PERCEPTIONS ON THE USE OF TELEHEALTH

PHYSICAL THERAPISTS’ PERCEPTIONS ON THE USE OF TELEHEALTH IN PATIENT CARE

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Independent Research

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The Faculty of the Marieb College of Health and Human Services

Florida Gulf Coast University

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In Partial Fulfillment

of the Requirement for the Degree of

Doctor of Physical Therapy

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By

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Woodly Sineus

2019
PERCEPTIONS ON THE USE OF TELEHEALTH

APPROVAL SHEET

This independent research is submitted in partial fulfillment of the requirements for the degree of

Doctor of Physical Therapy

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Tyler Capellan

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Woodly Sineus

Approved: May, 2019

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Committee Chair

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The final copy of this independent research report has been examined by the signatories, and we find that both the content and the form meet acceptable presentation standards of scholarly work in the above-mentioned discipline.
PERCEPTIONS ON THE USE OF TELEHEALTH

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ABSTRACT

Introduction: The United States along with many other countries have been searching for ways to increase health care access for individuals living in remote areas, those lacking transportation, or those with mobility deficits. One way these governments have been trying to combat these issues is with the use of telehealth. Telehealth is the practice of providing health care using communication technology to individuals at a site separate from the clinician. Previous research on telehealth has focused primarily on its barriers to implementation. The purpose of this study was to explore the perception of telehealth amongst physical therapist and physical therapist assistants pertaining to its benefits. Methods: This study involved a cross-sectional exploratory study utilizing an anonymous online survey. The survey was distributed to all licensed physical therapists and physical therapist assistants in Florida via email. Results/Discussion: Surveys were completed by 310 physical therapists. While many physical therapists are familiar with telehealth, they reported a lack of experience using the technology. Respondents, on average, agreed with the 13 advantages that telehealth technologies provide. On the ease of use items, the average response for feasibility in the participants’ setting was below agree, but they agreed to being willing to collaborate with a specialist. The participant’s sex and years employed did not produce significant relationships with their perceptions of the advantages. A significant negative correlation was found between hours of patient care and three of the survey (advantage) items. Conclusion: More research must be conducted exposing rehabilitation professionals to telehealth technology so they can further develop their opinions on its benefits. The lack of responses from physical therapist assistants limited the understanding of the perspectives of potential users of the technology.
INTRODUCTION

In the United States, the healthcare system is experiencing a variety of challenges that need to be resolved. One major issue is the lack of healthcare professionals needed to accommodate the aging baby boom population. Another issue is the lack of healthcare access for individuals living in rural areas. To resolve these issues, innovative approaches to healthcare are being developed and tested for potential use. One of the emerging practices is telehealth.

Telehealth can be beneficial to the healthcare system because it allows healthcare professionals to educate and to provide services and treatments for people with geographic barriers. Telehealth was first introduced to Americans in a 1924 newspaper article featuring an image of a physician observing a patient using a radio screen. Then in 1968, the first beta telemedicine program was used with health care providers from Massachusetts General Hospital and patients from the Medical Station at Logan International Airport. Telehealth has been researched for decades now, but there continues to be skepticism amongst the community about its feasibility. Studies for telehealth and its applications in rehabilitation settings, to date, have been primarily based around the barriers that prevent it from being widely accepted. The purpose of this study was to analyze physical therapists’ perceptions about telehealth relating to the benefits of its use.

LITERATURE REVIEW

Terminology

One issue care delivery using telehealth faces is that there is no universally accepted definition of telehealth. Many people use it synonymously with telemedicine when, in actuality,
these are two separate terms. According to the Agency for Healthcare Administration (2016), “Telemedicine is a generic term for the remote delivery of healthcare using electronic information and telecommunications technologies” (p.10). In contrast, the AHCA defines telehealth as “The practice of health care delivery by a practitioner who is located at a site other than the site where a recipient is located for evaluation, diagnosis, or treatment.”

Regardless of the different sources of definition, they all share the same concept, which is that telehealth is a method of providing healthcare to patients using communicative technology.

Telehealth is not actually a type of service provided but is a means or technique for delivering health care. Telehealth is essentially a broad term that encompasses a variety of different approaches such as telemonitoring, virtual reality, and mobile health (mHealth). Through telehealth clinicians can potentially reduce medical cost, improve treatment outcomes, and decrease barriers found in physical therapy.

Another common term associated with telehealth is telerehabilitation. Telerehabilitation or telerehab is known as the process of providing rehabilitation services via communication technology. This term is similar to telehealth but encompasses a wide variety of services such as prevention, supervision, monitoring, consultations, and assessments. Telerehab is most commonly used with rehabilitation occupations such as occupational therapy, physical therapy, and speech therapy whereas telehealth is used generally by all health professions. Regardless of the terminology preference, the use of communication technologies in health care has quickly expanded. There have been many types of telehealth technologies developed over the years such as telemonitoring or mobile health, and each one has their unique advantages.
Synchronous Telehealth

Synchronous telehealth also known as live video telehealth has become an efficient and popular practice in health care. Synchronous technology involves real time care being delivered between a provider and a patient at home or work using telecommunication technology. This type of technology enables immediate access to health services and usually costs less than standard clinic or hospital visits. Patients can therefore save costs from transportation and receive convenient care from the comfort of their home.6

Asynchronous Telehealth

Unlike synchronous telehealth, asynchronous telehealth is not conducted in real-time. A type of asynchronous telehealth is store-and-forward. Store-and-forward captures data and stores it to be used later. This needs a secure browser or encrypted email, and remote patient monitoring devices to store a patient’s health information that transfers it directly to a practitioner.7 Asynchronous telehealth works for patients who need to continue making progress and don’t require immediate interaction with their clinician. Clinicians can review the data sent to them on their own time and provide any feedback through messages.

