

RESEARCH NOTE

Survey on Clinician Perspectives on mRehab Interventions and Technologies

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Background

It has been 23 years since the Institute of Medicine issued its first report on assessing telecommunications/telemedicine in healthcare,¹ and 7 years since it issued its telehealth workshop report on the evolving health care environment². Over the past decade, technologies that have transformed society, education, entertainment and business, are now reaching the level of maturity needed to support robust remote mobile healthcare (mHealth). Smart phones, tablets and, more recently, wearable information and communication devices as well as smart home hubs for automation and control, environmental sensors, cloud computing, and high-speed networks have vastly expanded the technological foundation for effective mHealth care. This emerging technological environment was recognized in the recent NIH Research Plan on Rehabilitation, which noted that: “the expansion of smartphone use and the app design is literally placing sophisticated rehabilitation interventions in the hands of people with disabilities.”³

Indeed, today’s advances in consumer technology – wearable sensors and interfaces, home control and automation, geo-location, machine learning, artificial intelligence, etc. – literally place people with disabilities at the center of powerful, real-world rehabilitation solutions that can extend traditional in-clinic rehabilitation services to patients’ home and community. We refer to such technology supported, community-based rehabilitation as mRehab.

Implementing mRehab solutions for people recovering from traumatic injury or managing neurodegenerative diseases and other conditions requires informed engagement by rehabilitation clinicians. The Rehabilitation Engineering Research Center for Community Living, Health and Function (LiveWell RERC) conducted a survey of rehabilitation clinicians to discover and document the state of clinician knowledge, experience and needs for mRehab interventions and technologies.

Methods

The survey was conducted from January 14 to February 27, 2019 using convenience sampling methods and online data collection on the Survey Monkey web-based platform. Participants were recruited through the researchers' personal networks at Shepherd Center, Duke University Medical Center, the American Congress of Rehabilitation Medicine, American Physical Therapy Association, American Occupational Therapy Association, American Speech-Hearing Association and others.

A total of 505 rehabilitation clinicians across multiple specialties, including speech, physical and occupational, and recreation therapy, as well as psychology and other professions, completed the questionnaire (Table 1). Approximately half of the respondents had between 5 and 19 years of experience in their profession, and slightly more than half (55%) personally owned a wearable fitness tracker, smart watch or other wearable device with sensors.

Table 1. Respondents by profession.

	Count (n=505)	Percentage (%)
Physician	13	2.6
Physician assistant	4	0.8
Nurse or nurse practitioner	9	1.8
Physical therapist	74	14.7
Occupational therapist	104	20.6
Speech language pathologist	166	32.9
Recreational therapist	57	11.3
Exercise physiologist	2	0.4
Counselor or social worker	8	1.6
Psychologist	46	9.1
Case manager or care coordinator	1	0.2
Other	25	4.6

Most respondents treat multiple patient populations including those with acquired brain injury, neurodegenerative diseases, musculoskeletal injury/disorder, cancer, cardiovascular disease, spinal cord injury, and other conditions (Table 2).

Table 2. Respondents by rehabilitation population served.

	Count (n=505)	Percentage (%)
ABI	375	74.3
SCI	172	34.1
NDD	300	59.4
CVD	181	35.8
Musculoskeletal injury/disorder	198	39.2
Cancer	178	35.2
Other	119	23.6

Similarly, most respondents reported working in multiple clinical environments, including inpatient and outpatient environments, as well as skilled nursing facility, home health and other environments (Table 3).

Table 3. Clinical environments of respondents.

	Counts (n=505)	Percentage (%)
Inpatient acute	146	28.9
Inpatient rehab	203	40.2
Outpatient clinic	243	48.0
Skilled nursing facility	72	14.3
Home health	48	9.5
Other	73	14.5

Analysis

For the entire sample, respondents reported that well over 70% of their patients need additional therapy after discharge or between visits to outpatient programs (Table 4). As might be expected the medical specialties (physician, physician assistant, nurse and nurse practitioner) reported lowest percentages for their patients needing additional therapy post-discharge. Psychologists (83%) and recreation therapists (80%) reported the highest percentages of their patients needing additional intervention post-discharge. Speech, physical and occupational therapists said 70% or more of their patients needed additional therapeutic intervention post-discharge.

For outpatients the percentages needing additional therapy outside of clinical visits was substantially lower than for inpatients post-discharge. Still, for the entire sample of clinicians said that 54% of their patients need additional therapy outside the clinic. Recreation, speech and physical therapists reported the highest percentages of patients needing additional therapy between visits.

