Internet Journal of Allied Health Sciences and Practice

Volume 22 | Number 1 Article 24

December 2023

Physical Therapists and Physical Therapy Assistants' Readiness Levels to Deliver Telehealth Services: A Survey Analysis

Bhavana Raja
University of the Pacific, braja@pacific.edu

Alicia Rabena-Amen
University of the Pacific, arabenaamen@pacific.edu

David Gillette
University of the Pacific, dgillette@pacific.edu

Preeti Oza
University of the Pacific, poza@pacific.edu

Todd E. Davenport
University of the Pacific, tdavenport@pacific.edu

Physical Therapists and Physical Therapy Assistants' Readiness Levels to Deliver Telehealth Services: A Survey Analysis

Abstract

Purpose: The purpose of this study was to investigate physical therapists (PT) and physical therapy assistants' (PTA) readiness to deliver telehealth (TH) services during COVID-19 pandemic. **Method:** IRB approved this survey analysis study. The Modified Maryland TH Readiness Assessment Tool (mMTRAT) was distributed by email to all licensed PTs and PTAs in California in October 2020. One-way analysis of variance (ANOVA) was used to compare between-groups differences for continuous demographic data. Pearson chi-square analysis was used to assess between-group distributions of categorical data. The statistical significance of between-groups median mMTRAT scores was assessed using the Mann-Whitney U test. Statistical significance was set at α 0.05. **Results:** Respondents, n=337 completed the survey. Of the respondents, 42.9% reported having decision-making authority. Sixty percent of items in the core readiness domain and 80% in the financial consideration domain, 75% in the operations domain, 86% items in the staff engagement domain and 80% of the items in patient engagement domain demonstrated a median score of Agree/Strongly Agree. Self-identified decision makers demonstrated a significantly stronger assessment of readiness than non-decision-makers. **Conclusions:** Potentially important gaps remain across all areas of readiness. Observed limitations in agreement between decision-makers and non-decision-makers may present organizational challenges to TH adoption.

Author Bio(s)

Bhavana Raja, PT, PhD, is an Assistant Professor of Physical Therapy in the Department of Physical Therapy at University of the Pacific, Stockton, CA.

Alicia Rabena-Amen, PT, DPT, is an Assistant Professor of Physical Therapy and Director of Clinical Education in the Department of Physical Therapy at University of the Pacific, Stockton, CA.

David Gillette, PT, DPT, GCS, is an Assistant Professor of Physical Therapy in the Department of Physical Therapy at University of the Pacific, Stockton, CA.

Preeti D. Oza, PT, PhD, NCS, is an Associate Professor of Physical Therapy in the Department of Physical Therapy at University of the Pacific, Stockton, CA.

Todd E. Davenport, PT, DPT, MPH, OCS, is a Professor and vice-chair in the Department of Physical Therapy at University of the Pacific, Stockton, CA

Acknowledgements

To all the licensed PTs and PTAs in the state of California

IJAHSP™
The Internet Journal of Allied Health Sciences and Practice
Dedicated to allied health professional practice and education
Vol. 22 No. 1 ISSN 1540-580X

Physical Therapists and Physical Therapy Assistants' Readiness Levels to Deliver Telehealth Services: A Survey Analysis

Bhavana Raja
Alicia Rabena-Amen
David Gillette
Preeti Oza
Todd E. Davenport

University of the Pacific

United States

ABSTRACT

Purpose: The purpose of this study was to investigate physical therapists (PT) and physical therapy assistants' (PTA) readiness to deliver telehealth (TH) services during COVID-19 pandemic. **Method:** IRB approved this survey analysis study. The Modified Maryland TH Readiness Assessment Tool (mMTRAT) was distributed by email to all licensed PTs and PTAs in California in October 2020. One-way analysis of variance (ANOVA) was used to compare between-groups differences for continuous demographic data. Pearson chi-square analysis was used to assess between-group distributions of categorical data. The statistical significance of between-groups median mMTRAT scores was assessed using the Mann-Whitney U test. Statistical significance was set at $\alpha \leq 0.05$. **Results:** Respondents, n=337 completed the survey. Of the respondents, 42.9% reported having decision-making authority. Sixty percent of items in the core readiness domain and 80% in the financial consideration domain, 75% in the operations domain, 86% items in the staff engagement domain and 80% of the items in patient engagement domain demonstrated a median score of agree/atrongly agree. Self-identified decision makers demonstrated a significantly stronger assessment of readiness than non-decision-makers. **Conclusions:** Potentially important gaps remain across all areas of readiness. Observed limitations in agreement between decision-makers and non-decision-makers may present organizational challenges to TH adoption.

Keywords: telehealth, physical therapy, readiness, physical therapy assistants

BACKGROUND

Telehealth (TH) is the remote communication of health-related information or services via telecommunication and information technology between two or more people.[1] It may be synchronous or asynchronous, and includes video, email, text, and mobile phone applications. It also has potential to expand to new technologies such as voice interface (e.g., Amazon's Alexa™) or mobile sensors (pulse oximeters, thermometers, smartwatches, etc.).[2, 3] Emerging technology to allow for TH started with the NASA space program, and the first prototype of telemedicine system was created in 1967; however, the massive expansion of telecommunication and information technology growth in the 1990's led to rapid advancements in TH.[4] Historically, TH has been used by physicians and health care professionals to provide care, seek expert advice from their colleagues in different parts of the country or world, and interact with patients and their families.[5,6] Recently, telecommunication has also gained popularity in delivery of rehabilitation services.

