

EVALUATION OF THE QUICK INVENTORY OF DEPRESSIVE
SYMPTOMATOLOGY-SELF REPORT (QIDS-SR) IN
A SPINAL CORD INJURY POPULATION

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Dissertation Prepared for the Degree of
DOCTOR OF PHILOSOPHY

UNIVERSITY OF NORTH TEXAS

August 2008

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Reed, Kristin. *Evaluation of the Quick Inventory of Depressive Symptomatology – Self-Report (QIDS-SR) in a spinal cord injury population*. Doctor of Philosophy (Health Psychology and Behavioral Medicine), August 2008, 73 pp., 8 tables, references, 114 titles.

Spinal cord injury (SCI) is an acute and devastating event that results in significant and permanent life changes for the individuals who are injured, as well as their families and friends. Depression has received more attention from clinicians and researchers than any other psychological issue among persons with SCI. Measurement of depression in this population has a variety of methodological issues, including inconsistent assessments used (self-report versus clinical interviews), varying definitions of depression, inclusion and exclusion of physical symptoms in the assessment process, and use of measures that do not represent *DSM-IV* criteria for major depressive disorder. The primary goal of this study was to evaluate the Quick Inventory of Depressive Symptomatology – Self-Report (QIDS-SR) and provide descriptive analyses of this measure with persons with SCI. Results showed that somatic symptoms were more frequently endorsed than psychological symptoms in this population. Additionally, scores on the QIDS-SR were significantly associated with a depression diagnosis in the patient's medical chart. However, QIDS-SR scores were not found to be correlated inversely with quality of life scores as predicted. The QIDS-SR was shown to have good internal consistency and convergent validity with patients with SCI. However, it failed to demonstrate construct validity. The QIDS-SR has the potential to be a valid measure with this population and further analysis of the psychometric properties with patients with SCI is warranted.

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ACKNOWLEDGEMENTS

This dissertation would not have come to fruition without the help of many key individuals. I am truly grateful to Lisa Ottomanelli, Ph.D. for continued support and encouragement as well as for enthusiastically welcoming me aboard to the Spinal Cord Injury-Vocational Integration Program study that provided the data for this dissertation.

I sincerely thank my knowledgeable committee members, Rodney Isom, Ph.D, and J.R. Toledo, M.D. for their time and valuable contributions. My deepest gratitude and special thanks to Eugenia Bodenhamer-Davis, Ph.D. for the knowledge and guidance given to me as a professor throughout my graduate education and for stepping up to become my dissertation chair under unforeseen circumstances. I cherish the support I received from Jerry McGill, Ph.D., who supervised my research projects and guided me in my studies with great humor, encouragement and kind words up until his untimely death.

I am grateful to James Hall, Ph.D. for graciously agreeing to become part of my dissertation committee at the last minute. Additionally, I am truly appreciative for Jennifer Sippel, Ph.D and Lance Goetz, M.D. and the rest of the receptive and cooperative staff at the North Texas Veteran Affairs Medical Center during my work on this project, and for Daisha Cipher, Ph.D for her invaluable assistance with data analysis. Finally, I thank my parents for their love, support and understanding during the long years of my education.

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CHAPTER I

INTRODUCTION

Spinal cord injury (SCI) is an acute and devastating event that results in significant and permanent life changes for the individuals who are injured, as well as for their families and friends. Following the acute crisis, patients face a long rehabilitation process which may include mourning a loss of function, negotiating new interpersonal roles, modifying or developing new vocational roles, and finding new meaning in life. The patient with SCI faces a challenging task when learning to cope with a new way of living and when adjusting to a new environment. Rehabilitation programs combine physical therapies with skill building activities and counseling to provide social and emotional support. Depression has received more attention from clinicians and researchers than any other psychological issue among persons with SCI. Rates of clinically significant symptomatology range from 15% to 35% in persons with SCI.

Assessment of depression after a spinal cord injury is important because the presence of untreated depression can negatively interfere with the patient's physical rehabilitation. An effective method of early diagnosis and treatment of clinically depressed patients must be inherent to any rehabilitation effort since acutely injured patients who experience major depression do poorly in rehabilitation (Bracken & Berstein, 1980). There is evidence that depression may affect patients' learning and motivation, both during inpatient rehabilitation and afterwards.

Furthermore, depression has been associated with inadequate post-injury psychosocial adaptation, the occurrence of secondary complications and poor self-assessed health status. With the prevalence rates of depression higher in patients with

SCI than the general population, this group is at a greater risk for depression. Therefore, appropriate screening measures need to be used to help identify those at risk. Although the importance of identification and management of depression in persons with SCI is recognized in the literature, there are numerous methodological issues when assessing for depression in this population. These issues include lack of consistent methods of assessment, inclusion or exclusion of somatic items, and varying criteria for classifying depression. Since undiagnosed and untreated depression may compromise a SCI patient's adaptation to injury and motivation during rehabilitation, it is important to find a consistent, efficient, and valid measure to identify depression in this population.

