Racial and Ethnic Differences in Community Reintegration in a Community-Based Sample of Adults with Spinal Cord Injury

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The relationship of race/ethnicity to community integration and other variables was assessed in a sample of 164 adults who had lived with spinal cord injury for 2 to 47 years. Compared with blacks and Hispanics, whites were older, better educated, better off financially, less likely to have a violent etiology, less severely impaired, more physically independent, better able to access their community, and involved in more productive activities. Hierarchical regression analyses revealed that after controlling for other demographic and injury-related variables, the amount of variance in mobility and productivity accounted for by race/ethnicity was substantially reduced. Key words: *black, community integration, minorities, ethnicity, Hispanic, race, spinal cord injury*

COMMUNITY integration for individuals with spinal cord injury (SCI) is an important long-range goal of rehabilitation. The importance derives from the fact that, in general, integration into the community can be beneficial in many ways—living longer,[1] having a better quality of life,[2,3] and being less depressed,[4] to name a few.

Blacks and Hispanics have higher rates of disability than other population groups.[5–12] One reason for this is the increasing interpersonal violence—crime, gang activity, and family violence—among minority groups.[13–17] Low socioeconomic status is also associated with more chronic disability.[8,11,18,19] Activity limitation, infectious disease, chronic disease, obesity, and poor nutritional status represent

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many of the current health concerns for minority populations.[9,10,18,20] Minority groups have more restricted activity and more "bed-days" than white counterparts of the same age. Chronic conditions appear at younger ages for minorities than for whites.[19] Thus, such persons endure "double-barreled" discrimination.[21] They may be handicapped by their physical disability as well as by their minority status.[22]

In devising and implementing interventions designed to achieve community integration for persons with disabilities in the most effective manner, it is important to be sensitive to the racial and ethnic cultural context of the individual, including language, beliefs, values, and behaviors.[23] However, it is also important to consider other demographic characteristics in addition to racial or ethnic culture to avoid biases based on stereotyping.[24]

Relatively little is known about racial/ethnic differences in community integration outcomes after SCI. In one study, no significant differences among ethnic groups were found with regard to changes in functional independence from admission to discharge during initial rehabilitation following SCI.[13] In another study, social factors that were deterrents to rehabilitation for black patients with SCI included inadequate housing, lack of transportation, and insufficient financial resources.[25] A study of 1,238 persons enrolled in the National Spinal Cord Injury Statistical Center (NSCISC) database who had been employed at the time of injury revealed that blacks were less likely to have been employed at any time during the first 6 years after SCI than white individuals.[26] Older age (>45 years) and lower educational level were predictive of unemployment for both groups. Male gender was predictive of unemployment for blacks but not for whites, and more impaired neurologic level (ie, tetraplegia) was predictive for whites but not for blacks. In another study of the entire NSCISC database (N = 13,763), predictors of postinjury unemployment included older age, female sex, nonwhite race, lower educational level, and greater functional limitation.[2,27] This closely paralleled earlier findings based on data from one model system rehabilitation hospital.[28]

Community integration is a composite construct comprising social integration, community participation, and community resource utilization.

A study was undertaken to assess the community integration of a community-based sample of adults with SCI. As part of that study, the relationship of race/ethnicity to various measures of community integration and other relevant variables was assessed. To guide conceptualization of the study, a definition of community integration was formulated as follows: community integration is a composite construct comprising three distinct concepts:

1. social integration (the extent and diversity of interactions with other people[32])
2. community participation (the extent of participation in religious, social, recreational, vocational, political, and other organized community groups and activities[30–32])
3. community resource utilization (the accessing of goods and services in the community)

Method

Subjects

A complex sampling strategy was used for this study. In an earlier study of the life status of individuals with SCI (1988–1990), we identified 661 persons with SCI who resided in a 13-county area that included Houston and Galveston, Texas.* Candidates were solicited by means of a variety of media and by contacting people whose names were obtained from area hospitals and organizations for persons with disabilities. To be included in this group, an individual had to have sustained a traumatic SCI at least 9 months prior to enrollment, have residual motor disability at least severe enough to require use of an assistive device for walking (if the person was ambulatory), and be at least 17 years old. Twenty-six (4%) individuals who met the inclusion criteria and were contacted by the research staff declined the opportunity to be included. The Life Status Study design called for a random sample of 100 men and 40 women. In addition, 15 men who were injured after the age of 35 and 15 men who had experienced an SCI a relatively long time before the study were recruited. Candidates for inclusion in the sample were selected from the group of 661 individuals already identified, contacted by telephone or letter, and invited to participate. That process continued until the desired number of men and women agreed to participate. The participants represented 61% of the candidates randomly selected for contact (63% of men and 57% of women). Reasons for nonparticipation included (1) lack of interest or time (46%); (2) unable to contact, moved away, or deceased (31%); (3) too physically or mentally ill (15%); and (4) no reason given (8%).