TH in physical therapy addresses the use of telecommunication technology to provide rehabilitation services remotely, including examination, evaluation, diagnosis, interventions, and education.[7] TH facilitates increased access to services for patients who are remote or homebound, provides choices of times that are most convenient and less expensive for the patient, requiring less time off work, and less travel costs.[5] In addition to convenience, TH is also effective in terms of outcomes and cost. Several recent studies have reported equivalent outcomes compared to traditionally delivered therapy in patients post-stroke, knee and hip replacements, and coronary heart disease.[8,9,10] Additionally, two recent reviews and meta-analysis indicate that TH is comparable with traditional rehabilitation for a variety of conditions.[11,12] TH has also been demonstrated to be cost-effective in a systematic review for lower extremity joint replacements, review of musculoskeletal conditions, and may be in those with non-specific chronic low back pain and subacromial decompression.[13-16] However, despite multiple benefits, research suggests that therapists have been slow to adopt TH. As physical therapy is a hands-on profession relying on objective measures; technology has only relatively recently allowed providers to successfully use TH for physical therapy services.[7] Lawford et al reported that "firsthand experience may be necessary for physiotherapists to embrace new models of service delivery".[17]

The novel COVID-19 crisis erupted in 2020 and the high uncertainty of spread and transmissibility brought about the urgency for application of telemedicine and TH. It quickly became an important way to manage patients' healthcare while keeping them safe through social distancing and self-quarantine.[18] Consequently, the novel coronavirus pandemic accelerated adoption of TH by physical therapists, patients, and payers. On March 17th, 2020, the American Physical Therapy Association issued a statement advising their specialists to employ their judgment in deciding the best way to approach TH provision.[19] In April 2020, the Centers for Disease Control encouraged all non-essential activity in clinics, hospitals, and ambulatory surgical centers to be limited.[20] TH rapidly became an essential element for physical therapists and physical therapist assistants to deliver outpatient physical therapy services. Reduced access to in-person rehabilitation care along with changes in healthcare finance and delivery contributed to an exponential increase in TH.[21] Hardware infrastructure with widespread connected devices allowed direct point of care delivery.[22]

Prior to the pandemic, widespread TH adoption in the United States was limited by several factors; for example, the Centers for Medicare and Medicaid Services (CMS) did not have billing codes for TH physical therapy services, and physical therapists were not eligible TH. Additionally, there was lack of organizational support relating to the law, policies, and reimbursements of TH because not all insurance companies were on board.[23,24] However, early in the pandemic, many commercial insurance providers minimized barriers to reimbursement of TH physical therapy.[23] Additionally, the CMS issued policy changes to include physical therapists as eligible providers of TH services, allowing beneficiaries to access rehabilitative care during the public health emergency.[20] However, specific federal and state payer guidelines, regulatory hurdles, and patient privacy barriers still exist.[25] Readiness of all constituents for this methodology may have been questionable given the necessary speed of adoption. The need for implementation and adoption of TH technology was not considered before the pandemic.[26] Additionally, the perspectives of physical therapists and physical therapist assistants regarding implementation and adoption of TH has not been explored. There have been few published reports describing TH implementation planning or evaluation, and none to describe physical therapists and physical therapist assistants' readiness to deliver TH services. [23] Therefore, the purpose of this study was to investigate physical therapists' and physical therapist assistants' readiness to deliver TH services. We believe that readiness of rehabilitation and healthcare providers will inform not only decisions related to training and implementation of TH in physical therapy but also management-related strategies, both organizational and patient management strategies as identified by Bashshur et.al.[4]

METHODS

Aim

The study protocol aimed at performing survey analysis to investigate Physical Therapists and Physical Therapist Assistants readiness to deliver TH services was approved by University's Institutional Review Board (#20-114).

Study Design
Survey of physical therapist and physical therapist assistants' readiness to deliver telehealth services.

Participants
PTs and PTAs licensed in the state of California, United States, were the population under study. They were identified by enrollment with the Physical Therapy Board of California during the study period.

Survey Instrument
SurveyMonkey® (San Mateo, California, United States) was used to create the data collection instrument. The instrument consisted of a demographic questionnaire and the TH Readiness Assessment Tool.[27] The TH Readiness Assessment Tool (TRAT) was developed by the Maryland Health Commission to help small physician practices self-assess readiness to provide TH services. Results from the TRAT were used to identify potential areas of need to address and improve readiness. The TRAT was intended to be completed in 20 minutes or less by the lead physician or program manager. Each TRAT item was scored individually and then weighted to determine a subscale score. For this study, TRAT items were revised to declarative statements to which respondents could rate their level of agreement on a 5-point Likert scale, ranging from Strongly Agree (SA) to Strongly Disagree. The modified TRAT (mTRAT) was intended to provide an additional range of responses compared to the original TRAT.

Procedure
The data collection instrument, consisting of the demographic questionnaire and mTRAT, was circulated via email to licensed physical therapists and physical therapist assistants in the state of California by the Physical Therapy Board of California in august of 2020, and one reminder email was sent two weeks prior to the close of the survey. The data collection instrument was open from August 2020 to October 2020.

Statistical Analysis
Means and 95% confidence intervals (95% CI) were calculated for continuous data. Categorical data were expressed as frequencies and proportions. Subgroup analyses were completed for respondents who did versus did not report decision-making authority, and for respondents who reported their clinics did versus did not provide TH services. One-way ANOVA was used to assess the statistical significance of between-groups' differences for continuous demographic data. Pearson chi-square analysis was used to assess the statistical significance of between-group distributions of categorical data. The statistical significance of between-groups' median mTRAT scores was assessed using the Mann-Whitney U test. Differences were considered statistically significant at $\alpha \leq 0.05$.

RESULTS
A total of 479 responses were available for analysis, including 337 surveys that were complete and 142 surveys that were incomplete. The overall completion percentage, calculated as the number of respondents who completed the survey divided by the number of potential respondents who started the survey, was 69.2%.

