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Tele-Rehabilitation Therapy: A New Frontier in Post Covid-19 Epoch

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ABSTRACT

Tele-rehabilitation is a relatively new field in healthcare that makes use of modern communication and networking tools to provide rehabilitation treatments to patients in remote locations. Rehabilitative telemedicine involves providing treatments to patients in a variety of settings, including their own homes, using electronic means of contact. Patients' needs for rehabilitation can be met by telerehabilitation, which is supported since it maintains geographical separation and decreases the likelihood of viral transmission. Tele-rehabilitation helps those who need it by providing them with therapeutic treatments, remote progress monitoring, education, counseling, training, and a place to connect with others who share their condition. All facets of medical rehabilitation have been revolutionized by technological advancements in the last few years, from the delivery of specialised interventions to the supply of cutting-edge therapies. As a result of these rapid advancements, healthcare professionals are now able to give treatment remotely, in a different format. The term "mHealth," which encompasses the utilization of mobile gadgets like cell phones, tablets, and smart phones in healthcare and epidemiological research, has also developed recently. Because of its widespread accessibility and very inexpensive solutions, mHealth is often hailed as a force for positive transformation throughout the world. When it comes to communicating with and treating a wide variety of patients, the transition towards technology-based therapy, especially smart phone-based applications, is a highly significant topic. Due to the widespread nature of non-compliance with treatment and rehabilitation programmes, therapeutic compliance has been a focus of clinical concern since the 1970s. Recent technological progress has the potential to improve therapy results.

Key Words: Rehabilitation, Tele rehabilitation, COVID-19, Physiotherapy, Education, Communication, Digital Health, Tele health, mHealth, Smartphone, Covid-19.

INTRODUCTION

Due to the heightened hazards associated with in-person care and the strain placed on healthcare systems by the inflow of Covid-19 patients, the necessity for tele-rehabilitation services has been brought to light by the current epidemic. Physical therapy, occupational therapy and speech therapy are all part of tele-rehabilitation, which may be given via video conferencing, telephones, and mobile applications.

Access to care is increased, the risk of exposure to Covid-19 is decreased, and patients with mobility issues or busy schedules have more freedom to receive rehabilitation care when it is most convenient for them thanks to tele-rehabilitation, which is provided to them from the comfort of their own homes. The lack of standardization and regulation of tele-rehabilitation methods, as well as the requirement of sufficient technology and internet connectivity for all patients, are two of the obstacles that tele-rehabilitation faces.

In spite of these obstacles, tele-rehabilitation has the potential to transform the way rehabilitation services are delivered, not just during the pandemic but long after it has ended. The success and availability of this treatment for all patients depends on ongoing research and development in this field. By the use of technological means to provide rehabilitation, patients are encouraged to take an active role in the treatment of their disease, ultimately leading to a greater sense of independence and confidence. Those in underserved regions, or those who are physically or financially unable to go to treatment facilities, can benefit from tele-rehabilitation as well. In addition, both doctors and patients save money and time by not having to travel as much.

Changes in the delivery of rehabilitation services, including the incorporation of self-management techniques and technology, are necessary in light of the anticipated rise in the aged population. The use of smart phone applications to distribute physiotherapy home exercise regimens is a relatively recent development that has the potential to increase the level of patient and therapist engagement in the healing process.

There are substantial obstacles in providing and maintaining tele-rehabilitation practice, despite the fact that evidence shows it is just as effective as in-person therapy for persons with neurological diseases. Integrating in-person and tele-rehabilitation to provide engaging, evidence-based, and person-centered rehabilitation is a promising approach to overcoming these challenges; however, this approach requires rehabilitation organizations and physiotherapists to build the capacity to provide tele-rehabilitation; to focus on translating their communicative, relational, and clinical skills to the digital space; and to determine what constitutes "best practice" in tele-rehabilitation.

In tele-rehabilitation, patients and carers work together remotely via the use of various communication technologies such as the internet and mobile. Tele-rehabilitation is used in the medical fields of physical therapy, occupational therapy, speech-language pathology, audiology, and psychology. Motor skill exercises, speech therapy, virtual reality, robotic treatment, goal planning, and group exercise are just some of the modalities that can be employed in either private or public settings.

