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Patient and Family Perceptions of Physical Therapy in the Medical Intensive Care Unit

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Abstract

Purpose—Patient and family member perceptions of physical therapy (PT) in the intensive care unit and the factors that influence their degree of satisfaction have not been described.

Methods—A panel of experts developed a questionnaire that assessed patient and family perceptions of PT. Critically ill patients and their family members were asked to complete the survey. Patient and family member scores were compared and stratified by age, gender, and mechanical ventilation for greater than 14 days compared to 14 days or less.

Results—A total of 55 patients and 49 family members completed the survey. Patients and family members reported that PT was necessary and beneficial to recovery, despite associating PT with difficulty, exertion, and discomfort. Patient perceptions were similar regardless of age or

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gender. Family members underestimated a patient's enjoyment of PT ($p=0.03$). For individuals who required prolonged mechanical ventilation (>14 days), patients reported that PT was more difficult ($p=0.03$), less enjoyable ($p=0.049$), and family members reported PT as causing greater discomfort ($p=0.005$). Additionally, family members of patients who required prolonged mechanical ventilation felt that PT was less beneficial ($p=0.01$).

Conclusions—Physical therapy is perceived as necessary and beneficial to recovery by critically ill patients and family members.

Keywords

physical therapy; medical intensive care unit; patient satisfaction; family satisfaction

Introduction

The 2010 Affordable Care Act mandated the creation of the Patient-Centered Outcomes Research Institute (PCORI) to promote patient-centered outcomes research.[1] These outcomes are defined as those that directly affect the patient and are in contrast to physiologic or pharmacologic outcomes. Importantly, satisfied patients are more likely to adhere to therapy and have a higher health-related quality of life.[2] Given such findings and the unique role of family members as decision makers and caregivers for the critically ill individual, there is growing interest in family and patient-centered outcomes in critical care. [3,4]¹

In the United States, critical care accounts for an estimated 5 million patient admissions annually and over 23 million days of patient treatment.[5] As intensive care unit (ICU) utilization increases, prevention and management of the long-term debilitation caused by critical illness is becoming increasingly emphasized. Intensive care unit associated weakness (ICU-AW) is common, affecting 25-50% of all critically ill individuals.[6] Individuals who survive an episode of the acute respiratory distress syndrome (ARDS) report decreased physical performance and quality of life at one year.[7] The presence of long-term neuromuscular weakness has been demonstrated for up to 5 years after hospital discharge.[8] When initiated early in the course of critical illness, physical therapy (PT) appears to limit the long-term effects of ICU-AW.[9-11] Early PT in patients requiring mechanical ventilation can improve muscle strength, increase ventilator free days, and decrease length of hospital stay.[12] Small, prospective studies of patients in the medical ICU who received early PT have also demonstrated improved ability to perform independent activities of daily living at hospital discharge.[10] Based on these findings, ICUs are beginning to implement programs that promote early PT, indeed, ICU-based PT may now be more intensive than in other settings.[13]

Despite the growing implementation of early PT for critically ill individuals, patient and family perceptions and satisfaction with PT in the ICU have not been described. Due to the high patient acuity and the variability of patient abilities and conditioning, it is important to

¹PCORI - Patient-Centered Outcomes Research Institute, ICU – Intensive Care Unit, ICU-AW – Intensive care unit associated weakness, ARDS – acute respiratory distress syndrome, PT – physical therapy

identify factors that influence a patient's willingness to participate with PT. Several studies have developed outpatient-centered satisfaction surveys and examined the level of satisfaction with outpatient PT after orthopedic procedures or in individuals with chronic pain. These studies have demonstrated that individuals are generally satisfied with PT despite the potential for discomfort, expense, and time commitment.[2,14–18] However, no studies have investigated patient and family perceptions of PT that is performed during critical illness. Therefore, the purpose of this prospective study is to examine the degree of patient and family satisfaction with early PT, and to identify family and patient-related factors associated with a high degree of satisfaction.

