
Spinal Cord Injury Identified with Violence: Community Reintegration in Urban Areas

Rodney H. Adkins, Bruce Hume, Melinda Nabor, and Robert L. Waters

The data from a two-part study comparing outcomes related to firearm injuries versus injuries caused by motor vehicle crashes are reanalyzed from the perspective of an operational definition of antisocial behavior. One hundred sixty-four men with spinal cord injury (77 motor vehicle injuries and 87 firearm injuries) who were at least 2 years post injury completed an in-person interview. The interview included the Beck Depression Inventory (BDI), the civilian version of the Mississippi Scale of Posttraumatic Stress Disorder (M-PTSD), and the Craig Handicap Assessment and Reporting Technique (CHART) as outcome measures. The CHART was used as a measure of community reintegration. The data were categorized into three groups based on combinations of gang involvement and incarceration history. Unlike the findings associated with etiology, groups categorized by indicators of antisocial behavior were shown to be significantly different on all three outcome measures. In addition, correlation patterns between the three outcome measures were different for the three groups. Thus, treatment decisions and outcome expectations based on the superficial category of etiology should be avoided. Impairment, disability, education, employment history, and history of antisocial behavior are the most important factors associated with community reintegration. Key words: *community reintegration, spinal cord injury, violence*

HISTORICALLY, the leading cause of spinal cord injury (SCI) has been motor vehicle crashes. However, in recent years, the proportion of persons who have sustained SCI as a result of causes associated with violence has risen markedly. Within the National Spinal Cord Injury Model System Database, during the period from 1973 through 1978, causes identified with violence accounted for 13.3% of cases

entered into the database; from 1979 through 1982, 15.1%; from 1983 through 1986, 17.2%; from 1987 through 1990, 20.8%; and from 1991 through 1994, 30.4%.¹

Although violence seems pervasive in American society, SCI resulting from etiologies connected with violence is more prominent in facilities with primarily urban, as opposed to rural, catchment areas. In facilities with urban catchment areas, SCIs

Rodney H. Adkins, PhD, is Co-Director, Regional Spinal Cord Injury Care System of Southern California, and Director of Research, Rehabilitation Research and Training Center on Aging with Spinal Cord Injury, Rancho Los Amigos Medical Center, Downey, California.

Bruce Hume, MSW, is Director, Social Work Department, Rancho Los Amigos Medical Center, Downey, California.

Melinda Nabor, MSW, is Clinical Social Worker, Neurotrauma Division, Rancho Los Amigos Medical Center, Downey, California.

Robert L. Waters, MD, is Chief Medical Officer and Director, Regional Spinal Cord Injury Care System of Southern California, and Co-Director of Research, Rehabilitation Research and Training Center on Aging with Spinal Cord Injury, Rancho Los Amigos Medical Center, Downey, California.

Funded in part by the Public Health Service Centers for Disease Control, grant number R49/CCR903622, and the National Institute on Disability and Rehabilitation Research, Spinal Cord Injury Model Systems Program, grant number H133N00026.

Top Spinal Cord Inj Rehabil 1998;4(2):18-27
© 1998 Aspen Publishers, Inc.

linked to violent causes ranged from 21.1% to 50.0%; in those with rural catchment areas, the range was 6.6% to 21.2%.²

Violence comes in many forms. For example, we know of motor vehicle–pedestrian injuries that were inflicted intentionally. Nevertheless, one usually associates SCI owing to violence with gunshot wounds, and perhaps rightly so. Eighty-eight percent of the injuries identified with violence and documented in the National Spinal Cord Injury Model System Database were caused by firearms.¹ Of course, it is unlikely that all documented gunshot wound injuries were inflicted intentionally, especially in rural areas, just as it is unlikely that all injuries associated with falls are due to carelessness. In this regard, if violence is defined as an intentional act to cause harm, the available data are not perfectly reliable.

Nevertheless, despite the rising incidence of SCI associated with violence, information concerning differences between individuals who have sustained SCIs as a result of causes identified with violence and those who have sustained SCIs as a result of causes not identified with violence has been limited primarily to demographics. Published information pertaining to rehabilitation outcome differences, especially community reintegration, is almost nonexistent. In this article, we will review the few reports available dealing with SCI and violence that do not have a medical/surgical bent. We will look at data not previously reported and will analyze it in a manner we believe is more productive from a clinical and community reintegration perspective than categorization by etiology. In closing, we will offer some observations and opinions based on

Those injured by causes traditionally associated with violence are significantly younger than those injured by causes not associated with violence.

our experiences with persons who have sustained an SCI as a result of violence.