Common modalities utilized in tele-rehabilitation include webcams, videoconferencing, phone lines, videophones, and websites with rich Internet capabilities. In order to overcome the limitations imposed by the visual nature of tele-rehabilitation technology, it is frequently paired with other modalities, such as in-person treatment. Investigating novel and developing rehabilitation methods and contrasting tele-rehabilitation with in-person therapy in terms of patient functional results, cost, satisfaction, and compliance are essential topics of tele-rehabilitation research.

In the United States, health insurance companies have been slow to compensate for tele-rehabilitation treatments. Insurers and Medicare are more willing to pay for tele-rehabilitation services if studies indicate that tele-assessments and tele-therapy are equal to clinical visits.

HISTORY OF TELEREHABILITATION

From its inception in the 1950s by the United States Department of Defense and the National Aeronautics and Space Administration, telemedicine and tele-rehabilitation have advanced significantly. Telecom funds from the federal government, particularly from the Health Services Research Administration and the Department of Commerce, have greatly supported the development of this technology in recent years. State prison systems, rural healthcare networks, and the radiology field were among the earliest users of telemedicine. Yet, the veteran's administration is actively adopting telemedicine for those with impairments, whereas the Medicare programme for people over 65 is quite conservative about paying for telehealth.

The National Institute on Disability and Rehabilitation Research (NIDRR) established the first Rehabilitation Engineering Research Center (RERC) on tele-rehabilitation in 1998. (NIDRR). The Sister Kenny Rehabilitation Center of Minnesota, East Carolina University of North Carolina, and the National Rehabilitation Hospital in Washington, DC, collaborated to win the RERC. O. Bracy, a neuropsychologist, presented the first web-based, rich internet application for the tele-rehabilitation presentation of cognitive rehabilitation treatment in 2001.

Hospitals may turn a profit via telemedicine, as M.J. McCue and S.E. Palsbo discovered in a 2006 article published in the Journal of Telemedicine and Telecare. They stated that not just rural patients should have access to telerehabilitation so that others with impairments and those in pain might obtain the rehabilitative therapy they require.

Despite the progress made in tele-rehabilitation, there have only been a few equivalency trials conducted in the field of study. In 2006, most telemedicine studies published in academic journals were either case reports of pilot programmes or reports on new pieces of equipment. Further controlled tests are needed to prove the therapeutic efficacy of tele-rehabilitation and provide this data to doctors and payers in the rehabilitation field. When compared to occupational and physical therapy, speech-language pathology has significantly more convincing evidence of parity across a wider range of communication technologies.

The availability of rehabilitative therapy may be greatly expanded through the use of tele-rehabilitation, which is especially promising for persons who live in remote places or have physical limitations. Tele-rehabilitation has the potential to greatly benefit both healthcare practitioners and patients with the help of future research and technological developments.

TELE-REHABILITATION DURING COVID-19 PANDEMIC

The spread of Covid19 virus has had a major effect on the provision of medical treatment, especially rehabilitation services. Several doctors and hospitals have restricted or even stopped seeing patients in person as a precaution against the spread of the illness. Several patients have been left without access to necessary rehabilitative therapies as a result of this. Nevertheless, tele-rehabilitation presents an answer to this issue.

When a patient receives rehabilitation services via telemedicine, they don't need to physically go to a clinic or hospital. This is especially crucial for the elderly and people with preexisting illnesses who are at increased risk for contracting Covid-19. Furthermore, it allows patients who have trouble making time for in-person sessions due to job or family responsibilities more options. Via tele-rehabilitation, patients may get treatment whenever it is most practical for them, without having to travel somewhere.

In addition to making therapy more accessible, tele-rehabilitation has other advantages. As a result of fewer people needing in-person care, healthcare facilities will have more resources available for those with the Covid-19. This is especially crucial in regions with high Covid-19 transmission rates, where the strain on healthcare systems from treating infected people may be too great.

In view of the challenges posed by the recent Covid-19 outbreak, tele-rehabilitation has developed as a potential method of providing rehabilitation services. Tele-rehabilitation, the delivery of rehabilitation services at a distance while minimising risks such as those posed by Covid-19, can help patients restore their health and quality of life when conventional therapy is unavailable.

ADVANTAGES OF TELE-REHABILITATION

As the Covid-19 epidemic has shown, tele-rehabilitation is a viable option for offering rehabilitation treatments to patients, and it is growing in popularity. The benefits of tele-rehabilitation are as follows:

Increased Availability of Medical Services: Rehabilitation treatments are sometimes inaccessible to patients who reside in rural or distant places, or who have mobility impairments that make it difficult to go to healthcare facilities. Because of the convenience of tele-rehabilitation, more people have access to rehabilitation treatments.

