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Telerehabilitation for Chronic Low Back Pain: A Review of Current Evidence and Clinical Perspectives

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Abstract

Background. Chronic low back pain (CLBP) is a widely prevalent and multifactorial condition defined as pain lasting more than 12 weeks, associated with functional limitations and increased healthcare burden. Despite recommended treatments, barriers such as limited access to care and time constraints may reduce adherence. Telerehabilitation has emerged as a promising approach enabling remote delivery of rehabilitation.

Aim. The aim of this review was to evaluate current evidence and clinical perspectives on telerehabilitation in the management of chronic low back pain.

Materials and Methods. A literature review was conducted using PubMed, Google Scholar and SpringerLink databases, including studies published between 2016 and 2026. Articles were selected based on predefined inclusion and exclusion criteria and analyzed qualitatively.

Results. Available evidence indicates that telerehabilitation may reduce pain intensity and improve functional outcomes in individuals with chronic low back pain, with effects generally comparable to conventional physiotherapy. High adherence, completion rates and patient satisfaction support its feasibility. Telerehabilitation may also improve access to care and reduce time and healthcare costs. However, results remain heterogeneous and depend on

intervention type and delivery mode.

Conclusions. Telerehabilitation appears to be a practical alternative or adjunct to face-to-face rehabilitation. Nevertheless, further high-quality studies are required to standardize interventions and confirm long-term effectiveness.

Keywords: telerehabilitation, digital rehabilitation, remote rehabilitation, telehealth, chronic low back pain

1. Introduction

Chronic low back pain (CLBP) refers to persistent pain and discomfort in the lumbosacral region, which may be accompanied by radiating symptoms in the lower limbs and persists for more than 12 weeks. It is a widespread health concern globally and is among the top two causes for medical appointments in adults aged 65 years and above, while it can affect individuals of any age. Most cases are classified as nonspecific, meaning no definitive underlying pathology can be identified. CLBP is recognized as a multifactorial condition shaped by biological, psychological and social influences. Clinically and socially, it carries significant consequences, including functional disability, increased healthcare utilization, absenteeism from work and economic burden, which is projected to increase substantially in the future due to the growing number of individuals affected by CLBP. [1,2]

Traditional management of CLBP includes physiotherapy, exercise, psychological interventions, pharmacological treatment and patient education, as recommended in international guidelines. [3,4] These approaches emphasize non-pharmacological strategies, particularly exercise and patient education, often within a multidisciplinary framework. [3] However, variability in recommendations and potential challenges in their implementation remain [4]. Moreover, factors such as limited time availability, difficulties related to transportation and insufficient access to qualified healthcare services, particularly in areas with limited resources are associated with barriers to completing structured exercise programmes. As a result, telerehabilitation has emerged as a promising approach, enabling the delivery of rehabilitation services to more patients, while also saving time, reducing costs and decreasing the use of healthcare resources. [5]

Telerehabilitation is a form of healthcare delivery that uses digital technologies to provide rehabilitation interventions remotely, including exercise programmes, patient education and self-management strategies. Depending on the mode of delivery, interventions may be conducted synchronously (real-time interaction) or asynchronously, using tools such as mobile applications, web-based platforms or video communication. Evidence from recent studies suggests that telerehabilitation can produce clinical results comparable to conventional in-person physiotherapy. [2,5]

2. Aim

The aim of this literature review is to evaluate current evidence and clinical perspectives on telerehabilitation for patients with chronic low back pain, with a focus on its effectiveness, adherence, feasibility and comparison with conventional physiotherapy. Additionally, this review explores emerging trends, as well as the advantages and limitations of telerehabilitation in clinical practice.

3. Materials and Methods

A literature review was conducted to summarize current evidence and clinical perspectives on telerehabilitation in patients with chronic low back pain. Relevant articles were retrieved from electronic databases, including PubMed, Google Scholar and SpringerLink. The search covered publications from 2016 to 2026. The following keywords and their combinations were used: “telerehabilitation,” “telehealth,” “telemedicine,” “eHealth,” “mHealth,” “digital health,” “remote physiotherapy,” “exercise therapy,” “low back pain,” and “chronic low back pain.” Additional relevant studies were identified through manual screening of reference lists of selected articles. Inclusion criteria comprised full-text articles published in English, including systematic reviews, meta-analyses, randomized controlled trials, observational studies, case reports and narrative or other review articles addressing telerehabilitation in chronic low back pain or related musculoskeletal conditions. Particular emphasis was placed on recent high-quality evidence, including systematic reviews and randomized controlled trials. Studies focusing on other conditions, articles published in languages other than English or without accessible full text, non-human studies and duplicate records were excluded. Titles and abstracts were screened for relevance, followed by full-text assessment of eligible studies. The final selection included studies evaluating or discussing effectiveness, adherence, feasibility, comparison with conventional physiotherapy, advantages, limitations and emerging technological approaches in telerehabilitation. The included studies were analyzed qualitatively

and findings were synthesized descriptively to provide an overview of current evidence, as well as to identify key clinical implications and research gaps.