Telemonitoring

Telemonitoring is a technique using non-invasive, remote patient monitoring to provide care for individuals with chronic conditions. It involves the use of telecommunication devices (e.g. hand-held technologies, intelligent sensors, and monitoring devices) for the digital transmission of vital signs, glucose levels, and other physiological information from the patient’s home to the clinician.4 This approach allows for physical therapists and other healthcare professionals to have on-demand communication with the patient and gives the
patient the resources they need to sustain a healthy lifestyle. In a study conducted on the effect of telemonitoring on diabetes management, researchers observed an 82% reduction in outpatient visits for their test group. There was a noticeable improvement in the ability of patients, using telemonitoring, to maintain a healthy lifestyle compared to the control group who did not have access to the program.

In another study, which focused on the effects of telemonitoring on persons with chronic heart failure, the intervention group’s risk of heart failure-related hospitalization was significantly lower than the control group. Both studies have shown a tremendous improvement in the ability of patients to sustain long-term health and to reduce the chances of ending up in the hospital. Telemonitoring allows for supervision of a patient so that clinicians can ensure that he or she is continuing the with plan of care that was developed. Telemonitoring could be very beneficial for therapists by enabling them to track physiological changes and disease progression of their patients living in remote areas or dealing with transportation issues via synchronous or asynchronous technology.

**Virtual Reality**

Another way that researchers have used telehealth is by providing therapy through virtual reality. Using a computer-generated virtual environment, therapists can have patients perform everyday activities while being heavily distracted. Often patients lose focus while doing certain exercises. Many of these virtual reality programs are fun and interactive, which make patients more likely to perform them. Schmitt performed a study on the effects of virtual reality as an adjunctive analgesic technique for pediatric burn patients undergoing physical therapy. In the study, participants who used the virtual reality (VR) program scored
significantly lower on cognitive pain, affective pain, and sensory pain assessments than those who did not participate in VR activities. The virtual reality program demonstrated a lessening of pain in participants and could potentially be used by physical therapists to improve patient adherence of exercises that may be painful.

The potential of virtual reality therapy was also analyzed through a study on its effect on paretic upper limbs after stroke. Virtual reality was tested using tactile feedback to provide sensory information during object manipulation. Half of the participants in the study wore a device called a Cyberglove that could measure range of motion and speed while they performed virtual reality activities. Both groups showed signs of improvement in all tests after the treatment however, the differences in the scores were very minimal. Therefore, a conclusive answer could not be made on how effective the use of a Cyberglove was as a virtual reality therapy. Although, due to the ability to facilitate massed repetition, virtual reality can be helpful for patients who have suffered from a stroke or spinal cord injury and exhibit weakness or lack of function of a specific limb or limbs. Further research must be done to validate the findings.

**Mobile Health (mHealth)**

Mobile health, also known as mHealth, is another approach to telehealth. Mobile health uses smart phone technology to provide education and health services to patients. Cafazzo, Casselman, Hamming, Katzman, & Palmert, performed a study on the self-management of Type 1 diabetes with the help of an mHealth App. The results of the research study showed a 50% increase in the frequency of glucose measurements, and an average of eight rewards were distributed to the participants. Cafazzo et al. also showed that patients paid more attention
to their glucose levels with the help of this app, and they received positive reinforcement with rewards if they continued to be consistent. The mobile app not only helped motivate the participants but enhanced their ability to self-manage their condition.

Yu, Parmanto, Dicianno, & Pramana’s research on the accessibility of mHealth apps for individuals with Spina Bifida provided more information on mobile health. A smartphone app called the iMHere system provided patients with a clinician portal through which they could communicate with their health care provider. The app also provided reminders to take medications and other self-management treatments. The iMHere app allowed clinicians to monitor patients’ conditions and provide new treatment plans via a cellular device. The participants really loved using the app and gave it an average of 6.52 on a seven-point Likert scale for usability. This study was a qualitative study and observed the satisfaction of the individuals using the app. Many of the participants were satisfied with the app and stated they would use it, but there were a few issues identified. Some of the complaints included high number of steps required to accomplish a task in the app, lack of screen space, and a lack of audio feedback. These issues must all be addressed for iMHere app to be an effective treatment method in the healthcare field.

In a more recent study, a mobile health app was tested on its effectiveness of treating patients post lumbar surgery. The mobile app was compared against a control group that only received basic recommendations from their surgeon and simple instructions to strengthen their back muscles. At 24 months the mobile app group demonstrated improvement on the Oswestry Disability index by an average of 30.43 points whereas the control group improved by only an
average of 23.41. These participants were able to use the mobile health treatments to not only improve function but their overall quality of life.