Decreased Potential for Covid-19 Exposure: Due to the widespread spread of the Covid-19 epidemic, it is now dangerous for patients and doctors alike to travel to healthcare institutions in person. Patients at high risk, such as the elderly and those with preexisting diseases, can benefit greatly from tele-rehabilitation since it minimises the number of in-person appointments they need to have with a therapist.

Greater Versatility: Sometimes, patients can't make it in for an in-person visit because of conflicts with work or family commitments. Patients benefit from tele-rehabilitation because it allows them to schedule their care around their own lives and avoid making unnecessary trips to medical clinics.

Save Money: As there is less of a need for patients to travel and less of an impact on healthcare resources, tele-rehabilitation can be more cost-effective than in-person consultations.

Better Results: Tele-rehabilitation has been demonstrated to be just as successful as traditional in-person therapy in enhancing patients' functional results and quality of life. Moreover, tele-rehabilitation has been found to enhance results compared to conventional in-person therapy for patients with illnesses like stroke. Tele-rehabilitation allows patients to have more freedom and lower healthcare expenditures without sacrificing the high level of care they've come to expect.

A research by the Special Interest Group on Telerehabilitation (SIGOT) found several advantages of tele-rehabilitation for both patients and healthcare practitioners. Patient independence in controlling their condition as an active partner in their treatment is fostered through the use of technology in the delivery of rehabilitation services, giving patients a sense of agency and control over their recovery. This method enhances healthcare access for those living in rural regions or with mobility impairments by decreasing the need for patients and medical staff to travel.

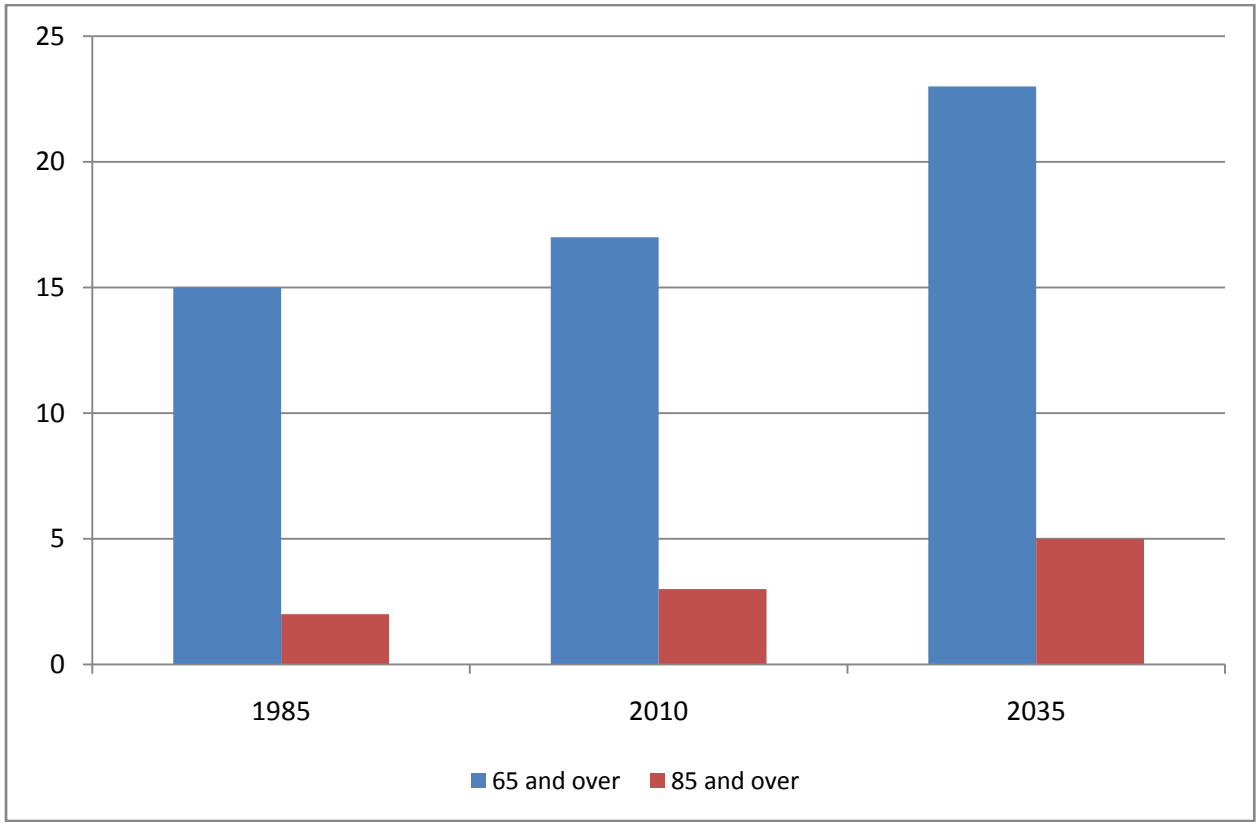
Stroke, traumatic brain injury, and other neurological illness survivors commonly have unmet rehabilitation needs at the community level, according to studies. By allowing clinicians to remotely engage and administer care outside of the medical context, tele-rehabilitation enhances patient continuity of care by removing the barrier of physical distance between clinician and patient. The patient is able to continue their therapy in their own social and professional setting, which should improve their functional results.