Nonparticipants ($n = 88$), when compared to the randomly selected participants ($n = 140$), were

- older (41.2 versus 37.0 years; $P < .01$)
- older at SCI onset (30.3 versus 26.4 years; $P < .05$)
- less likely to be involved in unpaid but productive activities (ie, attending school, homemaking, or doing volunteer work) (26% versus 42%; $P < .05$)
- more likely to live in Harris county, of which Houston is a part (83% versus 71%; $P < .05$).

Participants and nonparticipants did not differ significantly with respect to ethnicity, gender, marital status, educational status, veteran status, paid work status, etiology of SCI, impairment of arms or hands, time since injury, living arrangement (ie, private home, nursing home, other), living status (ie, alone, with a spouse, or with parents), need for personal assistance (ie, none, less than 1 hour per day, more than 1 hour per day), presence of pain, and presence of pain that interfered with daily activities.

A second phase of data collection (1991–1993) was completed for 118 of the 130 men involved in the first phase. For the third phase of data collection (1994–1996), which focused on measures of community integration, we attempted to recruit as many previous participants of both genders as possible. Of the original 130 men and 40 women, 95 men (73%) and 32 women (80%) participated in phase 3. Nonparticipants (n = 43) in the third phase of data collection who participated in the first phase, when compared with

*A list of publications emanating from the Life Status Study of Persons with SCI is available from the first author.

people who participated in both the first and third phases (n = 127), had significantly higher scores on the Craig Handicap Assessment and Reporting Technique (CHART) Economic Self-Sufficiency measure[33] (80 versus 65; $P < .05$) and had higher annual personal incomes ($31,044 versus $12,864; $P < .01$). No differences were found between the two groups with regard to gender; race/ethnicity; veteran status; etiology; living status (ie, alone, with a spouse, or with parents); level of education; age; age at onset of SCI; time since onset of SCI; American Spinal Injury Association (ASIA) Total Motor Index[34]; the Functional Independence Measure (FIM)[35]; CHART measures of independence, mobility, occupation, and social integration[33]; presence or absence of pain; and paid versus unpaid work. Reasons for nonparticipation were (1) deceased (26%), (2) unable to contact (28%), (3) lack of interest (23%), (4) too busy (19%), and (5) health problems (ie, diabetes and pressure ulcers) (5%).

For the third phase of data collection, we also randomly selected individuals who were between 2 and 6 years post injury from an updated sampling frame because all of our former participants were at least 6 years post injury. We recruited 26 men and 4 women from this group. Finally, to facilitate analyses of racial/ethnic groups, we recruited an additional 5 Hispanic men and 4 Hispanic women who were randomly selected from the remaining Hispanics in our updated sampling frame. For purposes of the present article, three men were excluded from all analyses; one white (non-Hispanic) former participant and one new Hispanic participant were excluded because of excessive missing data, and one former participant was excluded because he identified himself as of mixed Asian-European race. Thus, the findings reported here are based on 124 (76%) men and 40 (24%) women.

These 164 individuals with SCI had an average age of 44.22 years (SD = 12.80; range = 22–82). Thirty-six (22%) were black, 25 (15%) were Hispanic (primarily Mexican-American), and 103 (63%) were white. Sixty-two (38%) had never been married; 54 (33%) were currently married; and 48 (29%) were separated, divorced, or widowed. They had an average of 13.2 years of education (SD = 3.04; range = 3–20). Personal annual income ranged from $0 to $132,000, with a mean of $18,889 (SD = $20,122), and annual family income (total for all family members living in the household, including the participant) ranged from $360 (cash income for a nursing home resident) to $175,000 (SD = $27,986). Mean age at onset was 29.20 years (SD = 12.08; range = 10–68). Mean time since onset was 15.02 years (SD = 9.49; range = 2–47). Seventy-three (44%) were injured in motor vehicle crashes; 31 (19%) by gunshot wounds; and 60 (37%) by falls, sports, and other causes (eg, flying or falling objects, surgical sequelae).