Respondent Characteristics
Demographic characteristics for all respondents appear in Table 1. Respondents were 413 physical therapists (87.7%) and 57 physical therapy assistants (12.1%) with a mean age of 43.6 years (95% confidence interval [95% CI]: 42.5-44.6 years). There were 357 women (84.8%), 112 men (23.8%), and three respondents (0.6%) who preferred not to specify a gender. The most frequently reported highest level of education attainment was professional doctorate, such as Doctor of Physical Therapy (n=196; 41.6%). The most frequently reported practice settings were outpatient clinics (n=284; 60.3%) in urban locations (n=376; 79.8%). Most frequently reported practice specialties were orthopedics (n=221; 46.9%), pediatrics (n=73; 15.5%), and geriatrics (n=55, 11.7%). Respondents had an average of 16.4 years (95% CI: 15.3-17.5 years) of clinical experience and worked 30.5 hours per week (95% CI: 29.2-31.8 hours per week) as a clinician. One hundred thirty-two respondents (28.0%) also reported working as an owner, manager, or administrator, and 195 respondents (41.4%) had authority to make decisions within their clinic regarding TH. Three hundred twenty-two respondents (68.4%) provided TH services at the time they responded to the survey. Frequency distributions of respondent demographic characteristics significantly differed based on survey completeness for licensure designation ($p<0.001$), highest degree attained ($p=0.005$), practice setting ($p<0.001$), primary practice area ($p<0.001$), and whether the respondent's clinic already provided TH services ($p<0.001$). Data from all surveys were pooled for analysis to increase representation in the analysis for physical therapy assistants, respondents from acute care hospitals and 'other' practice settings, and respondents who did not yet provide TH services.

Table 1. Respondent demographics

	All respondents (n=471)	Completed surveys (n=337)	Incomplete surveys (n=142)
Age (years)	43.6 (42.5-44.6)	44.1 (42.8-45.4)	42.3 (40.3-44.2)
Gender			
Woman	357 (84.8%)	258 (76.6%)	99 (69.7%)
Man	112 (23.8%)	72 (21.4%)	40 (28.2%)
Prefer not to say	3 (0.6%)	2 (0.6%)	1 (0.7%)
Licensure designation			
Physical therapist	413 (87.7%)	304 (90.2%)	109 (76.8%)
Physical therapy assistant	57 (12.1%)	27 (8.0%)	30 (21.1%)
Other	1 (0.2%)	1 (0.3%)	0 (0.0%)
Educational attainment			
Associate degree	24 (5.1%)	8 (2.4%)	16 (11.3%)
Bachelor's degree/certificate	85 (18.0%)	58 (17.2%)	27 (19.0%)
Professional Master's degree	54 (11.5%)	42 (12.5%)	12 (8.5%)
Academic Master's degree	38 (8.1%)	26 (7.7%)	12 (8.5%)
Professional Doctorate	196 (41.6%)	50 (14.8%)	52 (36.6%)
Academic Doctorate	6 (1.3%)	5 (1.5%)	1 (0.7%)
Total duration worked as a clinician (years)	16.4 (15.3-17.5)	17.0 (15.7-18.3)	15.0 (13.1-16.9)
Time worked as a clinician per week (hours)	30.5 (29.2-31.8)	30.7 (29.2-32.2)	30.0 (27.6-32.5)
Work as an administrator			
Yes	132 (28.0%)	99 (29.4%)	33 (23.2%)
No	344 (73.0%)	236 (70.0%)	108 (76.1%)
Total duration worked as an administrator (years)	4.1 (3.4-4.8)	4.3 (3.5-5.1)	3.6 (2.4-4.9)
Time worked as an administrator per week (hours)	5.7 (4.6-6.7)	6.0 (4.7-7.2)	4.9 (3.0-6.7)
Current status of TH provision			
Provides TH services	322 (68.4%)	257 (76.3%)	65 (45.8%)
Does not provide TH services	152 (32.2%)	78 (23.5%)	74 (52.1%)
Decision-making authority for TH			
Yes	195 (41.4%)	144 (42.7%)	51 (35.9%)
No	281 (59.7%)	192 (57.0%)	89 (62.7%)
Practice setting			
Acute care hospital	31 (6.6%)	13 (3.9%)	18 (12.7%)
Assisted living setting	2 (0.4%)	1 (0.3%)	1 (0.7%)
Community health clinic	4 (0.8%)	2 (0.6%)	2 (1.4%)
Government facility	9 (1.9%)	6 (1.8%)	3 (2.1%)
Outpatient clinic – freestanding office	141 (29.9%)	108 (32.0%)	33 (23.2%)
Outpatient clinic – larger organization	143 (30.4%)	112 (33.2%)	31 (21.8%)
School	10 (2.1%)	4 (1.2%)	6 (4.2%)
Skilled nursing/extended care facility	37 (7.9%)	18 (5.3%)	19 (13.4%)
Other	99 (21.0%)	73 (21.7%)	26 (51.4%)
Practice location			
Urban (i.e., city or town)	376 (79.8%)	264 (78.3%)	112 (78.9%)
Rural (i.e., countryside)	39 (8.3%)	29 (8.6%)	10 (7.0%)
Mobile (i.e., home health)	44 (9.3%)	34 (10.1%)	10 (7.0%)
Remote (i.e., TH)	13 (2.8%)	10 (3.0%)	3 (2.1%)
Primary practice area			
Acute/subacute care	30 (6.4%)	14 (4.2%)	16 (11.3%)
Aquatics	2 (0.4%)	0 (0.0%)	2 (1.4%)
Cardiopulmonary	1 (0.2%)	0 (0.0%)	1 (0.7%)
Geriatrics	55 (11.7%)	29 (8.6%)	26 (18.3%)

Home health	34 (7.2%)	24 (7.1%)	10 (7.0%)
Neurology	32 (6.8%)	23 (6.8%)	9 (6.3%)
Orthopedics	221 (46.9%)	167 (49.6%)	54 (38.0%)
Pediatrics	73 (15.5%)	57 (16.9%)	16 (11.3%)
Pelvic health	8 (1.7%)	8 (2.4%)	0 (0.0%)
Prevention and health promotion	6 (1.3%)	6 (1.8%)	0 (0.0%)
Sports	12 (2.5%)	8 (2.4%)	4 (2.8%)

Table 1 describes respondent demographic characteristics and compares all respondents, as well as subgroups of respondents, who completed at least 50% of the survey instrument (i.e., completed survey) and respondents who completed less than 50% of the survey instrument (i.e., did not complete survey). Continuous data are given as means and 95% confidence interval. Categorical data are given as counts and percentages. Significant differences between subgroups appear in bold text and shading ($p<0.05$).