Changes in the delivery of rehabilitation services are necessary in light of the worldwide demographic trend towards an ageing population and the accompanying increase in chronic health issues. To accommodate the needs of Kerala's ageing population, which is expected to make up 23% of the state's total population by 2035, it is essential to use self-management practices and technology. All things considered, tele-rehabilitation is a novel approach that

helps patients who require rehabilitation services get them more quickly, at lower cost, and with better results.

Growth of Elderly Population in Kerala

The forecasted increase in Kerala's elderly population is likely to have far-reaching consequences for the state's healthcare system, including a rise in treatment demand and related expenses. Yet, telehealth interventions like telerehabilitation might potentially assist cut down on these expenses. According to research conducted in MG University, telerehabilitation is an effective method for improving patient outcomes at a 58% lower cost than traditional in-patient rehabilitation. Significant clinical effects have also been documented, and patient ratings of telerehabilitation have been quite good. It is envisaged that telerehabilitation will become an increasingly standard aspect of healthcare as new, cutting-edge technology continue to revolutionize the industry. NGOs working in the field of public health also play a major role in the area.

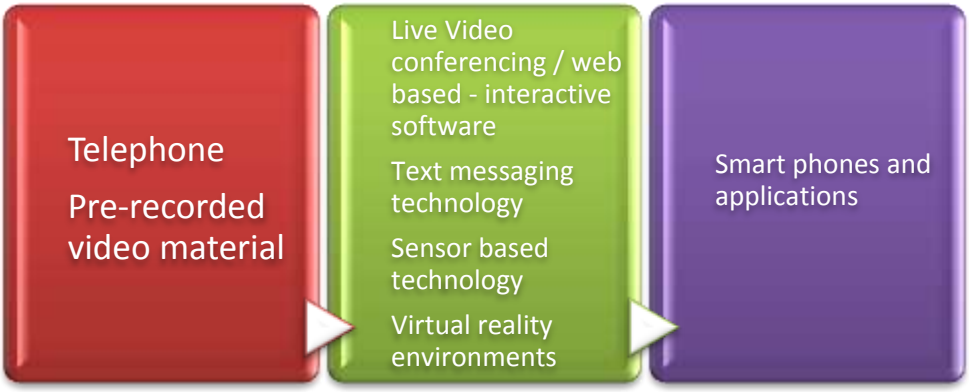


Predicted growth in the elderly population in Kerala
(Based on National Statistics 2012)

Progression of Telerehabilitation Technology

Because "hands-on" therapies like physiotherapy and occupational therapy were necessary for treating physical illnesses, implementing telerehabilitation presented some difficulties at first. Nevertheless, because of developments in healthcare technology, more efficient telerehabilitation solutions for these treatments are now available.

Initially, telerehabilitation trials were tiny, and physicians used telephone follow-ups and self-assessment assessments. The use of recorded videos and, later, live, interactive video conferencing was a step forward. Patients who had had complete knee replacement were randomly assigned to either internet-based telerehabilitation or traditional physiotherapy to evaluate the efficacy of video conferencing in physical therapy. Patients were satisfied with their telerehabilitation care, and similar outcomes were recorded.



