

Social Problem-Solving Abilities and Health Behaviors Among Persons With Recent-Onset Spinal Cord Injury

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Although many persons with spinal cord injuries (SCI) are at risk for preventable complications, very little research has examined the health behaviors of these individuals. In this study, we examined self-reported health behaviors of persons with recent-onset SCI. We also studied the association between health behaviors and social problem-solving abilities. The results indicated that positive problem-solving characteristics were associated with more adaptive wellness and accident prevention behaviors. A negative orientation toward problem solving and avoidant and impulsive/careless styles was associated with increased traffic and substance risk taking. Implications are discussed in terms of health education, research, and prevention programs.

KEY WORDS: spinal cord injury; problem solving; health behaviors.

Health promotion and prevention of secondary complications are focal issues in health care (Hughes, Nosek, Howland, Groff, & Mullen, 2003). Many of the secondary conditions most prevalent among individuals with a physical disability can include fatigue, mobility limitation, pain, social isolation, anxiety, depression, and weight problems (Coyle, Santiago, Shank, Ma, & Boyd, 2000). These types of complications can significantly impair an individual's quality of life and prove to be potentially life threatening. The emotional, physical, and potential financial costs associated with managing these secondary complications may place further strain on the individual, particularly when the individual is already attempting to cope with other primary areas of functioning that may have been affected by the disability (i.e., loss of sensation, impaired mobility).

To minimize these types of potential secondary complications and to promote a healthier lifestyle, a variety of health promotion intervention programs

have been developed for persons with disabilities (Raveslout, Seekins, & Young, 1998). Specifically, such programs often emphasize self-management, active coping skills, increased knowledge, exercise, and support and have been found to be positively associated with health outcomes (Dwyer, 1997; Hughes et al., 2003; Martine-Ginis et al., 2003; Sable, Craig, & Lee, 2000; Smarr et al., 1997). Other programs have placed a greater emphasis on cognitive-behavioral strategies such as those intended to build self-efficacy and problem-solving abilities.

In spinal cord injury (SCI) rehabilitation, preventive measures and health promotion efforts become increasingly important because of the nature, extent, and frequency with which secondary complications can occur. Secondary complications associated with SCI populations include pressure sores (Consortium for Spinal Cord Medicine, 2000), urinary tract infections (Stover, Lloyd, Waites, & Jackson, 1991), substance abuse (Heinemann, Mamott, & Schnoll, 1990) anxiety, and depression (Elliott & Rivera, 2003; Hughes, Swedlund, Petersen, & Nosek, 2001). To a great extent, these complications are believed to be mediated by social and behavioral mechanisms that are influenced by the everyday choices and activities of the person with a SCI. A person's lifestyle

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may reflect his/her ability to anticipate and cope with health-related problems. Coping with a chronic physical condition like SCI requires daily, ongoing self-care, exemplified by conscious, instrumental efforts to adhere to therapeutic regimens. Subscribing to health-promotive behaviors and avoiding health-compromising behaviors can reflect conscientious and planned responses to promote wellness and prevent health problems. Therefore, lifestyle choices are often viewed as major determinants of personal health and well-being throughout life (Matarazzo, 1984).

Unfortunately, there is little research examining the health behaviors reported by persons with SCI. Personal habits are believed to promote or compromise health and thus contribute to problems associated with illnesses and/or further complications of existing chronic conditions (Taylor, 1991). From this perspective, social problem-solving abilities might relate to the degree to which a person is willing to engage in behaviors that aid in the prevention of illness or accidents and promote physical and emotional wellness. Social problem solving is most commonly viewed as a process by which people effectively cope with commonplace and/or stressful events in the everyday social environment (D'Zurilla & Maydeu-Olivares, 1995). The concept is based on the theoretical model of problem solving that emphasizes the utility of employing self-directed skills in generating, evaluating, and implementing effective and adaptive coping strategies (D'Zurilla & Goldfried, 1971). Effective social problem-solving abilities are related to adjustment in routine and stressful conditions, and these abilities can be enhanced in cognitive-behavioral interventions (D'Zurilla & Nezu, 1999). Furthermore, effective problem-solving abilities are associated with adaptive attitudes and health promotion behaviors among undergraduates (Elliott, Johnson, & Jackson, 1997). However, ineffective problem-solving abilities are associated with health-compromising behaviors (e.g., alcohol ingestion, sedentary behaviors; Godshall & Elliott, 1997).