4. Results and Discussion

4.1. Effects of Telerehabilitation on Pain and Functional Outcomes

Exercise-based telerehabilitation has been associated with improvements in pain and physical function in patients with low back pain. Most interventions were associated with significant reductions in pain and disability, particularly when compared to usual care, non-exercise control conditions or information-only interventions. However, a small number of studies did not report meaningful differences between groups, highlighting some variability in outcomes across studies. [2]

mHealth-based physiotherapy, as a form of remote physiotherapy, has also been linked to reductions in pain intensity and improvements in physical disability in patients with chronic non-specific low back pain. The observed effects were moderate, suggesting that remotely delivered exercise-based interventions may contribute to improvements in both pain and functional outcomes. [6]

Similar findings have been reported in intervention studies, where telerehabilitation-based McKenzie therapy was associated with improvements in pain intensity in patients with chronic low back pain. [7]

Observational data from the COVID-19 pandemic further support the clinical applicability of telerehabilitation in patients with low back pain. In a large retrospective analysis, positive rehabilitation outcomes, including functional status, were observed among individuals receiving telerehabilitation. These findings suggest that telerehabilitation is a viable option for delivering rehabilitation care in this population. [8]

Additional evidence from a randomized controlled trial indicates that telerehabilitation-based core stability exercises were associated with significant decreases in pain-related disability in patients with CLBP. [9]

Similar observations have also been reported in an individual clinical case, where telerehabilitation-based interventions may be associated with reductions in pain and disability, together with improvements in movement-related parameters, including flexibility and range of motion. [10]

Overall, available evidence suggests that telerehabilitation may help reduce pain and improve functional outcomes in individuals with chronic low back pain. However, variability across studies and intervention protocols suggests that further high-quality, standardized research is

required to better define its clinical effectiveness.

4.2. Adherence Patterns and Feasibility of Telerehabilitation

Adherence to prescribed exercise programs represents a key determinant of treatment effectiveness in individuals with low back pain. In telerehabilitation settings, where direct supervision is limited, sustained participation is particularly important for achieving clinical benefits.

Although this review focuses on chronic low back pain, studies involving individuals with acute or non-specific low back pain were also considered in this section to provide a broader perspective on adherence and feasibility of telerehabilitation interventions.

A prospective pilot study assessed adherence to an 18-week remotely supported rehabilitation programme performed at home in individuals with chronic non-specific low back pain. Of the 27 enrolled participants, 25 completed the programme. Adherence rates were high in both monitoring modalities: patients using an exercise diary performed the exercises at least once daily on 82.3% of days and twice daily on 72.9% of days, while those using a mobile application exercised at least once daily on 94.8% of days and twice daily on 86.6% of days. All participants who completed the intervention reported satisfaction with the programme. The authors concluded that this structured home-based rehabilitation model with telemonitoring may be applicable in clinical practice. [11]

Similar findings were observed in a multimodal digital rehabilitation program for acute low back pain delivered entirely through a digital platform. The program, involving 406 patients, demonstrated a high completion rate (81.8%), with very high adherence rates reported. Participants performed on average more than two sessions per week, with engagement being highest during the initial phase of the intervention. Although the study lacked a control group, it reported high completion and high levels of patient satisfaction in a real-world cohort. [12]

A broader perspective on adherence in telerehabilitation is provided by a recent systematic review, indicating that adherence to prescribed exercise programs in telerehabilitation settings may be relatively high, with reported increases of approximately 9% and a greater proportion of patients achieving predefined adherence thresholds in comparative analyses. However, the overall level of evidence is considered low, because of variability between studies and methodological limitations. [13]

With regard to feasibility, a randomized controlled trial involving patients with non-specific low back pain reported high completion rates, with 89% of participants in the telerehabilitation group completing the intervention and 81% in the outpatient group. [5]

Additional evidence supporting feasibility comes from a pilot clinical trial in which a high-intensity training (HIT) telerehabilitation program for patients with chronic nonspecific low back pain demonstrated high completion rates, with 14 out of 15 participants successfully completing the intervention and no adverse events reported. Furthermore, adherence to the program remained high and usability of the digital platform was rated as above average, indicating that a home-based HIT telerehabilitation approach is feasible in this population. [14]
Taken together, the available evidence suggests that telerehabilitation and home-based exercise programs are associated with high adherence, completion rates and patient satisfaction, supporting their feasibility in clinical practice. Nevertheless, the strength of this evidence is limited by heterogeneity and methodological constraints across studies.