This group of 164 individuals was, on average, 6 years older than the mean age of our original pool of 661 individuals with SCI (1988) and had lived with their SCI an average of 5 years longer than the original pool. Minorities constituted 37% of the participants in this study compared with 30% in the pool, and women constituted 24% compared with 20% in the pool. Age at onset and distribution patterns for etiology of SCI in this study are very similar to those in the pool.

Procedures

After being recruited by telephone, participants were sent a packet of questionnaires

and standardized instruments covering a large number of topics regarding various areas of life. The completed packets were collected at the time of an interview conducted at the participant's residence. Additional information was obtained during the interview, and each participant received a sensory and motor examination.

Measures

Self-Reported Demographic and Injury-Related Information. Age, race/ethnicity, gender, marital status, years of education, personal and family income, age at onset of SCI, time since onset, and etiology were obtained by self-report.

Impairment. Degree of paralytic impairment was assessed during a physical examination by means of the ASIA Total Motor Index Score.[34] This score is the sum of ratings for 10 key muscle segments on each side of the body. Each muscle segment is rated on a six-point scale ranging from 0 (total paralysis) to 5 (normal). Total scores can range from 0 to 100 (50 for each side).

Participants also were categorized by a combination of their level of injury and the completeness of the injury. First, those whose injuries were in the cervical area were categorized as having tetraplegia. The remainder were categorized as having paraplegia. Second, participants were divided into those who had some motor function below the level of injury (ie, functionally motor incomplete; ASIA Impairment Scale level D) and those who did not have such function (ie, functionally motor complete; ASIA Impairment Scale levels A, B, and C). Finally, three groups were formed by combining level and completeness of injury: tetraplegia (A, B, or C), paraplegia (A, B, or C), and tetraplegia or paraplegia (D).

FIM. The motor items of the self-report version of the FIM[35] were administered during the home interview to assess level of disability. Each participant's degree of independence is assessed on a seven-point scale for each of 13 activities of daily living (ie, transferring to and from bed, climbing stairs, walking or using a wheelchair, transferring to and from tub or shower, bathing, grooming, dressing upper body, dressing lower body, feeding, transferring to and from the toilet, managing the bladder, managing bowel, and toileting). A total score is derived by summing the ratings across the 13 activities. Scores can range from 13 (totally dependent) to 91 (totally independent). Because we were interested in physical independence in self-care activities, the communication and cognitive portions of the FIM were not administered.

CHART. To measure various domains of handicap, the CHART[33] was administered to participants. The five domains include Physical Independence, Mobility, Occupation, Social Integration, and Economic Self-Sufficiency. Physical Independence is the individual's ability to sustain a customarily effective independent existence. Mobility is the individual's ability to move about effectively in his or her surroundings. Occupation is the individual's ability to occupy time in a manner customary to that person's gender, age, and culture. Social Integration is the individual's ability to participate in and maintain customary social relationships. Economic Self-Sufficiency is the individual's ability to sustain customary socioeconomic activity and independence. Scores on each domain can range between 0 and 100, with the higher value indicating absence of handicap. Test–retest reliability coefficients reported by Whiteneck et al[33] are: Physical Indepen-

Social Integration is the individual's ability to participate in and maintain customary social relationships.

dence, .92; Mobility, .95; Occupation, .89; Social Integration, .81 and Economic Self-Sufficiency, .80. As a validity check, Whiteneck et al[33] compared CHART scores with rehabilitation professionals' ratings of the level of handicap of the members of the sample. Individuals rated as having a high level of handicap had, on average, total CHART scores that were significantly lower (reflecting more handicap) than people rated as having a low level of handicap. The validity of the separate CHART domains was supported in a similar manner.

Vocational Status. Participants indicated which of a list of vocational activities applied to them (eg, working for pay full-time, working for pay part-time, full-time student, part-time student, homemaker, full-time volunteer work, part-time volunteer work, retired, "other" [which they described {eg, parenting}], and "none of the above"). They checked all that applied to them.

