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Rethinking Telerehabilitation: Attitudes of Physical Therapists and Patients

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Abstract

COVID-19 has accelerated the adoption of telehealth among various specialties, including rehabilitation. The fast-paced implementation of telerehabilitation has laid bare its challenges, providing an opportunity for innovation in order to enhance the experience of remote care. The purpose of this study sought to understand the attitudes toward telerehabilitation from physical therapist (PT) and patient perspectives. Two surveys administered to PTs, and the general patient population explored beliefs regarding telerehabilitation. There were a total of 289 participant responses in this study. There were 228 PT respondents and 61 patients who responded to the patient survey. Qualitative results describe current attitudes toward telerehabilitation. Results indicated both groups were receptive to virtual therapy sessions; however, some challenges were also reported. Current challenges and trends in utilizing telerehabilitation are further discussed.

Keywords

telerehabilitation, COVID-19, physical therapy

Introduction

Since the advent of technology, the health care industry has undergone dramatic transformations. Historical turning points have made major contributions to the advancement of the industry and practice of physical therapy as seen through wars and pandemics. In the face of the COVID-19 pandemic, once again history repeats itself with opportunity wrapped in human suffering.

The use of telehealth has long been around but drastically increased in 2020 due to the pandemic (1). Telerehabilitation may increase a patient's engagement in a number of ways:

Affordability

Care delivery through a telerehabilitation platform seems to be more affordable to many individuals given the costs and hassle of traveling to the clinic. Patients can receive consultation and treatment from the convenience of their home as well as full time access to their exercise and educational videos and materials (2,3).

Ubiquity and Accessibility

Online platforms can serve underprivileged or marginalized communities and low- to middle-resourced nations by providing access to care and clinicians from other parts of the global village (4).

Interactivity

As opposed to the conventional in-person sessions, telerehabilitation may extend care delivery time due to features like two-way, on-demand communication between therapists and patients (4). Moreover, technologies like artificial intelligence (AI) can provide valuable feedback for both parties while performing prescribed exercises and treatments.

Clinical evidence on the use of telerehabilitation exists. In order to increase the acceptability of telerehabilitation, a strong body of evidence is required to validate its various aspects such as assessment, diagnosis, and treatment. Validity and reliability of assessment via telerehabilitation was explored by Mani et al (5). This systematic review demonstrated that physical therapy assessment in telerehabilitation in areas such as pain, swelling, range of motion, muscle strength, balance, gait, and functional assessment appears to have overall good concurrent validity and excellent reliability. Having said that, assessment of lumbar spine posture, orthopedic special tests, neurodynamic tests, and scar assessment had low to moderate concurrent validity.

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The effectiveness of telerehabilitation has been explored in patients following total knee and hip arthroplasty (6), chronic pain (7), and musculoskeletal conditions (8). A systematic review by Cotrell et al examined effectiveness of telerehabilitation in musculoskeletal conditions with standard physical therapy (8). Results of the study by Cotrell et al suggested telerehabilitation is effective in the improvement of physical function (8). Moreover, telerehabilitation, when paired with the usual face-to-face clinical care, was reported more favorable than in-person sessions alone. Telerehabilitation-only sessions were equivalent to conventional rehabilitation in the improvement of physical function and decreased pain for a variety of musculoskeletal conditions.

Additionally, Eannucci et al explored patient satisfaction in telerehabilitation in a recent study (9). Eannucci et al indicate that there is no overall difference in patient satisfaction between those receiving in-person physical therapy and those receiving telehealth physical therapy (9).

Challenges of telerehabilitation exist. One can look at the challenges of telerehabilitation from various standpoints such as reimbursement, data privacy, and patient technology illiteracy. However, there seems to be two major setbacks from care delivery perspective:

Lack of Physical Contact: Lack of physical contact affects assessment required to exclude red flags as well as performing special tests to diagnose the cause of movement impairments and limitations (10). This barrier highlights the significance of implementing a hybrid model of care with initial in-person session for assessment and diagnosis, where possible.

Context-Related Factors: Context-related factors such as the therapy environment (colors, smell, etc), interaction with other patients, and the healing effect of a therapist's touch are not present in virtual visits, which increases the risk of underrating the therapeutic encounter between physical therapist (PT) and patient (11). Therefore, substituting the above contextual factors with new technologies and innovative solutions is of great importance. Utilizing carefully thought therapeutic online platforms with integrated feedback and messaging features as well as personalized educational materials are to name a few.