4.3. Comparison with Conventional Physiotherapy

Available evidence indicates that telerehabilitation appears to be generally comparable to conventional physiotherapy, although results are somewhat inconsistent. In musculoskeletal conditions, including populations with chronic low back pain, several reviews have reported no significant differences between remote and in-person interventions in terms of pain, function, or quality of life. Some studies indicate that telerehabilitation can provide similar or occasionally better functional outcomes, including studies involving non-specific low back pain. However, the overall evidence remains heterogeneous and is affected by methodological limitations and risk of bias across studies. Therefore, telerehabilitation can be considered a reasonable alternative to face-to-face physiotherapy, especially when access to in-person care is restricted, but clinical decisions should account for the quality of available evidence. [15]
Following this general observation, findings from a recent systematic review and meta-analysis indicate that no significant differences were observed between telerehabilitation and conventional face-to-face rehabilitation in terms of physical functioning, mental health and pain outcomes. However, the authors emphasized the low certainty of evidence, which limits the strength of these conclusions. [16]
In contrast, results from randomized controlled trials, summarized in a systematic review, suggest that in populations with various physical conditions, including musculoskeletal disorders, exercise-based telerehabilitation may produce comparable effects to other active interventions, some of which included conventional rehabilitation delivered in clinical settings, in terms of pain, physical function and quality of life. [17]
Another systematic review and meta-analysis, including 37 clinical trials with a total of 4,288 participants, demonstrated that telerehabilitation is more effective than no treatment or usual

care in improving pain, physical function and quality of life in patients with musculoskeletal disorders. However, when compared to face-to-face rehabilitation, no additional benefits over face-to-face rehabilitation were observed. Telerehabilitation was associated with lower treatment costs (approximately $90 less per patient) and a reduction in travel time. Despite these promising findings, the authors emphasize that results should be interpreted with caution due to heterogeneity across studies and limited robustness of some outcomes. Therefore, telerehabilitation may serve as an effective alternative or adjunct to conventional rehabilitation, especially when in-person therapy is not feasible. [18]

Similar observations have also been reported in another randomized controlled trial. In patients with non-specific low back pain, both telerehabilitation and in-clinic physiotherapy resulted in improvements in disability, pain intensity, pain catastrophizing and hip muscle strength after eight weeks of intervention. No significant differences between groups were observed for most outcomes. These findings indicate that the effectiveness of exercise therapy may be similar regardless of whether it is delivered remotely or face-to-face. Between-group differences were observed in selected strength parameters, with greater improvements in the supervised, in-clinic group. However, overall results support the use of home-based telerehabilitation as a practical and effective option, which may help reduce barriers to access and potentially lower costs. [19]

Collectively, the available evidence suggests that telerehabilitation may provide clinical outcomes comparable to conventional face-to-face physiotherapy in individuals with low back pain. While some variability across studies exists and the certainty of evidence remains limited, telerehabilitation appears to be a viable alternative or adjunct to in-person care, particularly when access to traditional services is restricted.

4.4. Emerging Trends in Telerehabilitation for Chronic Low Back Pain

Recent developments in telerehabilitation increasingly focus on the integration of advanced technologies, particularly artificial intelligence–based systems and digital tools supporting exercise delivery and monitoring.

In a randomized controlled trial, AI-assisted multimodal telerehabilitation led to greater reductions in pain intensity compared with conventional video-based telerehabilitation in individuals with chronic nonspecific low back pain. Clinically meaningful effects were achieved earlier and were maintained at follow-up in the AI group. Additionally, greater improvements were observed in selected functional outcomes. The intervention was also associated with increased thickness of core stabilizing muscles, suggesting potential benefits of real-time motion guidance in enhancing exercise precision and therapeutic effects. [20]

Complementary findings have been reported in a longitudinal cohort study evaluating an AI-supported mobile exercise app for individuals with low back pain compared with standard group rehabilitation. After eight weeks, pain intensity decreased by 1.4 points on the Numeric Rating Scale in the intervention group, while a slight increase of 0.1 points was observed in the control group. Differences between groups were not significant at baseline but became significant after 8 weeks. However, the magnitude of pain reduction did not reach the threshold considered clinically meaningful. Disability measured with the Oswestry Disability Index decreased by 3.8 points in the intervention group and increased by 2.3 points in the control group, with a statistically significant improvement and a medium effect size, although the change remained slightly below the level considered clinically meaningful. The authors also noted several limitations, including the small sample size, lack of randomization and baseline differences between groups. [21]

