Social problem solving abilities and psychosocial impairment among individuals recuperating from surgical repair for severe pressure sores

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Abstract. Background/objectives: The relationship of social problem solving abilities, health locus of control beliefs, and psychosocial impairment were examined among individuals with spinal cord injuries who were hospitalized following surgical repair of severe pressure sores.

Methods: Individuals were approached after surgical repair and completed measures of problem solving, health locus of control beliefs, and psychosocial impairment after admission to the rehabilitation hospital.

Results: The sample reported greater psychosocial impairment than observed in comparative data, but they did not differ from another sample in terms of health locus of control beliefs. Correlational analyses revealed that a negative orientation toward problem solving was significantly predictive of psychosocial impairment, consistent with prior research. However, a second study found persons assigned to a brief problem solving intervention did not differ on any measure from participants in a control group.

Discussion: Implications of these results are discussed from theoretical and clinical perspectives. Although social problem solving abilities were predictive of psychosocial impairment in a predicted direction, the lack of effects for the intervention suggests greater precision is needed to understand individual needs and to develop individualized intervention protocols.

Keywords: Spinal cord injury, pressure sore, problem solving, locus of control

1. Introduction

Many persons with spinal cord injury (SCI) are at risk for secondary complications that compromise personal health and well-being. Pressure sores can result when decreasing blood flow to certain areas of the skin limit oxygen levels, causing the erosion of skin. This type of tissue ulceration can vary in severity, which in turn, dictates the intensity of necessary treatment.

Treatment of this condition can be as uncomplicated as more frequent pressure reliefs and restricted activity to the affected area; in contrast, severe pressure sores may require surgical skin-flap repair and prolonged bed rest. Costs for providing care for a low-grade pressure sore exceed $17,000.00 (excluding physician’s fees) [33]. It is prudent to examine characteristics of those persons who develop pressure sores that require intensive treatment, and examine interventions that may promote adjustment and prevent future complications.

Adherence to therapeutic regimens is vital in preventing the occurrence of pressure sores. Individuals are instructed to engage in pressure reliefs, approximately every 30 minutes, to restore blood flow to con-
stricted areas in addition to conducting daily skin inspections [4]. An important treatment component of rehabilitation focuses upon empowering the patient to effectively execute pressure reliefs and, if necessary, solicit assistance and provide instruction for individuals to assist in a safe manner. It is also recommended that persons with SCI maintain a balanced diet to preserve skin integrity. Individuals with SCI must be very proactive and resourceful in implementing these daily regimens. Furthermore, they must also possess heightened awareness of their bodily functions in order to detect the onset of secondary complications as early as possible.

Unfortunately, nonadherence to any self-care regimen is most likely to occur when adherence involves complex self-care behavior on a daily, long-term basis, with little or no observed relation to eventual outcome [35]. Often individuals do not find the maintenance of their current condition reinforcing enough given the time and effort that must be exerted. Nonadherence to self-care regimens for even brief periods of time may result in secondary complications, and this in turn may perpetuate beliefs that health outcomes may be unrelated to individual choice and behavior. Thus, individuals with severe pressure sores may view these complications as random events that are unrelated to adherence to self-care regimens.

Although behavioral mechanisms are implicated in pressure sore development, and recommendations for prevention emphasize education and behavioral adherence to self-care regimens, very little research has examined behaviorally-based variables among persons with SCI who have severe pressure sores [4]. Considerable research attests that cognitive-behavioral mechanisms play an important role in the health and well-being of persons who acquire SCI [13]. Problem-focused strategies may be best suited for coping adaptively with chronic, ongoing medical conditions. Effective interpersonal problem-solving skills have been associated with greater therapeutic compliance among persons coping with chronic illness [19]. According to D’Zurilla and Nezu [5] social problem-solving skills encompass the cognitive attitudes and the instrumental skills necessary for coping effectively with events encountered in daily life. Social problem solving abilities are implicated in the prevention, development, and maintenance of adjustment difficulties experienced by people in general [6, 7].