Overall Readiness to Provide Telehealth

Data for all respondents' self-reported organizational readiness to provide care appears in Table 2.

Table 2. Readiness for TH service provision by survey respondents

	All Respondents		Clinic already provides TH		Clinic does not provide TH		Decision-making authority for TH		No Decision-making authority for TH	
	Responses (n)	Median (IRQ)	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR
1.1 Core Readiness Need for Telehealth										
Patients in my practice have difficulty getting the medical care they need because providers are too far away, patients lack transportation, or patients are unable to leave work or home.	403	3 (2)	295	3(2)	105	3 (2)	174	3 (2)	228	3 (2)
My organization has identified specific types of patients or clinical needs that may benefit from using TH	403	2 (1)	295	2 (1)	105	3 (2)	174	2 (1)	228	2 (1)
Patients in my practice ask for TH services or express interest in aspects of TH such as remote visits.	403	2 (1)	295	2 (1)	105	3 (2)	174	2 (1)	228	2 (1)
Patients in my practice use or express a need or desire for after-hours (evenings and weekends) care	403	3 (2)	295	2 (2)	105	3 (2)	174	3 (2)	228	2 (1)
Providers affiliated with my practice routinely travel over	401	4 (3)	295	4 (2)	105	3 (2)	172	4 (2)	228	4 (2)

	All Respondents		Clinic already provides TH		Clinic does not provide TH		Decision-making authority for TH		No Decision-making authority for TH	
	Responses (n)	Median (IRQ)	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR
30 minutes from their primary location to provide services in other locations										
Potential benefits of TH for my practice outweigh the potential challenges associated with TH	403	2 (2)	295	2 (2)	105	3 (2)	174	2 (2)	228	2 (1)
1.2 Core Readiness: Organizational Leadership Buy-in										
My practice's leadership has committed to TH development efforts.	390	2 (2)	290	2(1)	97	4 (1)	170	2 (1)	219	2 (2)
My practice has identified the vision, priorities, and goals for implementing TH.	390	2 (2)	290	2(1)	97	4 (1)	170	2 (2)	219	2 (2)
My practice has created a TH business plan.	389	3 (2)	290	2 (2)	96	4 (2)	170	2(1.25)	218	3 (2)
My practice's leadership had past successes with instituting programs that required complex change processes, such as quality improvement initiatives or electronic health record implementations.	388	2 (2)	290	2 (2)	97	3 (2)	169	2 (1)	218	2 (1)
2. Financial Considerations										
My practice has considered how it will fund any capital costs (e.g., equipment, software, licensing) needed to start a TH program.	372	2 (2)	280	2 (2)	89	3 (1)	163	2 (1)	208	3 (1)
My practice has identified what additional staffing costs, if any, are needed to implement and	372	2 (1)	280	2 (1)	89	3 (1)	163	2 (1)	208	3 (2)

	All Respondents		Clinic already provides TH		Clinic does not provide TH		Decision-making authority for TH		No Decision-making authority for TH	
	Responses (n)	Median (IRQ)	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR
maintain a TH program.										
My practice has examined the TH services reimbursement policies for major insurers (Medicare/Medicaid, and private insurance).	371	2 (2)	279	2 (2)	89	3 (2)	162	2 (2)	208	2 (1)
My practice has considered whether it would be financially feasible to offer TH services that are reimbursed by some but not all insurers.	371	2 (1)	279	2 (2)	89	3 (2)	162	2 (1.25)	218	2 (1)
My practice has gathered the necessary information to conduct a cost, benefit, and risk analysis of implementing and using TH.	370	3 (1)	278	2 (1)	89	3 (1)	162	2 (1)	207	3 (1)
3.1 Operations: Telehealth Roles										
My practice has determined the staff responsibilities required to manage the administrative aspects of TH, such as appointment scheduling, coordinating information across providers, and patient documentation.	336	2 (2)	257	2 (1)	77	4 (2)	143	2 (1)	192	2 (1)
My practice has determined the staff responsibilities required to support TH patients, such as having a dedicated TH contact person to explain TH, answer patient questions, and provide	336	2 (2)	257	2 (1)	77	4 (1.5)	143	2 (1)	192	3 (2)

	All Respondents		Clinic already provides TH		Clinic does not provide TH		Decision-making authority for TH		No Decision-making authority for TH	
	Responses (n)	Median (IRQ)	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR
assistance during TH appointments.										
My practice has determined what, if any, additional TH staffing support is needed to implement and maintain a TH program.	337	3 (1)	258	2 (1)	77	3 (1)	144	2 (1)	192	3 (2)
My practice has determined how to protect staff time that needs to be dedicated to their TH roles and responsibilities.	338	3 (2)	259	2 (1)	77	4 (2)	145	2 (1)	192	3 (2)
3.2 Operations: Scheduling and Workflow										
My practice has considered how administrative workflows (scheduling, billing, patient documentation, communication between staff) will need to change to incorporate TH?	320	2 (1)	247	2 (1)	71	3 (3)	138	2 (1.25)	181	2 (1)
My practice has considered how clinical workflows (e.g., taking vital signs) will need to change to incorporate TH services?	320	3 (2)	247	2 (1)	71	3 (2)	138	2 (1)	181	3 (2)
My practice has considered how care for TH patients will be coordinated and communicated across providers.	320	2 (1)	247	2 (1)	71	4 (1)	138	2 (1.25)	181	2 (2)
My practice has determined how to obtain and document the patient's consent prior to receiving TH services.	320	2 (1)	247	2 (1)	71	4 (2)	138	2 (1)	181	2 (2)
My practice has considered how TH	320	2 (1)	247	2 (2)	71	3 (2)	138	2 (2)	181	2 (1)

