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GAINS AND CHALLENGES OF TELEREHABILITATION: A NARRATIVE REVIEW

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ABSTRACT

Background: COVID-19 has accelerated the adoption of telehealth among various specialties, including physical therapy. The rapid adoption of telerehabilitation (TR) has uncovered both its potential benefits and associated challenges, highlighting the need for innovative approaches to improve remote healthcare services. Understanding current trends and challenges in post-pandemic TR utilization is essential for future healthcare planning.

Objective: This review aimed to identify and analyze the gains and challenges associated with telerehabilitation implementation.

Methods: A systematic bibliographic search was conducted across six online databases (PubMed, Google Scholar, ResearchGate, Scopus, ScienceDirect, and Cochrane Library) covering the period from 2020 to 2024. Original articles and reviews published in English were included for analysis.

Results: After comprehensive review, multiple benefits of TR were identified from both physiotherapist and patient perspectives. TR offers cost-effective and convenient solutions while empowering patients to take control of their home-based therapy, fostering patient autonomy. It particularly benefits underserved communities, enhances treatment frequency, and improves therapist-patient interaction through digital platforms. TR proves especially valuable for elderly, pediatric, and musculoskeletal care populations, increasing exercise adherence and supporting remote monitoring with personalized care delivery. However, TR faces significant challenges in performing physical assessments and manual techniques, limiting its effectiveness compared to in-person therapy. Inconsistent outcomes and lower patient satisfaction, particularly for conditions such as dementia, raise concerns about feasibility and clinical acceptance.

Conclusion: While TR demonstrates significant potential for expanding healthcare access and improving patient autonomy, addressing limitations in physical assessment capabilities and patient satisfaction remains crucial for widespread clinical acceptance.

Keywords: Telerehabilitation, Telemedicine, COVID-19 pandemic, Remote healthcare, Physical therapy

INTRODUCTION

Telerehabilitation (TR) is defined as "the delivery of rehabilitation services at a distance using telerehabilitation technology to deliver health care" [1]. TR encompasses the provision of rehabilitation services via telemedicine using information and communication technologies, including video/teleconferencing, remote data collection equipment, telemonitoring, computers, mobile phones, robotic devices, and virtual reality systems tailored for individuals with disabilities, their families, clinicians, supervisors, and the community [2].

The widespread adoption of TR began during the COVID-19 pandemic when physical contact with patients became restricted. During this period, physiotherapists recognized the necessity for remote healthcare delivery and demonstrated positive perceptions toward telerehabilitation with increased willingness to implement these technologies [3].

TR applications span multiple conditions including cardiopulmonary, musculoskeletal, and neurological disorders. It has facilitated patient access to interventions for various conditions such as cerebral palsy, dementia, rotator cuff-related shoulder pain, pregnancy-related complications, and knee osteoarthritis [4].

Telecommunication technologies serve as vehicles to improve care delivery for vulnerable and remote populations with various disabilities, aiming to conserve time and resources within healthcare systems [4]. TR reduces the physical burden of patient travel to clinics while offering scheduling flexibility for physiotherapists [5]. For pregnant women, TR can effectively maintain exercise programs, thereby increasing functionality and quality of life [6].

TR provides rehabilitative services to patients unable to reach rehabilitation centers due to financial constraints, geographical barriers, or disability-related limitations [7]. TR sessions have demonstrated effectiveness in addressing conditions including muscle weakness, limited range of motion, pain, balance deficits, and swelling. Care delivered through TR is both affordable and convenient [8].

The importance of TR extends to reducing high healthcare demands that result in resource saturation and extended waiting lists, thereby improving access to healthcare services [9]. TR has proven effective in maintaining therapeutic relationships between patients and therapists while delivering person-centered care.

However, TR implementation faces challenges including technical difficulties, poor patient compliance, and reduced personal interaction during the pandemic [10]. The absence of physical contact between physical therapists and patients, combined with technological complexity, represents primary barriers that impact therapist confidence, particularly during patient assessment and treatment [11]. Additional challenges include the inability to perform palpation and manual techniques, conduct diagnostic tests, and utilize rehabilitation equipment commonly available in outpatient settings [12].

RATIONALE FOR THE STUDY

While numerous studies have examined telerehabilitation, debates persist regarding its advantages and disadvantages across musculoskeletal, neurological, and cardiopulmonary conditions. This study was conducted to comprehensively evaluate the gains and challenges of telerehabilitation implementation.

METHODS

Study Design- Narrative review

Inclusion Criteria: Original articles published in English in medical journals**.** Articles focusing specifically on telerehabilitation

Exclusion Criteria: Articles containing only abstracts without full text**.** Systematic reviews, meta-analyses, editorials, book chapters, conference papers, papers with incomplete information, and articles from non-medical journals

Search Strategy: A comprehensive search was conducted using PubMed, Google Scholar, ResearchGate, Scopus, Cochrane Library, and ScienceDirect databases. Studies published from August 2020 to July 31, 2024, were included. Search terms related to TR were used in various combinations: telehealth, telerehabilitation, COVID-19 pandemic, home-based rehabilitation, and physical therapy patients.