**Remote Healthcare Delivery**

One of the biggest challenges in the healthcare system is providing access to healthcare for individuals living in remote areas. The life expectancy for people living in rural areas is around four years shorter compared to individuals living in urban areas. This may be credited to the inconsistent use of health services and poor access to health care. As a result, several studies have been conducted exploring the feasibility of providing remote health care to individuals living in remote areas through telehealth.\(^{15}\)

One study analyzed the efficacy of using a telehealth program to provide consultation to rural hospitals in New Mexico without comprehensive stroke care. The program decreased patient health care cost by $4,241 per patient and decreased patient transfers to urban hospitals from 85% to 5%.\(^{16}\) Telehealth has the potential to not only improve quality of care but also decrease health care spending. Using telecommunication technology, healthcare professionals can increase health care access to individuals struggling with immobility and transportation issues.\(^{16}\)

**Telehealth in Other Professions**

Telehealth has been a controversial topic in the healthcare field. Various professions such as physicians and nurses have been involved in studies analyzing their views on the new practice and its potential effects. In one qualitative study assessing the views of physicians on telehealth, the participants identified many benefits and risks. In the study, 83% reported not feeling like they could accurately assess a patient via telehealth technology. Out of the same
group of physicians, 100% stated that the technology could reduce patient’s travel times. The physicians were worried about the quality of telehealth care but felt that telehealth could be cost-efficient for their practice.

In another study analyzing the perception of telehealth amongst nurses in Brazil, they also expressed some concerns. One of the issues mentioned by the nurses was the difficulty to identify nonverbal communication through telehealth. Nonverbal signals such as eye contact, facial expression, and posture are all important cues that nurses need to identify to effectively manage their patients. Although concerned about nonverbal communication, the same nurses believed that telehealth had helped them care for patients from various countries. The lack of face to face patient care can create some issues in health care delivery in telehealth, but the potential to increase access to care for many rural individuals can outweigh the disadvantages.

Physical Therapy Applications of Telehealth

One study conducted with veterans was the Rural Veterans TeleRehabilitation Initiative Technology (RVTRI). This study consisted of 26 veterans who used synchronous live video technology to receive treatments, with 80.8% of them having a musculoskeletal diagnosis and 19.2% having neurological diagnoses. The researchers found significant improvements in physical function, functional independence, & cognitive function. The Functional Independence Measure (FIM) score of the participants increased by 7 points while the 2-Minute Walk Test score increased by 73. All the patients reported having a “satisfied” or “very satisfied” experience, and the Veterans Health Administration saved an average of $1,151.50 per veteran in travel reimbursement.
Another study focused on the use of telehealth to manage patients with Multiple Sclerosis (MS). The Department of Veterans’ Affairs implemented the Home Automated Telemanagement (HAT) system to provide physical telerehabilitation intervention while focusing on an individualized exercise plan. The HAT system utilized clinicians who would provide exercises and then analyze the patients’ results, similar to store and forward technology. The patients were provided a list of exercises as well as audio and video prompts of each exercise. The results of the study showed significant improvements when assessed after 12 weeks. The mean time for patients to walk 25 feet improved from 13.8 to 11.3 seconds, the six minutes mean distance walked by patients increased from 683.3 to 806.5 feet, and the Berg Balance Score improved from 38.8 to 43.1.

In a similar study, researchers designed a randomized study to explore the feasibility of a telerehab program for individuals with gait impairments secondary to Multiple Sclerosis. In the study, the control group received an unsupervised home exercises program, another group received physical therapy through telerehab, and a third group received in-person physical therapy services. Data showed that there was no significant difference in outcomes for the group who received in-person physical therapy and the group that received treatment through telerehab. Functional Gait assessment scores increased an average of 4 for the telerehab group and 3.6 for the in-person physical therapy group, and berg balance scores increased an average of 2.1 for the telerehab group and 2.3 for the in-person physical therapy group. The comparable results of this study showed that telerehab could potentially be an alternative treatment method for Multiple Sclerosis.
Telerehab has also been tested in patients post total joint replacement. One study examined the feasibility of using telerehab interventions to treat patients post total knee repair. One group received treatment from a mobile app and web portal, while the control group received conventional direct physical therapy treatment. Both groups received the same 8-week rehabilitation program that started on the day after discharge (7-10 days after surgery). There was found to be no statistical difference between both groups in timed up and go scores and knee range of motion. However, the Knee Osteoarthritis Outcome scale scores were significantly higher for the telerehab group at 3 and 6 months. At 3 months the telerehab group pain score improved from 34 to 95.5, Activities of Daily living (ADL) from 34 to 93, and Quality of life from 13 to 81. Compared to the control group which pain scores changed from 47 to 86, ADL from 47 to 87, and Quality of life from 25 to 56. The results of this study showed that not only can telerehab help improve functional impairments but also an individual’s overall wellbeing.