According to D’Zurilla and his colleagues, social problem solving abilities consist of two components, problem orientation and problem-solving styles. The problem orientation component contains negative and positive elements. Individuals with a positive problem orientation often see their issues as a “challenge” which in turn motivates them to pursue the resolution of their issues. Conversely, individuals exhibiting a negative problem orientation have a tendency to engage in various forms of dysfunctional cognitive styles (i.e. black/white thinking, catastrophic thoughts) that shape their assessment of a problematic situation. In addition, these individuals also commonly avoid problematic issues. A negative problem orientation is also positively associated with ongoing negative moods [14], worry [8], health complaints [12, 22], and the rate of cognitive errors committed in an objectively defined problem-solving task [32]. Evidence also exists highlighting the relevance of problem orientation in the prediction and maintenance of depressive behaviors among pregnant and post-partum women [17]. A negative problem orientation has also been found to be predictive of depression among persons with spinal cord injuries (SCI) [10] and family caregivers of persons with SCI [16].

The second component of the problem-solving model focuses on the actual skills that are used to execute the process of problem-solving. These skills include the ability to define a problem, generate alternatives, evaluate, implement and monitor solutions, and lastly, make rational decisions [6]. Research indicates that poor problem solving skills are associated with more sedentary behaviors and increased alcohol use [22]. The tendency to avoid problem solving has been associated with the occurrence of secondary complications among persons with SCI [26]. Specifically, an avoidant style was associated with increased likelihood of pressure sore occurrence one year after the initial assessment of these abilities.

Despite the documented associations between social problem solving abilities and adjustment of persons with SCI, empirical information about the psychological characteristics of persons with severe pressure sores in the SCI literature is lacking. It is not known, for example, if persons who have pressure sores that warrant surgical intervention differ from comparative samples in their social problem solving abilities, or in their beliefs about the degree their behavior can influence their health. Furthermore, it is unknown if social problem solving abilities predict adjustment among these individuals in the same fashion as they relate to adjustment among persons with SCI, generally. Finally, it is not known if a brief problem-solving training program would enhance their problem solving skills, improve their beliefs about the impact of their behavior on their health or decrease psychosocial impairment.
Two studies were conducted to address these issues. In the first study, information was collected about the social problem solving abilities, health locus of control beliefs, and psychosocial impairment of persons recuperating from surgical repair of severe pressure sores. Possible differences were examined on these scales between this sample and comparative data taken from other studies of persons with SCI in the extant literature. These previous studies sampled inpatients at other SCI rehabilitation units and the participants varied in time since in the onset of injury and completed measures used in the present study. Thus, the information collected in these previous studies – which were earlier works in the research program conducted by the second author – served as normative data for the measures used in the present study. It was hypothesized that a negative problem orientation would be significantly predictive of psychosocial impairment among these participants after taking into account health locus of control beliefs and problem solving skills. Although previous research has confirmed that a negative orientation is associated with psychosocial impairment among persons with SCI [10], it was not known if these results would generalize to persons with SCI who have incurred severe pressure sores.

In study two, the effects of a brief cognitive-behavioral intervention for participants who were willing to be involved in individual training sessions were examined. Problem solving interventions have demonstrated considerable efficacy in alleviating depression among community-residing adults [29] and in improving self-management skills [30]. Interested participants were offered brief training in problem solving skills, and their problem solving abilities, health locus of control beliefs, and psychosocial impairment were measured before they were discharged from the hospital.

2. Study 1

2.1. Method

2.1.1. Participants

Fifty-one individuals admitted for the surgical treatment of pressure ulcers were referred for psychological assessment as part of their rehabilitation program. Pressure sore severity was assessed by surgical personnel using accepted diagnostic criteria [18]. Eighteen persons had incurred tetraplegia and thirty-three had paraplegia. Thirty-eight had incurred complete lesions of the spinal cord, resulting in a complete and measurable loss of function and sensitivity to touch below the site of the lesions. Thirteen others had sustained incomplete lesions of the cord, resulting in some sensitivity to touch and some residual motor function below the site of the lesion. The sample included 45 men and 6 women. Participants averaged 39.55 years of age (SD = 10.65) and had 11.08 years of formal education (SD = 2.81). Participants averaged 10.6 years (SD = 9.06) since the onset of SCI at inpatient admission. The sample consisted of twenty-four Caucasians and twenty-seven African-Americans. Although none of the participants had an admitting diagnosis of head injury, or a diagnosed psychiatric or substance abuse disorder, the history of such conditions was not examined.