Spinal Cord Injury Definition

Spinal cord injury (SCI) is damage to the spinal cord that results in a loss of function, such as mobility or sensation. The spinal cord coordinates body movement and sensation; therefore, an injured spinal cord loses its ability to send and receive messages from the brain to the body's systems that control sensory, motor, and autonomic function (Kirshblum & Donovan, 2002). The spinal cord does not have to be severed in order for a loss of functioning to occur. With the majority of spinal cord injuries, the spinal cord is intact but the damage that occurs from the injury results in loss of functioning (Kirshblum & Donovan, 2002).

A SCI may result from a variety of causes, which can be classified as traumatic or nontraumatic causes. A traumatic cause may include a sudden blow to the spine that fractures or dislocates vertebrae, which results in bruises or tears to the spinal tissue.

These fractures and compression of the vertebrae crush and destroy axons that carry signals up and down the spinal cord between the brain and the rest of the body. Other traumatic causes of SCI include gunshot or knife wounds that penetrate and cut the spinal cord and may involve inflammation and fluid accumulation in and around the spinal cord (DeVivo, 2002). The majority of spinal cord injuries result from traumatic causes, however, a spinal cord can result from numerous nontraumatic causes. Examples of nontraumatic causes may include arthritis, cancer, tumors, blood vessel problems or bleeding, inflammation or infections, and degeneration of discs of the spine.

Recovery and loss of function from a SCI varies considerably, from almost complete recovery to complete paralysis. Complete injuries are defined as having no detectable motor or sensory function in the lowest sacral segments. Incomplete injuries refer to injuries with partial preservation of sensory, motor, or autonomic function below the neurological level and lowest sacral segments (American Spinal Injury Association, 2000). The term tetraplegia (formerly called quadraplegia) refers to loss of motor and/or sensory impairment to the cervical region of the spinal cord, resulting in functional impairment to the arms, trunk, legs and pelvic regions. Paraplegia refers to loss of motor and/or sensory function to the spinal cord in the thoracic, lumbar, and sacral segments (Kirshblum & Donovan, 2002). Paraplegia may involve impairment to the trunk, legs, and pelvic organs, depending on level of injury, however functioning of the arms is left intact.

The segments in the neck, or cervical region, referred to as C1 through C8, control signals from the neck, arms, hands and in some cases, the diaphragm (National Institute of Neurological Disorders and Stroke (NINDS), 2006). Nerves at the thoracic,

or upper back region (T1 through T12) relay signals to the torso and some parts of the arms. Injuries from T1 to T8 usually affect control of the upper torso, limiting trunk movement due to the lack of abdominal muscle control. Injuries from T9 to T12 allow good trunk control and good abdominal control (NINDS, 2006). Those with injuries in the lumbar region (L1 through L5) are able to control signals to the hips and legs. The most frequent neurological category at time of discharge is incomplete tetraplegia (34.1%), followed by complete paraplegia (23.0%), complete tetraplegia (18.3%) and incomplete paraplegia (18.5%) (Jackson, Dijkers, DeVivo, & Poczatek, 2004). The most common area of injury is the lower part of the neck at C4, C5, and C6 levels (National Spinal Cord Injury Statistical Center, 2006). The second most common area of injury is between T12 and L1 (National Spinal Cord Injury Statistical Center, 2006).

The International Standards for Neurological and Functional Classification of Spinal Cord Injury is a widely accepted system describing the injury level and severity of injury based upon a systematic motor and sensory examination of neurologic function (American Spinal Injury Association, 2000). These standards are called the ASIA (American Spinal Injury Association) Impairment Scale. The ASIA scale classifies injuries by level of completeness and sensory and motor functioning preserved and utilizes the nomenclature A, B, C, D, or E (American Spinal Injury Association, 2000). Level A refers to complete injuries; Level B refers to sensory but no motor function preserved below the neurologic level; Level C includes injuries where motor function is preserved below the neurologic level and more than half of the key muscles below this level have a muscle grade of less than 3; Level D refers to incomplete injuries where motor function is preserved below the neurologic level and more than half of the key

muscles below this level have a muscle grade of more than 3; and Level E includes motor and sensory functions that are normal and intact (American Spinal Injury Association, 2000).

General Demographics

The National Spinal Cord Injury Database (NSCID) was formed in 1973 and captures approximately 13% of new cases in the U.S. As of October 2007, the database contained information on 25,415 individuals who have sustained a spinal cord injury. Statistics have been derived from this database or from collaborative studies conducted by the 26 funded Model SCI Care Systems (National Spinal Cord Injury Statistical Center, 2006).