**Barriers to Telehealth**

Although Telehealth can potentially provide many advantages to health care, there are a few barriers that must be resolved before it can become a common practice. In a study by Acharya and Rai (2016), 47% of the participants had technical issues with telehealth. Not many individuals, especially the elderly population, are technically savvy. A physical therapist using telehealth to provide health services may have to deal with connection problems, application errors, and the lack of technical knowledge by patients. This can then lead to longer treatment sessions, and possibly less efficient health care.
Another barrier to telehealth is the concern over confidentiality. In the same study by Acharya and Rai (2016)\textsuperscript{23}, 31% of participants also felt uncomfortable sharing health information via telecommunication devices. An individual health record contains very confidential information that can affect their life. Patients and therapists want to ensure that private information can be safely transmitted without the likelihood of a security breach. Confidentiality is just one of a few barriers of telehealth that must be overcome before it becomes common practice.\textsuperscript{23}

**APTA and Telehealth**

As the population grows, so does the demand to provide healthcare. It is important to be able to provide fast and efficient care to patients to maximize time and minimize costs. Telehealth is the technology that will allow patients to receive flexible care that is less costly and accommodates patients’ busier lifestyles.\textsuperscript{24} The American Physical Therapy Association\textsuperscript{24} states that telehealth is not meant to replace traditional healthcare; it will be a supplement that allows physical therapists to manage patients from home, provide quicker screens, assessments, and referrals, as well as assist in consultation between providers. As time progresses it only seems more necessary to use telehealth to reach out to as many patients as possible in order to provide the best care possible.

In 2016, House Bill 7087 was passed as a law in Florida during the state’s Legislative session. Governor Rick Scott signed the law and it became effective on July 1, 2016. The law directed the state’s Agency for Health Care Administration (AHCA), the Office of Insurance Regulation (OIR), and the Department of Health (DOH) to collaboratively survey Florida’s licensed professionals and payers of health care services on the status and scope of telehealth
activities in the state. The survey identified the types of telehealth services in the state, the extent to which telehealth is used by practitioners, and the estimated healthcare costs and savings. Some of the questions in the survey asked practitioners if they used telehealth services, in what settings they used them, the types of telehealth services they used, and how much revenue they estimated telehealth created for their business.

The results of the survey provided good understanding of the status and barriers of telehealth in Florida. Lack of health insurance reimbursement was the highest reported obstacle by the participants. The inability to determine the return on investment has made many practitioners hesitant towards telehealth. This concern is supported by knowledge that only 43% of health plans that responded to the AHCA survey reimburse for telehealth.

Clinicians were also concerned about the lack of funding for telehealth technology. Many of these new telehealth technologies can be costly so finding sources of funding or making cost effective technology can potentially make more clinicians open to telehealth. Although there were many concerns expressed in the survey, there were still many clinicians who reported a lack of knowledge about telehealth and wanted to know more about telehealth services. More awareness and education about telehealth is needed before clinicians can fully determine their stance on this emerging practice. Results from the Florida Report on Telehealth Utilization and Accessibility can be found at www.ahca.myflorida.com/SCHS/telehealth/docs/telehealth_report_final.pdf.

The new law also established a Telehealth Advisory Council that was responsible for reviewing research findings and making recommendations to the Governor and the Legislature. The Telehealth Advisory Council worked with the AHCA, DOH, and OIR to assess the current
telehealth landscape and to spread awareness of the emerging practice. This study helped
collect follow-up data to the DOH’s 2017 telehealth survey. However, the questions asked on
the survey focused specifically on the benefits of telehealth.

Summary

Telehealth has been around since the early 1900s, and much advancement has been
made in the field. However, not all aspects of telehealth have been thoroughly researched, and
there are still many areas of telehealth that have yet to be explored. More research can be
done on the financial value of telehealth, the perceptions of health professionals, and potential
benefits. Cultural and psychosocial variables, such as how people perceive technology based on
age or sex, should also be studied pertaining to telehealth. Researchers must analyze how well
health professionals understand telehealth and address any concerns that may impede its
implementation. Those who utilize telehealth for a living can be studied specifically for their
firsthand experience and perceptions of telehealth as well. They can provide input that allows
for innovation and improvement of the technology. Understanding telehealth’s potential
benefits and barriers can lead to further advancements in the healthcare system.

The purpose of this study was to explore the perceived benefits of telehealth and how it
can improve the practice of physical therapy. The goal of this research was to answer the
research questions, “What are the perceived benefits of the use of telehealth by physical
therapists and physical therapist assistants?” and “Are there relationships between
demographic characteristics of a physical therapist or physical therapist assistant and their
perception of benefits of the use of telehealth?”
METHODS

Research Design

This research was a cross-sectional exploratory study that examined therapists’ perceptions of the benefits of using telehealth as well as the ease of the use of telehealth technologies. Data were collected through an anonymous online survey based on previous surveys that assessed the acceptance of telehealth in other healthcare fields.

Subjects

Institutional Review Board (IRB) approval was granted in the Spring of 2018 prior to subject identification and recruitment. Inclusion criteria for the study was physical therapists and physical therapist assistants who were licensed in Florida practicing in any setting. The questions on the survey differed slightly for the physical therapists (PTs) and physical therapist assistants (PTAs) to be consistent with the scope of practice for each discipline. Exclusion criteria for the study was physical therapists and physical therapist assistants who were not currently licensed as well as physical therapy technicians.