Community Participation Questionnaire. Participants indicated the number of times they had participated in each of a list of nine organized community activities during the preceding month. These included participation in a religious or spiritual organization; service organization (eg, Kiwanis, Masons); professional organization (eg, union, guild); community service organization (eg, chamber of commerce, school board); neighborhood civic club; political organization; disability advocacy organization; sports organization; or a community picnic, parade, or festival. They could also add other types of organized community activities in which they participated. The total number of times each person participated in any organized community activity was calculated.

Community Resource Utilization Questionnaire. Participants indicated which of a list of 53 community settings (eg, restaurants, grocery store, physician's office) they had gone to in the preceding month. The sum of these settings was calculated to obtain an index of the diversity of community settings each person entered.

Satisfaction with Community Activities. Participants indicated to what extent they agreed with the statement, "Overall, I am satisfied with my current community activities," using a scale ranging from 1 ("very untrue for me") to 7 ("very true for me").

Data analysis

Univariate relationships were assessed between the categorical variable indicating race/ethnicity and each other variable of interest using BMDP software (BMDP/386, BMDP Statistical Software, Inc., 1440 Sepulveda Blvd., Los Angeles, CA 90025). When the other variable was also categorical, χ^2 analysis was performed. In cases where any cell size was less than 5, categories were either collapsed or, when the category with the small cell size was of particular interest, an exact probability value was obtained using the StatXact software package (StatXact Version 2.05, CYTEL Software Corporation, Cambridge, Massachusetts). When the other variable was continuous, the nonparametric Kruskal-Wallace (K-W) test was performed. This test was used rather than analysis of variance because of violations of the

assumption of normality. When the overall K-W test was significant, post hoc pairwise comparisons were performed. Two measures of community integration—CHART Mobility and Occupation Domains—that were significantly related to race/ethnicity were selected for separate multiple regression analyses that assessed their relationship with race/ethnicity after controlling for selected demographic and injury-related variables that also were related to race/ethnicity. In preparation for these regression analyses, zero-order correlation coefficients among the predictor variables were examined to assess the potential for multicollinearity.

Results

Demographic information

Univariate relationships between race/ethnicity and demographic information are displayed in Table 1. Neither gender nor marital status was significantly related to race/ethnicity. On average, the white group was approximately 5 years older than the black and Hispanic groups. This difference approached significance ($P < .06$). Whites also had 2 to 3 years more education than either of the other two groups. This difference was significant overall, as were post hoc pairwise analyses (Tukey method) comparing years of education for whites separately with each of the other groups ($P < .05$). No significant difference was found for years of education between blacks and Hispanics. The white group also had roughly twice the personal and family incomes compared with the other two groups, and whites' mean CHART Economic Self-Sufficiency score was also substantially higher than that for the minority groups. For all three income variables, post hoc pairwise analyses revealed significant differences between whites and each of the other two groups ($P < .05$). No significant differences were found between the two minority groups on these three variables.

Injury-related and disability information

No group differences were found for age at onset of SCI or time since onset (Table 2). However, whites had higher scores on the ASIA Total Motor Index. Although the overall test was significant, none of the post hoc pairwise comparisons were significant for this variable. In terms of level and completeness of injury, whites were the most likely group to be in ASIA impairment group D, indicating they were less severely impaired, and blacks were least likely to be in this group. Because the ASIA D category had very small cell sizes and the distinction between the ASIA D group and the other two categories was of interest, in addition to the ordinary χ^2 probability value, an exact probability value (displayed in parentheses in Table 2) was calculated using StatXact. Blacks were the most likely group to have been injured by violence, whereas whites were least likely to have this etiology. For this variable, the etiologic categories of fall, sport, and "other" were collapsed to avoid small cell sizes. With regard to the disability measures, no significant differences based on race/ethnicity were found for the FIM, which scores the degree of assistance the person needs with each of 13 basic activities of daily living (ADLs). However, for the CHART Physical Independence domain, which measures hours of assistance received for ADLs as well as preparation and household duties, whites had higher scores (indicating less assistance) than either of the other

Table 1. Demographic information (N = 164 except as noted)

