Understanding Depressive Symptoms Among Individuals With Spinal Cord Injuries: A Biopsychosocial Perspective

Amber O'Shea, MS, EdS1 and Susan Miller Smedema, PhD, CRC2

Abstract
The purpose of this study was to investigate the relationship between various biopsychosocial factors and depressive symptoms in individuals with spinal cord injuries (SCIs). Survey data were collected from 238 individuals with SCIs. The survey measured symptoms of depression, injury level, pain, catastrophizing beliefs, coping skills, perceived stress, and social support. Results indicated that pain ($\beta = .14, p < .05$), catastrophizing beliefs ($\beta = .13, p < .05$), and perceived stress ($\beta = .50, p < .001$) have a positive association with depressive symptoms. Positive coping skills ($\beta = -.16, p < .01$) were found to have a negative relationship with depressive symptoms. Injury level ($\beta = .05, ns$) and social support ($\beta = -.09, ns$) were not found to significantly affect depressive symptoms. The results of the study generally support the biopsychosocial model of depression in individuals with SCIs. Interventions should be aimed at promoting positive coping and ameliorating pain, catastrophizing beliefs, and perceived stress.

Keywords
spinal cord injury, depressive symptoms, biopsychosocial, pain, catastrophizing beliefs, stress, coping

Depression is a serious mental disorder that is estimated to affect roughly 16% of individuals at some point in their lives (National Institute of Mental Health, 2005). In any one-year period in the United States, mood disorders affect 11% of adults and 6% of children (Woo & Keating, 2008). Furthermore, rates of depression are increasing, while the age of onset is decreasing. Some researchers have described this era as “the age of melancholy” (Schotte, Van De Bossche, Doncker, Claes, & Cosyns, 2006). These authors propose that biogenetic, psychological, somatic, and societal factors trigger distress which decreases an individual’s resistance to developing depressive symptoms.

People diagnosed with depression typically display symptoms of discouragement, hopelessness, fatigue, insomnia, and an inability to concentrate and make decisions (American Psychiatric Association, 2006). The co-occurrence of depression with other illnesses, such as anxiety and substance abuse disorders, is related to a decrease in positive treatment outcomes, premature termination from treatment, increased symptom severity, lower levels of functioning, and higher rates of suicide (Woo & Keating, 2008). It is estimated that approximately 60% of individuals who successfully attempt suicide were experiencing a mood disorder at the time of death (Woo & Keating, 2008). Due to the high prevalence of depression, the impact it has on the lives of those affected by it, and the personal and economic costs associated with the disorder, this remains one of the most important topics of research today.

Depression in Individuals With Spinal Cord Injuries (SCIs)
A plethora of research has found a strong positive correlation between depression and physical disabilities, lending support to the idea that biological factors are closely tied to mental health and illness (Townend, Tinson, Kwan, & Sharpe, 2010). While depression can affect anyone, some populations have been shown to be more susceptible to the disorder. Research has suggested that individuals with disabilities are up to four times more likely to have a major depressive episode than people without a disability (Turner & McLean, 1989). In particular, it has been found that individuals with SCIs have a high prevalence of depression (Fann et al., 2011). SCIs typically cause the individual varying...
degrees of paralysis, loss of voluntary muscle control and sensation, reduced personal independence, and a decreased ability to participate in social and vocational activities (Craig, Tran, Lovas, & Middleton, 2008). According to the Center for Disease Control and Prevention, National Center for Injury Prevention and Control (2010), an estimated 200,000 individuals in the United States are currently living with a SCI, with up to 20,000 new cases estimated to occur each year.

A review conducted by Sakakibara, Miller, Orenczuk, and Wolfe (2009) reported that between 20% and 40% of people with SCIs are at risk of having a depressive disorder during periods of rehabilitation and up to 60% are at risk of having elevated symptoms of depression, as well as an increased risk for substance use disorders and suicide. Over 50% of adults with SCI have reported abusing drugs or alcohol, and suicide has been found to be up to five times higher in these individuals than within the general population (Craig et al., 2008). Furthermore, elevated levels of depression have been found to increase the risk of physical problems such as pain and infections. Due to the severe negative consequences that depression has on the compromised health of individuals with SCI, as well as the high rates and prevalence of depression within this population, it is imperative that the etiology of the disorder be well understood.