Personalization of care is crucial. Technology provides opportunities to customize interventions to an individual's unique needs and opens new opportunities for learning and skill development for both the patient and the PT (4). Health care providers recognize the value of personalization in treating patients. Personalization in treatment results in higher quality of care, adherence to the plan of care, psychological effects of feeling heard and cared for, and an enhanced therapist–patient relationship (12). It seems myopic to consider personalization merely through patient perspective. Therapists can benefit from environments, which allows them to exhibit their unique style of treatment and communication. Such environments can increase a therapist's motivation to present their creativity and engage more effectively in the therapeutic journey. Current platforms such as telemedicine and home exercise program apps lack this critical feature.

Ignoring trends in telerehabilitation and telemedicine may prove detrimental to the future of the physical therapy profession. It is of paramount importance to note that telerehabilitation is not meant to take over in-person model of care but to enhance the service delivery process (13). Enhanced service delivery requires a platform promoting personalization in exercise and educational videos tailored for the unique needs of patients. Mass production of exercise videos as seen in classic home exercise programs no longer serves the emerging need of individualized care.

Another extension of personalization is the ability to track a patient's adherence and increase engagement through real-time feedback from the PT. Supervision during exercise interventions has been demonstrated to be the preferred approach, as it is associated with a superior influence on adherence with sustained improvements in functional capacity (14). This feature is achievable using AI, which provides both the therapist and patient invaluable information and outcome measures for further decision making for optimizing movement.

The purpose of this project was to explore the status, trends, and challenges of telerehabilitation among two target populations defined as practicing PTs and the general outpatient population. Our research questions are as follows:

1. What is the attitude of practicing PTs toward telerehabilitation?
2. What is the attitude of the general outpatient population to a telerehabilitation?

It is our hope that information from this descriptive study will inform the development of a new virtual telerehabilitation platform to improve patients' experience.

Methods

To explore the current status, trends, and challenges of telerehabilitation, two target populations were defined: (1) physical therapists who are licensed and engaged in practice in the United States and (2) general outpatient population. Authors conducted two descriptive survey studies to gain a thorough understanding of telerehabilitation from both the therapist and patient perspectives. Two separate institutional review board (IRB) approvals were sought, one for each population studied.

Survey for Physical Therapists

A questionnaire utilizing quantitative and qualitative questions was designed using Qualtrics in order to explore the extent to which telerehabilitation is adopted by PTs in the United States, the platforms and devices that are being used, and challenges to telerehabilitation. The questionnaire involved 22 items on demographic background as well as

current trends and challenges. Approval as exempt status was granted through the University of North Georgia IRB #2020-108. A total number of 256 responses were received, and only 228 actually completed the full questionnaire.

Physical therapist participants were recruited from the US business data physical therapist list of licensed PTs. Inclusion criteria required participants to be licensed PTs practicing in the United States. An email with an anonymous survey link was sent to potential participants.

Participants were informed that the questionnaire was anonymous and all data would be reported in aggregate. No personal identifiable information would be collected. The approximate duration to answer the questionnaire was about 10 to 15 minutes. The survey provided participants an opportunity to describe their experiences with telerehabilitation. At the end of the survey, participants were thanked for their contribution.

Survey for General Orthopedic Outpatient Population

Participants for general outpatient survey were recruited by sharing an anonymous link to the survey through patient networks from the PTs. A similar survey design approach was followed for the outpatient population; however, a general outpatient population in physical therapy settings around the globe was targeted to investigate trends and challenges of telemedicine through the eyes of patients. The questionnaire involved 18 items. Again, the survey allowed participants to describe their telerehabilitation experiences.

A recruitment notice with information about the purpose of the study was shared with potential outpatient participants. The participants were informed that personal information and identifiers would not be collected and that the link to the survey was anonymous. The approximate duration to answer the questionnaire was about 5 to 10 minutes. At the end of the survey, participants were thanked for their contribution. Exempt status approval was granted through the University of North Georgia IRB #2020-116.