Approximately 12,000 new spinal cord injuries occur each year. There is a total estimate of 255,000 patients with spinal cord injury in the United States (National Spinal Cord Injury Statistical Center, 2006). Males make up a larger percentage of injuries, with 77.8% of spinal cord injuries. The average age of injury onset is 39.5 years. There has been a trend showing an increase in the average age at time of injury for each decade over the last 30 years (Jackson, Dijkers, DeVivo, & Poczatek, 2004).

Approximately 57.4% of persons with SCI were employed at the time of injury (National Spinal Cord Injury Statistical Center, 2006). By 10 years post injury, 32.4% of persons with paraplegia are employed, while 24.2% of those with tetraplegia are employed (National Spinal Cord Injury Statistical Center, 2006).

There are approximately 44,000 veterans with a spinal cord injury (Department of Veteran Affairs, 2005). The VA Allocation Resource Center (ARC) maintains a

cumulative list of veterans with spinal cord injuries who have used VA healthcare services any time in approximately the past 10 years (Smith, Weaver, & Ullrich, 2007). However, information regarding etiology and demographic statistics specific to veterans was not gathered from this database to include in this paper. A study that utilized the ARC database showed that 22% of veterans with spinal cord injury received a diagnosis of depression during at least one encounter with a healthcare provider (Smith, Weaver & Ullrich, 2007).

Spinal Cord Injury Etiology

Motor vehicle accidents, falls, and gunshot wounds are the three leading causes of SCI in the United States (Nobunaga, Go, & Karunas, 1999). Motor vehicle accidents have been the most common cause of injury for the past 30 years (Jackson, Dijkers, DeVivo, & Poczatek, 2004) and since the year 2000, have accounted for 46.9% of reported SCI cases (National Spinal Cord Injury Statistical Center, 2006). Falls account for 23.7% of injury etiologies and acts of violence (mostly gunshot wounds) follow with 13.7%. Analysis of etiology of injury by ethnicity showed that African Americans and Hispanics made up the largest percentages of injuries due to violence, with African Americans making up 52.2% and Hispanics with 21.1% of people with violent etiologies (Jackson, Dijkers, DeVivo, & Poczatek, 2004). Caucasians are the largest group for all other etiologies, representing 74.8% of injuries from motor vehicle accidents and 69.8% for falls (Jackson, Dijkers, DeVivo, & Poczatek, 2004).

Secondary Factors Associated with SCI

People who survive a spinal cord injury will most likely have chronic medical complications. Besides a loss of sensation or motor function, individuals with a SCI may have loss of bowel, bladder, and sexual function, low blood pressure, deep vein thrombosis, spasticity, and autonomic dysflexia (Devivo, 2002). Other conditions that occur secondary to the spinal cord injury, include pain, pressure sores, and urinary tract infections. Immediately following the SCI, patients undergo intensive medical procedures designed to save their lives and stabilize their spinal cords. Injury-related changes leave many patients reliant on others for some assistance in activities of daily living. Following the acute crisis, patients face a long rehabilitation process which may include mourning a loss of function, negotiating new interpersonal roles, modifying or developing new vocational roles, and finding new meaning in life. Thus, people with SCI must cope with significant distress associated with losses in body function, independence, and self-concept.

Treatment and Rehabilitation

The role of the health care team, including psychologists, social workers, recreational therapists, and physical therapists can make a critical difference in the ultimate functioning of those with spinal cord injuries. The rehabilitation process can teach a person with SCI to cope with the disability outside of the hospital and therefore, providing them with the opportunity to achieve a fairly normal and satisfying life (Trieschmann, 1979). The patient with a spinal cord injury faces a challenging task when learning to cope with a new way of living and when adjusting to a new

environment. Rehabilitation programs combine physical therapies with skill building activities and counseling to provide social and emotional support. Rehabilitation helps patients gain increased mobility, redevelop fine motor skills, learn bowel and bladder management programs, and to develop coping skills for recurring episodes of spasticity, autonomic dysflexia, and pain (Elliott & Frank, 1996).

Psychological interventions can help those with SCI evaluate their strengths and weaknesses, identify barriers to the rehabilitation process, and teach effective coping skills. Another important role of the health care team is the assessment of psychological factors that may inhibit the patient from achieving the highest level of functioning possible (Trieschmann, 1979). In order to ensure successful rehabilitation and improve patient care, psychological assessment of SCI individuals is an important component throughout the rehabilitation process.

There are many social, environmental and psychological factors that can inhibit the adjustment process that also affect patient behaviors and the health and well-being of patients throughout their lives. Identification of these factors is necessary to reduce the negative impact these factors may have on the overall functioning of the patient. Depression is one such factor that has been shown to have a high prevalence in those with SCI and appears to be detrimental to many aspects of the lives and rehabilitation of those with SCI. In addition to the psychological benefits for the patient, effective screening and management of depression will be beneficial to helping health care services in terms of bed space and cost (Woolrich, Kennedy, & Tasiemski, 2006).