Individuals with SCI face a set of unique challenges that increase their vulnerability to developing mental disorders, including poor psychosocial adjustment to disability, changes in social roles and relationships, decreased independence, and physical pain and discomfort. Fully understanding the relationship between disability and depression may aid researchers and rehabilitation counselors in understanding the causes of depression among all populations and in developing efficacious treatment interventions.

**Biopsychosocial Model of Depression**

Current research shows that biological, psychological, and environmental factors may interact with one another to foster the development of depressive symptoms (Schotte et al., 2006). The biopsychosocial model (Engel, 1977) focuses on the inclusion of physical, psychological, social, and behavioral information in clinical evaluations. Proponents of the biopsychosocial model believe that consideration of these components is essential in forming a complete diagnosis. Research has begun to examine the interaction that these factors have with one another and how they relate to depression (Nemade, Reiss, & Dombeck, 2007; Schotte et al., 2006).

**Biological.** Evidence suggests that depression is linked to a range of physical conditions and symptoms (Nemade et al., 2007). Pain has been found to have a relationship with psychological distress and depression. For example, chronic pain has been associated with elevated levels of depression. In one study, almost half (43.4%) of those with depression were also found to have chronic pain (Lee, 2010). In addition to more severe depressive symptoms, individuals with chronic pain were found to suffer from higher rates of fatigue, insomnia, and difficulty concentrating. Specifically, when the pain was reported to be in the participant’s lower back, the rate of depression increased to 64%. Furthermore, individuals with chronic pain resulting from SCI are shown to experience poorer mental health outcomes than those without pain (Perry, Nicholas, Middleton, & Siddal, 2009). According to Ravenscroft, Ahmed, and Burnside (2000), pain can have a significant impact on the quality of life and presence of depression among individuals with SCIs. Researchers have found a relationship between pain intensity and psychological distress among individuals with SCI, which lends support to the biopsychosocial model (Perry et al., 2009). Due to potential differences in functional abilities, injury level (location of the injury along the spine) and injury completeness (the absence of motor and sensory function) also play important roles in the rehabilitation process and the development of psychological distress (Hough & Kleinginna, 2002).

**Psychological.** While the support for a biological basis of depression is evident, psychological factors have also been shown to play a significant role. Cognitive theorists propose that depression is caused and maintained by a pattern of negative beliefs and automatic thoughts that an individual holds (Corey, 2009). Subscribers to this theory propose that depressed individuals over-exaggerate negative events in their lives while attributing negative events to global and stable aspects of themselves, resulting in lower self-esteem and a feeling of hopelessness (Lee, 2010). According to cognitive behavioral psychology, individuals with depression hold on to a “negative triad” in which they hold negative views about themselves, the world, and the future (Esbensen & Benson, 2007). According to Lee (2010), this negative triad can lead to depression in individuals living with chronic pain who have low rates of self-reinforcement, negative self-evaluations, and pessimism about the future. Pain catastrophizing, which has been defined as negative and enduring beliefs about pain and the threat of painful stimuli, has been found to be related to poor psychological states and poor coping abilities (Sullivan, Bishop, & Pivik, 1995).

Researchers indicate that depression among individuals with SCI is associated with a perceived inability to cope with consequences of the injury (Kennedy, Duff, Evans, & Beedie, 2003). Evidence suggests that coping strategies play important roles in psychosocial adjustment to disability and, ultimately, have an impact on the quality of life of individuals with disabilities (Smedema, Catalano, &
Ebener, 2010). Specifically, proactive coping, which involves the identification of strategies and resources that will improve the quality of life, is linked to better adjustment in individuals with disabilities. The inability to cope with pain and stressful life events has also been linked to poor psychological outcomes (Sullivan et al., 1995).

**Social/environmental.** Environmental stressors, traumatic events, life changes, and social factors also play a role in the development of depression. Research demonstrates that adverse and traumatic life events, personal losses, threats to well-being, and challenges in completing daily activities have an etiological role in the development of depressive episodes (Schotte et al., 2006). Furthermore, evidence suggests that perceived social support and perceived societal discrimination are related to the positive acceptance of one’s disability (Li & Moore, 1998). Research findings indicate that when encountering perceived stressful events and situations, individuals who do not have access to social support are at an increased risk for depression (Lee, 2010). While social support has been found to be an important protective factor against depression in the general population, research suggests that it may affect people living with SCIs to a greater extent as it provides positive experiences and stability and may enhance perceived control and coping mechanisms under stressful circumstances (Beedie & Kennedy, 2002). Furthermore, feelings of social and emotional loneliness have been linked to depression, and may be assuaged by close personal relationships (DiTommaso & Spinner, 1997).