Table 4. Approximately what percentage of YOUR PATIENTS need additional therapeutic interventions (excluding medications) AFTER DISCHARGE from acute care? Or, BETWEEN VISITS to outpatient/day program? By specialty.

	AFTER DISCHARGE Average percentage of patients	BETWEEN VISITS Average percentage of patients
Physician or physician assistant	44.7	32.9
Nurse or nurse practitioner	59.7	54.1
Physical therapist	73.6	55.7
Occupational therapist	70.4	48.9
Speech language pathologist	75.3	57.8
Recreational therapist	79.7	68.0
Psychologist	83.4	53.9

Clinicians almost universally recognized the utility of mRehab technologies in supporting post-acute and between-visits therapy interventions for their patients, with 95% saying they think mobile and internet technology could be effective for such uses. This is notable given that these clinicians said that a substantially lower percentage of their patients needed mRehab therapeutic support. It suggests that the vast majority of clinicians have at least some patients that could use mRehab therapy. Indeed, 70% of respondents reported prescribing specific exercises and interventions to their patients to work on outside of the clinic (Table 5).

Table 5. Are there **specific exercises and interventions** that you prescribe for YOUR PATIENTS to work on outside of the clinic or at home?

	Counts	Percentage (%) Yes
All professions	356	70.5
Physician or physician assistant	9	52.9
Nurse or nurse practitioner	4	44.4
Physical therapist	55	76.4
Occupational therapist	71	68.3
Speech language pathologist	142	85.5
Recreational therapist	23	40.4
Psychologist	36	78.3

Despite the perceived need for mRehab technologies and interventions, just over half (51%) of respondents reported being comfortable integrating mRehab into their practice and only less than a quarter (22%) believe they are knowledgeable about rehabilitation technologies that could be used in their clinical specialty or for their patient populations.

Table 6. Comfort integrating and knowledge of mRehab technologies.

- How comfortable would you be with integrating mRehab technology into YOUR PRACTICE? (% Very comfortable/Extremely comfortable)
- How knowledgeable do you feel regarding current rehabilitation technology for your clinical specialty or patient population? (%Very knowledgeable/Extremely knowledgeable)

	Very comfortable and Extremely comfortable	Very knowledgeable and Extremely knowledgeable
All professions	256 (50.7%)	114 (22.6%)
Physician or physician assistant	11 (64.7%)	6 (35.3%)
Nurse or nurse practitioner	9 (100%)	2 (22.2%)
Physical therapist	36 (50%)	22 (30.5%)
Occupational therapist	46 (44.2%)	25 (24.0%)
Speech language pathologist	88 (53.0%)	41 (24.7%)
Recreational therapist or Exercise physiologist	25 (43.1%)	5 (8.6%)
Psychologist	23 (50.0%)	3 (6.5%)

Conclusion

The technologies needed to support mRehab have been maturing at a rapid pace. Meanwhile, clinicians almost universally recognize that many of their patients leave their clinic with unmet rehabilitation needs that could be met outside the clinic.

Together these trends suggest accelerating adoption of mRehab technologies. Obstacles remain for clinicians, particularly due to many (almost half) not yet feeling comfortable integrating mRehab technologies into their practice, and more than three-fourths (78%) reporting not being knowledgeable about mRehab technologies. The potential benefit is recognized but providers need additional knowledge and support to comfortably incorporate these approaches into practice, understandable given the emerging state of the field.

Because mRehab is developing rapidly in terms of technology, regulation/reimbursement and user acceptance, the LiveWell RERC has created the Clinician Network on mRehab (ClinNet on mRehab) to track the experiences and needs of clinicians related to mRehab interventions and technologies. At the end of the questionnaire for the survey data reported here, we asked respondents if they would be interested in joining the ClinNet on Rehab. Just under 300 respondents (59%) said yes. We will continue to engage this group going forward in order to map the contours of mRehab adoption, preferences and needs.

Works cited

1. Field, MJ., ed. (1996). *Telemedicine: A Guide to Assessing Telecommunications for Health Care*. Washington, DC: Institute of Medicine, National Academies Press.
2. Lustig, TA. rapporteur. (2012) *The Role of Telehealth in an Evolving Health Care Environment: Workshop Summary*. Washington, DC: Institute of Medicine, National Academies Press.
3. Frontera, WR., et al. (2017). *Rehabilitation Research at the National Institutes of Health Moving the Field Forward (Executive Summary)*. *Am J Phys Med Rehabil* 2017;96:211-220.