Theories on Depression and Adjustment to SCI

Depression has received more attention from clinicians and researchers than any other psychological issue among persons with SCI (Elliott & Frank, 1996). Past theories suggested that depression following SCI was a universal reaction. This idea was supported by a landmark study by Wittkower, Gingras, Mergler, Wigdor, and Lepine (1954) in which all 50 subjects in their sample demonstrated having deep depression in the early months following the spinal cord injury. It has been suggested that after a SCI, patients must experience depression to achieve healthy adjustment and that for a patient not to demonstrate depression is an indication of denial (Siller, 1969). Siller (1969) argued that depression was therapeutic, and the absence of depressive symptoms was unhealthy. Nemiah (1957) suggested that a nondepressed patient should be confronted with the realities of the injury so that depression was induced and appropriate grieving was initiated. Others have described a mourning period that patients should experience and believe that a disruption of this process would have negative consequences on long-term adjustment (Holmes, 1975).

Stage models of adjustment propose that depression is one of a number of phases occurring in a specific sequence through which a patient must pass to attain appropriate adjustment to the injury. Several stage model theories have been proposed, with each suggesting that a progression through some variant of shock, denial, depression and adaptation occurs in the adjustment process. While there is a significant variation in how explicitly these stages are described and sequenced, each stage was considered necessary for successful adaptation (Elliott & Frank, 1996).

However, models that have viewed depression as an inevitable consequence of

SCI typically have relied on anecdotal evidence. Due to the strong adherence to a mourning framework, clinical observations may have been biased toward inferring depression from dysphoric moods (Boekamp, Overholster, & Schubert, 1996). A critical implication of earlier studies is that the injury itself is the primary factor influencing postinjury behavior and as a result, other factors such as premorbid personality characteristics and postinjury situational differences are considered secondary to the injury (Frank, Elliott, Corcoran, & Wonderlich, 1987).

In contrast to these earlier investigations, more recent research has found little evidence that depression is necessary or that it occurs in every patient. Three well-controlled studies have not found depression to be an inevitable reaction. Howell, Fullerton, Harvey, and Klein (1981) conducted an assessment of 22 patients who had been injured for less than six months, and found that only 22.7% had experienced a depressive disorder. The percentage of those with depressive episodes was higher than found in a survey of an urban community in which 5.7% of people were found to be experiencing depression (Weisman & Myers, 1978). However, this percentage is much less than expected by those who argue that depression is experienced by all patients with spinal cord injury.

Expanding this study, Fullerton, Harvey, Klein, and Howell (1981) increased the sample size to 30 and patients were evaluated for current and previous mental disorders. It was found that 30% of the sample qualified for a depressive disorder. Another study found that 44% of a sample of 32 patients met the *Diagnostic and Statistical Manual of Mental Disorders – 3rd edition (DSM-III, 1980)* diagnostic criteria for a depressive episode (Frank, Kashani, Wonderlich, Lising, & Visot, 1985).

Other research has stated that it is not inevitable that all individuals with SCI present with severe depression, but individuals can be labeled as going through a mourning process (Jacob, Zachariah & Bhattacharji, 1995). The need to accept the disability of SCI is considered by some to be mandatory for a healthy adjustment and the process of acceptance is regarded as a mourning process (Jacob, Zachariah & Bhattacharji, 1995). The term chronic sorrow has been used to describe the grief experienced by persons with disability (Burke, Hainsworth, Eakes & Lindgren, 1992; Davis, 1987). Davis (1987) claims that stage theories of adaptation to loss distort the grief experienced by those persons who must live continuously with their disability. The mourning process that follows a physical injury has been described as cyclical and prolonged and the presence of a disability and its chronicity serve as constant reminders of loss. Burke (1992) described chronic sorrow as different from grief, due to the cyclical nature and the ability of persons with chronic sorrow to remain highly functional despite the constant reminder of the permanent loss.

Additional research has also explored the process of acceptance of disability and loss as it pertains to the person's perception of impairment and the individual's emotions and values associated with the disability (Wright, 1983). Wright (1983) described the changes that are necessary in order for a person to accept the loss, which leads to adjustment to disability. These changes include enlarging the scope of values, subordinating of physique, containment of disability effects, and transforming comparative values into asset values.

Prevalence of Depression in SCI

In the more recent literature, prevalence rates of depression after SCI vary considerably from study to study, depending on the definition of depression, the type of measure employed, and whether the measure was taken during rehabilitation, or years after discharge from rehabilitation. Rates of clinically significant symptomatology range from 15% to 35% (Frank, Chaney, & Clay, 1992; Fuhrer, Rintala, Hart, Clearman, & Young, 1993; Mccoll & Rosenthal, 1994). Evidence clearly shows that depression is not an inevitable reaction to a SCI, and it is not a necessary component of rehabilitation as stage theories suggest. However, findings do indicate a higher proportion of individuals with SCI are depressed in comparison to the general population.