Demographics

Demographically, those injured by causes traditionally associated with violence are significantly younger than those injured by causes not associated with violence.^{1–3} In addition, although SCIs are sustained predominantly by males, for those injuries identified with violence, the gender gap is greater. For example, of 2,324 individuals injured from 1980 through 1996 and rehabilitated within the Regional Spinal Cord Injury Care System of Southern California, 86% were males. Of those injured by violence, 92% were males. However, the most prominent demographic difference between individuals with SCI resulting from violent causes and those with SCI resulting from other causes is in the ethnic distribution of those injured. Within the National Spinal Cord Injury Database, 71.8% of those who sustained an SCI by firearm injury were ethnic minorities.² Of the firearm injuries recorded in the Southern California database, 94.9% occurred in ethnic minority groups, predominantly Hispanics (56.3%) and blacks (34.8%).

Examining the issue from a different perspective, among all Hispanics sustaining an SCI from 1980 through 1996 and treated

within the Southern California System, 52.1% were injured by firearms. Among blacks treated within the system during the same period, 63.4% were injured by firearms, compared with only 9.5% of all non-Hispanic whites. Cases reported to the National Spinal Cord Injury Database between 1990 and 1993 show similar trends, with 45.7% of SCIs in blacks, 52.4% of SCIs in Hispanics, and only 8.5% of SCIs in non-Hispanic whites caused by violence.² In a community-based sample, Rintala et al. also found similar ethnic distributions, with 67% of blacks, 35% of Hispanics, and 14% of whites in their sample being injured by violence.⁴

Zafonte and DeSantis⁵ retrospectively examined differences in demographics and medical complications at 1 year post injury in two groups comprising 48 individuals each. The two groups were matched for level and completeness of injury and for age. The members of one group had SCIs resulting from violence-associated causes; members of the other group had SCIs resulting from other causes. The association of ethnicity and violence was also supported in this study: 69% of those with nonviolent injuries were white; 85% of those with injuries stemming from violence were black. The only other reported preinjury difference between the groups was in employment at time of injury. Of those with nonviolent injuries, 67% were employed at the time of injury; whereas only 28% of those with violent injuries were employed at the time of injury. At follow-up, greater percentages of contractures and spasticity were noted for those with injuries related to violence; and the rehospitalization rate within the first year of injury was nearly double for these patients. The authors con-

cluded that socioeconomic status, premorbid personality, and access to health care were the primary causes of follow-up differences.

Rintala et al⁴ reported the results of a telephone survey of community-based persons with paraplegia resulting from violent or nonviolent injuries. Patients with injuries related to violence were more likely to have problems with pain, to smoke, to have incomes under \$10,000, to have poorer support systems, to not live with a spouse or significant other, and to not be involved in any productive activity. They also found those with violent injuries were less well educated and spent more time in bed.

Waters and Adkins⁶ examined a sample of 164 men who were between 18 and 35 at the time of injury. Motor vehicle crashes accounted for 77 (47%) of injuries and firearms for the remaining 87 (53%). Ethnically, 23% were white, 28% were black, and 49% were Hispanic. However, no whites were injured by firearms, compared with 89% of blacks. Of the Hispanics in the sample, 57.5% had been injured by firearms, and 42.5% by motor vehicle crashes.

The study by Waters and Adkins⁶ emphasized outcomes at discharge from rehabilitation and factors that might influence the rehabilitation process and outcomes. Analyzed from one perspective, significant differences between etiologic and ethnic groups were found. Those injured by firearms were found to have lower levels of preinjury employment, higher levels of antisocial behavior (arrests, imprisonment, and gang involvement), lower impairment, fewer associated injuries, fewer spine surgeries, greater scores on the Functional Independence Measure (FIM)⁷ at admission and discharge from rehabilitation, and shorter lengths of stay for

rehabilitation and total hospitalization. Because of the disproportionate distribution of ethnicity across etiology as described above, the best comparison of etiologic groups was among Hispanics, and the trends noted earlier were generally supported. Also because of this disproportionate distribution, with all firearm injuries being sustained by ethnic minorities, ethnic differences tended to follow the same pattern as differences between firearm and motor vehicle injuries.

