globally (2). Traditional in-clinic therapy, the standard care approach, offers comprehensive management but often poses logistical challenges that can limit patient adherence to prescribed rehabilitation regimes (3).

The advent of telehealth rehabilitation has been catalyzed by technological advances and the increasing need for accessible healthcare solutions, particularly highlighted by the recent global health crises (4). Telehealth, or tele-rehabilitation, promises convenient, flexible, and immediate healthcare delivery, which is particularly advantageous for patients residing in remote areas or those with mobility issues (5). Research indicates that telehealth rehabilitation can achieve outcomes comparable to those of traditional face-to-face therapy in

terms of pain management, functional improvement, and patient satisfaction (6). For instance, studies have shown no significant differences in the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores between telehealth and traditional therapy methods immediately post-intervention and two months thereafter (7).

Despite its advantages, telehealth rehabilitation is not without its limitations (8). The effectiveness of telehealth can vary widely depending on the specific protocols used, the technology's ease of use, and the patient's comfort with digital tools (9). Technical issues, such as poor internet connectivity or lack of access to compatible devices, can impede the effective delivery of tele-rehabilitation services (10). Additionally, the lack of physical presence in telehealth sessions may reduce the ability of therapists to perform accurate physical assessments and modify treatments in real-time (11).

Moreover, the debate regarding the efficacy of telehealth versus traditional therapy continues to be a subject of rigorous scholarly discussion (12). Proponents of traditional therapy argue that the physical presence of a therapist ensures immediate feedback and adjustment of techniques, which is crucial for the proper rehabilitation of knee osteoarthritis (13). Critics of telehealth caution about the potential impersonality of digital interactions, which may affect the therapeutic relationship crucial for patient motivation and adherence (14).

However, the flexibility and potential cost-effectiveness of telehealth offer compelling reasons for its integration into mainstream healthcare services (15). With ongoing improvements in technology and increasing familiarity with its use among both providers and patients, telehealth has the potential to complement traditional therapy approaches, thereby creating a hybrid model of care that leverages the strengths of both modalities (16).

While telehealth rehabilitation presents a novel approach to managing knee osteoarthritis, it is imperative that each modality is considered within its context of strengths and limitations. The continuous evolution of healthcare practices must aim to harness technological advancements to enhance patient outcomes while addressing the barriers that may limit their effectiveness. As the healthcare landscape shifts, the integration of telehealth into rehabilitation services for knee osteoarthritis stands as a testament to the dynamic nature of medical practice, reflecting an adaptability that could define the future of chronic disease management.

MATERIAL AND METHODS

In the study, a total of 64 participants diagnosed with knee osteoarthritis were enrolled and randomly assigned to one of two groups, each consisting of 32 individuals. RehabGroup1 comprised 18 males and 14 females, who underwent a telehealth rehabilitation program. ClinicalGroup2 consisted of 22 males and 10 females, who received traditional in-clinic therapy. The intervention for both groups spanned a period of six weeks, with sessions scheduled three times per week. Each session lasted approximately one hour, designed to enhance knee extensor strength, improve knee range of motion (ROM), and facilitate better performance in stair climbing activities, which are critical functional measures for individuals with knee osteoarthritis.

Participants in RehabGroup1 accessed rehabilitation services via a digital platform that allowed real-time interaction with physical therapists. This telehealth service provided exercises and regimens specifically tailored to strengthen the knee extensors, increase ROM, and improve stair-climbing capabilities. The therapists remotely monitored the participants' techniques and progress, making adjustments to the regimen as needed via the telecommunication software.

Conversely, participants in ClinicalGroup2 attended sessions at a physical therapy clinic where they engaged in a structured rehabilitation program under the direct supervision of physical therapists. The in-clinic sessions utilized standard physical therapy equipment and hands-on techniques to target the same set of outcomes: knee extensor strengthening, ROM enhancement, and stair climbing efficiency.

Both groups were assessed at the beginning of the study and at the end of the six-week intervention period. The primary outcome measures included the strength of the knee extensors, evaluated using a standardized isometric strength testing protocol. Knee ROM was measured using a goniometer, a device commonly employed to assess joint flexibility and range of motion. Additionally, stair climbing performance was evaluated by timing each participant as they ascended and descended a standard flight of 12 steps, reflecting their functional mobility.

The effectiveness of the interventions in both groups was analyzed using repeated measures ANOVA to compare changes in knee extensor strength, ROM, and stair-climbing times from baseline to the study's conclusion. This statistical approach was chosen to account for the repeated observations over time and to compare the efficacy of telehealth rehabilitation against traditional in-clinic therapy.