Material and Methods

Study Participants

ICU patients were enrolled as part of randomized controlled trial evaluating early, intensive of PT compared to usual care ([ClinicalTrials.gov](https://clinicaltrials.gov/ct2/show/study/NCT01058421) NCT01058421). Patients admitted to an ICU service who required mechanical ventilation for at least four days were eligible for enrollment. PT could be initiated while the patients were still requiring mechanical ventilation. Patients were excluded if they were less than 18 years of age, pregnant, had an underlying disorder that would make the patient unlikely to survive six months, had a dissecting aortic aneurysm, had a history of pulmonary embolism within the last six weeks, had severe physical or cognitive impairment that would impair the ability of the patient to exercise, or had a significant language barrier that would limit the ability of the patient to participate in PT. Additionally, patients with a myocardial infarction within the last three weeks, signs or symptoms of unstable angina, unstable arrhythmias including ventricular tachycardia and atrial fibrillation, or a history of severe aortic stenosis were excluded. Finally, individuals with a pre-existing peripheral motor nervous system or central nervous system disorder were excluded.

All patients gave informed consent prior participating in this study. Demographic information was collected for each patient including age, gender, APACHE II score, duration of mechanical ventilation and ICU stay, and the number of PT sessions the individual received. Function outcomes were measured by the Function Independence Measurement (FIM) score. This score measures functional independence on a 7 point scale (with a score of zero representing inability to perform the activity and a score of seven representing complete independence). Scores for bed mobility, sitting to standing transfers, and ambulation were recorded and totaled at the initiation, weekly, and at the completion of PT. FIM scores are reported at initiation, within 7 days and ICU discharge, and at the completion of PT.

Patients were randomized to either a control arm versus an early, intensive physical therapy arm. Patients were randomized after four days of mechanical ventilation and met the inclusion and exclusion criteria. PT was initiated if the patient met the follow vital sign thresholds: blood pressure > 90/40 and < 200/100, FIO₂ < 60%, SpO₂ > 88%, PEEP < 10, and respiratory rate < 35 breaths/min. If patients were still requiring vasopressors, interventions were limited to bed exercises only. Finally, patients need to be alert and cooperative, able to follow 3 of 5 simple commands, on or off sedation. Physical therapy in

the ICU included breathing exercises, functional training, upper and lower extremity active range of motion, resistance exercises, and marching in place over a 30 minute session. The intensity goal was a 3-5 BORG score for functional training. Additionally, decisions regarding the intensity of PT treatment and treatment progression were based on physiological status as well as the participants' strength, functional ability, and self-reported fatigue. Treatment was terminated based on the patient's report of excessive fatigue or abnormal physiologic responses (hemodynamic instability or respiratory decline). This strategy, referred to as 'response-dependent management', is an import aspect of PT management for patients in the ICU and has been previously well described.[19,20] Consequently, goals for each patient were created by the individual physical therapists during the initial examination and modified as the patient progressed through the hospital stay.

Study coordinators individually determined a patient's cognitive ability to complete the survey. Family members were eligible to participate regardless if they had observed a session of PT. All surveys were completed in the hospital. Institutional Review Board approval was obtained at all sites.

Survey Development, Content, and Administration

A questionnaire was developed and validated through an iterative process by a panel of experts in survey design, critical care medicine, PT, and clinical research at our institution. The final survey consisted of eight questions to be answered by the patient and 9 questions to be answered by the family member regarding perceptions of PT over the course of the overall hospitalization. Using a 10-point Likert scale, the patient survey assessed perceptions of necessity, difficulty, exertion, benefit, enjoyment, desire for more PT, and satisfaction. Patients in both arms of the trial completed the surveys. Also using a 10-point Likert scale, the family survey assessed perceptions of necessity, difficulty, benefit, desire for more or less PT, patient pain, adequacy of interventions for pain, and satisfaction (Table 1). Responses were grouped as slight (a score of 1-3), moderate (a score of 4-7), and extreme (a score of 8-10). Patients and families completed the survey at the end of 28 days of therapy or at discharge from the hospital, whichever came first.

Statistical Analysis

Results are reported as means and standard deviation or medians and 25-75% interquartile range. Patient and family member responses were compared for related questions using Wilcoxon rank-sum tests. Patient and family responses were stratified by surveys completed in the ICU compared to surveys completed after ICU discharge and answers were compared using Wilcoxon rank-sum tests. As markers of severity of illness, patient and family member responses were stratified by duration of mechanical ventilation of greater than 14 days compared to 14 days or less. All values were compared via Wilcoxon rank-sum tests. Finally, the change in FIM scores over the course of the hospitalization were stratified by the patient and family responses to the surveys. Values were compared by Kruskal-Wallis Tests. Statistical analysis was performed using JMP 10.0 (SAS, Cary, NC).