Moreover, studies have determined that effective problem-solving abilities are associated with greater assertiveness and less psychological impairment among persons with SCI (Elliott, Godshall, Herrick, Witty, & Spruell, 1991). There is also evidence that ineffective problem-solving abilities are associated with pressure sore development in cross-sectional (Herrick, Elliott, & Crow, 1994) and prospective studies of persons living with SCI (Elliott & Bush, 2003). Other studies have also found that social problem-solving abilities are associated

with regimen adherence among persons with diabetes (Toobert & Glasgow, 1991) and cancer (Nezu, Nezu, Friedman, & Faddis, 1998; Nezu, Nezu, Houts, Friedman, & Faddis, 1999). However, we do not know the relationship between social problem-solving abilities and health promotion behaviors among persons with SCI.

Understanding the associations between social problem-solving abilities and health promotion behaviors could be useful in identifying persons who may be at risk for secondary complications following a SCI. This information could be used to inform, monitor, and evaluate the development of strategic treatment interventions. Persons with ineffective problem-solving abilities may likely report poor health behaviors, and thus be at risk for secondary complications. These persons could therefore be identified and interventions could be provided to assist these people prior to discharge and following their return into the community. This study was designed to examine the possible associations between social problem-solving abilities and health behaviors reported by persons with a recent-onset SCI prior to their discharge from an inpatient rehabilitation program.

METHOD

Participant Characteristics

Participants were individuals admitted to an urban SCI inpatient rehabilitation program. The sample included 43 males (29 Caucasian, 14 African American) and 13 females (7 Caucasian, 6 African American). Age of participants ranged from 17 to 72 years ($M = 39.05$, $SD = 15.66$), and formal education ranged between 5 and 18 years ($M = 12.18$, $SD = 2.57$). Nineteen persons had paraplegia, 27 had tetraplegia, 7 were diagnosed with cauda equina, and 3 persons had related spinal injuries. Thirty-six patients had incomplete lesions, and 20 patients had complete lesions. The time since the injury had occurred ranged between 2 and 36 weeks ($M = 7.12$, $SD = 6.53$) at time of admission to the unit. Twenty-four participants incurred SCI in motor vehicle accidents (16 men, 8 women), 4 resulted from acts of violence, 9 were disease related, 11 were due to falls or other work-related incidents, 6 were due to recreational or athletic injuries, and 2 were specified as other. Twenty-four of the participants reported some loss of consciousness whereas 24 participants

did not. However, none of the patients was diagnosed by a physician to have a concomitant head injury upon admission. Substance use at the time of injury was obtained from the patient’s chart and/or verbal reports by the patient. Forty-one participants had no evidence of either alcohol or illicit drug use at the time of injury onset. Twelve participants reportedly used alcohol but no illicit drugs at the time of injury, one participant engaged in illicit drugs but no alcohol use, and one participant reported drug and alcohol use at onset of injury.

Measures

Social Problem-Solving Abilities

The Social Problem-Solving Inventory-Revised (SPSI-R; D’Zurilla, Nezu, & Maydeu-Olivares, 2002) was used to assess social problem-solving abilities. This inventory closely aligns with the original model of problem solving developed by D’Zurilla and Goldfried (1971). The SPSI-R assesses five-dimensions of social problem solving and subsequently contains five factors: Negative Problem Orientation, Positive Problem Orientation, Rational Skills, Avoidant Style, and Impulsive/Careless Styles. Higher scores on each factor denote greater intensity on that particular dimension. Items on the SPSI-R are rated on a 5-point Likert-type scale (1 = *not at all true of me* to 5 = *extremely true of me*) in which participants are asked to indicate how they usually respond to problems. Support for the psychometric properties of the inventory has been demonstrated (D’Zurilla & Chang, 1995; D’Zurilla et al., 2002).

Health Behaviors

The Health Behaviors Checklist (HBC; Vickers, Conway, & Hervig, 1990) is a 40-item scale designed to assess health behaviors. Twenty-six of the items assess four factor-analytically derived health behaviors. Participants are asked to rate each item on a Likert-type scale ranging from 1 (*disagree strongly*) to 5 (*agree strongly*). The four factors include (1) Wellness Behaviors (e.g., “I exercise to stay healthy”), (2) Accident Control (e.g., “I fix broken things around my house right away”), (3) Traffic Risk Taking (e.g., “I speed while driving”), and (4) Substance Risk Taking (e.g., “I drive after drinking”). Support for the psychometric properties of the HBC has rendered acceptable internal stability coefficients for the fac-

tors (Vickers, Conway, & Hervig, 1990) and evidence of criterion-referenced validity in comparison with relevant measures (Booth-Kewley & Vickers, 1994; Vickers, Conway, & Hervig, 1990).

Procedure

Patients were referred for routine psychological assessment upon admission to the SCI inpatient rehabilitation program. Prior to discharge from the program, individuals were seen for a second psychological assessment to evaluate cognitive-behavioral factors relevant to their adjustment following their return to the community. A psychology assistant verbally administered the measures to patients. Questionnaire results were subsequently included in discharge assessments.