	All Respondents		Clinic already provides TH		Clinic does not provide TH		Decision-making authority for TH		No Decision-making authority for TH	
	Responses (n)	Median (IRQ)	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR
services will fit within your practice's workflow with respect to when TH services are offered (e.g., follow-up care vs treatment, referral vs. self-referral, after hours vs. regular hours).										
3.3 Operations: Operational Requirements										
My practice has determined state licensing requirements necessary for each provider type (e.g., physical therapist, physical therapy assistant, physician, nurse, physician assistant, and others) implementing TH services.	308	2 (2)	241	2 (1)	65	3 (2)	133	2 (1)	174	2 (2)
My practice has determined whether TH visits by physical therapists are allowed under my state's practice act.	308	2 (1)	241	2 (1)	65	3 (2)	133	2 (1)	174	2 (2)
My practice has determined that it does not need to seek answers for regulatory issues surrounding TH.	306	3 (1)	239	3 (1)	65	3 (1.5)	133	4 (1)	172	3 (1)
At least one person from my practice referred to our state board's website to find information regarding the regulation of TH at least once.	308	2 (2)	241	2 (1)	65	3 (2)	133	2 (1)	174	2 (2)
At least one person from my practice called our state's board to find information regarding the	307	3 (2)	240	3 (2)	65	3 (2)	133	3 (2)	173	3 (2)

	All Respondents		Clinic already provides TH		Clinic does not provide TH		Decision-making authority for TH		No Decision-making authority for TH	
	Responses (n)	Median (IRQ)	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR
regulation of TH at least once.										
The regulation of TH is clearly stated on my state board's website.	306	3 (1)	239	3 (1)	65	3 (0.5)	132	3 (1)	173	3 (1)
At least one person from my practice referred to our state's American Physical Therapy Association chapter website to find information regarding the regulation of TH at least once.	307	2 (2)	240	2 (2)	65	3 (2)	133	2 (2)	173	3 (1)
My practice has evaluated privacy and confidentiality procedures for TH services and how these conform to patient health protection laws (e.g., HIPAA; 42 CFR-Part II).	288	2 (1)	229	2 (1)	58	3 (2.25)	119	2 (1)	168	2 (2)
My practice has determined potential TH malpractice insurance coverage and liability costs.	307	3 (2)	240	3 (2)	65	3 (2)	133	3 (2)	173	3 (2)
My practice has determined whether any additional credentialing processes are needed for providers to provide TH services	290	3 (1)	231	3 (1)	58	3 (1.5)	121	2 (1)	168	3 (1)
3.4 Operations: Assessment Approach										
My practice has considered what the "success factors" for TH are such as cost effectiveness, patient/provider satisfaction, improved patient outcomes.	281	2 (1)	223	2 (1)	57	3 (2)	117	2 (2)	163	3 (1)

	All Respondents		Clinic already provides TH		Clinic does not provide TH		Decision-making authority for TH		No Decision-making authority for TH	
	Responses (n)	Median (IRQ)	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR
My practice has considered how staff and patients will provide feedback on the TH program and how it is working.	281	3 (2)	223	2 (1)	57	3 (2)	117	2 (1)	163	3 (2)
My practice has tools or methods in place for soliciting feedback from providers, staff and patients that could be used or adapted for TH.	281	3 (2)	223	2 (1)	57	4 (2)	117	2 (1)	163	3 (2)
My practice has considered the need for making improvements to services and administrative procedures based on feedback from providers, staff, and patients.	282	2 (1)	224	2 (1)	57	3 (3)	117	2 (1)	164	3 (2)
3.5 Operations: Technology										
My practice has reviewed or tested different TH equipment, software or services.	280	2 (3)	222	2 (2)	57	4 (2)	116	2 (2)	163	2 (2)
My practice has identified what types of telecommunication connections (e.g., bandwidth and internet connectivity quality) are needed to support TH at both originating and distant sites.	280	2 (2)	222	2 (2)	57	4 (2)	116	2 (2)	163	2 (1)
Staff at my practice have been involved in reviewing or selecting the technology.	280	3 (2)	222	3 (2)	57	4 (2)	116	2 (3)	163	3 (2)
My practice has existing IT staff or an IT vendor that provides technical expertise, technical	279	2 (3)	221	2 (2)	57	3 (2)	116	2 (3)	162	2 (2)

	All Respondents		Clinic already provides TH		Clinic does not provide TH		Decision-making authority for TH		No Decision-making authority for TH	
	Responses (n)	Median (IRQ)	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR
support and troubleshooting.										
3.6 Operations: Physical Space										
My practice has identified a designated space for virtual patient visits with an appropriate layout, privacy, and adequate lighting that will enable a distant provider to do a clinical assessment.	280	2 (2)	222	2 (2)	57	4 (2)	116	2 (2)	163	3 (2)
My practice has identified the requirements for physical space and equipment at the provider's site to ensure quality and privacy.	280	2 (1)	222	2 (2)	57	4 (2)	117	2 (2)	162	3 (2)
My practice has considered emergency protocols for TH patients.	280	3 (2)	222	3 (2)	57	4 (2)	117	2 (3)	162	3 (2)
4.1 Staff Engagement: Education and Awareness										
My staff are aware of TH and the potential benefits and challenges involved in implementing a program.	279	2 (1)	221	2 (1)	57	3 (2)	115	2 (1)	163	2 (1)
My practice has considered how to ensure provider engagement in TH services once they're implemented.	279	2 (1)	221	2 (1)	57	3 (3)	115	2 (2)	163	2 (1)
My practice has considered how much time (calendar time and staff time) will be devoted to training staff and providers (particularly those who are less tech-savvy) on TH services.	279	3 (2)	221	3 (2)	57	4 (2)	115	3 (2)	163	3 (2)