Individuals with SCIs likely experience a multitude of environmental stressors, including occupational and financial stress, relationship and social role changes, and chronic pain (Latimer, Martin, & Hicks, 2005). In a study aimed at developing a deeper understanding of the lived experiences of individuals with disabilities, Graf, Marini, and Blankenship (2009) found that environmental barriers that restrict access to activities present problems for individuals with SCIs. These authors found that individuals with SCIs are likely to face various societal barriers in terms of restricted access and discrimination, and that these barriers can be the source of negative emotional states and a withdrawal from activities. In addition, studies have found that pain may act as an environmental barrier, and that pain-related interference in daily activities is associated with an increase in psychological distress (Perry et al., 2009).

Understanding the impact that the environment, along with biological and psychological factors, has on depressive symptoms among people with SCI is an important step toward implementing the most efficacious treatment for depression. According to the biopsychosocial model, biological, psychological, and social components interact to impact mental health and wellness. The purpose of the current investigation is to examine the relationships among biopsychosocial factors and depressive symptoms among individuals with SCIs. Specifically, this study examines the relationship among the biological factors injury level and pain; the psychological factors, catastrophizing beliefs and coping skills; and the social/environmental factors perceived stress and social support with depressive symptoms in individuals with SCIs.

**Method**

**Procedures**

Participant approval for this study was secured from the Florida State University Institutional Review Board. Individuals with SCIs were recruited from the Florida Brain and Spinal Cord Injury Program (FBSCIP), the Florida Spinal Cord Injury Resource Center (FSCIRC), and the National Spinal Cord Injury Association. The survey was administered in a web-based format as well as a paper-and-pencil format for individuals without access to a computer or the Internet. The Internet-based survey was accessible through a link provided on the organizations’ websites, and the FBSCIP and FSCIRC were provided with paper-based surveys to administer to participants. One-hundred twenty paper-based surveys and 118 online surveys were included in the data analysis. As the data were collected both online and via paper-and-pencil surveys, no determination about response rate can be made. Data were analyzed using t tests on all variables to determine if any differences occurred based on survey format (paper vs. online). No differences were identified.

**Participants**

The participants in this study consisted of 238 individuals with SCIs. Of the participants, 157 (66.0%) were male and 81 (34.0%) were female. The participants’ ages ranged from 18 to 81 years with a mean of 44.6 (SD = 13.2). The majority of participants (181, 75.7%) identified their ethnic background as White, 27 (11.3%) identified as African American, 19 (7.9%) identified as Latino or Latina, 6 (2.5%) identified as Native American, and 5 (2.1%) identified as Asian. Ninety participants (37.7%) reported being married, 69 (28.9%) reported being single, 29 (12.1%) reported being in an unmarried committed relationship, 6 (2.5%) reported being separated, and 45 (18.8%) reported being divorced. Of the participants, 54.4% indicated that they were living with a spouse or romantic partner (with or without children), 21.8% indicated that they lived alone (with or without support), 16.7% stated that they lived with their parents or guardians, 2.9% reported living with a roommate, and 2.9% indicated that they lived in an institutional setting. Of the participants, 28.9% were employed, 23.9% participated in volunteer activities, and 10.9% attended school.
Participants worked an average of 10 hr per week ($SD = 17.6$), volunteered an average of 2 hr per week ($SD = 5.9$), and attended school or college an average of 1.5 hr per week ($SD = 5.3$). The time since injury onset in years ranged from 1 to 48 ($M = 10.6$, $SD = 9.8$). With respect to injury level, 52.8% of participants reported that their injury was in the cervical spine, 38.9% reported their injury was in the thoracic spine, 6.6% reported that the injury was in the lumbar spine, and 1.6% reported it was in the sacral spine. In terms of the completeness of injury, 117 (49%) indicated that their injury was incomplete, 94 (39.3%) indicated that their injury was complete, and 27 participants (11.3%) did not indicate whether the injury was complete or incomplete.

**Instruments**

A variety of instruments were used to measure the variables in this study. In addition to a demographic questionnaire, instruments included a pain scale, a catastrophizing scale, a coping scale, a perceived stress scale, a social support scale, and a scale that assessed the presence of depressive symptoms.

