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ORIGINAL RESEARCH

Occupational, Physical, and Speech Therapy Treatment Activities During Inpatient Rehabilitation for Traumatic Brain Injury

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Abstract

Objective: To describe the use of occupational therapy (OT), physical therapy (PT), and speech therapy (ST) treatment activities throughout the acute rehabilitation stay of patients with traumatic brain injury.

Design: Multisite prospective observational cohort study.

Setting: Inpatient rehabilitation settings.

Participants: Patients (N=2130) admitted for initial acute rehabilitation after traumatic brain injury. Patients were categorized on the basis of admission FIM cognitive scores, resulting in 5 fairly homogeneous cognitive groups.

Interventions: Not applicable.

Main Outcome Measures: Percentage of patients engaged in specific activities and mean time patients engaged in these activities for each 10-hour block of time for OT, PT, and ST combined.

Results: Therapy activities in OT, PT, and ST across all 5 cognitive groups had a primary focus on basic activities. Although advanced activities occurred in each discipline and within each cognitive group, these advanced activities occurred with fewer patients and usually only toward the end of the rehabilitation stay.

Conclusions: The pattern of activities engaged in was both similar to and different from patterns seen in previous practice-based evidence studies with different rehabilitation diagnostic groups.

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Acute inpatient rehabilitation is composed of multiple treatment activities with varied interventions within each activity. Delivery of activities is by multiple professional disciplines across numerous patient encounters and in mixed environmental settings over varying periods of time and maybe affected by individual patient characteristics and diagnostic findings. For these reasons, the study of rehabilitation effectiveness is not amenable to the use of randomized controlled trials.[1] Thus, the use of other methodologies to describe and capture what therapists do to identify the active ingredients of acute rehabilitation has been a focus of rehabilitation studies during the past decade.[2-13] Understanding what patients receive day-to-day is a necessary first step to identifying which therapy activities or combinations of therapy activities are associated with the best outcomes.

Standard treatment programs in acute rehabilitation include occupational therapy (OT), physical therapy (PT), and speech

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therapy (ST). Specific therapy activities implemented in acute rehabilitation by OT, PT, and ST were studied in 3 previous practice-based evidence (PBE) research projects for patients receiving acute inpatient rehabilitation after stroke (OT, PT, ST),[2-6,12] joint replacement (OT, PT),[7,8] and spinal cord injury (SCI) (OT, PT, ST).[9-11,13] The Post-Stroke Rehabilitation Outcomes Project was the first PBE study to examine day-to-day therapy activities for patients receiving acute inpatient rehabilitation.[2] A detailed analysis of OT activities revealed that most of OT time (37%) was spent on remediating impairments, followed by 32% of time spent on training in basic activities of daily living. OT tasks became more complex as patients progressed, whereas basic level activities predominated with patients who did not progress. The least amount of time was spent on community integration and leisure activities.[4] The pattern of moving to higher level activities as patients progressed in function was also seen in PT. However, most of PT time (25%−38%) was spent on gait activities, regardless of mobility limitations. The least amount of time was spent on community mobility activities.[5] In ST sessions, most of the time was spent on swallowing activities (20%), followed by problem solving/reasoning activities (18%) and then verbal expression activities (10%). However, most striking was the finding that low-level and mid-level communicators who were engaged in complex cognitive and linguistic activities experienced better outcomes than did similar patients who were engaged in less complex activities, challenging clinical convention.[6]

The Joint Replacement Outcomes in Inpatient Rehabilitation Facilities and Nursing Home Treatment Sites study was the second PBE study to examine content of day-to-day therapy activities.[8] OT and PT activities after knee or hip replacement surgery were examined in freestanding skilled nursing facilities, hospital-based skilled nursing facilities, and inpatient rehabilitation facilities. Although the study noted differences in the level of therapy intensity across different settings, the types of therapy activities used during OT and PT sessions were similar. Patients spent 56% to 66% of their OT time engaged in activities focused on exercise, functional mobility, and lower body dressing and 70% to 75% of their PT time engaged in activities focused on exercise and gait.[7,8]