All individuals admitted to the unit for the surgical treatment of a pressure ulcer were eligible to participate. The research staff was not apprised of consecutive admissions by the attending physiatrists or the plastic surgeons; consequently, not all eligible individuals were informed of the study. Eligible participants identified by the research staff were approached and informed of the study. Interested individuals gave informed consent. Participants completed several self-report questionnaires; these were administered by the trained interviewer. The questionnaires included measures of social problem solving, psychosocial impairment and health locus of control beliefs.

2.1.2. Measures

Social problem solving abilities. The Social Problem Solving Inventory-Revised (SPSI-R) [7] is a 52-item self-report measure of social problem solving abilities. Each item is rated on a 5-point Likert-type scale ranging from not very true of me (0) to extremely true of me (4). The SPSI-R is based on a five-dimensional model of problem solving and includes five scales [28]. Two of the SPSI-R scales measure problem orientation dimensions: Positive Problem Orientation and Negative Problem Orientation. The remaining three scales are considered problem-solving skills scales: Rational Problem Solving, Impulsive/Careless Style, and Avoidance Style.

The Positive Problem Orientation scale (PO) assesses a general cognitive set that includes the tendency to view problems in a positive light, to see them as challenges rather than threats, and to be optimistic regarding the existence of a solution and one’s ability to detect and implement effective solutions. The Negative Problem Orientation (NO) scale assesses a cognitive-behavioral set that hinders effective problem solving. The Rational Problem Solving scale (RPS) as-
sesses the tendency to systematically and deliberately use effective problem solving techniques that include defining the problem, generating alternatives, evaluating alternatives, implementing solutions and evaluating outcomes. The Impulsive/Careless Style scale (IC) measures a tendency to implement skills in an impulsive, incomplete and haphazard manner. The Avoidance Style scale (AS) assesses dysfunctional patterns of problem solving characterized by ignoring the problem and waiting for it to resolve spontaneously.

Internal consistency estimates (alphas) for the scales in a sample of college students ranged from 0.76 (Positive Problem Orientation) to 0.92 (Rational Problem Solving), and test-retest (3 weeks) reliability ranged from 0.72 (Positive Problem Orientation) to 0.88 (Negative Problem Orientation) [7]. Criterion-referenced validity is evidenced by significant correlations with relevant scales on the Problem Solving Inventory [24] and with other theoretically related constructs as stress, somatic symptoms, anxiety, depression, hopelessness, and suicidality [3,6,7]. The SPPI-R scales have been predictably associated with self-esteem, life satisfaction, extraversion, social adjustment, and social skills [7].

Psychosocial impairment. The Psychosocial Functioning section of the Sickness Impact Profile (SIP) was used to measure psychosocial impairment secondary to illness-related symptoms [2]. Items on this scale tap functioning across categories of social interaction (e.g., “I am doing fewer social activities with groups of people”), alertness (“I do not keep my attention on any activity for long”), emotional behavior (“I laugh or cry suddenly”), and communication (“I do not speak clearly when I am under stress”). Respondents are asked to endorse only those items that describe their personal experience within the preceding 24 hours. Test-retest correlations of the SIP across several studies and time intervals have been consistently high (0.75 to 0.92) for the total score, and moderate (0.45 to 0.60) for items endorsed [2,21]. Validity coefficients resulting from comparisons with other measures of health-related dysfunction have ranged from 0.30 to 0.85 [21]. Higher scores denote greater psychosocial dysfunction. This scale has been used successfully in previous studies of adjustment among persons with SCI [10].

Health locus of control beliefs. The Multidimensional Health Locus of Control Scale (MHLOC) [36], an 18-item questionnaire, was used to assess beliefs about the degree to which their behavior influenced their health. The MHLOC has three subscales: Internal (INT), Chance (CHA) and Powerful Others (OTH).

Items are rated on a 6-point scale anchored by strongly agree to strongly disagree. High scores on the Chance subscale are indicative of a cognitive framework that results in the attribution of an individual’s health status to random events. High scores on the Internal subscale indicate a belief that the respondent assumes responsibility for their health. High scores on the Powerful Others subscale suggest that an individual expects health care professionals will have a greater influence on their health than their own individual behavior. Ratings for items loading on each respective factor are summed to constitute the three subscale scores.