RESULTS

In the conducted study, both RehabGroup1 and ClinicalGroup2 demonstrated significant improvements from baseline to the 6th week across all measured outcomes—knee extensor strengthening, knee range of motion, and stair climbing performance. The gains in knee

extensor strength increased to approximately 49.6 units, knee range of motion enhanced to around 105.15 degrees, and stair climbing times improved to nearly 17.15 seconds. Despite these advances, statistical analysis revealed no significant differences between the groups ($p > 0.05$), suggesting comparable efficacy of telehealth and traditional in-clinic rehabilitation approaches.

Table 1: Mean Age of Patients

| Group | Mean Age (years) | Standard Deviation (SD) |
|----------------|------------------|-------------------------|
| RehabGroup1 | 55.4 | 7.2 |
| ClinicalGroup2 | 57.3 | 6.8 |

Table 2: Gender distribution of Patients

| Group | Males | Females |
|----------------|-------|---------|
| RehabGroup1 | 18 | 14 |
| ClinicalGroup2 | 22 | 10 |

Table 3: Presenting the results for the three outcomes at baseline and at the 6th week

| Outcome Measure | Group | Baseline Mean (SD) | 6th Week Mean (SD) | Test Name | p-value | Comparison Between Groups |
|-----------------------------|----------------|--------------------|--------------------|-----------|---------|---------------------------|
| Knee Extensor Strengthening | RehabGroup1 | 45.2 (5.6) | 49.7 (5.8) | ANOVA | 0.045 | No significant difference |
| | ClinicalGroup2 | 45.0 (5.8) | 49.5 (5.7) | | | |
| Knee Range of Motion | RehabGroup1 | 100.5 (10.2) | 105.3 (10.0) | ANOVA | 0.039 | No significant difference |
| | ClinicalGroup2 | 100.3 (10.5) | 105.0 (9.8) | | | |
| Stair Climbing (seconds) | RehabGroup1 | 18.6 (2.4) | 17.1 (2.1) | ANOVA | 0.047 | No significant difference |
| | ClinicalGroup2 | 18.7 (2.5) | 17.2 (2.2) | | | |

Table 3 presents the outcomes for knee extensor strengthening, knee range of motion, and stair climbing, comparing baseline and 6th-week results across two groups, RehabGroup1 and ClinicalGroup2. Initially, both groups showed similar baseline values with knee extensor strength at approximately 45 units, knee range of motion around 100 degrees, and stair climbing times near 18.6 seconds. By the 6th week, both groups exhibited minor improvements: knee extensor strength increased to just under 50 units, range of motion to about 105 degrees, and stair climbing time decreased to approximately 17 seconds. The p-values (0.045 for extensor strength, 0.039 for range of motion, and 0.047 for stair climbing) suggest minor but statistically significant within-group improvements, yet no significant differences were found between the groups, indicating that both interventions might be equally effective.

DISCUSSION

The study investigated the comparative efficacy of telehealth rehabilitation (RehabGroup1) and traditional in-clinic therapy (ClinicalGroup2) for patients suffering from knee osteoarthritis. Significant improvements were observed within both groups across all outcomes, including knee extensor strength, range of motion, and stair climbing ability, after six weeks of intervention. Despite these improvements, the comparative analysis revealed no significant differences between the two treatment modalities, suggesting that telehealth could be as effective as traditional in-clinic therapy in managing knee osteoarthritis (17).

The strengths of this study include a well-defined participant cohort and the rigorous monitoring of intervention fidelity across both groups. However, the study's limitations must be acknowledged. The sample size was relatively small, and the study duration was limited to six weeks, which may not capture long-term outcomes or adherence rates. Additionally, the study assumed equal engagement and motivation across participants, which might not hold true in a broader, more diverse population (18).

In terms of clinical implications, these findings support the integration of telehealth into rehabilitation services for knee osteoarthritis, particularly in contexts where traditional in-clinic access is challenging. Telehealth not only shows potential for comparable outcomes but also offers a practical solution for continuous, accessible care. Nevertheless, the similar efficacy of both approaches raises further debates about patient preferences, the role of technology in healthcare, and the potential for a hybrid model combining elements of both methods to optimize patient outcomes and satisfaction (19).

Despite the promising results, further research is required to explore the nuances of these findings over longer periods and across varied demographics. Larger-scale studies could provide more definitive evidence and help refine intervention protocols to maximize the benefits of both telehealth and in-clinic therapies (20).

CONCLUSION

This study highlights the viability of telehealth as an alternative to traditional therapy for knee osteoarthritis rehabilitation, demonstrating substantial improvements in clinical outcomes. The lack of significant differences between the two modalities underscores the potential of telehealth to complement or substitute traditional in-clinic care under certain conditions. As the healthcare landscape continues to evolve, the flexibility to adapt treatment strategies to individual patient needs and contexts will be crucial for enhancing therapeutic efficacy and patient well-being.

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