	Race/Ethnicity							
	Black (n = 36)		Hispanic (n = 25)		White (n = 103)			
	n	%	n	%	n	%	χ^2	*P*
Gender								
Male	28	77.8	17	68.0	79	76.7		
Female	8	22.2	8	32.0	24	23.3	0.94	0.62
Marital status								
Never married	18	50.0	8	32.0	36	50.0		
Married	9	25.0	8	32.0	37	25.0		
Other (separated, divorced, or widowed)	9	25.0	9	36.0	30	25.0	3.45	0.50
	Mean (median)	**SD (quartile range)**	**Mean (median)**	**SD (quartile range)**	**Mean (median)**	**SD (quartile range)**	**K-W**	***P***
Age (y)	41.03 (39.57)	11.34 (32–48)	41.12 (36.98)	12.39 (32–49)	46.09 (44.40)	13.11 (37–56)	5.63	0.06
Education (y)	11.92 (12.00)	2.64 (11–13)	11.12 (12.00)	3.13 (10–12)	14.20 (14.00)	2.72 (12–16)	29.72	0.01
Annual income								
Personal (N = 151)	$10,402 ($7,653)	$8,089 ($5,904–$13,356)	$12,446 ($8,364)	$11,791 ($6,510–$11,400)	$23,262 ($13,854)	$23,068 ($9,030–$31,014)	19.55	0.01
Family (N = 138)	$19,664 ($13,536)	$15,924 ($7,935–$25,000)	$17,787 ($11,880)	$14,053 ($6,744–$27,000)	$36,206 ($30,714)	$30,869 ($12,000–$50,000)	14.83	0.01
Economic Self-Sufficiency (CHART) (N = 135)	57.29 (50.00)	36.47 (25–100)	55.00 (50.00)	34.98 (25–100)	76.37 (100.00)	31.04 (50–100)	10.62	0.01

Table 2. Injury-related and disability information (N = 164 except as noted)

	Race/Ethnicity							
	Black (n = 36)		Hispanic (n = 25)		White (n = 103)			
	Mean (median)	SD (quartile range)	Mean (median)	SD (quartile range)	Mean (median)	SD (quartile range)	K-W	*P*
Injury-related data								
Age at onset (y)	27.85 (24.99)	9.09 (20–36)	27.20 (25.39)	11.21 (18–32)	30.16 (25.59)	13.14 (20–38)	0.68	0.71
Time since onset (y)	13.17 (12.06)	7.57 (6–17)	13.92 (12.20)	10.08 (8–15)	15.93 (13.07)	9.91 (9–21)	1.85	0.40
ASIA Total Motor Index	38.08 (44.00)	17.52 (26–50)	35.00 (42.00)	21.39 (18–50)	44.69 (49.00)	23.02 (26–55)	6.52	0.04
	n	**%**	**n**	**%**	**n**	**%**	χ^2	*P*
Level and completeness of Injury								
Tetraplegia (A, B, or C)	18	50.0	12	48.0	40	38.8		
Paraplegia (A, B, or C)	17	47.2	11	44.0	39	37.9		0.05
ASIA D	1	2.8	2	8.0	24	23.3	9.76	(0.04)*
Etiology of SCI								
Motor vehicle crash	15	41.7	10	40.0	48	46.6		
Violence (gunshot wound)	15	41.7	8	32.0	8	7.8		
Fall, sport, and other	6	16.7	7	28.0	47	45.6	25.89	0.01
	Mean (median)	**SD (quartile range)**	**Mean (median)**	**SD (quartile range)**	**Mean (median)**	**SD (quartile range)**	**K-W**	***P***
Disability measures								
Functional Independence Measure (FIM) (N = 163)	60.17 (70.50)	24.39 (38–78)	54.88 (69.00)	25.61 (31–75)	62.03 (75.00)	62.03 (40–80)	3.00	0.22
Physical Independence (CHART)	68.35 (82.25)	33.67 (38–99)	70.41 (79.40)	27.73 (48–88)	80.42 (91.00)	27.35 (78–100)	8.27	0.02

*Result of exact χ^2 test (StatXact software).

two groups. In post hoc pairwise analyses, these differences approached significance ($P < .10$). No such indication of difference was found between the two minority groups on this variable.