Recruitment Methods

The survey was distributed to over 14,000 active physical therapists in the state of Florida directly via email addresses obtained from the Florida Board of Physical Therapy website. The Director of Clinical Education of the Doctor of Physical Therapy Program at Florida Gulf Coast University also distributed the survey to key clinical contacts for further distribution to physical therapists and physical therapist assistants. The target sample size was 300 participants for the study. The survey remained open throughout the Fall semester of 2018 and the first half of the Spring semester (2019). Follow-up emails were distributed at weeks two
and four, reminding prospective participants of the survey and thanking those who had already completed it. Shortly after the second email reminder, the 300-participant goal had been reached.

**Informed Consent**

Prior to beginning the survey, participants were educated in the risks and benefits of their participation via written informed consent. The participants provided their consent by checking a box stating they had read and agreed to the terms of the survey and approved of any risks and/or benefits they may experience through participation. No identifiable information was gathered from the participants and all responses remained anonymous.

**Survey Instrument & Pilot Testing**

The survey tool was developed with two focuses. First, items focused on the demographics of the individual (age, sex, education, years of practice, practice setting, telehealth experience, and familiarity with telehealth technologies). Secondly, there were items that explored the perceived benefits that PTs and PTAs had related to the use of telehealth. The survey began with a description of the risks and benefits and a choice to provide online consent. Those who agreed proceeded to the introduction of the survey which defined the following key terms: telehealth, synchronous, asynchronous, telemonitoring, and mobile health for those not familiar with telehealth. Then, perceptions were gathered from responses to questions utilizing a four-point scale that included; Strongly Disagree, Disagree, Agree, and Strongly Agree. The questions inquired about how useful participants believed telehealth would be in their setting, if they believed telehealth would increase their efficiency, how willing they were to utilizing telehealth themselves, and if they perceived that telehealth would be a cost-
effective option in their setting. One open-ended question was included to gather specific comments from the physical therapists and physical therapist assistants about specific ways in which telehealth could be applied to their setting. The survey took no more than 10 minutes to complete.

Pilot testing of the survey was conducted on six licensed physical therapists and survey development experts who gave their permission to review the survey for understanding, readability, and ease of use. The survey operated as expected and was deemed ready for distribution.

Data Collection

Those who chose to participate in the survey were redirected to Checkbox™ once they clicked the link in their email. Five weeks after distribution, 310 participants completed the survey. The responses were exported from Checkbox™ and placed into an excel file for storage. An unedited version of this file was distributed to the supervising faculty for secure storage of the original data set in the locked cabinet of Dr. Ellen Donald. Three years following the completion of the study, all stored data will be permanently erased from drives containing it.

Data Analysis

The responses collected through Checkbox™ were imported into SPSS. Frequency, percentages, range, means, and standard deviations, as appropriate, were generated for the participants’ demographic items as well as their perceived advantages and ease of use items. The descriptive statistics for the advantages of telehealth items were utilized to answer the first research question: “What are the perceived benefits of telehealth?” And a Spearman’s Rho correlation was used to determine if the clinicians’ demographic data were correlated to their
perceptions of telehealth. These analyses were performed to answer the second research question: “Are there relationships between demographics and perceptions of telehealth?” The open-ended question allowed for elaboration by the participants on how telehealth could benefit their clinical setting.

RESULTS

Demographics

Of the 310 responses collected, 310 were from licensed physical therapists and none were licensed physical therapist assistants. Thirty of the 310 participants were not employed at the time of the survey, which excluded them from further analysis. One participant was excluded for reporting an age of 18 years with five years’ experience, which is not consistent with licensing laws and deemed an error. 189 (67.74%) of the participants were female and the remaining 90 (32.26%) were male. The ages of the participants ranged from 26 to 80 years old, the mean age of the participants was 47.70 years old (SD)=11.80 (Table 1).

Table 1. Descriptive Statistics Examining Age, Years Employed, and Hours of Patient Care of the Participants.

<table>
<thead>
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<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Median</th>
<th>Mode</th>
<th>Std. Deviation</th>
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<td>Age</td>
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<td>47.70</td>
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<td>23.00</td>
<td>20</td>
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<tr>
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<td>Valid N (listwise)</td>
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<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Table 2 exhibits the highest degree earned by the participants: Most participants (48.7%) reported the DPT degree was their highest degree earned, followed by Master’s degree (25.8%), Bachelor’s (17.9%), and Academic Doctorate (6.5%). “Other” was chosen by the remaining 1.2% to specify: B.S. Orthotist, Doctor of Chiropractic, and certificate degree.
(82.4%) of the physical therapists reported having no ABPTS certifications. Table 3 displays the certifications of the remaining participants.

**Table 2.** Descriptive Statistics Examining Highest Degree by Participants.

<table>
<thead>
<tr>
<th>Degree</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
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</thead>
<tbody>
<tr>
<td>Valid</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academic Doctorate (PhD, EdD)</td>
<td>18</td>
<td>6.5</td>
<td>6.5</td>
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<td>.4</td>
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<tr>
<td>DC, Doctor of Chiropractic/ BS, PT</td>
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<td>.4</td>
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<td>DPT</td>
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<tr>
<td>Total</td>
<td>279</td>
<td>100.0</td>
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**Table 3.** ABPTS Certifications Obtained by Participants.