Beyond AI-driven and app-based interventions, emerging research highlights the growing role of bioengineering technologies in the evaluation and management of low back pain. These include wearable sensors enabling continuous monitoring of posture and movement, surface electromyography for assessing muscle function, motion capture systems that enable precise tracking of three-dimensional joint and segmental movements, allowing detailed characterization of spinal mobility and intersegmental coordination. However, these technologies are not yet widely implemented in routine clinical practice and further research is needed to clarify their clinical usefulness and facilitate their integration into standard rehabilitation practice. [22]

Consistent findings have been reported in a systematic review evaluating telerehabilitation and virtual reality-based approaches incorporating motion-sensing technologies in patients with chronic low back pain. The review suggested that such technologies may contribute to improvements in pain, movement control and treatment adherence, although the heterogeneity of study designs and interventions limits direct comparison of results. [23]

Overall, these technological advancements are supported by the increasing availability of information and communication technologies, including internet connections, smartphones, tablets and videoconferencing platforms. These tools allow physiotherapists to deliver rehabilitation remotely, including patient education, exercise prescription and monitoring of progress. Telerehabilitation may also be used alongside conventional face-to-face care, supporting continuity of rehabilitation in different clinical settings. [24]

These findings suggest that emerging technologies may enhance the effectiveness and personalization of telerehabilitation, although further high-quality research is needed to confirm their clinical value.

4.5. Advantages and Limitations of Telerehabilitation

Telerehabilitation improves access to care [13,25,26] and reduces costs. [13,25] It also reduces travel-related burden and is generally well accepted by patients. [13,25] These advantages may extend beyond individual cost savings, as emerging evidence suggests that telerehabilitation can also contribute to reducing overall healthcare costs. [27] Additionally, it allows greater flexibility in scheduling, enabling patients to better integrate therapy into their daily routines. Delivering rehabilitation in the home environment may further facilitate exercise performance and support patient involvement in self-management. [13] High levels of patient satisfaction with telerehabilitation have also been reported. [28]

However, several limitations remain. Technical issues, such as problems with internet connection or difficulties with videoconferencing platforms, can affect attendance at telerehabilitation sessions. [13] Limited digital literacy and barriers related to access to appropriate devices may affect implementation. The lack of physical contact can restrict certain assessments and therapeutic interactions and some musculoskeletal evaluations are more difficult to perform remotely. Implementation may also be influenced by organisational factors, including training requirements, technical infrastructure and regulatory constraints. [25] The use of telerehabilitation therefore requires consideration of factors such as access to appropriate technology, the home environment and the patient's familiarity with digital technologies. [29]

Safety considerations should be taken into account. Although telerehabilitation is generally associated with a low incidence of adverse events, issues such as falls, pain, or overexertion may still occur, particularly in unsupervised settings. Some patients also report concerns related to the lack of physical contact, which may contribute to difficulties in communication and clinical assessment, [30] as well as challenges in establishing a therapeutic alliance. [29]

Furthermore, evidence from broader telehealth research indicates that the successful implementation of remote healthcare depends not only on clinical effectiveness but also on system-level factors, including accessibility, technological infrastructure and organisational readiness. Despite the growing integration of such solutions into healthcare systems, persistent challenges remain, including disparities in access to digital technologies, variability in implementation, as well as organisational and regulatory barriers that may limit their wider adoption. [31]

A further limitation concerns the lack of standardisation in telerehabilitation interventions, along with insufficient reporting of key components such as exercise content, intensity and progression, which may affect the implementation in clinical practice. [32]

These limitations highlight the need for greater standardisation and transparency in reporting

to improve the reproducibility and clinical applicability of telerehabilitation interventions.

5. Conclusion

Telerehabilitation can be considered a practical and accessible option for managing chronic low back pain, especially when access to face-to-face care is limited. Available evidence suggests that it may reduce pain and improve functional outcomes, with effects generally comparable to conventional physiotherapy. It may also reduce time and costs and is generally well accepted by patients. However, its use depends on factors such as access to technology, digital skills and the limitations of remote assessment. In addition, variability between interventions and the lack of standardisation make it difficult to compare findings across studies. Further high-quality studies are needed to better define its place in everyday clinical practice.

Disclosure

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