RESULTS

Preliminary Analyses

One-way ANOVAs and Pearson correlations were computed to examine significant associations between the self-report variables and several demographic categories. A *p* value of <.05 was used for all tests of significance. Means and standard deviations for the social problem-solving variables and health behaviors are presented in Table I. Men

Table I. Means and Standard Deviations for the SPSI-R and the HBC Scales by Gender

	Men (N = 43)		Women (N = 13)	
	M	SD	M	SD
SPSI-R scales				
Positive problem orientation	13.70	3.59	13.46	4.61
Negative problem orientation	7.33	8.34	6.54	7.43
Avoidant style	5.38	4.90	5.15	4.0
Impulsivity/carelessness style	9.83*	7.78	4.38*	4.48
Rational problem solving	47.25	16.21	52.31	9.41
HBC scales				
Accident prevention	23.58	4.80	23.54	4.91
Wellness behaviors	31.77*	7.84	38.23*	5.39
Traffic risk taking	15.77*	6.05	9.85*	2.58
Substance risk taking	9.02	2.73	7.92	2.02

Note. SPSI-R = Social Problem Solving Inventory-Revised; HBC = Health Behaviors Checklist.

**p* < .05.

Table II. Correlations Between SPSI-R Dimensions, HBC Scores, and Age for SCI Inpatients

	PPO	NPO	I/CS	RPS	AS	AP	WB	TRT	SRT	Age
PPO										
NPO	-.05									
I/CS	.06	.57								
RPS	.69	.08	-.18							
AS	-.19	.75	.50	-.04						
AP	.35*	-.16	-.22	.28*	-.27*					
WB	.17	-.13	-.29*	.33*	-.15	.37				
TRT	.08	.34*	.46*	-.13	.22	-.14	-.35			
SRT	.16	.17	.20	.07	.06	-.04	-.32	.31		
Age	-.02	-.42*	-.33	-.01	-.28*	.33*	.10	-.50*	-.22	

Note. PPO = Positive Problem Orientation; NPO = Negative Problem Orientation; AS = Avoidant Style; I/CS = Impulsivity/Carelessness Style; RPS = Rational Problem Solving; AP = Accident Prevention; WB = Wellness Behavior; TRT = Traffic Risk Taking; SRT = Substance Risk Taking.

* $p < .05$.

reported significantly higher impulsive/careless tendencies than women ($M_s = 9.83, 4.38$, respectively) and significantly more traffic-risk-taking behaviors than women ($M_s = 15.77, 9.85$, respectively). Women reported significantly higher wellness behaviors than men ($M_s = 38.23, 31.77$, respectively). African-Americans reported significantly higher scores on the rational skills component of the SPSI-R than Caucasians ($M_s = 54.82, 45.50$, respectively); no other differences were found by race on these variables.

Lower levels of education were significantly associated with a greater negative orientation, $r = -.34, p < .05$. Education was not significantly correlated with any other self-report variable. Mean comparisons revealed no significant differences between persons with complete and incomplete lesions on the measures of health behaviors or social problem-solving abilities. Persons who incurred SCI in high-impact incidents (acts of violence, or motor vehicle accidents, $N = 28$) did not differ significantly from other patients on the health behaviors and the social problem-solving variables.

However, persons who had used either alcohol or other substances at the time of injury differed from those who did not on several self-report variables. Persons who were positive for substance use at injury had a higher negative orientation toward problem solving ($M = 11.71, SD = 9.95, N = 14$) than those who did not use substances at injury ($M = 4.97, SD = 5.93, N = 38, p < .01$). Persons who used substances also reported more traffic-risk-taking behaviors ($M = 17.86, SD = 6.41$) and greater substance use risk-taking ($M = 10.29, SD = 2.99$) than persons who did not use substances at the time of injury ($M_s = 13.20, 8.27, SD_s = 5.49, 2.31; p's < .05$). Thus, persons who evidenced some substance use at injury on-

set were more negative in their orientation toward solving problems and were more likely to take risks in driving and in substance use when compared to persons who were not using substances at injury onset.

As depicted in Table II, significant correlations were found between several health behaviors and problem-solving abilities. A higher positive problem orientation was associated with a greater likelihood to engage in accident prevention behavior, $r = .36, p < .05$. In contrast, a negative problem orientation was associated with the likelihood of traffic-risk-taking behaviors, $r = .34, p < .05$. A thoughtful and rational approach to problem solving was associated with more wellness behaviors, $r = .33, p < .05$. Additionally, accident prevention behaviors were associated with a more conscientious and thoughtful problem-solving approach, $r = .28, p < .05$. An impulsive/careless style was associated with fewer wellness behaviors ($r = .46, p < .05$) and with more traffic-risk-taking behaviors ($r = -.29, p < .05$). Finally, an avoidant problem-solving style was associated with fewer accident prevention behaviors, $r = -.27, p < .05$.