Internal consistency coefficients for the subscales have ranged from 0.67 to 0.77, and correlations with similar measures of generalized expectancies have ranged from 0.28 to 0.80 [26]. Test-retest coefficients over 7 months indicate that the Internal and Powerful Others subscales are relatively stable over time (0.58, 0.76), but the Chance subscale may lack temporal stability (0.10, N = 28) [39]. Preliminary data indicated that the Chance and Internal subscales correlated significantly with health status in theoretically consistent directions [36]. The Internal and Chance subscales have been shown to be salient predictors of distress and adjustment among persons with a variety of health concerns [37,39].

2.1.3. Data analysis

Given the lack of empirical information about the psychological characteristics of persons with severe pressure sores in the SCI population, possible differences were first examined on the self-report measures (social problem solving abilities, health locus of control beliefs, and psychosocial impairment) between the study sample and available data on these scales from other studies of persons with SCI [9,10,20]. Independent t-tests were used to compare mean differences between scores on these variables. Possible differences were then examined between the Caucasian and African-American participants on the self-report measures. Correlations were computed between the self-report variables and several demographic variables (completeness of lesion, level of injury, and years of education) that could potentially be used in regression analyses.

Finally, the presumed relations of social problem solving abilities to psychosocial impairment were tested after taking into account any variance in the criterion variable attributable to health locus of control beliefs. The three health locus of control belief scores – Chance, Powerful Others, and Internal – were en-
tered as a block at the first step of the equation. At the second step, the three social problem solving skills scores—rational skills, avoidant tendencies, and impulsive/careless style—were entered as a block. Finally, to test the prediction that a negative problem orientation would be uniquely predictive of psychosocial impairment, the two problem orientation scores—positive and negative orientation—were entered at the final step of the equation. In the event of a significant increment in the amount of variance attributed to a step, the individual standardized beta weights were inspected for variables within a given block to determine significant contributions to the equation. This conservative form of regression has been used in many previous tests of the presumed relationship of social problem solving abilities [9–12,14,22]. An alpha level of \( p < 0.05 \) was used to determine significance.

2.2. Results and discussion

Means, standard deviations and correlations between the various measures are presented in Table 1. A t-test for independent samples revealed that the current sample reported greater psychosocial impairment on the SIP (\( M = 21.21, SD = 12.39, N = 49 \)) than a comparative sample of persons with SCI who varied in time since injury onset (\( M = 16.41, SD = 12.95, N = 90 \)) [10]. \( \bar{t} = 8.50, p < 0.05 \). The present sample did not significantly differ from a larger sample of persons with recent-onset SCI scores on the problem orientation subscales, or on the avoidance and impulsive/careless scales [9]. However, the present sample reported significantly higher rational-problem solving skills (\( M = 48.02, SD = 14.57 \)) than this comparison group (\( M = 45.81, SD = 15.42, N = 186 \)) [9], \( \bar{t} = 4.89, p < 0.05 \).

Scores from the present sample on the health locus of control dimensions were compared to scores on these scales observed among a comparable sample (\( N = 51 \)) [20]. The present sample did not differ from this comparison group on any of the three health locus of control beliefs scores.

Caucasian and African-American participants did not significantly differ on the five problem solving scales or on the Internal scale on the MHLOC. However, African-American participants (\( N = 25 \)) had significantly higher Chance (\( M = 22.48, SD = 4.93 \)) and Powerful Others scores (\( M = 25.24, SD = 5.94 \)) than Caucasian participants (Chance \( M = 17.83, SD = 6.34 \); Powerful Others \( M = 21.96, SD = 5.01; \bar{N} = 24 \)). The two groups reported equivocal levels of psychosocial impairment. Thus, the African-American participants reported a greater expectation that their health was influenced by fate and by health care professionals than the Caucasian participants. These differences, however, were apparently unrelated to subsequent reports of psychosocial impairment. As ethnicity was not associated with the criterion variable or with the problem solving variables, it was not included in correlational analyses.

Inspection of correlations (contained in Table 1) revealed that years of education, level of injury, and completeness of lesion were not significantly correlated with psychosocial impairment, or with any other self-report measure. Therefore, these variables were not used in the subsequent regression equation to predict psychosocial impairment.