There was one interesting aspect of the findings of Waters and Adkins,⁶ however, that might have some bearing on community reintegration. Although those injured by firearms had slightly fewer years of education than those injured by motor vehicles, the difference was not significant. This was due to the fact that the blacks, who were overrepresented in the group injured by firearms, actually had the highest mean years of education (26% had education beyond the high school level). Nevertheless, 75% of blacks with education beyond the high school level had been injured by firearms. In addition, although blacks had the highest mean number of years of education and Hispanics the lowest, blacks had the lowest rate of preinjury employment and Hispanics the highest.

Despite the differences noted above, when analyzed using multiple regression techniques, the outcomes studied were shown not to be primarily related to etiology or ethnicity, but to impairment, associated injuries, and respective treatments. Similarly, education, work ethic (as indicated by employment history), and antisocial behavior did not affect outcome at discharge from rehabilitation.⁶

In the second report using the same sample

studied by Waters and Adkins,⁶ the relationships of selected injury and preinjury factors with specific outcomes following rehabilitation were assessed.⁸ Injury and preinjury factors included impairment, FIM score at discharge from rehabilitation, evidence of brain injury, chronic pain, duration of injury, education, employment, gang activity, arrests, self-reported alcohol and drug abuse, available support, etiology, and ethnicity. The outcomes examined were mean numbers of documented complications, pressure sore episodes, nonroutine clinic visits, and days hospitalized per year after discharge from rehabilitation, and total score on the Craig Handicap Assessment and Reporting Technique (CHART)⁹ at follow-up. The five outcomes were assessed in multiple regression models using the factors above as independent variables. Complications and pressure ulcers were treated as and added to the independent variables for the regression models for clinic visits and hospitalization; complications, pressure ulcers, clinic visits, and hospitalization were treated as and added to the independent variables for the regression model for CHART. Although CHART is regarded a measure of handicap, it has been used as a measure of community integration¹⁰ and discussed in the same context as the Community Integration Questionnaire.¹¹ Presumably the less the handicap, the greater the degree of community integration.

The results of these analyses demonstrate that complication rates were significantly associated with discharge FIM scores and self-reported alcohol use/abuse only; pressure ulcer episodes were significantly associated with injury completeness and drug abuse after injury; the rate of nonroutine clinic visits was also associated with injury

Impairment and resulting disability, as measured by FIM score, demonstrated the strongest associations with both medical and social outcomes.

completeness, as well as duration of injury, complications, and pressure ulcer episodes; and the only significant correlate of hospitalization was pressure ulcer episodes. With regard to CHART scores, discharge FIM scores, chronic pain, and injury completeness were the primary correlates, accounting for 22.6% of the variance. Preinjury education was also a significant correlate of CHART, accounting for 9.8% of the variance; other significant correlates were length of continuous employment, mean numbers of nonroutine clinic visits, and hospitalization.

Again, as in the first report examining data from this sample,⁶ impairment and resulting disability, as measured by FIM score, demonstrated the strongest associations with both medical and social outcomes. In addition, alcohol and postinjury drug abuse were correlated with medical problems, which in turn were associated with handicap. Preinjury education was negatively correlated with handicap. In sum, although etiology and ethnicity may mask other important factors (eg, injury completeness and antisocial behavior influencing outcomes) because of strong associations with those factors, when taken alone, they are not important correlates of outcome.

Issues related to community reintegration are likely to be affected by minority status, and the large proportion of ethnic minorities injured by violence may influence the per-

ception of outcome trends. In addition, it is common to stereotype those injured by violent means as possessing certain attributes that might cause them to respond less successfully to rehabilitation than those injured by other means. It is not uncommon for those injured by violent causes to be perceived as being more at fault or somehow more accountable for their injury, and therefore perhaps less deserving of the benefits of rehabilitation, than those injured by nonviolent causes. In general, those injured by violence tend to be perceived as being associated with antisocial behavior. In reality, a proportion of those injured by violent causes have no history of antisocial behavior; whereas a proportion of those injured by nonviolent causes may have strong histories of such behavior.

Methods

Based on the supposition that behavioral characteristics influence community reintegration to a greater extent than etiology, we operationally defined antisocial behavior and recategorized the participants from the sample discussed above^{6,8} into three defined groups: Group 1 included individuals who reported no gang affiliation and had never been incarcerated; Group 2 included those who either reported gang affiliation (past or present) or had been incarcerated, but not both; and Group 3 included those who reported gang affiliation and had been incarcerated.

Participants

Participants were drawn from a volunteer convenience sample of 164 men who were between 18 and 35 at the time of injury, and who were injured by firearms or motor ve-

