

ORIGINAL ARTICLE

Racial and Ethnic Disparities in Functioning at Discharge and Follow-Up Among Patients With Motor Complete Spinal Cord Injury



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Abstract

Objective: To examine racial and ethnic differences in self-care and mobility outcomes for persons with a motor complete, traumatic spinal cord injury (SCI) at discharge and 1-year follow-up.

Design: Retrospective cohort study.

Setting: Sixteen rehabilitation centers contributing to the Spinal Cord Injury Model Systems (SCIMS) database.

Participants: Adults with traumatic, motor complete SCI (N=1766; American Spinal Injury Association Impairment Scale grade A or B) enrolled in the SCIMS between 2000 and 2011. Selected cases had complete self-reported data on race and ethnicity (non-Hispanic white, non-Hispanic black, or Hispanic) and motor FIM scores assessed at inpatient rehabilitation admission, discharge, and 1-year follow-up.

Interventions: Not applicable.

Main Outcome Measures: Functional outcomes were measured by FIM self-care and mobility scores on a 1 to 7 FIM scale, at discharge and 1-year follow-up.

Results: Multiple regression models stratified by neurologic category and adjusted for sociodemographic and injury characteristics assessed racial and ethnic group differences in FIM self-care and mobility change scores at discharge and 1-year follow-up. At discharge, non-Hispanic black participants with tetraplegia and paraplegia had significantly poorer gains in FIM self-care and mobility scores relative to non-Hispanic white and Hispanic participants. At 1-year follow-up, similar FIM self-care and mobility change scores were found across racial and ethnic groups within each neurologic category.

Conclusions: Non-Hispanic white and Hispanic participants had comparatively more improvement in self-care and mobility during inpatient rehabilitation compared with non-Hispanic black participants. At 1-year follow-up, no differences in self-care and mobility outcomes were observed across racial and ethnic groups. Additional research is needed to identify potential modifiable factors that may contribute to racially and ethnically different patterns of functional outcomes observed during inpatient rehabilitation.

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Spinal cord injury (SCI) is a sudden and debilitating injury that results in paralysis, sensory deficits, and drastically altered function and quality of life.¹⁻³ According to the National Spinal Cord Injury Statistical Center, approximately 275,000 individuals in the United States are living with SCI, with roughly 12,000 new cases of SCI reported annually.^{4,5} The 3 largest

racial and ethnic groups living with a traumatic SCI are non-Hispanic white (64.4%), non-Hispanic black (24.4%), and Hispanic (7.9%), respectively.⁶

As the proportion of racial and ethnic minorities with SCI has increased over the past 3 decades, health disparities research in SCI has begun to reveal important differences in health outcomes among racial and ethnic groups. Racial and ethnic minorities living with an SCI are at increased risk of secondary health complications,⁷⁻⁹ psychological distress,^{10,11} poorer quality of life,^{11,12} and having inadequate wheelchair quality.^{13,14} For example, non-Hispanic black individuals living with SCI have higher rates of severe pressure ulcers requiring invasive treatment than their Hispanic and non-Hispanic white counterparts.^{8,15,16} Non-Hispanic black and Hispanic women with SCI also report more depressive symptoms in comparison to non-Hispanic black men and non-Hispanic white women and men.^{17,18} Only a fraction of persons with SCI attain gainful employment postinjury, and this socioeconomic problem is magnified by a significant employment gap observed between non-Hispanic whites and minority groups.¹⁹⁻²¹ Any combination of these negative outcomes can impose an additional burden on health status, community integration and participation, and readjustment to life after an SCI for minority groups.