Estimates of timing of clinical depression following SCI have varied across studies. Fullerton, Harvey, Klein, and Howell (1981) found that 30% of SCI patients met *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV, 1994) criteria for major and minor depressive disorders within one month of injury, with all except one patient recovering without additional treatment at discharge, which averaged 3 months post injury. Richards (1986) identified that immediately postdischarge, SCI patients were significantly more depressed than were controls, but this difference was not significant at 3 months postdischarge. In contrast, other studies have found that depressive symptoms may develop later in the course of hospital rehabilitation or following discharge. Judd, Weber, Brown, and Burrows (1989) found that 20% of patients were considered depressed, and time of onset of depression varied from 3 to 40 weeks post injury.

Another study looked at levels of depression from time of onset of SCI to 2 years postinjury. Kennedy and Rogers (2000) found a modest decrease in depression scores

between time of injury and week 18. At week 18, scores gradually increased and rose steadily until discharge at week 48 when 60% of patients were considered depressed. These numbers decreased steadily until 2 years post discharge, at which 28% of the patients were found to be depressed.

Across a variety of studies, there has been a small or nonsignificant correlation between depression and time of injury suggesting that level of depression does not simply reflect chronicity of functional impairment (Boekamp, Overholser, & Schubert, 1996). The course of depression after SCI may vary and a variety of factors can influence the relationship between SCI and depression. Many personal and environmental factors have been found to moderate the presence of depression among those with SCI.

Factors Contributing to Depression

Contemporary theories of adjustment of physical disability take into account the interactive effects of disability parameters, psychosocial stressors, and personal and environmental factors that culminate in the prediction of depression (Elliot & Frank, 1996). One important factor related to depression in SCI patients is social support. The relationship between SCI and depressive symptoms is moderated by the quality of social support. McColl and Rosenthal (1994) showed that among people aging with SCI, social support correlated significantly and substantially with both depression (negatively) and life satisfaction (positively).

Kishi, Robinson, and Forrester (1994) revealed that lack of social support is integral in the maintenance of depressive disorders. It was found that individuals who

displayed depression over the first 6 months since their injury tended not to recover as well as those individuals with a low number of social supports available to them. Rintala, Young, Hart, Clearman, and Fuhrer (1992) evaluated the well-being of 140 individuals with SCI living in the community. Results showed that greater satisfaction with social support was associated with lower levels of depression and high life satisfaction scores; whereas the total number of supports was positively related to life satisfaction and self-assessed health, and negatively related to the presence of urinary tract infections.

However, the type of social support may be a factor in the relationship between depression and social support. Immediately following a spinal cord injury, tangible, noncontingent assistance from others and informative guidance from professionals in the medical environment may be more strongly related to less depressive behavior (Cutrona, 1986). Among persons who have been disabled for longer periods of time, peer relationships that foster social integration and a sense of self-worth may be negatively associated with depressive behavior (Elliott, MacNair, Herrick, Yoder, & Byrne, 1991). Elliott, Herrick, Witty, and Godshall (2000) examined the association of different types of social relationships with depressive behavior among persons with spinal cord injury. Specifically, reassurance of personal worth and social integration support were associated with lower levels of depression.

Tate, Forchheimer, Maynard, and Dijkers (1994) have shown a link between depression and level of impairment. Subjects who reported higher levels of general impairment and self-perceived impairment during either the first and second years of the study were more likely to become depressed during the second year. An impairment in social integration among depressed individuals appears to be related to their

perceptions of being less physically active, of being more isolated and of having only limited access to transportation (Tate, Forcheimer, Maynard, & Dijkers, 1994).

Both depression and distress have also been associated with a patient's beliefs of control over their life and over their environment. Patients who believe they have control over their health and their lives are found to be less depressed (Frank & Elliott, 1987). Patients with SCI are often faced with numerous barriers, such as environmental barriers and insufficient support services, and regaining control over these barriers appears to be a critical component of coping effectively and reducing depression and distress. Another important factor is the person's locus of control. External locus of control has been associated with increased emotional distress and depression in men with SCI (Shadish, Hichman, & Arrick, 1981). Those with an internal locus of control reported less depression and provided positive ratings for physical therapy and increased satisfaction with life (Shadish, Hichman, & Arrick, 1981).

Other factors contributing to the onset and relapse of depressive episodes include environmental and psychosocial stressors, including marital distress, social isolation, and social loss (Boekamp, Overholser, & Schubert, 1996). Those with SCI face many stressors that can occur after hospitalization. These stressors may include divorce (Brown & Geisy, 1986), increased social isolation associated with transportation obstacles and social stigma, job loss, financial strain of medical bills and the continuous strain of secondary physical complications (Boekamp, Overholser, & Schubert, 1996). How the individual responds and copes with these events is critical to the person's overall well-being and development of depression.