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>230</td>
<td>82.4</td>
<td>82.4</td>
<td>82.4</td>
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<td>Geriatrics</td>
<td>6</td>
<td>2.2</td>
<td>2.2</td>
<td>84.6</td>
</tr>
<tr>
<td>Neurology</td>
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<td>2.2</td>
<td>86.7</td>
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<tr>
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<td>9.0</td>
<td>95.7</td>
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<tr>
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<td>.4</td>
<td>96.1</td>
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<td>Pediatrics</td>
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<td>.7</td>
<td>96.8</td>
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<td>4</td>
<td>1.4</td>
<td>1.4</td>
<td>98.2</td>
</tr>
<tr>
<td>Sports, Neurology</td>
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<td>.7</td>
<td>.7</td>
<td>98.9</td>
</tr>
<tr>
<td>Sports, Orthopaedics</td>
<td>2</td>
<td>.7</td>
<td>.7</td>
<td>99.6</td>
</tr>
<tr>
<td>Women’s Health</td>
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<td>.4</td>
<td>.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>279</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Participant’s years employed as a licensed physical therapist and hours of patient care per week ranged from minimum values of zero to maximum values of 50 years and 80 hours respectively. The mean years employed by the participants was 21.73 (SD)=12.19, and the mean hours of patient care per week was 29.18 (SD)=16.24 (see Table 1).
When reporting their familiarity with telehealth, a majority (64.16%) either agreed or strongly agreed they had heard of the technology, while the remainder (35.84%) disagreed or strongly disagreed with familiarity (Figure 1). Figure 2 demonstrates that 89.61% of the participants reported low or very low experience utilizing telehealth technology. Table 4 illustrates the descriptive statistics for the responses collected for all 15 items. The following are the results for the perceptions of each section individually.

Figure 1. Participant’s Level of Familiarity with Telehealth Technology.
Perceived Advantages of Telehealth

There were 13 items that created the “advantages of telehealth” portion of the survey. The first two items discussed the cost advantages of telehealth. When asked if telehealth could help reduce transportation costs and overall costs for patients, a majority of respondents either agreed or strongly agreed; 92.47% and 81.36% respectively (Figure 3 and Figure 4). Next, the participants were asked if telehealth could save clinicians’ time when caring for patients. Over half (67.02%) of the respondents believed that telehealth could help save clinicians’ time (Figure 5). More respondents (88.89%) agreed that telehealth can improve the time it takes to provide quality care than those who disagreed (Figure 6).
Figure 3. Participants’ Perceptions of Telehealth’s Effect on Transportation Costs.

Figure 4. Participants’ Perceptions of Telehealth’s Effect on Cost of Patient Care.
**Figure 5.** Participants’ Perceptions of Telehealth’s Effect on Clinicians’ Time.

**Figure 6.** Participants’ Perceptions of Telehealth’s Effect on Timely Healthcare.
Several items inquired about the respondents’ perceptions regarding the improvement in quality of care and patient experiences. When asked if telehealth could contribute to quality healthcare, 77.42% of the respondents agreed and 22.58% disagreed. Next, they were asked if telehealth could improve patient outcomes which was agreed upon by 73.47%. When the participants were asked if telehealth could reduce the cancellation rates of patients, a slight increase in the disagree and strongly disagree responses was noted (26.53%). Lastly, it was asked if telehealth could be an acceptable adjunct to face to face care. Only 9.67% of respondents disagreed or strongly disagreed that telehealth could be an adjunct to traditional care, 90.33% perceived it could be.

The final group of items in the advantages section pertained to telehealth’s possible effect on the accessibility of healthcare by patients and the accessibility of patients by clinicians. First, participants provided their perception on whether telehealth could improve patient access to healthcare. Ninety-one percent (91.04%) agreed or strongly agreed that telehealth could improve access. The participants were then asked more specifically if telehealth could increase the patient access to specialists, where 87.45% of the respondents agreed to this sentiment. Participants were then asked if they believed telehealth could provide access to healthcare for patients living in remote regions of the country. It was believed by 91.04% that telehealth could help to increase access to healthcare in these underserved areas. Next, participants were asked if telehealth could provide clinicians with immediate access to patient information, 87.82% of the respondents agreed that it could with 12.18% stating they believed it couldn’t. Finally, the participants were asked if telehealth could increase their ability
to monitor patient adherence to home exercise programs. Eighty-five (85.31%) of the respondents agreed that telehealth would improve monitoring of home exercise programs.

**Ease of Use**

In the ease of use portion of the survey, there were two items in which the participants were asked about their comfort personally utilizing the technology. The first item stated “with proper training, would telehealth be feasible in the participant’s setting?” Of the 279 participants, 62.01% agreed or strongly agreed with telehealth having a place within their patient population however, a larger percentage disagreed or strongly disagreed than the previous items (37.99%) (Figure 7). Lastly, the respondents were asked if they would appreciate the opportunity to collaborate with specialists via telehealth. Seventy-eight percent (78.85%) of the respondents reported that they were willing to and would appreciate the chance to work with specialist via telehealth technology (Figure 8).