Results

As part of the randomized control trial, 763 individuals were screened and 120 individuals were enrolled between June, 2010 and July, 2013. Of the 643 patients who were excluded, 189 were excluded for prior physical impairment, 128 for cardiac and pulmonary related risks, 218 for cognitive concerns, 122 were unlikely to survive 6 months, 61 declined to participate, and 205 for other reasons (some patients were excluded for more than one reason). Of those enrolled in the randomized control trial, 87 patients were eligible to participate in the survey. Of these 87 patients, 10 patients died prior to survey completion, 10 had persistent altered mental status, 1 left the hospital against medical advice before completing the survey, and 1 was never able to participate in PT. One patient who completed surveys died before hospital discharge. Therefore, 65 patients were approached to complete the survey. An additional 10 patients chose not to complete the survey, and thus 55 (85%) individuals were included in the study. These patients were 60% (n=33) male with an average age of 52 ± 16 years. The average APACHE II score at the time of study enrollment was 17.3 ± 6.6 . Individuals required mechanical ventilation for a median of 9[6-17] days, with 54% (n=30) requiring greater than 14 days. Individuals had a median ICU length of stay of 15[9-23] days. Patients received a median of 7[4-12] PT sessions during their hospitalization. FIM scores were collected for 53 individuals. On average, individuals were very disabled at that start of PT with FIM scores of 2[1-2] for bed mobility, 1[0.5-2] for sit to stand transfers, and 1[0-1] for ambulation. A subset of patients (n=27) had FIM scores collected within seven days of ICU discharge that were not either their initial or final FIM scores. The median FIM scores were 2[2-5] for bed mobility, 3[1, 5] for sit to stand transfers, and 1[1, 5] for ambulation; all were significantly improved from baseline (all $p < 0.05$). By the end of the hospitalization, FIM scores had significantly increased to 5[3-7] for bed mobility, 5[2.5-7] for sit to stand transfers, and 4[1-6.5] for ambulation (all $p < 0.001$). Overall, FIM scores significantly improved by 10[4.5-15] ($p < 0.001$) over a median of 11[6.5-23.5] days.

From these 55 patients, 49 family members completed surveys. Of these family members, 8 (19%) were male. In addition, 23 (51%) were spouses, 13 (29%) were parents, 2 (4%) were children, and 7 (16%) were other relations but the patients' medical durable power of attorney. These family members observed a median of 3[2-5] PT sessions.

Patients reported that PT was both extremely necessary and beneficial (9[8-10] and 9[7-10], respectively). Patients reported moderate degrees of difficulty and exertion associated with PT sessions (table 2). Overall, patients were extremely satisfied with their PT experience. Similarly, family members reported that PT was both extremely necessary and beneficial (10[9-10] and 10[8-10], respectively). Family members perceived PT as being moderately difficult and causing moderate discomfort to the patient (table 2). Overall, family members were extremely satisfied with the PT experience.

When patient perceptions were compared to family member perceptions, family members rated the necessity of PT higher than patients ($p = 0.003$). Patients and family members both rated PT as moderately difficult and required moderate exertion or discomfort. Despite the required effort, patients reported PT was more enjoyable than predicted by family members

($p=0.03$). In regard to the overall satisfaction with the PT experience, there were no differences between the patient and family member perceptions (table 2).

Patient perceptions of PT did not differ significantly according to age or gender. Eleven (20%) surveys were completed while patients were still in the ICU setting; the remaining surveys were completed in a non-ICU setting. There was no difference in age, APACHE II scores, number of PT sessions between patients who completed the survey in the ICU compared to the non-ICU setting. While patients who completed surveys in the ICU found PT more difficult than those who completed surveys on the floor (8[5-9] vs 5.5[4-7], $p=0.02$), all other responses between surveys completed in the ICU or in a non-ICU setting were otherwise similar. However, patients who required prolonged mechanical ventilation (greater than 14 days) reported greater difficulty with PT than those who received 14 days or less of mechanical ventilation (7[5-9] vs 6[4-7], $p=0.03$). Similarly, scores for degree of patient exertion tended to be higher in patients requiring more than 14 days of mechanical ventilation, although this did not achieve statistical significance (table 3). Additionally, patients with prolonged mechanical ventilation reported less enjoyment of PT than patients who required 14 days or less of mechanical ventilation (5[4-7] vs. 8[5-9], $p=0.049$). There were no differences in patient scores regarding necessity, benefit, satisfaction, or desire for more or less PT between patients receiving less or greater than 14 days of mechanical ventilation.