Elliott, Godshall, Herrick, Witty and Spruell (1991) found that effective skills in problem solving and a greater confidence in problem solving were significantly associated with lower depression scores. The authors conclude that those with planned, goal directed strategies may be less likely to have problems with depression when dealing with life stressors. Other studies indicate that higher levels of hope and goal-directed energy are associated with less distress, regardless of time of injury (Elliott & Franks, 1996). Elliott and Franks (1996) stated that measures of social-cognitive characteristics such as problem solving, hope, and locus of control are valuable to clinicians because these variables are embedded in a learning tradition and are thus theoretically amenable to psychological interventions in medical settings.

It was found that higher levels of hope were associated with lower levels of depression (Elliott, Witty, Herrick & Hoffman, 1991). Hope was also found to be an important predictor of depression and psychosocial impairment, with those reporting more hope showing lower impairment scores soon after injury (Snyder 1989). Snyder (1989) explained that the components of hope may be important to people who have sustained permanent physical injuries or losses. It has been suggested that hope helps maintain a sense of self-worth in spite of the physical loss, and is associated with engaging in behaviors that are conducive to optimal psychological and physical adjustment (Elliott et al., 1991). Hope can combat depression and anxiety or at least make them more manageable (Fichtenbaum & Kirshblum, 2002).

An absence of depression, along with expressed optimism, has been interpreted by some as reflecting a state of denial of one's disability status (Elliott, Witty, Herrick & Hoffman, 1991). However, it has also been found that rehabilitation staff tends to

overestimate the psychological distress experienced by persons with SCI (Bodenhamer, Achterberg-Lawlis, Kevorkian, Belanus & Cofer, 1983; Gans, 1981). It was found that persons with SCI reported a higher than predicted positive outlook and less depression than predicted by rehabilitation staff (Bodenhamer, Achterberg-Lawlis, Kevorkian, Belanus & Cofer, 1983). It was suggested that focusing on the positive aspects of the situation as a defense mechanism may provide protection against hopelessness in an uncertain situation for the person with SCI (Bodenhamer et al., 1983). Cairns and Baker (1993) suggest that prerequisite to progress in rehabilitation, staff should first accept the patient's emotional expressions as genuine and relevant instead of interpreting them as denial, depression, anger or some other transient emotion representing a pre-ordained stage of adjustment. It may be that staff holds preconceived ideas regarding the manner in which patients respond to SCI, and these ideas distort what is actually observed. This phenomenon has been termed "demand for mourning" (Wright, 1983).

Consequences of Depression on Rehabilitation and Health

There are also medical consequences of depression. Depression in persons with spinal cord injury has been associated with the occurrence of secondary complications, such as bed sores, urinary tract infections (Herrick, Elliott, & Crow, 1994) and poor self-assessed health status (Schultz & Decker, 1985). Tate, Forchheimer, Maynard, and Dijkers (1994) found that persons with higher depression scores spend more days in bed, and have greater use of paid personal care attendants and greater general medical expenses than those with lower levels of depression.

Depression also has been shown to alter the immune system and has been found to lower lymphocyte responses to mitogens, lowering the body's defense against infections (Kronfol, Silva, Greden, Dembinski & Carroll, 1982). Disturbances in immune function can place people at risk for health problems. Depression influences the health of a person by having a direct relationship with the immune system or by indirectly influencing how someone takes care of himself/herself. Depressed individuals with SCI are more likely to neglect themselves than nondepressed person with SCI (Malec & Neimeyer, 1983). This self-neglectful behavior may be associated with higher mortality rates, and an increase in pressure sores (Devivo, Kartus, Stover, Rutt, & Fine, 1989). Judd and Burrows (1986) state that self-neglect may be a consequence of unrecognized and untreated depression. People with SCI who are depressed may be more likely to abuse substances and less likely to provide proper care for themselves (Boekamp, Overholser, & Schubert, 1996). Alcohol use is associated with lower motivation during rehabilitation, and therefore affects rehabilitation outcomes (Heinemann, A., Goranson, N., Ginsburg, K., & Schnoll, S., 1989).

Although transient periods of dysphoria may occur for many persons with SCI, a major depressive episode is likely to occur when a variety of psychosocial variables culminate in sustained feelings of despair and hopelessness. Frequent stressful life events following the injury are likely to increase the patient's feelings of helplessness. Stress-coping mechanisms have an impact on the immune system. Depression along with stressors and inability to effectively cope affect the ability of the immune system to function at the highest level possible, leading to an unstable and ineffective immune system (Weisse, 1992). This leads to a further decline in health and slower healing

ability of the body (Weisse, 1992). Therefore, the impact of stressful life events is mediated by the patient's cognitive appraisal of coping resources and the patient's characteristic pattern of responding to stress (Boekamp, Overholser, & Schubert, 1996). Thus, patients with a similar injury may differ in their risk of depression depending on their typical coping style, the perceived availability of social support, and the degree of relationships over time.