**Demographic questionnaire.** The demographic questionnaire consisted of nine items designed by the researchers to gather demographic information about each of the participants. Specifically, information was gathered regarding age, gender, race, relationship status, living situation, and time since injury. In addition, participants were asked to report on the time per week they spent engaging in volunteer work, paid employment, and school. Respondents were asked to indicate their level of injury (C1-S5) and were assigned a score from 1 to 30, with a higher score indicating a more severe level of injury. Finally, respondents were asked to indicate whether their injury was either “complete” or “incomplete.”

**Pain.** Pain was measured using relevant items from the Short Form-36 (SF-36), a brief self-report measure which yields a profile of functional health and well-being (Ware & Sherbourne, 1992). The SF-36 has been validated for use in estimating disease burden for various diseases and complications including SCIs. The SF-36 includes two items that ask the participant to rate their perceived pain (e.g., “In the past 4 weeks, how much did pain interfere with your normal work?”) on a 5-point Likert-type scale ($a = not$ $at$ $all$ to $e = extremely$). Possible scores range from 0 to 200, with higher scores indicative of more perceived pain. The authors report that studies have demonstrated the content, concurrent, criterion, construct, and predictive validity of the instrument. Reliability is reported by the authors to exceed .90. In this study, the Cronbach’s alpha was found to be .82.

**Pain catastrophizing.** The Pain Catastrophizing Scale (PCS) is a brief instrument that is designed to measure catastrophizing (Sullivan et al., 1995). The authors of this instrument defined catastrophizing as exaggerated negative orientation toward specific stimuli (i.e., pain). Specifically, catastrophizing involves magnification, negative expectations, worry, excessive focus on negative aspects of pain, helplessness, and the inability to cope with pain. The PCS consists of 13 items which focus on the thoughts and feelings that participants experience when they are in pain. The participants are prompted to indicate the degree to which they agree with a statement when experiencing pain (e.g., “When I’m in pain . . . I feel I can’t go on”). Responses are based on a 5-point Likert-type scale ($0 = not$ $at$ $all$ to $4 = all$ $of$ $the$ $time$). Possible scores range from 0 to 52, with higher scores indicating higher degrees of pain catastrophizing. Moderate positive correlations were found between scores on the PCS and measures of depression ($r = .26$, $p < .05$), trait anxiety ($r = .32$, $p < .05$), and fear of pain ($r = .80$, $p < .01$). The instrument was also found to contribute significant variance to the prediction of pain intensity. The authors reported a Cronbach’s alpha coefficient of .87. In this study, the alpha coefficient was found to be .96.

**Proactive coping.** Proactive coping was measured with the Proactive Coping subscale from the Proactive Coping Inventory (PCI; Greenglass, Schwarzer, & Taubert, 1999). The PCI was developed to measure individuals’ skills in coping with distress. The Proactive Coping subscale is one of seven scales of the PCI, and it measures cognitions and behaviors related to autonomous goal setting and attainment (Greenglass et al., 1999). It consists of 14 statements (e.g., “I try to pinpoint what I need to succeed”), and the respondent is asked to indicate how true they find each statement on a 4-point Likert-type scale ($1 = not$ $true$ $at$ $all$ to $4 = completely$ $true$). Possible scores range from 14 to 56, with higher scores indicating higher levels of proactive coping. Factorial validity and homogeneity have been demonstrated for the PCI (Greenglass et al., 1999). High scores have been shown to be positively correlated with active coping ($r = .50$, $p < .001$), internal control ($r = .62$, $p < .001$), and professional self-efficacy ($r = .29$, $p < .001$), and negatively associated with depression ($r = -.35$, $p < .001$) and self-blame ($r = -.47$, $p < .001$). The Proactive Coping subscale has been found to have high internal consistency, with a Cronbach’s alpha ranging from .71 to .85. In this study, the alpha coefficient was found to be .91.

**Stress.** The Perceived Stress Scale-4 (PSS-4; S. Cohen, Kamarak, & Mermelstein, 1983) was used to measure the amount of stress that each individual perceives in his or her life. The scale contains four items, which measure thoughts and feelings and focus particularly on the participants’ experiences over the past month. For example, participants...
Developed by functioning. Participants are asked to indicate how often mood, somatic complaints, social interactions, and motor population of individuals with SCIs. The questions measure the CES-D 10 Item Version was validated for use among the study performed by Miller, Anton, and Townson (2008), 20-item CES-D, originally developed by Radloff (1977). In (1994). This 10-item scale is the shortened version of the Depression. The alpha coefficient was computed to be .92. 