Finally, a greater improvement in FIM scores was associated with patients who found PT extremely enjoyable compared to those who found PT only moderately or slightly enjoyable (overall change in FIM score 12[9-16] vs 6.5[1-14.3] vs 2[6-15] respectively, $p=0.03$). Additionally, a lesser improvement in FIM scores was associated with patients who found PT extremely difficult than those who found PT moderately or slightly difficult (overall change in FIM score 4.5[-1.3-12.8] vs 10[6-15] vs 12[9-15] respectively, $p=0.03$).

Family members who completed surveys in the ICU (14 or 28%) had similar satisfaction score to those who completed surveys outside of the ICU. However, when family member responses were stratified by the patient receiving prolonged mechanical ventilation compared to 14 days or less of mechanical ventilation, family members reported that PT was more difficult (8[7-10] vs 6[4-8], $p = 0.005$) and resulted in less enjoyment (4[3-5] vs 7[4-8], $p=0.004$) in patients who required prolonged mechanical ventilation (table 4). Similarly, family members reported PT as having less benefit in patients who required greater than 14 days of mechanical ventilation compared to those who required shorter duration of mechanical ventilation (9[5-10] vs 10[9-10], $p=0.010$). Despite these perceptions, families were equally satisfied and would not choose to have patients receive less PT, regardless of length of mechanical ventilation.

Discussion

We reported the perceptions of critically ill patients who required mechanical ventilation and their family members regarding the patient experience with PT. First, patients and family members reported that PT was both necessary and beneficial to their recovery. Secondly, both patients and family members thought PT was associated with moderate

difficulty, exertion, and discomfort. Third, family members underestimated the actual patient enjoyment of PT. Fourth, patients who required prolonged mechanical ventilation and their family members both reported that PT was more difficult, required more exertion, and was perceived by the family members as causing greater discomfort. Interestingly, family members of patients with prolonged mechanical ventilation felt that PT was less beneficial. Finally, a greater improvement in functional abilities was associated with great patient enjoyment of PT.

To our knowledge, this is the first description of patient and family perceptions of ICU-delivered PT. Previous studies, including the systematic review by Hush, have described patient satisfaction with outpatient PT. Hush concluded that patients were satisfied with PT, particularly individuals with acute conditions. Physical therapist attributes including skill, knowledge, and communication abilities, were also associated with more satisfied individuals. While Hush reviewed outpatient PT studies, many of these same attributes are likely to remain true in the inpatient ICU setting.[2] Similarly, trauma patients who received intensive PT were satisfied with their treatment, but the participation in PT did not improve their confidence with mobility or ability to manage care at home. However, specific factors that affected these individuals' perceptions were not evaluated.[21]

Our study builds on these findings and investigates factors that influence both patient and family perceptions of PT during critically ill. For instance, despite the possible discomfort and exertion involved with PT, critically ill patients and their families found PT beneficial, necessary, and satisfying. However, it is unclear if this perception derives from the exercises of PT itself or the impact of increased individualized attention from the physical therapist. Regardless, it is important to the patient's participation that both the patient and family members embraced the physical intervention as an important aspect of ICU care.

PT was found more difficult by those patients who completed surveys while still in the ICU than those on the floor, perhaps reflecting the degree disability which develops with critical illness and improve with PT throughout the hospitalization as demonstrated by the trend in FIM scores. Importantly, patients with a longer duration of mechanical ventilation viewed PT as being equally necessary and beneficial to recovery, despite PT being associated with increased difficulty and less enjoyment when compared to patients with a shorter duration of mechanical ventilation. Surprisingly, family members, while generally recognizing the necessity of early PT, rated PT as less beneficial in patients needing longer duration mechanical ventilation or ICU stays. Potentially, the perceived benefit of early PT was tempered by the family member's perception that the patient requiring longer duration mechanical ventilation enjoyed PT less or possibly the family members thought it would be more appropriate to wait until the patient had recovered further. These findings suggests that patients, even with severe and long duration illness, are accepting of early and intensive PT. Family members, however, may need additional education regarding the benefits of PT, particularly in patients with a longer duration of mechanical ventilation.

This study has several limitations. First, the small sample size and moderate survey response rate introduces possible biases into our results. We do not have information on those 15% of patients and their families who did not complete our survey. Additionally, these patients

were enrolled as part of a randomized study with specific inclusions and exclusion criteria in the medical ICU which may limit generalizability. Secondly, the clinical importance of the numerically small, yet statistically significant, differences in responses as measured by a 10-point Likert scale is difficult to gauge. Moreover, given the varying number and location of PT sessions experienced by both patient and family, in addition to the variable timing of the survey, there is a risk of recall bias skewing results. To address this, satisfaction scores from surveys completed in the ICU were compared to those outside those surveys outside of the ICU. Finally, we are unable to determine to relative contribution of increased individualized attention compared to the physical benefits of PT on patient or family satisfaction.

