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A Review on Digital Divide and Its Impact on Physiotherapy Delivery in Rural Settings

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Abstract

Digital physiotherapy has been evidenced to be an effective and practical way of delivering physiotherapy services to individuals, principally those with inadequate access to traditional in-person care. However, the assistances of digital physiotherapy are not evenly distributed. Rural areas are disproportionately affected by these disparities due to deprived network coverage area, limited affordability of electronic devices, lower educational levels, awareness of telerehabilitation and limited exposure to digital health interventions. The goal of this review is to evaluate and synthesize existing literature on the digital divide and what impact the digital divide has on physiotherapy service delivery in rural areas. In doing so, this review will identify the main barriers, implementers, and gaps in research, with the goal of informing clinical practice, guiding future research, and supporting policy initiatives designed to promote the equitable access of digital physiotherapy services delivered in rural settings.

Keywords: Telerehabilitation; Physiotherapy; Rural

Introduction

Today, access to medical and healthcare services continue to differ greatly between urban and rural communities with the latter frequently suffering ongoing hardships when trying to obtain timely and appropriate rehabilitation. These obstacles are related to impaired healthcare infrastructure, inadequate human resources, far travel distance as well as poor economy. Rehabilitation services, in particular physiotherapy, are particularly impacted on the rural environment due to the requirement for regular review and face-to-face assessment and supervised exercise. Therefore, people in rural areas are more likely to experience untreated functional limitations, extended disability and lower quality of life. [1,2]. Recent developments in digital health technologies have changed the way healthcare is delivered and created new opportunities for rehabilitative services. Physiotherapy is now available outside of typical clinical settings because digital tools include wearable sensors, teleconsultations, mobile applications, and remote monitoring systems. Without requiring persistent in-person visits, these methods ease chances to deliver fitness plans, track progress, offer education, and encourage self-management. Digital physiotherapy or telerehabilitation offers the ability to improve access to rehabilitation services, reduce geographic obstacles, and improve continuity of care for rural populations. [3,4]. However, the benefits of digital physiotherapy are not evenly distributed. The term "digital divide" describes inequalities in access to electronic digital devices,

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internet connectivity, technology, and digital literacy. Rural areas are disproportionately affected by these imbalances due to poor network coverage area, limited affordability of electronic devices, lower educational levels, awareness of telerehabilitation and limited exposure to digital health interventions. Consequently, individuals who may benefit most from digital physiotherapy often face prominent challenges in accessing and effectively using these services. [5] The digital divide has implications not only for access but also towards the quality and effectiveness of physiotherapy treatment. Limited digital literacy among patients in rural areas may affect engagement, adherence to prescribed exercise programs, and understanding of rehabilitation programmes and its objectives [6]. From a provider's viewpoint, physical therapist working in rural settings may come across difficulties related to inadequate training in digital platforms, lack of organizational support, and concerns viewing data security and professional answerability. These factors can obstruct the successful integration of digital tools into routine physiotherapy practice [6]. Previous studies have found digital health discrepancies and telehealth applications in healthcare, but there is still lack of evidence that focuses specifically on physiotherapy delivery in rural areas. In Physiotherapy, the movement-based and cooperative nature, profession-specific trials and facilitators examined effective implementation strategies. A structured synthesis of available evidence is necessary to understand how the digital divide influences physiotherapy services in a rural context. This review aims to demonstrate the existence of a digital divide between urban and rural regions through a summary of existing research on the impact of this divide on access to physical therapy services in rural locations. This review additionally seeks to demonstrate significant barriers, facilitators, and gaps in the research that will facilitate equitable access to digital physiotherapy services to provide a basis for clinical practice, future research, and policy recommendations.

Methods

Review Design

This review adopts a narrative methodology to consolidate the existing literature regarding the digital divide and its impact on physiotherapy services in rural areas. This approach was selected due to the diversity, evolution, and methodological variety present in this field of research.

Search Strategy

PubMed, Scopus, PEDro, and Google Scholar were used in a methodical literature search. Digital divide, physiotherapy, physical therapy, telerehabilitation, digital health, and rural health were among the terms used in the search. To include information that could not be located through database searching, reference lists from appropriate articles were searched as well.

Eligibility Criteria

You could find a study that looked at either how digital physiotherapy services were carried out with people living in rural or remote areas or what hindered access to or understanding of digital services for those individuals, or the views of users of the services or providers of digital physiotherapy. This includes quantitative, qualitative, reviews, and policy reports which are published in English. The studies which are irrelevant to rehabilitation services and bounded to urban populations are excluded.