	All Respondents		Clinic already provides TH		Clinic does not provide TH		Decision-making authority for TH		No Decision-making authority for TH	
	Responses (n)	Median (IRQ)	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR
4.2 Staff Engagement: Innovators and Champions										
My practice has identified one or more provider champions within the practice who are enthusiastic for TH and can keep the process moving forward once started.	278	2 (3)	220	2 (2)	57	4 (2)	115	2 (2)	162	3 (2)
Clinical staff at my practice are interested in and willing to use TH technology for client services.	278	2 (2)	220	2 (1)	57	3 (2)	115	2 (1)	162	2 (2)
Staff at my practice have experience with TH services.	278	2 (2)	220	2 (1.75)	57	3 (1)	115	2 (2)	162	3 (2)
My practice has solicited interest and input on implementing TH from clinical staff and administrative staff within your practice.	276	2 (1)	218	2 (2)	57	4 (2)	114	2 (2)	161	3 (2)
5. Patient Readiness: Patient Engagement										
My practice has considered whether TH could be used to increase patient engagement in managing their health and making healthcare decisions.	277	2 (1)	220	2 (1)	56	3 (2.75)	115	2 (1)	161	2 (1)
When my practice has implemented technologies aimed at patients (e.g., patient portals, text reminders, online scheduling), my patients have used them?	277	2 (1)	220	2 (2)	56	3 (2)	115	2 (2)	161	2 (1)
My practice has existing mechanisms in place that can be used or adapted to conduct education and outreach about	277	2 (1)	220	2 (1)	56	3.5 (3)	115	2 (2)	161	3 (2)

	All Respondents		Clinic already provides TH		Clinic does not provide TH		Decision-making authority for TH		No Decision-making authority for TH	
	Responses (n)	Median (IRQ)	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR	Responses (n)	Median (IQR
TH to the target population.										
My practice has considered what additional methods might be needed to conduct education and outreach about TH to the target population.	277	3 (1)	220	2 (1)	56	3 (2)	115	2 (1)	161	3 (2)
My practice has considered patient demographics and cultural issues that could influence implementing TH.	277	2 (1)	220	2 (1)	56	3 (2)	115	2 (2)	161	3 (2)

Table 2 describes readiness for TH service provision by survey respondents, related to need, buy-in, financial considerations, operation, staff engagement, and patient readiness. Responses counts (n), medians, and interquartile ranges (IQRs) are reported. Values are reported for (1) all respondents, (2) subgroups of respondents reporting their clinic already provides versus does not provide TH, and (3) subgroups of respondents reporting versus does not report decision-making authority for TH at their clinical setting. Significant differences between subgroup medians appear in bold text and shading ($p < .05$).

Effect of Current TH Provision

Respondents from clinics that did not yet provide TH rated themselves lower than respondents from clinics that provided TH on almost all readiness assessment tool subscales ($p<0.05$; Table 2). They rated themselves similarly on perceived difficulty for patients to obtain medical care, patient interest in after-hours care, and the need to seek answers for regulatory issues related to TH.

Effect of Decision-making Authority

Respondents who had decision-making authority regarding TH consistently rated stronger agreement about organizational readiness than individuals who did not have decision-making authority ($p<0.05$; Table 2). Each subgroup indicated similar levels of agreement that patients had difficulty accessing care, patients had expressed a desire for after-hours care, the practice had gathered the necessary information to conduct a cost/benefit/risk analysis, and the need to seek answers for regulatory issues surrounding TH.

DISCUSSION

Principal Findings

TH has gained momentum ever since the pandemic and several studies on this topic have investigated and reviewed the needs, role, and cost of TH.[21,24] We used the mTRAT scale to investigate Physical Therapists' and Physical Therapist Assistants' readiness to deliver TH services in the state of California at the start of the pandemic. mTRAT was used to provide additional range of perceptions of the participants.

The results of the survey provided quite plausible and new results especially regarding the setting type and individual roles. The results of the study revealed that there are specific types of patients or clinical needs that may benefit from using TH; musculoskeletal and pediatrics, and patients expressed interest in aspects of TH such as remote visits and after hour services; however, TH may not be the most appropriate option for some areas of PT practice; cardiopulmonary and aquatics. Overall, the potential benefits of TH outweigh challenges, as supported by the findings of our study. The respondents stated that the organizational leadership had made financial considerations, and responding clinicians agreed that TH roles had been considered indicates that PTs and PTAs had been thinking of TH for a while. However, data reveal lack of consensus regarding a solid business

plan and a formal cost-benefit and risk analysis. The respondents stated there was an agreement regarding the extent of necessary staffing support and time management for TH roles and responsibilities, scheduling and workflows and any anticipated changes thereof. This suggests that although the physical therapy providers have made great progress in TH services, there is a lot of progress that needs to be done to fill in these gaps.

The Physical Therapy Board of California has been preparing for TH in physical therapy; and the regulation of TH is clearly stated on the state board's website, thus making it easier for participants to assess answers for regulatory issues and minimizing the need to call the state licensing board regarding TH regulation. Seventy eight percent respondents agreed their practice had considered the TH assessment approach and had access to adequate tools and technology. Majority of the respondents were neutral about practice's plan for patient and staff feedback, and plans to solicit feedback; staff involvement in reviewing or selecting the technology and any emergency protocols, thus indicating need for a more overall approach and systematic planning in the application of TH. They agreed that needs for innovators and champions, as well as staff education and awareness, had been considered, but they were neutral about the amount of time necessary to train staff and providers. They generally agreed that patient engagement in application of TH had been planned, but they were neutral when asked if their practices considered what additional methods might be needed to conduct education and outreach.