Study Selection and Data Extraction: Search results were independently screened with sequential evaluation of titles and abstracts. Full papers of potentially eligible references were retrieved by one author, and article eligibility was assessed by two researchers.

The PRISMA flow diagram shows that 28 articles were initially identified from database searches. After applying inclusion and exclusion criteria, 15 articles fulfilled all selection criteria and were included in the final analysis.

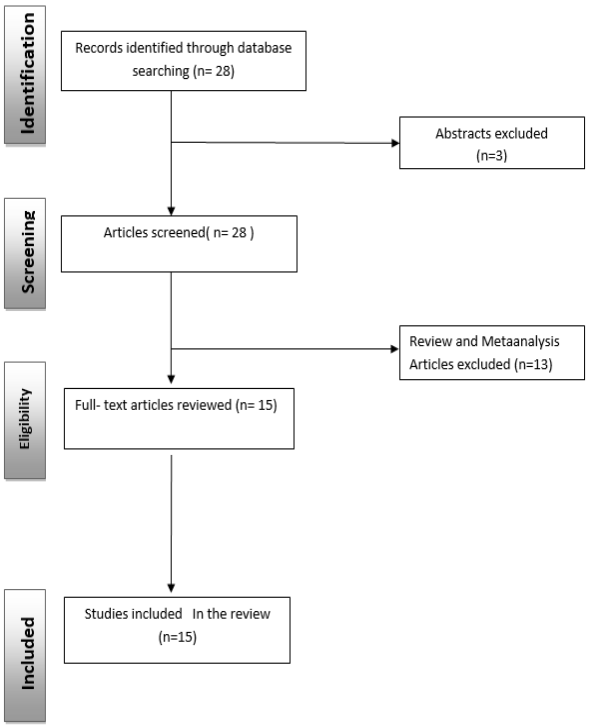

Fig 1 : PRISMA Flow diagram of the results from the database searches

Data extraction was performed for all studies meeting the inclusion criteria, with information extracted on participant characteristics, sample sizes, and test conditions.

RESULTS AND DISCUSSION

Study Characteristics

First Author, Year	Sample Size	Mean Age	Conditions
Calvin, 2024	307	53	Neurological diseases
Zindigi Aman, 2024	140	43	Knowledge, attitude, and barriers towards telerehabilitation
Esra Uzelpasaci, 2023	11	31	Pregnant women
Fereshteh Saaei, 2021	289	-	Attitudes of physiotherapy and patients
Martina Cristinziano, 2021	53	7	Cerebral palsy
Ali Jasem Buabbas, 2021	53	51	Gross motor disease
Claudio Lorito, 2021	10	63	Dementia
Jungae An, 2021	60	70	OA knee
Mark W. Werneka, 2021	222,680	55	Stroke, edema, and vestibular dysfunction
Henrik Hansen, 2020	134	68	Severe COPD
Talita Dias da Silva, 2020	44	19	Cerebral palsy
Hinman, 2020	175	47	OA knee
Mina R. Rezk, 2020	30	54	Cerebral palsy
Peter Mallianas, 2020	36	51	Rotator cuff related shoulder pain
Kamran Azma, 2020	27	56	OA knee

Advantages of Telerehabilitation

Following comprehensive review of TR literature, several significant advantages emerged from perspectives of both physiotherapists administering TR (synchronously or asynchronously) and patients receiving TR services.

Cost-Effectiveness and Convenience- One prominent advantage of TR is its potential to deliver cost-effective and convenient care solutions. This approach empowers patients to manage therapy at home, fostering autonomy that traditional in-person rehabilitation may not consistently provide. TR particularly benefits underserved communities where access to quality healthcare services may be limited.

Enhanced Access and Continuity- By enabling remote care delivery, TR expands access and enhances care continuity for populations who might otherwise struggle to receive consistent treatment. Digital platforms facilitate more frequent therapist-patient interactions, proving particularly valuable for elderly individuals, pediatric patients, and those with musculoskeletal conditions.

Improved Adherence and Monitoring- TR enables higher adherence to prescribed exercises through remote monitoring capabilities and automated reminders. The technology supports personalized care delivery and can incorporate innovative approaches such as virtual reality in sports rehabilitation.

Population-Specific Benefits- TR demonstrates particular effectiveness for specific populations, including elderly patients requiring consistent monitoring, pediatric patients who may benefit from gamified interventions, and individuals with musculoskeletal conditions requiring exercise-based interventions.

Challenges of Telerehabilitation- Despite numerous benefits, TR faces significant implementation challenges that limit its effectiveness compared to traditional in-person therapy.

Assessment and Manual Technique Limitations- Physical assessments and hands-on techniques, essential components of many rehabilitation approaches, are difficult to perform remotely. This limitation significantly reduces TR effectiveness compared to traditional therapy approaches. The inability to perform palpation, manual techniques, and diagnostic tests represents a fundamental barrier to comprehensive care delivery.

Variable Outcomes and Satisfaction- Inconsistent outcomes and sometimes lower patient satisfaction, particularly among patients with cognitive impairments such as dementia, raise concerns regarding TR feasibility and clinical acceptance in specific populations. These variations highlight the need for condition-specific TR protocols.

