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ORIGINAL RESEARCH

Depression Trajectories During the First Year After Spinal Cord Injury

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Abstract

Objective: To determine the number and type of longitudinal depression trajectories during the first year after spinal cord injury (SCI) and to identify baseline predictors of these trajectories.

Design: Cohort study.

Setting: Rehabilitation and postacute community settings.

Participants: Of 168 consecutive admissions to inpatient rehabilitation for acute SCI, 141 (115 men, 26 women) patients were enrolled in a randomized controlled trial telephone follow-up intervention, which showed no outcome differences, and completed assessments on at least 2 of the 4 follow-up occasions (3, 6, 9, and 12 months after SCI). Participants were on average 41 years old, most were non-Hispanic (96%) and white (86%), and 61.7% had tetraplegia.

Interventions: Data were drawn from the ineffective randomized controlled trial.

Main Outcome Measure: Patient Health Questionnaire-9 (PHQ-9).

Results: Unconditional linear latent class growth analysis models of PHQ-9 total scores revealed an optimal 3-class solution: stable low depression (63.8%), mild to moderate depression (29.1%), and persistent moderate to severe depression (7.1%). Preinjury mental health history and baseline pain, quality of life, and grief predicted class membership.

Conclusions: The modal response to SCI was stable low depression, whereas persistent moderate to severe depression primarily represented a continuation or relapse of preinjury depression. This line of research has the potential to improve identification of subgroups destined for poor outcomes and to inform early intervention studies.

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The prevalence of depression after spinal cord injury (SCI) has been studied extensively.[1] We know that approximately 20% to 38% of individuals with new SCI will exhibit significant depressive symptomatology during inpatient rehabilitation, and 11% to 31% surveyed in the community will have a depressive episode. However, group averages captured at one point in time actually convey little clinically relevant information for the individual patient. We do not know how many people are never depressed, how many become depressed, how many remain depressed, and how many recover from depression. For purposes of prognosis and treatment planning, we need to know a given person's likely course of depression.

There is surprisingly little research on the course of depression in SCI. Two studies on the course of depression through inpatient rehabilitation found 54% to 62% were never depressed, 20% to 21% were persistently depressed, and 18% to 25% recovered from depression.[2,3] There is new onset major depression, depression recovery, and persistent depression 3 to 6 months after SCI.[3,4] Approximately 30% of people who are depressed and anxious after SCI remain so 1 to 2 years after SCI.[5] One longitudinal study on depression 1 to 5 years after SCI found that 8.7% of the

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sample had persistent or recurrent depression, whereas 25% demonstrated improved depression, and 20% reported worsening depression.[6]

Newer statistical methods are able to detect subgroups with similar longitudinal trajectories within samples that have heterogeneous outcomes.[7] A seminal European study detected 4 depression trajectories during the first 2 years after SCI.[8] The trajectories were as follows: stable low depression (50.8%), depression improvement (23.9%), delayed depression (12.8%), and persistent moderate to severe depression (12.5%). However, it is unclear whether these trajectories will be the same for those with SCI in the United States where mental health treatment may be different and initial rehabilitation stays are shorter.

Depression after SCI is currently undertreated in the context of usual care.[9] Describing and ultimately being able to predict depression trajectories using demographic, injury, and clinical characteristics (eg, past psychiatric history, pain, alcohol use, grief, quality of life) has potential not only for enhanced understanding of post-SCI depression, but also for improved targeting and tailoring of prevention and treatment efforts. Numerous studies have provided specialized treatment indiscriminately to people with SCI in an effort to improve overall adjustment.[10-14] Trajectory research holds promise for identifying those at risk of persistent depression and designing specific interventions that target them.

Therefore, we examined trajectories of depression in a sample of individuals with new SCI who were followed for 1 year after injury. We hypothesized that the 4 depression trajectories found in the European study would characterize our sample.[8] Based on research in SCI and other populations, we also examined potential demographic, injury, and clinical predictors of trajectory membership. We predicted that younger age and single or divorced marital status,[15] being a woman and nonwhite race,[16] preinjury history of depression or substance abuse,[17] and pain[2,18] would predict higher depression trajectories.

Methods

Participants

The study sample was drawn from consecutive admissions to inpatient rehabilitation units at the University of Washington Medical Center and Harborview Medical Center (Seattle, WA) between 2007 and 2010 for acute SCI. Participants were excluded if they were <18 years old; were not fluent in English; did not complete inpatient rehabilitation; had severe speech, cognitive, or psychotic disorders that would prevent reliable responding; or had no telephone access after discharge from the hospital. Eighty percent of eligible patients who were admitted agreed to participate. There were 168 persons who consented and enrolled into a randomized controlled trial of a telephone follow-up intervention. The randomized controlled trial tested the efficacy of telephone counseling to reduce rehospitalizations and emergency health care visits and to improve adjustment after inpatient rehabilitation. The treatment group received up to 11 calls over 1 year from 1 of 2 care managers supported by a multidisciplinary team of SCI experts. The counseling was comprised of eliciting participant concerns; facilitating problem-solving; and providing education, resources, or referrals. The control condition received usual care.

Outcomes of the trial were equivalent in the treatment and control groups.[19] Therefore, data from both groups were combined to form this cohort study. Thirty-five additional persons were excluded from the cohort study because they completed <2 of the follow-up assessments (at 3, 6, 9, and 12mo postinjury). The final sample consisted of 141 people (115 men, 26 women). Those excluded did not differ from the final sample on initial depression scores ($t_{174}=1.36$, $P=.18$). Excluded participants were more likely to be nonwhite ($\chi^2_1=11.09$, $P<.001$) and less educated ($\chi^2_2=8.84$, $P=.01$) than those included. No other differences were found on any variables of interest.

List of abbreviations:

PHQ-9 **Patient Health Questionnaire-9**
SCI **spinal cord injury**

Procedure

Trained research assistants screened all admissions for basic eligibility. Eligible persons underwent informed consent procedures. Individuals who consented completed a structured in-person interview at baseline that included all the variables subsequently described. Depression was assessed at baseline and via telephone at 3, 6, 9, and 12 months after injury by trained research assistants blinded to treatment assignment. The University of Washington Institutional Review Board approved all study procedures.

Measures

Demographics

Demographic information, including age, race, sex, education, marital status, and insurance status, was obtained from medical records and self-report.

Injury and treatment characteristics

Injury characteristics and treatment information, including length of hospital stay, neurologic level, discharge FIM scores, and use of antidepressant medications, were collected from participants' inpatient medical records.

Psychological characteristics

Psychological characteristics were assessed at baseline via self-report. First, preinjury depression history was assessed, which was measured (yes/no) by an item that asked whether the participant had ever been diagnosed with depression prior to injury. Second, other preinjury mental health history was assessed, which was comprised of items (yes/no) that asked whether the participant had ever been diagnosed with bipolar disorder, panic, generalized anxiety, posttraumatic stress disorder, obsessive-compulsive disorder, phobias, or schizophrenia prior to injury. Endorsement of any condition was coded as a positive history of other mental health disorder. Third, hazardous drinking was assessed using the Alcohol Use Disorders Identification Test-consumption, a 3-item measure that captures typical quantity and frequency of alcohol use and binge drinking on a 0 to 4 scale.[20] The cutoff for hazardous drinking is a score of ≥3 for women and ≥4 for men. Fourth, quality of life was measured with the Life-1.[21] Subjects indicated how they felt about their overall quality of life since their SCI on a scale from 1 (terrible) to 7 (delighted). The Life-1 is a valid measure of well-being and not significantly influenced by social