Importance of Identifying Depression

Assessment of depression in persons with SCI is important because the presence of untreated depression can significantly interfere with the patient's physical rehabilitation. Although some depressive symptoms following a spinal cord injury may spontaneously remit over time, other symptoms may require more intensive treatment and need to be identified. With the prevalence rates of depression higher in patients with SCI than the general population, this group is at a greater risk for depression. Therefore, appropriate screening measures need to be used to help identify those at risk. The Consortium for Spinal Cord Medicine Clinical Practice Guidelines recommend routine screening of persons with SCI for depression as well as appropriate referral for psychotherapy and psychotropic medication when appropriate (Consortium for Spinal Cord Medicine, 1998). Since undiagnosed and untreated depression may compromise a SCI patient's adaptation to injury and motivation during rehabilitation, it is important to find a consistent, efficient, and valid measure to determine which patients might require more focused psychological assessment and treatment.

Although there is debate regarding the best type of screening measure to employ, some consensus has emerged that early identification and intervention for psychological disorders in medical care settings has utility because of the cost offset in terms of reduced health care utilization as well as the improvements in the quality of life among patients. Weingardt, Hsu, and Dunn (2001) found that positive screens for depression and anxiety disorders in inpatients with SCI were significantly correlated with the total number of hospital admissions in the year prior to the index admission date.

Assessment Methods

Estimates of the prevalence of depression following SCI are limited due to the various definitions and assessment methods used across studies. Some studies have used standardized structured interviews, while others have relied on self-report measures. Skinner, Armstrong, and Rich (2003) found that the Beck Depression Inventory (BDI) was the self-report measure utilized most frequently in the literature. In a review of diagnostic methods for depression in SCI, Skinner, Armstrong, and Rich (2003) concluded that there was little agreement among researchers as to the primacy of any one measure of depression for use with individuals with SCI.

Elliott and Frank (1996) report that it is unclear if the differences in depression frequency across studies are a function of the different diagnostic and interview methods or possible differences between samples.

The authors suggest the possibility of structured or semistructured interview methods being more sensitive to the salient and multifaceted features of depression and have greater specificity in diagnosing depression.

Another barrier to the accurate assessment of depression following SCI, is that a majority of depression screening measures have item content, question format, time frame, or cut off scores that make it difficult to relate to the *DSM-IV* diagnostic criteria for major depressive disorder (Elliott & Frank, 1996). In some studies, the prevalence rates for depression reflect depressive disorders of varying severity, while in other studies, less severe depressive episodes were excluded from the rates. After a review of 64 research studies from 1985 to 2000, Skinner, Armstrong and Rich (2003) concluded that there may be a lack of a consensus concerning diagnostic criteria for this population.

Efficiency of Assessment in Medical Settings

Along with the limitations in measurement already mentioned, another barrier is that current screening measures are considered too long and cumbersome to be used routinely in typical medical settings (Williams, J., Avins, Miranda, & Browner, 2002). Most commonly used measures of depressive symptomatology, such as the Beck Depression Inventory, Center for Epidemiological Studies Depression Scale, Older Adult Health and Mood Questionnaire and the Zung Depression Rating Scale, have 20 to 22 items (Williams, J., Avins, Miranda, & Browner, 2002). Interview methods can be clinically cumbersome and time consuming. It is important to find a screening measure that can provide an efficient means of determining the prevalence of depression, provide consistent measurement criteria across samples and time, and have wide-reaching diagnostic capability comparable to the *DSM-IV* criteria.

Physical Symptoms in Measurement

Reliability and validity of diagnostic criteria for mental disorders has been examined and standardized for psychiatric populations. Criteria for depressive disorders include both somatic (i.e., fatigue, weakness, sleep disturbance) and psychological (i.e., sadness, loss of interest, suicidal ideation) symptoms. The diagnosis of depression in medical patients is complicated by the presence of medical symptoms that may also be symptoms of depression. For example, many biological symptoms of depression (loss of appetite, weight loss, lowered sex drive, sleep disturbance, fatigue) are common medical symptoms.

With SCI specifically, there may be common SCI related issues that create the clinical impression of depression when none exists. Many persons become incapable of engaging in many activities previously enjoyed, and working and completing certain tasks becomes difficult. To prevent pressure sores, individuals with SCI may shift bodily positions frequently during the night and individuals may employ a nighttime bowel regimen. Both of these health-care behaviors can contribute to sleep disturbances. Other common issues with SCI include fatigue, loss of sexual libido, and weight loss due to muscle atrophy.