Community access

Whites had the highest mean scores on the CHART Mobility domain (Table 3). The overall test was significant, as was the post hoc pairwise comparison between whites and blacks ($P < .05$). No other pairwise comparisons approached significance. Whites also entered the greatest number of different community settings in the month prior to their interview. Again, the overall relationship was significant, and the post hoc pairwise comparison between whites and blacks was significant at the .05 level.

Productivity

Whites had the highest mean scores on the CHART Occupation domain (see Table 3). The overall test was significant, as was the post hoc pairwise comparison between whites and blacks ($P < .05$). Whites were the most likely group to be working for pay and the most likely to be involved in at least one productive activity or to be retired. Blacks were least likely to be working for pay or involved in other productive activities or retired.

Social involvement

No significant differences were found among the three groups on the CHART Social Integration domain or for the number of times a person participated in an organized community activity in the month prior to his or her interview (see Table 3). Interestingly, whites were the least likely to be involved in disability rights activities; blacks were most likely to be in the "Very Active" category, and Hispanics were the most likely group to be active at all. Because the distinction between "Somewhat Active" and "Very Active" was of interest, these categories were not collapsed. An exact probability value was calculated because of the very small cell sizes in the "Very Active" category. Both the regular χ^2 test and the exact test approached significance ($P < .10$).

There was no significant difference among the three groups with regard to their satisfaction with their community activities.

Satisfaction with community activities

In spite of the differences found with regard to community access and productivity, there was no significant difference among the three groups with regard to their satisfaction with their community activities (see Table 3).

Multiple regression analyses

Because of the numerous significant differences among the three racial/ethnic groups on the demographic and injury-related variables, multiple regression analyses were performed on two selected community integration variables: the CHART Mobility and Occupation domains. These two measures were selected to represent the two areas of community integration for which significant racial/ethnic differences were found: community access and productivity. These analyses were directed at answering the ques-

Table 3. Selected measures of community integration (N = 164 except as noted)

	Race/ethnicity							
	Black (n = 36)		Hispanic (n = 25)		White (n = 103)			
	Mean (median)	SD (quartile range)	Mean (median)	SD (quartile range)	Mean (median)	SD (quartile range)	K-W	*P*
Community access								
Mobility (CHART)	70.64 (78.50)	26.26 (50–92)	73.24 (81.00)	27.11 (49–97)	82.73 (92.00)	20.78 (75–100)	9.02	0.01
Diversity of community settings entered (number of different settings)	8.61 (7.50)	6.08 (4–13)	10.72 (11.00)	7.35 (6–16)	12.83 (12.00)	5.79 (9–16)	13.83	0.01
Productivity								
Occupation (CHART) (N = 163)	32.81 (18.00)	33.77 (10–41)	42.44 (28.00)	32.75 (18–64)	56.71 (57.00)	33.64 (26–100)	15.90	0.01
	n	%	n	%	n	%	χ^2	*P*
Working for pay								
Yes	5	13.9	6	24.0	36	35.0		
No	31	86.1	19	76.0	67	65.0	6.10	0.05
Involvement in at least one of the following: working for pay, student, homemaking, volunteer work, other productive activities, retired								
Yes	13	36.1	11	44.0	88	85.4		
No	23	63.9	14	56.0	15	14.6	38.01	0.01

(continues)

Table 3 Continues

	Mean (median)	SD (quartile range)	Mean (median)	SD (quartile range)	Mean (median)	SD (quartile range)	K-W	*P*
Social interaction and community participation								
Social Integration (CHART) (N = 163)	74.97 (85.00)	28.14 (69–97)	85.36 (99.00)	22.52 (85–100)	81.74 (89.00)	22.04 (72–100)	4.21	0.12
Number of organized community activities	1.33 (0.00)	2.06 (0–2)	4.64 (0.00)	7.71 (0–4)	3.52 (1.00)	5.63 (0–5)	3.17	0.20
	n	**%**	**n**	**%**	**n**	**%**	χ^2	*P*
Degree of involvement in disability rights activities								
Not at all active	28	77.8	17	68.0	87	84.5		
Somewhat active	6	16.7	8	32.0	15	14.6		0.10
Very active	2	5.6	0	0.0	1	1.0	7.81	(0.10)*
	Mean (median)	**SD (quartile range)**	**Mean (median)**	**SD (quartile range)**	**Mean (median)**	**SD (quartile range)**	**K-W**	*P*
Satisfaction with community activities	4.11 (5.00)	2.30 (2–7)	4.28 (4.00)	2.11 (3–6)	4.39 (4.00)	1.93 (3–6)	0.27	0.87