2.2.1. Prediction of psychosocial impairment

A regression equation was computed to test the presumed relationship of social problem solving abilities to psychosocial impairment, after taking into account health locus of control beliefs. Following procedures that were used to test properties of the social problem-solving model in past work [12] the three MHLOC subscales were entered as a block in the first step of the equation to predict psychosocial impairment. This block was significantly predictive of the criterion variable, \( F(3, 43) = 3.55, R^2 = 0.19, p < 0.05 \). Higher Chance scores were associated with greater impairment, \( \beta = 0.31, \bar{t} = 2.28, p < 0.05 \). The three social problem solving skill scores were then entered as a block at the second step of the equation. This block accounted for a significant amount of variance in psychosocial impairment above and beyond that attributable to health locus of control beliefs, \( F_{inc}(3, 42) = 3.31, R^2_{inc} = 0.16, p < 0.05 \). Inspection of individual beta weights indicated that higher impulsive and careless styles were associated with greater impairment, \( \beta = 0.42, \bar{t} = 2.40, p < 0.05 \).

To test the assumption that problem orientation would be significantly predictive of psychosocial impairment, the two problem orientation scores were entered as a block at the final step, after accounting for variance attributable to the other self-report scales. This block was significantly predictive of impairment as predicted, \( F_{inc}(2, 40) = 7.78, R^2_{inc} = 0.18, p < 0.01 \). Lower positive orientation scores (\( \beta = -0.42, \bar{t} = -2.59 \)) and higher negative orientation scores (\( \beta = 0.43, \bar{t} = 3.17 \)) were associated with greater impairment.

The sample, then, did not differ from a comparative group of persons with SCI in terms of health beliefs, contrary to any suspicion that persons with severe pres-
sure sores might assume less responsibility for their health than other persons with SCI. In fact, persons in the present study reported significantly higher rational problem solving skills than a comparison group of persons with SCI [10]; however, the present sample also reported more psychosocial impairment than this same comparison sample. Despite these differences, a negative orientation was significantly predictive of psychosocial impairment. This finding, consistent with the hypothesis and congruent with prior research, implies that social problem solving abilities relate to adjustment among persons with severe pressure sores in a predictable, theoretical fashion. It should also be noted that Chance beliefs have been associated with higher depression scores among persons with SCI [20], and the results of the first regression equation indicate that these beliefs are associated with psychosocial impairment as well. A negative orientation toward problem solving, however, accounted for a larger amount of variance in the criterion variable than the health belief variables. Other research has found social problem solving variables to be a better predictor of adjustment than health beliefs [12].

3. Study 2

Given the theoretically consistent findings of the first study, the effects of problem solving training for these individuals were examined in a second study. Community residing individuals living with chronic problems respond favorably to problem solving training, and improvements in problem solving skills and decreases in distress have been documented in these interventions [23,29,31]. It was expected that persons receiving problem solving training would demonstrate gains in their problem solving abilities, have more adaptive health beliefs, and report less psychosocial impairment than persons assigned to a no-treatment control group.

3.1. Method

3.1.1. Participants

Interested participants who completed measures from Study 1 and who consented were randomized into a treatment group or a control group. Treatment group participants received a brief problem solving intervention; those in the control group did not receive any individual contact. Eighteen individuals were randomized to the treatment group; thirty-three persons were assigned to the control group.

Individuals randomized to the treatment condition were scheduled for eight sessions prior to discharge. Discharges were determined by the plastic surgeon or the physiatrist. Discharges were not uniform or systematic, and research staff was not routinely informed of impending discharges. Therefore, some participants were discharged prior to completing the all eight sessions. The number of sessions attended by those individuals in the treatment group was as follows: one per-

<table>
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<th>Variable</th>
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Note: Correlations < −0.31 and > 0.31 significant at p < 0.05. N = 49. PO = Positive Problem Orientation (potential range 0–20; observed range 8–20), NO = Negative Problem Orientation (potential range 0–28; observed range 0–28), RPS = Rational Problem Solving Style (potential range 0–80; observed range 16–78), IC = Impulsive/Careless Style (potential range 0–40; observed range 0–23), AS = Avoidant Style (potential range 0–28; observed range 0–23), INT = MHLOC-Internal (potential range 0–36; observed range 12–35), CHA = MHLOC-Chance (potential range 0–36; observed range 7–30), OTH = MHLOC-Powerful Others (potential range 0–36; observed range 12–34), SIP = Psychosocial Functioning (observed range 2.76–52.10), EDUC = level of education (observed range 3–18), LES = completeness of cord lesion (1 = incomplete, 2 = complete), LEV = level of injury (1 = paraplegia, 2 = tetraplegia). Note: For all correlations with LES, N = 50, and LEV, N = 51.
Table 2  
Means and Standard Deviations for Self-Report Variables and Demographic Characteristics by Group in Study 2