Technical and Infrastructure Challenges- Technical difficulties, poor internet connectivity, and limited access to rehabilitation equipment commonly available in outpatient settings present ongoing barriers to effective TR implementation.

Innovation Needs- These challenges underscore the need for continued innovation in rehabilitation delivery. New approaches and technologies, potentially incorporating hybrid models combining virtual and in-person components, may address current limitations and increase overall TR effectiveness and clinical acceptance.

LIMITATIONS

This narrative review has several limitations. The search was limited to articles published between 2020-2024, potentially excluding relevant earlier studies. Additionally, the narrative review format does not provide the systematic quality assessment typically found in systematic reviews. Language bias may exist as only English-language articles were included.

CONCLUSION

Telerehabilitation demonstrates significant potential for expanding healthcare access, improving patient autonomy, and providing cost-effective care solutions, particularly for underserved populations. However, addressing limitations in physical assessment capabilities, manual technique delivery, and variable patient satisfaction remains crucial for widespread clinical acceptance. Future research should focus on developing hybrid models and innovative technologies to overcome current limitations while maintaining the accessibility benefits that make TR valuable for diverse patient populations.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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REFERENCES

1. Humphries, S., & Bezuidenhout, L. (2024). Factors associated with the willingness to provide telerehabilitation by physiotherapists treating older adults or people with neurological diseases during the COVID-19 pandemic in Sweden. PLOS Digital Health, 3(7).
2. Aman, Z., & Shakeel, K. (2024). Knowledge, attitude, and barriers towards telerehabilitation-based physical therapy in Peshawar: A descriptive cross-sectional study. Journal Name, 6(15). (Add journal name and DOI or URL if available)
3. Uzelpasaci, E., & Ozcekar, L. (2023). Telerehabilitation for exercise training in pregnancy. Journal Name, 29(1), 27–29. (Add journal name and DOI or URL if available)
4. Saaei, F., & Klappa, S. G. (2021). Rethinking telerehabilitation: Attitudes of physical therapists and patients. Journal of Patient Experience, 8, 1–7.
5. Cristinziano, M., & Assenza, C. (2021). Telerehabilitation during COVID-19 lockdown and gross motor function in cerebral palsy: An observational study. European Journal of Physical and Rehabilitation Medicine, 58(4), 592–597.
6. Buabbas, A. J., & Albahrouh, S. E. (2021). Telerehabilitation during the COVID-19 pandemic: Patients' and physical therapists' experiences. Medical Principles and Practice, 31, 156–164.
7. Di Lorito, C., & Duff, C. (2021). Tele-rehabilitation for people with dementia during the COVID-19 pandemic: A case study from England. International Journal of Environmental Research and Public Health, 18, 1717. https://doi.org/10.3390/ijerph18041717
8. An, J., & Ryu, H. K. (2021). Effects of preoperative telerehabilitation on muscle strength, range of motion, and functional outcomes in candidates for total knee arthroplasty: A single-blind randomized controlled trial. International Journal of Environmental Research and Public Health, 18, 6071. https://doi.org/10.3390/ijerph18116071
9. Werneke, M. W., & Deutscher, D. (2021). Telerehabilitation during the COVID-19 pandemic in outpatient rehabilitation settings: A descriptive study. Physical Therapy, 101, 1–11.
10. Hansen, H., & Bieler, T. (2020). Supervised pulmonary tele-rehabilitation versus pulmonary rehabilitation in severe COPD: A randomised multicentre trial. Thorax, 75, 413–421.
11. da Silva, T. D., & da Silva, P. L. (2021). Serious game platform as a possibility for home-based telerehabilitation for individuals with cerebral palsy during COVID-19 quarantine—A cross-sectional pilot study. Frontiers in Psychology, 12, 622678. https://doi.org/10.3389/fpsyg.2021.622678
12. Hinman, R. S., Campbell, P. K., et al. (2020). Electronic lifestyle activity monitors with health professional support to reduce pain and improve function in knee osteoarthritis: The IMPACT randomised controlled trial. British Journal of Sports Medicine, 54(13), 790–797. https://doi.org/10.1136/bjsports-2019-101498
13. Rezk, M. R., & Aly, M. G. (2021). Tele-rehabilitation for upper limb functions of children with hemiplegic cerebral palsy during COVID pandemic: Randomized controlled trial. Turkish Journal of Physiotherapy and Rehabilitation, 32(3).
14. Malliaras, P., Cridland, K., et al. (2020). Internet and telerehabilitation-delivered management of rotator cuff–related shoulder pain (Intel Trial): Randomized controlled pilot and feasibility trial. JMIR mHealth and uHealth, 8(11), e24311. https://doi.org/10.2196/24311
15. Azma, K., & RezaSoltani, Z. (2018). Efficacy of tele-rehabilitation compared with office-based physical therapy in patients with knee osteoarthritis: A randomized clinical trial. Clinical Rehabilitation, 32(8), 1089–1099. https://doi.org/10.1177/0269215518777882