Bach’s alphas ranging from .89 to .95. In the present study, the alpha coefficient was found to be .86. The alpha coefficient found for the sample in the present study was .77.

Social support. The Personal Resources Questionnaire-2000 (PRQ-2000; Weinert, 2003) consists of 15 positively worded items which are designed to measure an individual’s degree of perceived social support. Participants are asked to respond to items (e.g., “There is someone I feel close to who makes me feel secure”), on a 7-point Likert-type scale (1 = strongly disagree to 7 = strongly agree). Possible scores range from 15 to 105, with higher scores indicating higher levels of support. The PRQ-2000 was found by the author to be significantly correlated, in the predicted directions and with the anticipated strength, with various measures of mental health outcomes. For example, the PRQ-2000 was found by the authors to be significantly negatively correlated with the Center for Epidemiologic Studies Short Depression Scale–10 Item Version (CES-D 10; r = -.51, p < .001). The author reported Cronbach’s alpha ranging from .89 to .95. In the present study, the alpha coefficient was computed to be .92.

Depression. Depression was measured using the CES-D 10, developed by Andresen, Malmgren, Carter, and Patrick (1994). This 10-item scale is the shortened version of the 20-item CES-D, originally developed by Radloff (1977). In a study performed by Miller, Anton, and Townsend (2008), the CES-D 10 Item Version was validated for use among the population of individuals with SCIs. The questions measure mood, somatic complaints, social interactions, and motor functioning. Participants are asked to indicate how often they have felt certain ways (e.g., “I felt sad”) during the past week. Responses to the questions are on a 4-point Likert-type scale (1 = rarely or none of the time [less than one day] to 4 = all of the time [5-7 days]). Possible scores range from 10 to 40, with higher scores indicating greater impairment. Internal consistency estimates range from .8 to .9, and test–retest reliability ranges from .4 to .7. In the present study, the alpha coefficient was found to be .86.

Results

Means, standard deviations, and correlations for the seven variables used in this study were calculated using the Statistical Package for Social Sciences (SPSS) version 18 and are shown in Table 1.

The results of the simultaneous regression analysis performed with the criterion variable of depression is presented in Table 2. The set of predictor variables contributed a significant amount of variance to depression scores, $R^2 = .66, F(6, 232) = 75.22, p < .001$. All variables with the exception of injury level and social support were significantly associated with level of depressive symptoms. Specifically, results indicated that pain ($\beta = .14, p < .05$), catastrophizing beliefs ($\beta = .13, p < .05$), and perceived stress ($\beta = .50, p < .001$) have a positive association with depressive symptoms. Positive coping skills ($\beta = -.16, p < .01$) were found to have a negative relationship with depressive symptoms. Injury level ($\beta = .05, ns$) and social

| Table 1. Means, Standard Deviations, and Correlations for all Variables (N = 238). |
|-----------------|-----------|----------|----------|----------|----------|----------|----------|
| Variable        | M (SD)    | 1        | 2        | 3        | 4        | 5        | 6        | 7        |
| Injury level    | 10.5 (7.0)|          |          |          |          |          |          |
| Pain            | 104.2 (55.9)| -0.12    |          |          |          |          |          |
| Catastrophizing | 18.6 (14.6)| 0.00     | 0.69***  |          |          |          |          |
| Proactive coping| 41.1 (8.8)| -0.22    | -0.26**  | -0.36**  |          |          |          |
| Perceived stress| 7.2 (3.7)| 0.07     | 0.34**   | 0.51**   | -0.54**  |          |          |
| Social support  | 77.5 (18.5)| -0.72    | -0.24**  | -0.31**  | 0.56**   | -0.50**  |          |
| Depression      | 11.3 (6.8)| 0.06     | 0.46**   | 0.57**   | -0.55**  | 0.75**   | -0.51**  |

*p < .05. **p < .01.

| Table 2. Regression Analysis for Depression (N = 238). |
|-----------------|----------|----------|
| Variable        | B        | SE B     | \(\beta\) |
| Injury level    | .05      | .04      | .05      |
| Pain            | .02      | .01      | .14*     |
| Catastrophizing | .06      | .03      | .13*     |
| Coping          | -.13     | .04      | -.16***  |
| Stress          | .94      | .10      | .50***   |
| Social support  | -.03     | .02      | -.09     |

Note. $R^2 = .66, F(6, 232) = 75.22, p < .001$. 
*p < .05. **p < .01. ***p < .001.
support ($\beta = -.09$, ns) were not found to significantly affect depressive symptoms.