*Result of exact χ^2 test (StatXact software).

tion, "For how much variance does race/ethnicity account in either the mobility or occupation domains after controlling for age, education, personal income, and impairment (ie, the ASIA Total Motor Index Score)?" Other potential predictor variables, such as level and completeness of injury, etiology, and CHART Physical Independence domain, were not included to avoid multicollinearity. All of these measures were significantly related to the ASIA Total Motor Index. Post hoc pairwise comparisons (Tukey method) revealed that individuals with tetraplegia (A, B, or C) had significantly ($P < .01$) lower scores (mean = 21.64) than persons with paraplegia (A, B, or C; mean = 50.9) and persons with an ASIA impairment grade of D (mean = 71.2). Persons with paraplegia (A, B, or C) also had significantly ($P < .01$) lower scores than individuals with an ASIA impairment grade of D. Individuals injured in sports had significantly ($P < .01$) lower ASIA Total Motor Index scores (mean = 26.8) than persons injured by violence (mean = 47.8), falls (mean = 54.4), or "other" etiologies (mean = 48.6) and tended ($P < .10$) to be lower than persons injured by motor vehicle crashes (mean = 39.4). In addition, individuals injured in motor vehicle crashes tended ($P < .10$) to have lower scores than persons injured by falls. The ASIA Total Motor Index score and the CHART Independence score were significantly correlated ($r = .47$; $P < .01$).

Because 13 people were unwilling to disclose their personal income, the number of people included in these analyses was reduced by that number. Race/ethnicity was dummy coded for these analyses, resulting in two binary variables: black (yes = 1; no = 0) and Hispanic (yes = 1; no = 0). The correlation coefficients among the predictor variables are displayed in Table 4. Although there are several significant findings, the correlations are generally quite low, with the highest being .37. This indicates that multicollinearity is not a severe problem in the regression analyses. The four control variables accounted for 31% of the variance in the Mobility score (Table 5). Race/ethnicity did not account for any significant additional variance in Mobility (1.14%). When race/ethnicity was the only variable

Table 4. Correlation coefficients (r) of variables included as predictors in hierarchical multiple regression analyses (N = 151)

	Age	Education (y)	ASIA Total Motor Index	annual personal income ($)	Black	Hispanic
Age	1.00	0.02	0.34*	0.21†	– 0.13	– 0.10
Education (y)	0.02	1.00	– 0.12	0.37*	– 0.23*	– 0.30*
ASIA Total Motor Index	0.34*	– 0.12	1.00	0.10	– 0.09	– 0.13
Annual personal income ($)	0.21†	0.37*	0.10	1.00	– 0.22*	– 0.14
Black (yes = 1; no = 0)	– 0.13	– 0.23*	– 0.09	– 0.22*	1.00	– 0.22*
Hispanic (yes = 1; no = 0)	– 0.10	– 0.30*	– 0.13	– 0.14	– 0.22*	1.00

*$P < .01$.
†$P < .05$.

Table 5. Hierachical regression examining the unique contribution of race/ethnicity to CHART Mobility Domain (N = 151)

Step	Variable	R^2	F	R^2 change	*P* for Set	β	*P* for variables
1	Demographic and injury-related variables	0.31	13.88	0.31	0.01		
	ASIA Total Motor Index Score					0.4806	0.01
	Education (y)					1.6095	0.01
	Age (y)					– 0.5012	0.01
	Annual personal income ($)					0.0003	0.01
2	Race/ethnicity	0.32	1.58	0.01	0.21		
	Black					– 6.7946	0.08
	Hispanic					1.7490	0.74

entered, it accounted for 5.25% of the variance in Mobility (data not included in the tables).

The four control variables accounted for 23% of the variance in Occupation, and race/ethnicity accounted for an additional 3.78% of the variance (Table 6). Although this was a statistically significant unique contribution, it was less than half the 8.32% of the variance accounted for when race/ethnicity was the only variable entered (data not included in the tables). Thus, controlling for demographic and injury-related variables substantially reduced the variance accounted for by race/ethnicity in these two measures of community integration.