Conclusion

In conclusion, patients and families generally find PT in the medical ICU necessary and beneficial to recovery despite the potential for discomfort and exertion. Family members of patients requiring longer lengths of stay may not appreciate the importance of PT as much as family members of patients with shorter duration of illness. Further evaluation of patients and family perceptions of PT, particularly while the patient requires mechanical ventilation or other forms of life support, is necessary to improve patient and family acceptance and satisfaction with PT in critically ill individuals. Additionally, qualitative exploration of patient and family members' perceptions of physical therapy would enhance our understanding of which aspects of PT patients and family enjoy or find difficult. This would aid substantially in improving education information given to patients and family regarding physical therapy.

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Table 1
Survey Questions

Category	Patient Questions	Family Questions
Necessity	Do you think physical therapy is necessary for you to gain back the strength and endurance you have lost since becoming ill?	Do you think physical therapy is necessary for your family/significant other to gain back the strength and endurance they have lost since becoming ill?
Difficulty	Overall, how difficult (hard) was physical therapy?	Overall, how difficult (hard) do you think physical therapy was for your family member/significant other?
Exertion	Rate your OVERALL level of exertion (overall fatigue, leg fatigue, breathlessness, recovery time, etc) during most of your physical therapy sessions.	
Benefit	Do you think physical therapy was beneficial to you?	Do you think physical therapy was beneficial to your family member/significant other?
Enjoyment	Did you enjoy physical therapy?	Do you feel that your family member/significant other enjoyed physical therapy?
More PT	If you had a choice, would you choose to receive more physical therapy than you have received to date?	If you had a choice, would you choose for your family member/significant other to receive more physical therapy than he/she has received to date?
Less PT	If you had a choice, would you choose to receive less physical therapy than you have received to date?	If you had a choice, would you choose for your family member/significant other to receive less physical therapy than he/she has received to date?
Discomfort		Did your family member/significant other report discomfort or pain during physical therapy sessions? If there was discomfort during physical therapy sessions, do you feel that it was adequately addressed?
Satisfaction	Reflecting upon your ICU stay, were you satisfied with your physical therapy experience?	Reflecting upon your family member's/significant other ICU stay; were you satisfied with your family member's/significant other physical therapy experience?

Table 2
Patient and Family Responses

Category	Patient Response (n=55)	Family Response (n=49)	p-value
Necessity	9[8-10]	10[9-10]	0.003
Difficulty	6[4-7]	7[5-8]	0.05
Exertion	6[5-8]	NA	NA
Benefit	9[7-10]	10[8-10]	0.14
Enjoyment	7[5-9]	5[4-8]	0.03
More PT	5[1-7]	5[1-8]	0.62
Less PT	1[1-3]	1[1-2]	0.88
Discomfort	NA	5[2-7]	NA
Satisfaction	8[6-10]	9[8-10]	0.05

Table 3
Patient Responses Stratified by Ventilator Days

Category	Less than 14 Days of Mechanical Ventilation	Greater than 14 Days of Mechanical Ventilation	p-value
Necessity	9[8-10]	9[7-10]	0.90
Difficulty	6[4-7]	7[5-8]	0.02
Exertion	6[5-7]	7[5-9]	0.05
Benefit	9[7-10]	8[6-9]	0.10
Enjoyment	8[5-9]	5[4-7]	0.049
More PT	5[1-8]	4[1-5]	0.47
Less PT	1[1-2]	1[1-5]	0.25
Satisfaction	8[6-10]	8[6-10]	0.90

Table 4
Family Responses Stratified by APACHE Score, ICU Days, and Ventilator Days

Category	Less than 14 Days of Mechanical Ventilation	Greater than 14 Days of Mechanical Ventilation	p-value
Necessity	10[9-10]	10[8-10]	0.14
Difficulty	6[4-8]	8[7-10]	0.005
Discomfort	4[1-6]	5[4-8]	0.08
Benefit	10[9-10]	9[5-10]	0.01
Enjoyment	7[4-8]	4[3-5]	0.004
More PT	5[3-8]	4[1-7]	0.18
Less PT	1[1-2]	1[1-3]	0.48
Satisfaction	9[8-10]	9[7-10]	0.64