Results

Physical therapists (n = 228) from a variety of practice areas completed the survey. Participants in the PT survey were both male (26%) and female (72%) with 4 participants preferring not to answer. Physical therapist participants ranged in age from 25 to 70 years with nearly 50% of participants between 25 and 40 years of age. Participants in the PT survey practiced in the areas of outpatient orthopedics (53%), geriatrics (18%), neurorehabilitation (14%), acute care (10%), pediatrics (4%), and cardiopulmonary care (1%). Overall, participants (73%) reported increased use of telerehabilitation strategies during the COVID-19 pandemic. See Table 1 for details.

With regard to technology, about half of the participants reported use of apps in their practice of physical therapy. Interestingly, only 17% of the youngest participants in this study aged 20 to 25 years reported using apps in their practice. When exploring years of experience as a PT, 27% of PTs with less than 5 years of experience use apps in their practice. Physical therapists with 5 to less than 10 years of experience reported the highest frequency (60%) of utilizing apps. Approximately, half of other participants reported using apps

Table 1. Descriptive Characteristics of Physical Therapist Participants.

Survey 1: Physical therapist survey	
Total number of participants: 228	
Sex:	
Males: 26%	
Females: 72%	
Preferred not to answer: 2%	
Mean age in years:	
20-<25: 1	
25-<30: 12	
30-<35: 42	
35-<40: 43	
40-<45: 0	
45-<50: 30	
50-<55: 28	
55-<60: 25	
60-<65: 26	
65-<70: 21	
Total respondents: 228	
Areas of practice of participants:	
Outpatient orthopedics: 53%	
Geriatrics: 18%	
Neurorehabilitation: 14%	
Acute care: 10%	
Pediatrics: 4%	
Cardiopulmonary care: 1%	
Year of experience and use of apps in physical therapist practice:	
0-<5 years: 28% using; 72% not using	
5-<10 years: 48% using; 52% not using	
10-<15 years: 60% using; 40% not using	
15-<20 years: 54% using; 2% unsure; 44% not using	
20-<25 years: 44% using; 2% unsure; 54% not using	
25-<30 years: 57% using; 43% not using	
30-<35 years: 50% using; 50% not using	
Use of virtual visits—Increased use of telerehabilitation: 73%	
Daily: 40%	
Weekly: 36%	
Challenges associated with virtual care:	Preferred devices:
Sending exercise videos through multiple platforms: 31%	Desktop/laptop: 68%
Other: 30%	Cell phone: 25%
Teaching exercises on video calls: 22%	Tablet: 7%
Nonfriendly user experience: 10%	
Access to medical records: 4%	
Lack of marketing potentials: 2%	
Subscription fee: 2%	

in their practice of physical therapy. See Table 1 for details. Approximately 95% of all participants reported the use of home exercise programs in their practice in different formats such as apps (39%) and software (56%), which included YouTube, hardcopy, email, and other formats.

According to the survey results, PTs (97%) reported incorporating virtual visits into their practice on a daily (40%) or weekly (36%) basis. Moreover, 20% of participants reported that they produce educational content for patients. Surprisingly, more than half of the study participants (55%) reported not tracking patient adherence. Among those PTs who track patient adherence, methods for doing so included verbal communication, emails, number of logs in an app, and follow-up discussion in the next session.

With regard to the devices used in virtual rehabilitation sessions, desktops and laptops seem to be more popular among PTs (68%), followed by smartphones (25%) and tablets (7%). See Table 1 for details.

Physical therapist participants were also asked to identify challenges associated with telerehabilitation. Participants reported patient education on virtual exercises as well as sharing exercise and educational materials on multiple platforms as the most challenging issues with virtual care. Furthermore, technology illiteracy of patients has been another challenge reported by PTs in this study. See Table 3 for results.

Patient Results

Patients (n = 61) completed the patient survey. Participants in the patient study ranged in age between 20 and 70 years. Participants in the age group of 20 to less than 25 years comprised 30% of the participants. Moreover, patient participants included females (66%) and males (34%). Table 2 presents the descriptive characteristics of participants including their age distribution. More than half of this survey population stated that they live in suburban areas. Participants did not cite living in a rural, urban, or suburban community as a limitation to telerehabilitation access. The types of patient impairments included primarily orthopedic problems. See Table 2 for details.