An a priori power analysis was conducted for the total $R^2$ value for a multiple regression analysis with six predictor variables, power equal to .80, and an alpha level of .05. GPOWER (Erdfelder, Faul, & Buchner, 1996), a software tool for a general power analysis, yielded a sample size of 98 for a medium effect size ($f^2 = .15$; J. Cohen & Cohen, 1983). Using the effect size found in the present study ($R^2 = .66$, $f^2 = 1.94$), the actual chance of finding a significant result with the sample size of 238 was computed by GPOWER software to be 100.0%.

**Discussion**

The results of the present study generally support the biopsychosocial model of depression as it applies to a sample of individuals with SCIs. The current study found that biological, psychological, and environmental factors were indeed associated with depressive symptoms among the sample used. Specifically, physical pain, catastrophizing beliefs, coping abilities, and stress were each found to be correlated with the presence of depressive symptoms, while injury level and social support were not. These findings are consistent with the literature on depression among individuals with SCIs, and support the proposed model (Kennedy et al., 2003; Perry et al., 2009; Ravenscroft et al., 2000; Smedema et al., 2010). The results of this study provide important information regarding the interaction of various biopsychosocial variables that clinicians should consider when assessing and treating depression among individuals with SCI.

**Biological**

Two variables were used in the current study to represent biological components of the model: injury level and pain. Injury level was not found to have a significant relationship with the experience of depressive symptoms in this sample. This finding is consistent with the literature (Craig, Hancock, & Dickson, 1994; Craig et al., 2008), which has found that neither the level of lesion (injury) or the completeness of the injury are associated with a lower level of quality of life. However, in the current study, perception of pain was found to be significantly related to the presence of depressive symptoms. These findings are also supported by previous research which found that pain intensity is associated with quality of life in people with SCIs (Craig et al., 2008). These results indicate that perceived pain is an important biological variable to be considered when understanding depressive symptoms among individuals with SCIs.

**Psychological**

According to the biopsychosocial model, psychological variables are related to the development of depression. This association was supported in the current study. Specifically, two psychological constructs were measured in the current sample: catastrophizing beliefs and coping abilities. The current study provides support for a positive relationship between catastrophizing beliefs and symptoms of depression. According to Lee, Chan, and Berven (2007), pain catastrophizing is related to the development of depression. Furthermore, positive coping skills were found to be significantly negatively related to symptoms of depression in the current study. This finding supports the idea that a higher degree of positive coping ability is related to a decrease in the prevalence of depression (Kennedy et al., 2003; Smedema et al., 2010).

**Social/Environmental**

In addition to potentially overcoming the acutely stressful experience of injury, individuals with SCI are undoubtedly faced with environmental challenges as they adjust to their disabilities. Research has recognized a strong connection between chronic stress and decreased well-being (Latimer et al., 2005). These findings are validated in the present study, as stress was found to be associated with depressive symptoms. Furthermore, the presence of environmental and social barriers may lead to feelings of frustration (Graf et al., 2009), which can impact perceptions of stress. The interactions of these relationships provide support for the biopsychosocial model’s usefulness in understanding depression within this specific population.

In the present study, although perceived social support was significantly associated with depressive symptoms in the correlation analysis, it did not contribute a significant amount of unique variance to the regression analysis. Social support is a complex and multidimensional variable, and a large body of research is devoted to understanding its relationship with depression. Research has indicated that there are various types of social support, and that they are not all equally as beneficial to the individual’s subjective experience of well-being (Beedie & Kennedy, 2002). Specifically, with regard to individuals with SCI, type of support (i.e., emotion-oriented vs. problem-oriented), as well as source of support (professional vs. family member), may play a role in associated well-being. For instance, while emotion-oriented social support from family members has been found to increase life satisfaction, when provided by friends this same type of support was not found to benefit social functioning (Beedie & Kennedy, 2002). In addition, different types of social support (i.e., problem-oriented support) may be more relevant in regard to decreasing depressive
Implications for Clinical Practice