The SCI-PBE study, referred to as Spinal Cord Injury Rehabilitation (SCIRehab) study,[13] found that in both OT and PT sessions, 77% of a patient's time was spent in individual therapy and 23% in group therapy. OT sessions were primarily composed of activities focused on strengthening/endurance (23% of the total time), activities of daily living (17%), range of motion (ROM)/stretching (9%), and education (7%). Total times for PT activities varied by level and completeness of injury (high level of tetraplegia, low level tetraplegia and paraplegia) and included ROM/stretching (23%, 16%, 12% for the 3 subgroups, respectively), strengthening (11%, 12%, 11%), and transfer training (11%, 14%, 22%).[9,10]

ST sessions are generally not required for all patients with SCI.[11] ST consults were ordered for 40% of the sample in the SCIRehab study. Of these patients, 57% received >5 sessions of ST, and ST activities varied on the basis of the motor level of injury. Swallowing activities dominated the time (32%) for patients with the highest level of motor injury (C1-4, completeness A, B, or C), whereas cognitive communication activities predominated the time for patients with lower level or less complete injuries (40%). Accumulated activity times for ST were more varied than those for OT and PT, and less variability in ST activity times was accounted for by patient and injury characteristics.[11]

In these 3 PBE studies, similarities of therapy activities used within the disciplines are seen. However, the findings are sufficiently varied, and so it warrants a detailed analysis of different impairment groups. DeJong et al[7] examined the differences in PT activities across 3 patient groups: stroke, total knee arthroplasty, and traumatic brain injury (TBI). The TBI group received the least amount of the total PT time. These findings, coupled with previous retrospective TBI research that has investigated factors such as frequency of therapy, aggregate therapy time, or time spent in OT, PT, or ST,[2,14,15] warrant a detailed investigation of therapy activities delivered during acute rehabilitation for TBI.

The first purpose of this study was to provide descriptions of OT, PT, and ST activities throughout acute inpatient rehabilitation for patients admitted after TBI. Sufficient detail on the engagement of patients in different activities throughout the rehabilitation length of stay (RLOS) is included, and so subsequent analyses relating therapy activities to interventions and outcomes can be performed. The second purpose was to provide descriptions of changes in therapy activities throughout the acute RLOS.

List of abbreviations:

CSI	Comprehensive Severity Index
IADL	instrumental activities of daily living
OT	occupational therapy
PBE	practice-based evidence
POC	point-of-care
PT	physical therapy
PTA	posttraumatic amnesia
RLOS	rehabilitation length of stay
ROM	range of motion
SCI	spinal cord injury
SCIRehab	Spinal Cord Injury Rehabilitation
ST	speech therapy
TBI	traumatic brain injury

Methods

Data were collected using the PBE research design and corresponding data collection methodology. PBE uses a cohort design with a prospective collection of comprehensive data on characteristics and deficits/problems of patients at the beginning of their rehabilitation admission, treatments received during their stay, and their status at discharge and follow-up. Previous reports have addressed similarities and differences of PBE research with other observational designs, as well as relative strengths and weaknesses of various designs for establishing effectiveness of treatments.[16-19]

Facilities and patients

The TBI-PBE project was a multicenter investigation conducted at 10 TBI inpatient rehabilitation facilities.[20] The approval of the institutional review board was obtained at each site. Consecutive patients admitted to each facility's specialized brain injury unit for initial rehabilitation after TBI were approached for enrollment. Inclusion criteria were age >14 years and informed consent by patient or by proxy for patients unable to consent and for minors. TBI was defined as damage to brain tissue as a result of external force and evidenced by objective neurological findings, loss of consciousness and/or posttraumatic amnesia (PTA), or skull fracture. Patients who needed transfer to a medical/surgical unit during their rehabilitation stay were retained in the study, but their acute care hospital days were not counted as part of the RLOS.