The data from a 5-point Likert-type scale regarding attitudes toward the prerequisites of virtual care indicated that all the respondents had access to technology and internet and felt comfortable navigating mobile apps. Participants (75%) reported that they usually felt heard and understood when speaking to their caregiver through telerehabilitation portals. Moreover, respondents ranked 7 different concerns and demands regarding telerehabilitation. An overall score was computed by adding points for each item. Quality of care was reported to be the most critical concern, followed by privacy, and friendly user experiences. See Table 2 for details. Participants reported preferring laptops/computers (65%), cell phones (29%), and tablets (6%) for telerehabilitation visits. See Table 3 for comments from the patient perspective.

Table 2. Descriptive Characteristics of Patient Participants.

Survey 2: Patient survey
Total number of participants: 61
Sex:
Males: 34%
Females: 66%
Community setting:
Urban: 32%
Suburban: 53%
Rural: 15%
Age distribution of patient participants:
20-<25: 28%
25-<30: 15%
30-<35: 10%
35-<40: 8%
40-<45: 4%
45-<50: 6%
50-<55: 5%
55-<60: 7%
60-<65: 12%
65-<70: 5%
Preferred devices:
Desktop/laptop: 65%
Cell phone: 29%
Tablet: 6%
Concerns regarding virtual care:
Quality of care
Privacy
Friendly user experience
Follow-up patient's progress
Access to educational resources
Reimbursement
Encouragement to do exercises

Discussion

The physical therapists and patient participants in this study were all able to articulate personal experiences related to telerehabilitation. Participants were also able to identify challenges and opportunities related to personal experiences with telerehabilitation.

Telerehabilitation is a branch of telemedicine and refers to the delivery of rehabilitation services via information and communication services (15,16). Yet, full realization of telerehabilitation success is yet to be thoroughly achieved or realized. There remains a huge gap between the current virtual visits occurring now and the comprehensive definition of telerehabilitation. To bridge the gap that exists and achieve optimal telerehabilitation outcomes, we are in need of platforms that provide PTs and patients with the infrastructure needed to fulfill the various stages of telerehabilitation, from assessment to treatment and follow-up.

According to the PT survey, 55% of PTs do not follow up the progress of their patients. Follow-up strategies reported by others are mostly verbal and subjective in nature, which speaks to the importance and need for a standardized

Table 3. Patient and Physical Therapist Concerns With Telerehabilitation.

Advice from patients for telerehabilitation providers	Physical therapist comments about telerehabilitation
Be more personable.	It is more challenging to get patients to exercise where you can see them well.
Ensure the patient is heard and make every effort to accommodate needs in order to keep quality of care extremely high.	I am limited in my ability to perform mobility and neuromotor examinations and get feedback regarding quality of one's mobility and limitation.
Do not make it rushed. Show patients you care for them even if it is not face to face.	We do not have a private room to do telemedicine visits. It is one open gym, so the lack of privacy is an issue.
Your time is valuable and so is ours. Make the telemedicine session worth it.	Technical issues: Patient's ability to access Wi-Fi. Connectivity issues. Patient utilization of the technology.
They must be empathetic, and they must never forget they are treating human beings.	Assessing a patient is difficult without tablet/phone or person to move the device.
Make a strong effort to connect with patients, as they will feel more isolated over the screen.	Difficult to get elderly individual to perform. Hard to engage the kids/students sometimes.
Stay involved.	Visually impaired or hard of hearing makes communication more challenging.
Take your time to look at the whole person, not just your area of care.	Difficult to interface EPIC note/screen share to see them and website/app for HEP.
Be attentive to listening skills as well as the nonverbal [communication] that are important even during in-person appointments.	Few of my geriatric patients have the tech or the tech knowledge for video calls.
	Delay in internet access so cannot assess finer points of gait because internet skips.
	I send out exercise packets beforehand, so patients will have visual materials handy. It helps them understand exercises better.
	Diabetic foot care and telemedicine is a challenge.

Abbreviations: HEP, home exercise program.

approach to monitor patient's adherence to the established plan of care. According to a study by Martin et al, nonadherence proves to be a barrier to patient's well-being and can be as high as 70% among patients (17).