The results of this survey pointed to some important gaps across the different areas of readiness investigated, including:
1) Core readiness for TH and buy-in from organizational leadership: Clinics that did not provide TH at the time of the survey reported that their clinic did not need TH and that their clinic's leadership did not believe in the use and application of TH and thus did not put in adequate efforts and resources.

2) Financial considerations for TH: Clinics that had not implemented TH did not investigate associated financial costs for set up and reimbursement but had investigated cost-benefit and risk analysis. This suggests that some practices did not see value in implementing TH.

3) Staff engagement – education, identifying champions or leaders: Most practices identified the need for and importance of champions, however, the group that did not have decision-making authority was essentially neutral about their interest in time, technology, and personnel expertise requirements.

4) Patient readiness –engagement of patients as stakeholders: Participants whose facility did not use TH or who did not have the authority to make decisions felt that their practice did not have mechanisms in place that could be used or adapted to conduct education and outreach about TH to the target population.

Limitations
This study had several limitations. Participants' responses may not be valid indicators of their actual feelings, beliefs, and actions. Additionally, the study design involved a convenience sample using an electronic survey and may lack the rigor of a study with statistically calculated sample size and stratified sampling technique. The study population is limited geographically to one state and may not have captured perspectives of healthcare and technological resources determined by policies across different states. Replicating this study across the country will capture diverse opinions influenced by different state policies. The results therefore must be analyzed with that understanding. Nevertheless, this study identifies areas of focus to improve individual and organizational readiness for implementing TH services. Additionally, the information provides avenues to explore further, including potential inclusion of TH in Doctor of Physical Therapy education and training of future healthcare providers.
This study indicates an overall positive attitude and readiness towards TH, with the belief that organizations, clinical providers, and patients have identified the potential benefits and incentives. Readiness to implement TH may be further improved by addressing concerns related to TH business planning, workflow and staffing support, and regulatory and technology issues.

CONCLUSIONS

This study revealed two key insights into challenges associated with implementation TH services. First, there is a gap in readiness amongst providers with authority to make decisions regarding implementation of TH as compared to those who are not involved in the decision-making process. Those with authority to make decisions appeared to be more convinced about organization readiness. This mismatch in confidence may be indicative of a need to engage providers who play a vital role but with no-decision making authority early in the process to understand and overcome the barriers identified for implementing TH. Workloads, education, scheduling issues and competing time constraints based on different projects of the clinical providers may be some of the areas to be explored further by the organization/ administration.[28]

Second, responders from clinics already providing TH rated themselves higher on readiness assessment. It may be fair to assume that once implemented TH seems to decrease the perceived difficulty with its implementation and service delivery. Some of the effective strategies for successful implementation of TH would be: 1) using World Physiotherapy Congress' (WCPT) and American Physical Therapy Association's (APTA) tool kits for digital practice implementation to get started;[1] 2) identifying 'change-champions' to provide awareness and education to organization/administration; and finally, 3) engaging partners and all stakeholders.[28] While aforementioned strategies are important, few other areas that require further research include HIPAA-compliant communication technologies for TH, evaluation of services provided via TH and reimbursement for TH. Literature shows that providers who invested initially in TH were concerned about reimbursement and returns of investment.[29] The initial investments to set up infrastructure for TH also involved changes to workflow and training of staff, which affected efficiency of care delivery. Providers had to weigh in on the benefits for the initial costs and be prepared that there would be a very gradual return on initial investments. Therefore, considerations for TH reimbursement, including payment plans from Medicare and different private insurances, is an important area that needs to be addressed to improve readiness of healthcare providers for TH.

DISCLOSURE STATEMENTS

Informed Consent

All participants who clicked on the survey link in their email were presented with a statement of informed consent, and participation in the survey was voluntary.

Authorship

All authors read and approved the final manuscript.

Conflicts of Interest

The authors declare that they have no competing interests.

Funding

The authors declare that no funding was received to complete this study.

Human and Animal Rights

The study protocol was approved by University of the Pacific's Institutional Review Board (#20-114). All methods were carried out in accordance with relevant guidelines and regulations.

REFERENCES

1. Telehealth in Practice. 2021; Available at: - https://www.apta.org/your-practice/practice-models-and-settings/telehealth-practice. Accessed December 08, 2021.
2. Amazon Alexa
   Available at: https://developer.amazon.com/en-IN/alexa/alexa-skills-kit. Accessed April 21, 2022.
3. Keesara S, Jonas A, Schulman K. Covid-19 and Health Care's Digital Revolution. N Engl J Med 2020 June 04;382(23):e82.
4. Bashshur RL, Reardon TG, Shannon GW. Telemedicine: a new health care delivery system. Annu Rev Public Health 2000;21:613-637.
5. Colbert GB, Venegas-Vera AV, Lerma EV. Utility of telemedicine in the COVID-19 era. Rev Cardiovasc Med 2020 Dec 30;21(4):583-587.
6. Lurie N, Carr BG. The Role of Telehealth in the Medical Response to Disasters. JAMA Intern Med 2018 Jun 1;178(6):745-746.
7. Russell TG. Physical rehabilitation using telemedicine. J Telemed Telecare 2007;13(5):217-220.
8. Cramer SC, Dodakian L, Le V, See J, Augsburger R, McKenzie A, et al. Efficacy of Home-Based Telerehabilitation vs In-Clinic Therapy for Adults After Stroke: A Randomized Clinical Trial. JAMA Neurol 2019 Sep 1;76(9):1079-1087.
9. Petersen W, Karpinski K, Backhaus L, Bierke S, Häner M. A systematic review about telemedicine in orthopedics. Arch Orthop Trauma Surg 2021 Oct;141(10):1731-1739.
10. Ramachandran HJ, Jiang Y, Tam WWS, Yeo TJ, Wang W. Effectiveness of home-based cardiac telerehabilitation as an alternative to Phase 2 cardiac rehabilitation of coronary heart disease: a systematic review and meta-analysis. Eur J Prev Cardiol 2021 Jul 13.
11. Suso-Martí L, La Touche R, Herranz-Gómez A, Angulo-Díaz-Parreño S, Paris-Alemany A, Cuenca-Martínez F. Effectiveness of Telerehabilitation in Physical Therapist Practice: An Umbrella and Mapping Review With Meta-Meta-Analysis. Phys Ther 2021 May 4;101(5):pzab075. doi: 10.1093/ptj/pzab075.