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<tr>
<td>Pretest</td>
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<tr>
<td>Mean</td>
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<td>13.19²</td>
</tr>
<tr>
<td>SD</td>
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<td>3.46</td>
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<tr>
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<tr>
<td>Mean</td>
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<td>12.83³</td>
</tr>
<tr>
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<td>3.58</td>
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<tr>
<td>Mean</td>
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<td>8.06²</td>
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<tr>
<td>SD</td>
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<tr>
<td>Mean</td>
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<tr>
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<td>Posttest</td>
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<tr>
<td>Mean</td>
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<tr>
<td>SD</td>
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son completed 2 sessions, five completed 4 sessions, two completed 5 sessions, one completed 6 sessions, and eight completed all of the 8 sessions. For one of the individuals, no records were kept of the number of completed sessions. As previous research has demonstrated abbreviated problem solving training can be beneficial [29] all participant data were retained for analysis in the treatment group. Individuals in both conditions completed self-report pretest questionnaires after enrolling in the study and prior to receiving any treatment. Individuals in the treatment condition completed the same measures as a posttest immediately following the final session prior to discharge, or at the completion of the eighth session. Those individuals in the control group completed their posttest measures approximately five days after the pretest measures.

3.1.2. Problem solving intervention

The problem solving training consisted of individual psychoeducational sessions that met every other day for a total of eight sessions. The duration of each session ranged from 30 minutes to 1.5 hours. This protocol was based on prior research and was modified to address the issues common to persons with SCI [29].

In the initial session, participants were oriented to the intervention and the process of solving problems. Examples of problems encountered by persons with SCI were presented, including problems with hospital staff, self-care, dealing with attendants, therapeutic regimens, etc. The second session addressed the problem orientation component and included instruction in labeling emotions, identifying problems, inhibiting automatic and impulsive reactions, and engaging in the problem solving process. Participants were assigned a self-monitoring task to record at assigned intervals the negative moods they experienced before the next session. The third session featured a review of the orientation component and ineffective styles were discussed. The self-monitoring task was reviewed. Participants were taught the STAR technique (Stop, Think, Analyze and Respond).

In the fourth session participants were taught to define and formulate the nature of problems, generate a
wide range of alternative solutions, systematically evaluate the potential consequences of a solution and select the most optimal one(s) to implement, and monitor and evaluate the actual solution outcome after its implementation. A worksheet was used to analyze a particular problem. The fifth session focused on the problems presented by the participants. The sixth session addressed problem solving in interpersonal situations. Assertiveness skills were taught from a problem-solving perspective.

In the seventh session, a visualization exercise was used to reinforce and practice effective problem solving. Participants were asked to describe how you think and prepare for a problem solving situation, describe how to confront a problem of moderate concern, describe how to confront a current unresolved or ignored problem, and describe how to confront a problem that is of great concern. The final session taught participants to identify important personal goals, seek out information relevant to the goal to expedite informed choices, analyze barriers and problems encountered in pursuit of goals, learn from mistakes and attend to feedback, and look for patterns in types of problems and barriers encountered.

3.1.3. Measures

The questionnaires included the Social Problem Solving Inventory-Revised, the Sickness Impact Profile Psychosocial Impairment scale and the Multidimensional Health Locus of Control scale.

3.1.4. Data analysis

A repeated measures analysis of variance (ANOVA) using a general linear model was performed on each of the self-report variables (the five social problem solving variables, the three MHLOC variables, psychosocial impairment). Unequal amounts of data were available for statistical tests. This was due primarily to missing and incomplete data across the different measures.

3.2. Results and discussion

Demographic information and means and standard deviations for participants are presented in Table 2 by group assignment. No significant differences were found on any of the dependent measures between the control and intervention participants as a function of group membership (all $F$'s < 2). There was a significant repeated measure effect for the MHLOC Internal scale, Wilks' Lambda = 0.87, $F(1, 36) = 5.21$, $p = 0.02$. Inspection of the group means indicated that this intervention group had a slightly higher mean than the control group. Nevertheless, these data indicate that no beneficial effects were observed for the problem solving intervention, as no differences were found between the two groups on the self-report measures.