Increasing adoption of virtual care has proved challenging for both parties, PTs and patients, involved in giving and receiving information through telerehabilitation. The technology illiteracy of patient participants in this survey seemed to be a major setback according to PTs, and a user-friendly experience is among the top 3 demands of surveyed patients. Furthermore, an integrated all-in-one platform for uploading and sending educational information and exercise material to patients appears to be of significant importance according to PTs (52%) in this study. These PTs reported teaching exercises and sending these materials is challenging in the currently available platforms.

Less engagement of new graduate PTs (27%) with apps seems to be in contrast to typical inclination of younger populations toward new technologies and requires further study to investigate the possible explanations. We hypothesized that this group of PTs were busy honing their professional identity before embracing new apps in their practice (18).

While patients are longing for a deeper connection through the screen, PTs are struggling with technical difficulties (19,20). The stated challenges in remote physical therapy are valid and need to be addressed; however, it is advisable that PTs improve their verbal and nonverbal communication skills in order to cultivate trust in their patients. As technology becomes an inseparable part of our life, the fundamental elements of human connection gain more significance.

Soler-Gonzalez et al (21) suggest human connections are key to the promotion of health and prevention of illness. Internal constructs such as disease may deteriorate human connection. External constructs such as a pandemic may also lead to isolation. Health care professionals must develop their ability to create and sustain good human connections with patients whether in a telerehabilitation or face-to-face setting. Human connection and trust are the foundations on which the therapeutic alliance bond between health care practitioner and patient is built. This therapeutic alliance is a source of social and emotional support, which can be challenging to provide in the midst of a pandemic.

Research findings often drive innovation in an industry such as physical therapy. Turning to solutions, a new telerehabilitation platform for PTs named *PTcircle* is being developed to address the current challenges in virtual care. It is a web-based community and ecosystem seeking to fill the gap in current practice. This new platform ensures personalization by allowing providers to upload tailored educational and exercise videos for patients leading to better health outcomes derived from more patient engagement in the plan of care, thanks to a deeper therapist–patient bond, and loyalty. *PTcircle* may fill the gap in telerehabilitation needs and provide a necessary response to the emerging need

of more individualized care whether in a pandemic or not. Furthermore, providers may upload videos in a general library and grant access to the other members of the physical therapy community in order to promote collaboration. This dynamic ecosystem will benefit both therapists and patients by enhancing quality of care. It will help individuals and the profession grow and evolve.

To our best knowledge, AI has proved to be an accessible and relatively cost-effective solution to track patient adherence by providing them with real-time feedback when performing exercises. Motion trackers utilizing AI-powered can report reliable metrics regarding movements of patients and generate invaluable data for future research. This service is offered in *PTcircle* and sparks hope in the future of telerehabilitation, ensuring that remote care does not necessarily equal less quality care.

Strengths and Limitations

This study has several strengths. The survey was disseminated to a broad group of participants in the early phases of COVID-19. Two perspectives, those of PTs and patients, were represented in this study. Furthermore, the surveys reached 289 participants from the PT (228 responses) and general outpatient (61 responses) populations, providing us with thick, rich descriptions regarding telerehabilitation during the early phase of the COVID-19 pandemic.

There are some limitations as well. This study was conducted in the time of COVID where face-to-face meetings were prohibited at our institution and online virtual platforms such as Zoom and Skype were not funded at the time. Since this study occurred in the height of the COVID-19 pandemic, the survey method was chosen. Physical therapist participants were recruited from a list of licensed PTs. The patient population was invited to participate from the patient networks of the PT participants. We cannot be assured that all patient participants were indeed actual patients. However, from the stories shared with us in the survey, it appears all patient participants did have a previous physical therapy encounter. This situation is a limitation of this study. The patient survey indicated that all respondents had access to internet and electronic devices, which did not provide an accurate picture of the level of technology accessibility simply because those with no access to such technologies did not have the opportunity to take the survey in the first place. Having said that, cell phones are now available and popular even in some of the most remote and resource-poor environments (19).

Conclusion: Call to Action

The future in every arena of human life is automated, remote, and decentralized. In order to survive and thrive in this imminent future, the physical therapy profession faces no choice but to keep pace with new emergent technologies. We must devise innovative solutions to enhance the quality of care, which allows communities of experts and patients to interact in a virtual community that ensures excellence in patient care and education. New, novel platforms that embrace the therapeutic alliance between PT and patient are needed. Additionally, platforms focusing on community building among clinicians are needed to optimize patient care through educational information and sharing of ideas.

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