Despite the increased focus on the occurrence and implications of health disparities in medical rehabilitation, few SCI studies have examined the association between race and ethnicity on functional outcomes. Functional outcomes are the key predictors of SCI health status, community integration/participation, and quality of life, as well as quality indicators of inpatient rehabilitation facilities.^{22,23} Self-care and mobility are key domains of SCI rehabilitation used in the classification of therapeutic interventions²⁴⁻²⁶ as well as constructs of commonly used rehabilitation outcome measures, such as the FIM.²⁷⁻²⁹

Few published studies have used the Spinal Cord Injury Model Systems (SCIMS) data set to examine the impact of race and ethnicity on functional outcomes. Of these, 3 studied FIM scores from admission to discharge from inpatient rehabilitation,³⁰⁻³² while only 1 study analyzed changes in functional outcomes after discharge and up to 12 months postinjury.³³ While these previous studies observed similar functional outcomes across racial and ethnic groups with SCI, their findings were limited by (1) relatively small sample sizes; (2) limited statistical power to disaggregate racial and ethnic differences (ie, these studies compared only white and black rather than non-Hispanic white, non-Hispanic black, and Hispanic groups), which does not account for the cultural diversity of individuals living with SCI and the potential impact of race and ethnicity on functional outcomes; and (3) broad functional measures that failed to capture clinically important aspects of functional gains over time, such as self-care and mobility.^{34,35} This cohort study builds on the current literature by examining the effect of race and ethnicity on self-care and mobility outcomes in individuals living with SCI at rehabilitation discharge and 1 year postinjury, after controlling for key socio-demographic and injury characteristics.

List of abbreviations:

CI confidence interval
 SCI spinal cord injury
 SCIMS Spinal Cord Injury Model Systems

Methods

Data source

Secondary data analyses were conducted using data extracted from the SCIMS database (sponsored by the U.S. Department of Education's National Institute on Disability and Rehabilitation Research). The SCIMS database is a longitudinal repository of clinical, psychosocial, health, and functional data on patients with traumatic SCI.³⁶ In-depth descriptions of the SCIMS database history and methods are described elsewhere.^{4,36-38} Each center has approval by its local institutional review board, and the primary site for the current study obtained approval from the institutional review board to conduct the current analysis.

Analytic sample

The study sample was derived from acute rehabilitation programs and 1-year follow-up data from persons with traumatic SCI enrolled in the SCIMS database between 2000 and 2011. A total of 16 unique rehabilitation facilities were included in the SCIMS database during the 2000 to 2006 and 2006 to 2011 SCIMS grant cycles. During these grant cycles, 11 rehabilitation facilities were consistently in both grant periods being studied. Inclusion criteria were informed by previous research and the Consortium for Spinal Cord Medicine's clinical practice guidelines,^{23,39} to ensure our comparison groups were functionally similar. Sampling targeted (1) individuals from the 3 largest racial and ethnic groups included in the SCIMS database—persons who self-identified as non-Hispanic white, non-Hispanic black, and Hispanic; (2) persons classified with motor complete American Spinal Injury Association Impairment Scale grade A or B at discharge, consistent with the Consortium for Spinal Cord Medicine's clinical practice guidelines²³; (3) complete diagnostic information related to neurologic level of injury obtained at discharge; (4) onset date (ie, the period from injury data to admission date was <60 days), to ensure the similar clinical profiles (ie, minimize risk of major secondary complications associated with an SCI during acute care)⁴⁰; and (5) complete FIM data at rehabilitation admission, discharge, and 1-year follow-up. Sampling methods are illustrated in figure 1 and yielded a final sample of 1766 participants. The proportions of non-Hispanic white, non-Hispanic black, and Hispanic participants were 62.6%, 25.5%, and 11.9%, respectively. When we compare the motor complete SCI cases missing FIM data with the motor complete cases not missing data, we found the following: (1) a small proportion of non-Hispanic whites were missing FIM data ($P<.05$); and (2) the group excluded for missing FIM data had significantly lower FIM self-care at admission ($P<.05$) and mobility scores at discharge ($P<.01$).

Independent variable

Racial and ethnic group differences in functional independence are the primary focus of the current analysis. The SCIMS collects self-identified data about race (ie, white, black, Native American, Eskimo or Aleut, Asian or Pacific Islander) separately from ethnicity (Hispanic origin). Hispanic origin is not mutually exclusive from racial categories; however, we prioritized Hispanic identity for those individuals who self-identified as being of Hispanic origin. The final race/ethnicity variable used in the analyses distinguished respondents who are non-Hispanic white, non-Hispanic black, and Hispanic.

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