Progression of Tele-rehabilitation Technology

Consultations, diagnostic evaluations, therapeutic treatments, and other forms of verbal and visual communication are all possible via videoconferencing. Nevertheless, originally there were difficulties in assessing the individuals' actual physical performance. Sensor and remote monitoring technologies for in-home exercise monitoring are examples of the measuring instruments that overcame this challenge by providing an objective quantification of physical performance.

Real-time interaction with computer-generated settings has also been introduced in the healthcare sector through the usage of virtual environments. By utilizing this technology, medical practitioners may create settings that can be utilized in a variety of settings, including but not limited to: surgery, physical therapy, education, and training.

Smart phones have completely changed the way doctors and patients can stay in touch, allowing for immediate assistance no matter where they may be. The majority of smart phone owners (50%) use their devices to research health topics, and one in five (21%) download health-related apps. There is a plethora of options for everyone from doctors to medical students to patients and the general public to use on their mobile devices..

Application of telerehabilitation for Specific Conditions

Innovations in mHealth, a field at the intersection of mobile health care and technology, are reshaping how chronic illness is treated and giving patients of all age newfound agencies. Smartphone applications, interactive tools, and podcasts are available to cater to a wide range of healthcare illnesses and impairments, recognized and promoted by health departments. Official applications allow people to record and submit health measurements to physicians and specialists electronically, boosting accessibility to healthcare resources and enabling self-management and prevention in regular care. This method helps save healthcare expenses for the elderly by decreasing the number of unneeded hospitalizations and improving the speed with which patients requiring medical intervention are treated.

According to the UK National Delivery Plan 2012, healthcare IT deployment presents a chance to improve care delivery by expanding treatment options, lowering costs, and keeping up with growing demand and prices. The National Institute on Disability and Rehabilitation Research (NIDRR) verifies that several healthcare applications for acute and chronic diseases are accessible for download and have been approved by the health department or private sector. Tools for self-evaluation, screening, and testing; symptom checkers; goal setters; and treatment and exercise diaries are all included. Some applications gather together helpful videos or tips, while others provide direct assistance.

Examining the Possibilities of Smart Phone Applications to Improve Physiotherapy
This research looks at how physiotherapists and patients can work together better with the use of mobile apps for musculoskeletal rehabilitation. It focuses on the ways in which mobile technology may be used to strengthen the bond between patients and physiotherapists, specifically by investigating the elements that affect patients' compliance with home exercise programmes (HEPs).
When administered in an outpatient environment, HEPs are tailored to each patient and intended to address their unique collection of symptoms. Patients are given a home exercise regimen to follow in between physiotherapy visits, with the physiotherapist making adjustments to the programme as the patient improves. Although consistent at-home training is vital to meeting both intermediate and long-term objectives, research shows that as much as 20% of people don't really do it.
Many situations, such as worry, pain, a lack of social support, and a lack of awareness of the patient's condition, might affect compliance with HEPs, in addition to aspects such as self-efficacy, motivation, and goal-setting. Physiotherapists and the rest of the interdisciplinary team can help patients overcome these obstacles and achieve better outcomes if they work together to better grasp the patient's point of view.
This research recommends using telerehabilitation and other mobile technologies to foster a better interaction between patients and physiotherapists and boost treatment adherence. While still in their infancy, these technologies have the potential to revolutionize healthcare by providing new, more effective treatments and services. However, additional study is required

to fully grasp the potential of Smartphone applications to improve physiotherapy and their limits.

Concluding Remarks

Future physiotherapists will need to keep pace with technological developments if they want to engage patients in their treatment. Smartphone applications can help patients stick to their exercise regimens at home by facilitating better communication, goal planning, and progress reporting, despite the fact that many studies have highlighted the problem of non-compliance in improving healthcare results. Yet, it is challenging to establish the possible effect of mobile-based techniques on physical activity behavior due to the different study designs and implementations. So, more study is needed to learn how these innovative physiotherapy apps affect patient behavior change and satisfaction. For the purpose of measuring the impact of telehealth and Telecare on efficiency and cost-effectiveness, it is essential to first create a reference point and then implement standardised outcome measures. Telehealth and Telecare methods must be sustainable and valuable, according to the American Speech-Language-Hearing Association (ASHA). Further study is needed to determine the best strategies to enhance patients' home exercise and rehabilitation regimens.

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