Discussion

This study provided a unique opportunity to assess the relationship of race/ethnicity on a variety of measures of community integra-

Table 6. Hierachical regression examining the unique contribution of race/ethnicity to CHART Occupation Domain (N = 150).

Step	Variable	R^2	F	R^2 Change	*P* for Sets	β	*P* for Variables
1	Demographic and injury-related variables	0.23	8.61	0.23	0.01		
	Education (y)					2.4254	0.01
	ASIA Total Motor Index Score					0.4141	0.01
	Age (y)					– 0.9019	0.01
	Annual personal income ($)					0.0003	0.01
2	Race/ethnicity	0.27	3.84	0.04	0.02		
	Black					– 18.3133	0.01
	Hispanic					– 3.7969	0.62

tion as well as a number of demographic and injury-related data for individuals with SCI. The sample was generally representative of community-based adults with SCI in large urban, suburban, and rural areas of Texas. These individuals had lived with SCI for up to 47 years. No differences based on race/ethnicity were found for gender, marital status, functional independence (ie, FIM scores), social interactions, community participation, or satisfaction with community activities. However, significant differences were found between whites and two minority groups—blacks and Hispanics—on a number of measures. Compared with the minority groups, whites were older, better educated, better off financially (on three measures), less likely to have been injured by violence, less severely impaired (on two measures), more physically independent with regard to hours of assistance received, better able to access their community (on two measures), and involved in more productive activities (on three measures).

It is noteworthy that, with the exception of the two disability measures, when there was more than one measure of a construct, the results were consistent with regard to the relationship with race/ethnicity. One possible explanation of why differences in impairment were not reflected in differences in disability as measured by the FIM is that minority participants did not have as much personal assistance services or assistive equipment available as white participants, and therefore white participants with a similar level of impairment as minority participants may have had a choice of doing activities of daily living with help or with equipment although they may have been able to do the activity independently or without equipment. However, the CHART Independence Domain score indicates that white participants had fewer hours of personal assistance than their minority counterparts. Hierarchical regression analyses revealed that after controlling for age, education, income, and degree of impairment, race/ethnicity no longer accounted for significant amounts of variance in mobility, and the amount of variance that race/ethnicity accounted for in productive use of time was substantially reduced. The significant relationships between productive use of time and age and education is similar to results of other studies.[26–28]

One limitation of this study is possible bias resulting from the complex sampling strategy. The sample is likely to be a few years older and to have lived with their SCI a few years longer, on average, than the general population of adults with SCI. Women and racial/ethnic minorities are likely to be overly represented. In addition, all participants resided in one region of one state. Another limitation is that all measures except the ASIA Total Motor Index were based on self-reports. Such reports are vulnerable to a variety of problems, such as errors of perception and memory and provision of socially desirable responses. A third limitation is that raw FIM scores, which are based on the sum of items that are ordinal in nature, were utilized rather than Rasch transformations of these scores.[36] The extent to which these factors influenced the results is unknown. Thus, replication of the study is necessary with other groups of persons with SCI who may have somewhat different characteristics. In addition to the measures utilized in this study, future studies might use methods other than self-report surveys to assess com-

munity integration (eg, observation or reports from family members). The effect of transforming the scores for measures such as the FIM should be assessed.

The findings in this study indicate that although race/ethnicity may be a marker variable for degree of community integration, it is not race or ethnicity themselves that explain much of the variance in community integration. As suggested by Rogler,[24] it is necessary to control for other demographic and injury-related differences that may better explain differences in community integration. Socioeconomic status translates into access (or lack of access) to needed resources, which has important implications for community integration. This is not to say that cultural sensitivity is not important for rehabilitation professionals, only that it should not overshadow other individual differences.

To assist people with disabilities to achieve full community integration, policy makers and service providers must realize that simply focusing on racial or ethnic differences is insufficient; their efforts must be aimed at providing additional resources to individuals who were injured by violence or are older, less educated, poorer, or more severely impaired. In particular, encouraging individuals to increase their educational status may be effective in minimizing some of these differences. If people of all racial and ethnic backgrounds have the necessary knowledge, appropriate assistive equipment, sufficient financial resources, and needed education and skills, and if the physical and social environments are accessible, then individuals with SCI are more likely to be able to become fully integrated into the community. This is the ultimate goal of rehabilitation.

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