![Figure 7. Participants’ Perceptions of the Feasibility of Telehealth in their Clinical Setting.](image-url)
Figure 8. Participants’ Willingness to Collaborate with a Specialist via Telehealth.
Table 4. Descriptive Statistics for Benefits of Telehealth

<table>
<thead>
<tr>
<th>Benefit</th>
<th>N</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport Cost</td>
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<td>1</td>
<td>4</td>
<td>3.26</td>
<td>0.709</td>
</tr>
<tr>
<td>Patient Care Cost</td>
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<td>4</td>
<td>3.02</td>
<td>0.734</td>
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<tr>
<td>Save Clinicians’ Time</td>
<td>279</td>
<td>1</td>
<td>4</td>
<td>2.76</td>
<td>0.732</td>
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<tr>
<td>Timely Healthcare Delivery</td>
<td>279</td>
<td>1</td>
<td>4</td>
<td>3.06</td>
<td>0.626</td>
</tr>
<tr>
<td>Contributes to Quality Care</td>
<td>279</td>
<td>1</td>
<td>4</td>
<td>2.90</td>
<td>0.800</td>
</tr>
<tr>
<td>Improve Outcomes</td>
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<td>4</td>
<td>2.83</td>
<td>0.742</td>
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<tr>
<td>Cancellation Rate</td>
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<td>Access to Healthcare</td>
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<td>4</td>
<td>3.22</td>
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<tr>
<td>Access to Specialists</td>
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<td>4</td>
<td>3.13</td>
<td>0.711</td>
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<tr>
<td>Access to Remote Regions</td>
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<td>4</td>
<td>3.23</td>
<td>0.763</td>
</tr>
<tr>
<td>Access to Patient Info</td>
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<td>4</td>
<td>3.10</td>
<td>0.692</td>
</tr>
<tr>
<td>Adjunct to Face-to-Face</td>
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<td>4</td>
<td>3.19</td>
<td>0.712</td>
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<tr>
<td>Monitor Adherence to HEP</td>
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<td>1</td>
<td>4</td>
<td>3.11</td>
<td>0.753</td>
</tr>
<tr>
<td>Feasible in my Setting</td>
<td>279</td>
<td>1</td>
<td>4</td>
<td>2.76</td>
<td>0.912</td>
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<tr>
<td>Willingness to Collaborate</td>
<td>279</td>
<td>1</td>
<td>4</td>
<td>3.01</td>
<td>0.791</td>
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</tbody>
</table>

Correlations

A Spearman Rho correlation was used to assess the relationship between the participants’ demographic data and responses to the 15 perception items. Table 5 illustrates the results of the analysis and relationships between the data. Significant relationships are represented by the highlighted boxes. Statistically significant relationships were found between
the number of hours the therapist provided patient care and 3 of the perception items. Small, negative correlations were found between hours of care and telehealth improving patient access to healthcare, improving access to specialists and improving PTs access to patient information, respectively.

**Table 5. Correlation Between Demographics and Telehealth Benefits.**

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Age</th>
<th>Years Employed</th>
<th>Hours of PT Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport Costs</td>
<td>.058</td>
<td>.078</td>
<td>-.103</td>
</tr>
<tr>
<td>Patient Care Cost</td>
<td>.084</td>
<td>.093</td>
<td>-.074</td>
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<tr>
<td>Save Clinicians’ Time</td>
<td>.025</td>
<td>-.011</td>
<td>-.049</td>
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<tr>
<td>Timely Healthcare Delivery</td>
<td>-.00018</td>
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<td>-.055</td>
</tr>
<tr>
<td>Contributes to Quality Care</td>
<td>.031</td>
<td>.030</td>
<td>-.034</td>
</tr>
<tr>
<td>Improve Outcomes</td>
<td>.014</td>
<td>.009</td>
<td>-.050</td>
</tr>
<tr>
<td>Cancellation Rate</td>
<td>.014</td>
<td>-.0169</td>
<td>-.032</td>
</tr>
<tr>
<td>Access to Healthcare</td>
<td>-.039</td>
<td>-.052</td>
<td>-.171** (0.004)</td>
</tr>
<tr>
<td>Access to Specialists</td>
<td>-.022</td>
<td>-.023</td>
<td>-.158** (0.008)</td>
</tr>
<tr>
<td>Access to Remote Regions</td>
<td>.081</td>
<td>.092</td>
<td>-.053</td>
</tr>
<tr>
<td>Access to Patient Info</td>
<td>.035</td>
<td>.067</td>
<td>-.135** (0.024)</td>
</tr>
<tr>
<td>Adjunct to Face-to-Face</td>
<td>.038</td>
<td>.046</td>
<td>-.099</td>
</tr>
<tr>
<td>Monitor Adherence to HEP</td>
<td>.097</td>
<td>.078</td>
<td>-.097</td>
</tr>
<tr>
<td>Feasible in my Setting</td>
<td>.075</td>
<td>.063</td>
<td>-.024</td>
</tr>
<tr>
<td>Willingness to Collaborate with Specialists</td>
<td>-.057</td>
<td>-.036</td>
<td>.040</td>
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</table>
DISCUSSION

The purpose of this study was to analyze the perceived benefits of telehealth by physical therapists and physical therapist assistants. This study was created as an adjunct to an earlier study that emphasized the barriers to the use of telehealth, and explored the advantages in order to obtain a comprehensive understanding of physical therapists’ and physical therapist assistants’ perceptions of telehealth. The results of the survey were generally positive when assessing the perception of telehealth, and demonstrated that a vast majority of respondents responded “agree” or “strongly agree” to each of the benefit items.