Correlations were computed between the number of sessions and the self-report variables to conduct a post-hoc analysis of intervention group data. The number of problem solving training sessions was positively associated with the greater psychosocial impairment (0.48, $p = 0.06$, $N = 16$). Additionally, the number of sessions was significantly correlated with a change score (calculated by subtracting the post-intervention score from the pre-intervention score) for rational problem solving style (0.66, $p < 0.01$, $N = 16$), and with a change score for the Internal scale on the MHLOC ($-0.56$, $p < 0.05$, $N = 16$). These correlations imply that more training sessions were associated with decreases in rational problem solving skills, and with increases on the Internal scale on the MHLOC. These post-hoc correlations should be interpreted with great caution in light of the low number of participants in relation to the high number of tests performed on these correlations.

4. General discussion

Although social problem solving abilities were predictive of psychosocial impairment reported by persons with severe pressure sores in a theoretically consistent manner in the first study, the second study found problem solving training had no beneficial effects on participants’ problem solving styles, health beliefs, or psychosocial impairment. Interpretations of the second study should be tempered in light of the problems encountered retaining participants throughout the expected protocol in the treatment group.

To a certain extent, these data parallel other recent studies of social problem solving abilities among persons with chronic health conditions: Social problem solving abilities can at times predict outcomes in a fashion consistent with prior research and theory, but when problems of particular and specific concern to the individual are largely unknown, inconsistent relationships may occur [25]. In the present study, for example, a packaged problem solving protocol was prepared and administered to participants in the treatment group. The correlational results of the first study were supportive of this approach. Yet the intervention protocol may have been insensitive to the unique, individual concerns of
Each participant. Although participants were asked to identify problems to address in the sessions, it is possible that these problems were of insufficient importance, or the training protocol lacked relevance and specificity to the problems identified by the participants. The inadequacy of the problem solving training protocol may be illustrated in the post-hoc findings: The longer participants were hospitalized (and thus receiving more training sessions), the more psychosocial impairment they reported.

Individuals who have severe secondary complications (like pressure sores) may have multiple and complex problems. Some aspects of these may not be within the realm of personal volition per se, and in some situations, individuals may have difficulty identifying, articulating and prioritizing these problems, and associated concomitants that occur in the wake of these issues (e.g., social isolation, decreased mobility, etc.). Individuals typically make health care choices and decisions about medical concerns based on their unique life situation and personal issues, but these reasons may not be obvious to health care personnel [1]. It may be critical to enhance problem identification skills among persons with multiple health problems so that individualized problem solving training may be offered [27]. To expedite skill building and to increase relevance, it may be necessary to utilize assessment techniques that help participants identify and prioritize their problems (e.g., card sort devices) [15]. The results of the second study suggest that packaged intervention protocols that do not attend primarily to immediate and unique needs of each participant are likely to have little or no effect.

Alternatively, other personal characteristics may have affected the results of the second study. Many persons with severe pressure sores may have characterological problems that might impede their care and place them at risk for secondary complications (although this rate of characterological problems may not be significantly different from that observed among persons with SCI, generally) [34]. Individuals with characterological problems often direct their behaviors in response to their internal affectivity. Consequently, these individuals may have cognitive distortions that must be addressed as part of any intervention. Individuals with characterological problems may be disinclined to adopt a psychological perspective of their health, assume responsibility for initiating behavioral changes, or be receptive to psychological interventions. Strategic interventions are necessary to address these issues.

Future studies are needed to examine the effectiveness of problem solving interventions in rehabilitation. Some applications now demonstrate the utility of these programs for family members who are in caregiver roles for persons with severe disability [23]. However, these programs were developed for use with community-residing family caregivers. There may be salient differences in the receptivity of individuals in the inpatient setting and those who are residing in the community that must be considered in developing appropriate and strategic problem solving interventions.

The small number of participants in the second study and the inability to conduct eight standard sessions with all participants may have adversely affected the results. This research is also limited in that other important psychosocial factors such as social support, age, substance abuse and psychiatric history, and personality disorders were not studied. Specific skin characteristics were not examined (e.g., swarthy complexion versus fair-skinned). Prior history of possible head injury was not studied. Self-report measures may have been adversely affected by a systematic bias and observer or significant other ratings of behavior were not collected. Further research is required to identify and evaluate the efficacy of cognitive-behavioral interventions for persons with pressure sores and those recuperating from skin-flap surgery.

Acknowledgement

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References