The findings of the current study provide information that is valuable to providers of mental health services for individuals with SCIs, such as rehabilitation counselors, social workers, and psychologists. The results of this study indicate that symptoms of depression among this population are associated with pain, catastrophizing, limited coping ability, and perceived stress. Interventions aimed at decreasing depressive symptoms should address these issues, in particular. While a variety of empirically validated interventions may be employed to address depression among individuals with disabilities, studies indicate that cognitive behavioral therapy (CBT) techniques may be useful at modifying cognitions and coping abilities (Budh, Kowalski, & Lundeberg, 2006). A CBT technique known as “reframing” may be particularly helpful in restructuring catastrophic and dysfunctional thinking related to the disability (Smedema et al., 2010). Rehabilitation counselors should work with their clients to identify any catastrophizing beliefs and use techniques to challenge and restructure negative thought patterns, replacing them with more productive and realistic thoughts. Assessing the individual’s cognitive response to stress is an important step in determining the best approach at teaching coping skills (Smedema et al., 2010). Coping skills interventions should aim at identifying and building on the individual’s preexisting adaptive coping mechanisms. As perceived stress was found to be associated with increased symptoms of depression, sources of stress, and its interaction with other variables, should be identified and addressed in a clinical setting. Counselors and practitioners should be aware of the environmental and societal barriers and discriminatory practices that exist, and focus on implementing self-advocacy and assertiveness training (Graf et al., 2009). In addition, appropriate stress management interventions, such as engagement in leisure activities and participation in group-based exercise programs, should be encouraged when possible (Latimer et al., 2005). Finally, as perceived pain was found to be highly correlated to depressive symptoms in the current study, this issue needs to be addressed and measures should be taken to help individuals with pain management by making referrals to pain specialists. Furthermore, as pain has been linked to psychological distress, an assessment of depressive symptoms among individuals presenting with chronic pain is warranted (Perry et al., 2009).

The results of this study indicate that the presence of depressive symptoms among individuals with SCIs is multifaceted and contains many complex and interacting biopsychosocial variables. Therefore, to prevent clients from developing depression, it is recommended that the approach to treatment should incorporate biopsychosocial components. Screening and early identification of potential risk factors for depression are essential in directing appropriate treatment and minimizing depressive symptoms among individuals in this population.

Limitations

While the current study provides partial support for the biopsychosocial model of understanding depression among individuals with SCIs, it has several limitations. First, as the aim of the study specifically focused only on individuals with SCIs, the results may not be generalizable to other populations. In addition, all of the data used in the present study was gathered through self-report measures, which should be considered throughout the interpretation. While the instruments used in the current study were valid and reliable, they were not adequate for forming a clinical diagnosis or assessment. Specifically, it is important to remember that the CES-D 10 is a tool used for assessing the presence of depressive symptoms, and is not meant to diagnose depression. Furthermore, the psychometric properties of the CES-D 10 are less established than they are for the full version, and many cut-off points have been used in research for various populations. In addition, while the current study found that injury level was not associated with increased symptoms of depression, little information was included in this study regarding the completeness of the SCI. A more complete evaluation of the physical consequences of the injury may be helpful in further understanding the implications of this disability and designing treatment interventions. Finally, limitations with regard to the sample, including geographic and demographic restrictiveness, the proportion of males versus females, and the small proportion of respondents from diverse ethnic and racial backgrounds, also suggest that caution should be used in generalizing the results to a larger population of individuals with disabilities.

Implications for Future Research

Future research in the area should include further study into the individual variables of the biopsychosocial model and their relation to depression in individuals with SCIs.
Specifically, the relationship between social support and symptoms of depression among individuals with SCIs must continue to be explored to further understand the social constructs of positive adjustment to and acceptance of disabilities. Based on the current findings, interventions that aim at addressing pain, perceived stress, catastrophizing, and positive coping skills need to be explored and validated. As these variables were associated with symptoms indicating depression in the present study, it is imperative that interventions successfully address them to minimize health care costs and decrease symptoms of depression. In addition, this study only measured a handful of the potentially important biopsychosocial variables that may be related to depression. Future research may address additional relevant variables, such as self-esteem and self-efficacy, and their impact on depression in individuals with SCI.

Conclusions

This study has provided a statistically significant model for understanding the relationship between biopsychosocial factors and depressive symptoms among people with SCIs. As the rates of depression are so high among this population, fully understanding the etiology and treatment implications are essential in providing adequate treatment and care in a clinical setting. To provide the most effective and efficient interventions, depression must be understood and treated using a multifaceted approach, which includes the relevant aspects of the biopsychosocial model.

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