12. Seron P, Oliveros MJ, Gutierrez-Arias R, Fuentes-Aspe R, Torres-Castro RC, Merino-Osorio C, et al. Effectiveness of Telerehabilitation in Physical Therapy: A Rapid Overview. Phys Ther 2021 Jun 1;101(6):pzab053. doi: 10.1093/ptj/pzab053.
13. McKeon JF, Alvarez PM, Vajapey AS, Sarac N, Spitzer AI, Vajapey SP. Expanding Role of Technology in Rehabilitation After Lower-Extremity Joint Replacement: A Systematic Review. JBJS Rev 2021 Sep 13;9(9):10.2106/JBJS.RVW.21.00016.
14. Grona SL, Bath B, Busch A, Rotter T, Trask C, Harrison E. Use of videoconferencing for physical therapy in people with musculoskeletal conditions: A systematic review. J Telemed Telecare 2018 Jun;24(5):341-355.
15. Fatoye F, Gebrye T, Fatoye C, Mbada CE, Olaoye MI, Odole AC, et al. The Clinical and Cost-Effectiveness of Telerehabilitation for People With Nonspecific Chronic Low Back Pain: Randomized Controlled Trial. JMIR Mhealth Uhealth 2020 Jun 24;8(6):e15375.
16. Pastora-Bernal JM, Martín-Valero R, Barón-López FJ. Cost analysis of telerehabilitation after arthroscopic subacromial decompression. J Telemed Telecare 2018 Sep;24(8):553-559.
17. Lawford BJ, Delany C, Bennell KL, Hinman RS. "I Was Really Pleasantly Surprised": Firsthand Experience and Shifts in Physical Therapist Perceptions of Telephone-Delivered Exercise Therapy for Knee Osteoarthritis-A Qualitative Study. Arthritis Care Res (Hoboken) 2019 Apr;71(4):545-557.
18. Cervino G, Fiorillo L, Surace G, Paduano V, Fiorillo MT, Destefano R, et al. SARS-CoV-2 Persistence: Data Summary up to Q2 2020. Data 2020;5(3)(81).
19. APTA Board of Directors. APTA Statement on Patient Care and Practice Management During COVID-19 Outbreak. 2020; Available at: https://www.apta.org/patient-care/public-health-population-care/coronavirus/statement-on-patient-care-and-practice-management-during-covid-19. Accessed December 8, 2021.
20. Centers for Disease Control and Prevention, (U. S.). CDC activities and initiatives supporting the COVID-19 response and the President's plan for opening America up again : May 2020. 2020; Available at: https://www.cdc.gov/coronavirus/2019-ncov/downloads/php/cdc-activities-initiatives-for-covid-19-response.pdf. Accessed 12/08/, 2021.
21. Tenforde AS, Borgstrom H, Polich G, Steere H, Davis IS, Cotton K, et al. Outpatient Physical, Occupational, and Speech Therapy Synchronous Telemedicine: A Survey Study of Patient Satisfaction with Virtual Visits During the COVID-19 Pandemic. Am J Phys Med Rehabil 2020 Nov;99(11):977-981.
22. Ting DSW, Carin L, Dzau V, Wong TY. Digital technology and COVID-19. Nat Med 2020 Apr;26(4):459-461.
23. Miller MJ, Pak SS, Keller DR, Barnes DE. Evaluation of Pragmatic Telehealth Physical Therapy Implementation During the COVID-19 Pandemic. Phys Ther 2021 Jan 4;101(1):pzaa193. doi: 10.1093/ptj/pzaa193.
24. Mahmoud IAM S. Usability of Telemedicine in Physical Therapy Rehabilitation: Systematic review. JMIR Rehabil Assist Technol 2021 Jun 3.
25. Lee AC, Davenport TE, Randall K. Telehealth Physical Therapy in Musculoskeletal Practice. J Orthop Sports Phys Ther 2018 Oct;48(10):736-739.
26. Niknejad N, Ismail W, Bahari M, Nazari B. Understanding Telerehabilitation Technology to Evaluate Stakeholders' Adoption of Telerehabilitation Services: A Systematic Literature Review and Directions for Further Research. Arch Phys Med Rehabil 2021;102(7):1390-1403.
27. Pollak Andrew N. Telehealth Readiness Assessment Tool. 2019; Available at: https://mhcc.maryland.gov/mhcc/pages/hit/hit_telemedicine/documents/TLHT_TRA_Tool.pdf. Accessed August, 2020.
28. Kho J, Gillespie N, Martin-Khan M. A systematic scoping review of change management practices used for telemedicine service implementations. BMC Health Serv Res 2020 September 01;20(1):815-w.
29. Alami H, Gagnon MP, Fortin JP. Some Multidimensional Unintended Consequences of Telehealth Utilization: A Multi-Project Evaluation Synthesis. Int J Health Policy Manag 2019 Jun 1;8(6):337-352.