The first objective was to identify what the perceived benefits of telehealth were amongst physical therapist. The perceived advantages with the highest mean (on a four-point scale) were reducing transportation costs (3.26), increasing access to remote regions (3.23), improving access to healthcare (3.22), and being an appropriate adjunct to face-to-face care (3.19). The common theme of these four advantages are that telehealth eases the burden of travel on the patients. With less costly transportation and increased access to care, a physical therapist who utilizes telehealth as a supplementary tool to traditional care may help reduce their patients’ barriers to receiving efficient care. Review of the responses to the open-ended question indicated that many respondents felt that the access that telehealth provided and the ability to communicate with patients to answer questions were important benefits. These responses also agree with the report published by the AHCA\textsuperscript{1} that found patient convenience and care coordination to be the two highest benefits of telehealth.

The four advantages that had a mean below three (on a four-point scale) were improving quality (2.90), reducing cancellation rates (2.88), improving patient outcomes (2.83),
and saving clinicians’ time (2.76). The commonality between three of the four items is that telehealth leads to better outcomes and care for the patient. One potential reason for the lower mean of these items may have been due to the wording of the question. It may have been implied that telehealth alone would be used to “provide quality care” or “improve patient outcomes.” It is understandable that physical therapists are weary of quality of care telehealth provides on its own. The lower mean response for saving clinicians’ time, as compared to other items, could be related to reported low level of experience with telehealth. Very few respondents reported having experience with telehealth therefore, lack of firsthand experience may explain why they believe their time with the technology wouldn’t be improved. Further research may help better understand these perceptions and the underlying reason for these perceptions of telehealth.

The second research question pertained to the relationships of demographics and the perceptions of telehealth. The first demographic data assessed was age. The responses received were from a wide range of participants regarding age, 26-80 years old. This provided feedback from multiple generations of physical therapists and allowed the researchers to explore if age played a role in how telehealth technology was perceived. None of the items had statistically significant relationships to age. The data indicates that the perception of telehealth is not a generational viewpoint. Regardless of whether the respondent was born before the technological age or grew up during it, they were equally likely to agree or disagree on the concept of telehealth in physical therapy. The years employed as a physical therapist produced no statistically significant relationships with the items as well. This data indicates that one’s level of experience within the physical therapy world doesn’t influence their perceptions on
telehealth technology. The respondents who were newer to the profession and those who have been practicing for many years demonstrated similar viewpoints on the advantages telehealth could bring to the field. These two relationships show that within this sample, there is open-mindedness amongst physical therapists of varying life and professional experience.

The hours of patient care a week was the only demographic that produced results of statistical significance. Increasing access to healthcare ($r = -.171$), increasing access to specialists ($r = -.158$), and increasing access to patient information ($r = -.135$) were all statistically significantly and negatively correlated to the hours of patient care the therapists reported as shown in Table 5. This finding may indicate that the more hours of direct patient care a therapist has, the less they perceive telehealth to help in these areas. This is interesting because those who see more patients face-to-face have a lesser belief that telehealth could increase the access of patient to therapist and vice versa. It was also observed that all but one of the items, whether statistically significant or not, produced negative correlations with the hours of patient care. The question could be raised that the more physical therapists have face-to-face time with patients, the less likely they are to perceive telehealth to be beneficial to their practice.

Another notable relationship was the level of participants’ familiarity and their experience with telehealth. As show in Figure 1 and Figure 2, there are many physical therapists who are familiar with telehealth and telehealth technology, but a majority have never used the technology. This means that the perceptions gathered in this study may be based primarily from secondhand information rather than experience or fact.
Limitations and Further Research

One weakness of the study is that 31 of the participants’ data were excluded due to not being employed at the time of the study or reporting a false age. This exclusion decreased the expected sample size which in turn decreased the data’s statistical power. Further research should be conducted using a larger sample size to get a better representation of the physical therapy community. Another limitation of this study is the lack of additional research on the benefits of telehealth. Further research should be conducted to refine the survey instrument as more knowledge is known about the potential advantages of telehealth. Rewording items to clarify if telehealth is being considered as an independent mode of treatment or in conjunction with traditional care would improve respondent understanding. More specific items will allow the researchers to understand specific positive and negative perceptions of the technology. Lastly, data from this study lacked responses from physical therapist assistants. Future studies should strive to include the important perceptions of all of those who utilize the technology to increase the significance of the results. Studies focusing on telehealth may consider excluding participants who report 10 or less hours of direct patient care as they represent a different area of physical therapy than direct care providers. Since it was noted that there is a relationship between hours of patient care and the items used in this survey, a future study that emphasizes those with more patient care items may be able to more carefully investigate this relationship.

CONCLUSION

Telehealth continues to be a misunderstood form of delivery in the field of physical therapy and health care. Many are not familiar with the delivery method, yet the use of telehealth rapidly increases. There appears to be a perception of benefit to both the patient
and therapist through using telehealth, but little is known about the experiences of those who have utilized telehealth. Advancements in technology open doors for patients and practitioners. But practice should be informed by evidence-based practice. Future research should be encouraged using telehealth technologies to not only allow physical therapists to become familiar with the technology, but to increase their understanding of its potential benefits.
REFERENCES


7. Stephens S. Telehealth is Calling. PT in Motion. 2014;6(4):30-38.


