Commentary

The SCIRehab Project: What rehabilitation interventions are most strongly associated with positive outcomes after spinal cord injury?

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The SCIRehab project was designed to answer the question: What inpatient rehabilitation treatment interventions are most strongly associated with positive outcomes in people with traumatic spinal cord injury (SCI) at discharge and one year post injury, after controlling for patient and injury characteristics? A Practice-Based Evidence (PBE) observational research methodology was employed to delve into the black box of rehabilitation by documenting details of the treatment process, and then to relate natural variation in treatment (along with information about patient and injury differences) to variation in outcomes. Funded by the National Institute on Disability and Rehabilitation Research in the United States Department of Education, the SCIRehab study consented and enrolled individuals aged 12 years and over with traumatic SCI who were rehabilitated at six participating SCI centers from the fall of 2007 through the end of 2009, and followed them 1 year post-injury. It has been a massive effort to document the process of rehabilitation and begin to understand relationships between the vast array of rehabilitation services provided and optimal outcomes. More than 1000 clinicians across the seven disciplines at the six centers documented details of more than 460 000 interventions provided to 1376 patients during more than 280 000 treatment sessions (or nursing shifts) and more than 250 000 hours of treatment.

The first phase of SCIRehab reported in the June 2009 (*Journal of Spinal Cord Medicine* (JSCM)), developed a rehabilitation treatment taxonomy to describe the intervention activities of each of seven disciplines (physical therapy (PT), occupational therapy (OT), therapeutic recreation (TR), speech language pathology (SLP), psychology (PSY), nursing, and social work/case management (SW/CM)) and programmed handheld electronic data capture devices to document the details of the rehabilitation process.

The second phase[2] of SCIRehab reported in March 2011 described the nature of the rehabilitation process (detailing for the first time how much of each treatment intervention was delivered to patients with SCI during inpatient rehabilitation by each discipline) and determined which patient and injury characteristics explained variation in the amount of treatment provided.

The third phase of SCIRehab reported in this issue of *JSCM*, examines relationships between treatment variation (as well as patient and injury characteristics) and a range of outcomes including function and residence at discharge and 1 year post-injury, rehospitalization and medical complication in the first year, and societal participation and life satisfaction at 1 year post-injury. It is this third phase that attempts to answer the question of which interventions are most strongly associated with positive outcomes, after controlling for patient and injury differences.

In the first article, Whiteneck *et al.* describe the SCIRehab PBE methodology in detail and demonstrate that the majority of variation in outcomes is accounted for by patient and injury differences, with variation in total hours of each discipline's treatments adding relatively small but significant explanatory power to understanding outcomes (when all patients are analyzed together and types of treatments are not differentiated).[3] The next seven articles examine the individual treatment activities of each discipline and relate them to outcomes. Each article begins with examination of the full SCIRehab sample. Again, demographic and injury characteristics demonstrate strong associations with many outcomes. In fact, sometimes the associations

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DOI 10.1179/2045772312Y.0000000083

are so strong that it appears little variance remains to be attributed to differences in treatment. Several papers, as relevant to each discipline, introduce subgroup analyses that examine specific outcomes for specific groups of patients. As patient groupings become more homogeneous, the influence of patient characteristics becomes less influential and we see more explained variance being contributed by discipline-specific treatments; this is especially true for functional outcomes.

The analysis of relationships between treatment interventions (total time spent in each discipline and time spent in discipline-specific activities) and outcomes has identified some positive relationships, some negative relationships, and quite a few relationships that are not significant. Positive relationships should not be interpreted as 'good' and negative relationships as 'bad.' Indeed, negative relationships may be indicative of nothing more than a patient need that has not been measured adequately. Thus, caution is required in interpreting these findings; we stress they are associations and cannot be considered causal.

It is well known that the level and completeness of injury and expected functional performance of persons with SCI is quite diverse and that one-size rehabilitation does not fit all patients. In this series, effort has been taken to focus OT and PT analyses on functionally homogeneous groups of patients with motor complete injuries, assessing functional outcomes that are particularly relevant to these subgroups.

While SCIRehab has not resulted in clear standard-of-care recommendations, it has provided information for clinicians to consider in selecting treatment interventions, and it has provided suggestions for further research and clinical trials. To facilitate analysis of this wealth of rehabilitation data, the release of public use data sets is planned.

References

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