Digital Divide in Rural Healthcare

The digital divide is defined as differences or disparities in access to digital technologies; in this case digital technology would include things like internet connectivity and skills necessary for efficient use of them. In many cases rural health care disparities or changes to the digital divide occur because of geographical isolation, lack of broadband infrastructure, and/or lower income levels as well as fewer opportunities to receive digital education. Significantly, when talking about the digital divide in rural settings there are three aspects that can affect rural residents' abilities to make meaningful use of digital health services: confidence, familiarity, and the ability to access digital health technology. [6-8]. In physical therapy, where observation of movement, interaction, and patient engagement are central to care, digital boundaries can have a direct influence on service quality. Uneven internet connections or lack of suitable devices may intrude sessions, restrict visual assessment, and reduce the efficiency of therapeutic communication [9].

Digital Physiotherapy & Rehabilitation

Digital physiotherapy refers to everything from using any type of technology that improves assessment, treatment, education, and follow up outside a provider setting. Telerehabilitation technology has been suggested as a practical resolution for workforce deficit and access barriers in rural areas. In some studies, it is reported that after the application of digital physiotherapy in musculoskeletal, neurological, and cardiopulmonary disorders, there is success recorded across wide range of conditions [10,11]. Digital physiotherapy may reduce requisitions for travelling, improve continuity of care, and provide greater flexibility for rural living people. However, these advantages are interconnected to the availability of reliable technology and facility of patients and clinicians to employ digital platforms effectively [3,12-14].

Patient-Level Barriers

There is a significant obstacle to patient level, as they have limited access to computers, smartphones, or stable internet services. The older adults may also encounter barriers, who frequently demand physiotherapy, concerning visual

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or hearing impairments, low digital proficiency and digital illiteracy. Language barriers and limited health literacy can also affect engagement in, or hinder, patients' ability to follow their digital rehab program(s) [3,13,14]. Financial barriers can also impact participation, especially in rural areas that have less socioeconomic resources available. The cost of devices, data plans, or internet services may prevent patients from using digital physiotherapy long enough to ensure they have followed their plan of care, contributing to poor compliance or an early end to their rehabilitation.

Provider-Level Challenges

Physiotherapists practising in rural areas often report limited exposure to digital health training. Uncertainty about clinical effectiveness, concerns regarding professional responsibility, and lack of technical support can reduce confidence in using digital platforms. The time constraints and other clinical obligations may limit the amount of time available for using new technologies [15]. Clinicians might also find it challenging to evaluate movement abilities and position or perform hands-on treatment while running a session via various remote standards, as the entire profession of physiotherapy is focused on movement. These challenges underscore the need for targeted training to support digital physiotherapy through professional-specific guidance.

Health System & Infrastructure Barriers

A lack of adequate infrastructure is a barrier to the delivery of digital physiotherapy in rural communities. There are frequent issues with unreliable connection, inadequate investment from institutions, and no universal clarity concerning policies for digital health. Other issues associated with implementing digital health care are concerning. These could be related to data privacy, security, and methods for getting paid for digital services [16]. Healthcare systems that are fragmented and have poor connectivity and integration with digital platforms and existing services create challenges for continuity of care and limit the future viability of digital physiotherapy programs.

Facilitators and strategies

Numerous strategies facilitate digital physiotherapy in rural communities and areas. These include user-friendly platforms, digital literacy community-based programmes, and hybrid care models that provide a combination of in-person and digital services. Additionally, providing educational resources to physiotherapists and providing ongoing technical assistance before and after training to improve confidence and increase use of technologies [17,18]. on order to successfully scale digital physiotherapy resources, supportive health policies, reimbursement mechanisms, and funding to enable rural digital infrastructure must be established. By including caregivers, community health workers, and local organisations, digital exclusion will be addressed [11,19].

Implications & Conclusion

To improve equity in physiotherapy care to rural populations, reducing the digital divide must take place. Sustainable digital rehabilitation models will require coordinated investment in infrastructure, training, and governance [4,20]. Digital physiotherapy presents a major opportunity to reduce barriers due to distance to increase access to physiotherapy services; but many existing barriers prevent this from occurring including insufficient access to technology and digital skills, as well as lack of support from systems. Identifying and addressing issues in these areas through a combined clinical, educational, and policy approach is critical to ensuring equitable access to digital physiotherapy services.

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