DISCUSSION

These data indicate that self-reported health behaviors are associated with social problem-solving abilities among persons with SCI. Positive problem-solving characteristics—a positive problem orientation and rational skills—were associated with more adaptive wellness and accident prevention behaviors. These skills are reflective of a more conscientious, planful manner of regarding one's health and well-being. In terms of health behaviors and lifestyle habits, individuals with this type of style may have a tendency

to (a) appraise health-related problems as a challenge, (b) view health-related problems with a sense of optimism, (c) believe that they have the ability to actually solve problems related to their health, and (d) are committed to solving problems. Additionally, they also have a tendency to engage in strategies that are more rational, deliberate, and systematic. When faced with a problem, these individuals may be more likely to carefully gather health-related facts and information, identify demands and obstacles related to their health, set reasonable goals, generate alternatives, and then choose and implement a solution while carefully evaluating the outcome.

Effective problem-solving skills are beneficial when an individual with a SCI is faced with new and unique health problems related to the SCI (e.g., performance of specific regimens such as range of motion exercises, reducing pressure and restricting activity to the affected area, stretching, and making appropriate transfers). Persons with a positive orientation may be motivated to engage in an active role in their healthcare and initiate lifestyle choices that promote wellness. For example, they may be more willing to ask health-related questions and be more involved in their rehabilitation regimen. Persons who report positive problem-solving styles may be more capable of adhering to long-term therapeutic regimens of self-care necessary to prevent secondary complications (Herrick, Elliott, & Crow, 1994) and to maximize healthy lifestyle choices.

In contrast, elements of a negative, ineffective approach to problem solving—a negative orientation, avoidant, and impulsive/careless styles—were associated with increased traffic risk taking and negatively associated with accident prevention and wellness behaviors. Individuals who approach daily problems with a negative problem orientation have difficulties regulating unpleasant moods, which can in turn exacerbate into depression or anxiety (Elliott, Shewchuk, Richeson, Pickelman, & Franklin, 1996; Nezu, 1987). Avoidant problem-solving styles have been associated with greater sedentary behavior and preferences for unstructured lifestyles (Elliott, Herrick, Elliott, & Shrout, 1995; Godshall & Elliott, 1997); avoidant tendencies were predictive of pressure sore diagnosis in a retrospective chart review of persons with SCI (Herrick, Elliott, & Crow, 1994). Individuals with avoidant behaviors may not expend the energy necessary to implement problem-solving skills effectively, and may subsequently take risks in terms of their choices and actions related to their health due to poor/avoidant decision-making.

Additionally, impulsive/careless styles were positively related to greater traffic-risk-taking behavior and negatively related to wellness behaviors. This type of problem-solving approach tends to reflect less foresight and neglect for details or consideration of alternative solutions. These types of styles are often associated with narrowed, impulsive, careless, hurried and incomplete lifestyle choices regarding health. Impulsivity is often suspected among persons with SCI who develop pressure sores (Richards, 1981; Temple & Elliott, 2000).

The cluster and direction of the correlations found in this study indicate that persons with SCI differ considerably in their recognition and endorsement of health behaviors at discharge from inpatient rehabilitation. There is considerable variation in the degree to which persons with recent-onset SCI recognize and appreciate personal health and wellness. Therefore, it may be beneficial to screen patients prior to discharge to evaluate their appreciation for wellness and health behaviors and the likelihood to engage in health-compromising behaviors. The results of the present study imply that social problem-solving abilities may be related to health behaviors that reflect daily choices that may promote or compromise personal health in everyday routines. This may in part account for the relations between social problem-solving abilities and secondary complications reported in other research (Elliott & Bush, 2003). This information may be useful for improving health education in SCI rehabilitation, generally, and in identifying persons with health-compromising behaviors who may in turn be at risk for preventable secondary complications.

A multidisciplinary team effort in which all rehabilitation team members collaborate on teaching and coaching patients to learn and integrate problem-solving strategies into their treatment may help patients learn active strategies to promote their health in their everyday choices. A collaborative multidisciplinary approach may facilitate learning through multiple presentations and repetitions of the problem-solving strategies (i.e., occupational therapy sessions, physical therapy sessions, psychological sessions, etc.). This approach may also help patients learn that the problem-solving strategies generalize across different problems in everyday living and patients can be monitored as they try to recognize and utilize different problem-solving strategies.

Our study was limited by a small sample size. Further studies with larger sample sizes are needed to explore other relationships and mediating factors.

Longitudinal studies are needed to evaluate the influence of health promotive behaviors and problem-solving abilities on secondary complications. The self-report nature of the instruments also limits the results of this study: Overt behavior was not studied. It is interesting that profiles indicative of greater risk-taking with substances when operating a motor vehicle were associated with documented substance use at the time of SCI onset. This finding provides some index of validity for this scale.

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