Due to the complicated relationship between medical issues and depression, the issue of how to most accurately measure depression in individuals with SCI has been heavily debated in the literature. The main issue is identification of an approach that can reliably diagnose depression in a patient with SCI. To gain a better understanding of the implications involved when using different approaches to assessing depression in the SCI population, further exploration of this issue is warranted. There are four approaches

that have been explored and discussed in the literature and each approach has unique strengths and limitations.

The first approach is the inclusive strategy, which recommends inclusion of all depressive symptoms toward a diagnosis of depression even if the symptoms are plausibly secondary to medical illness. The inclusive approach is more sensitive for the diagnosis of depression but potentially less specific, which leads to an increase in the false positive rate (Jacob, Zahariah, & Bhattacharji, 1995). The Beck Depression Inventory (BDI) has been frequently used in research for the assessment of depression in SCI patients (Skinner, Armstrong, & Rich, 2003). It has been the subject of criticism for its use with medical patients due to the inclusion of somatic items. Numerous studies that have used the BDI as a measure of depression with SCI patients mention the limitations of this measure with this population. Levin, Llabre, and Weiner (1988) questioned the validity of the BDI with Parkinson's patients due to high endorsement of somatic symptoms of depression. Radnitz et al. (1997) suggested that in those instances interpretation of BDI results become ambiguous since it is difficult to determine if high scores should be attributed to depression or medical illness.

However, when assessing for depression, it is important to use the approach found to be the most reliable and valid with the population being evaluated. There have been several studies that support the inclusion approach and various measurements utilizing somatic items have been shown to be reliable and valid with medical patients and when used with patients with SCI.

The BDI-II has been shown to support inclusion of somatic items and demonstrated reliability and validity when administered to women with physical

disabilities (Hughes, Robinson-Whelen, Taylor, & Peterson, 2005). Arnau, Meagher, Norris and Bramson (2001) explored the psychometric characteristics of the BDI-II in a primary care medical setting and found the BDI-II to yield reliable, internally consistent, and valid scores. Analysis showed that a cutoff score of 18 yielded the best balance between sensitivity and specificity for predicting major depressive disorder in this setting, which led to an overall rate of correct classification of 92%. The authors also concluded that somatic symptoms made a salient contribution to a second-order factor of depression and covaried with other cognitive and affective symptoms of depression (Arnau, Meagher, Norris & Bramson, 2001).

Additional depression measures have been explored with patients with SCI. Bombardier, Richards, Krause, Tulsy, and Tate (2004) examined the Patient Health Questionnaire-9 (PHQ-9) with 849 patients with SCI and concluded that all depressive symptoms, including somatic items had high specificity and high NPV (negative predictive values) in predicting who would or would not meet criteria for probable Major Depressive Disorder (MDD). The authors concluded that somatic symptoms are nonspecific symptoms of SCI, but are predictive of probable MDD and should be counted toward diagnosis (Bombardier, Richards, Krause, Tulsy & Tate, 2004). Additionally, the authors suggest that the PHQ-9 may be a useful screen for probable MDD in people with SCI.

A study utilizing the Zung Self-Rating Depression Scale supports the inclusion approach (Davidoff, Roth, Thomas, Doljanac, Dijkers, et al., 1990). The study consisted of patients with acute SCI and a control group. This study found that patients with SCI demonstrated abnormally elevated scores in both somatic and affective distress,

suggesting that abnormal ZUNG scores reflect disturbances in mood and affect and not simply medical aspects of acute SCI (Davidoff, Roth, Thomas, Doljanac, Dijkers, et al., 1990).

When exploring the relationship between depression and physical symptoms of illness, it is also important to consider the expression of depression in medical patients. Somatic symptoms may not only be a secondary condition of the medical problem but also could be the way depression is being expressed by the patient. It has been reported that in two-thirds of primary care patients with depression, the clinical picture is dominated by somatic symptoms, which patients frequently attribute to normal or nonclinical causes (Tylee & Gandhi, 2005). In a community study conducted by the World Health Organization, 69% of participants meeting criteria for major depression had approached their primary care physician on the basis on somatic symptoms alone (Simon, Vonkorff, Piccinelli, Fullerton & Ormel, 1999). Research has shown that some patients are less willing or able to express emotional distress but discussing physical symptoms is more acceptable and comfortable for them (Simon et al., 1999). Thus, in medical patients, such as those with SCI, there may be confounding variables such as lack of acknowledgement of psychological symptoms and increased expression of depression through somatic symptoms that are not directly due to a medical condition. Therefore, inclusion of the somatic symptoms is important for identifying depression that may otherwise go undetected. It has been found that clinicians and researchers in medical settings tend to underdiagnose and undertreat depression (Bombardier, Richards, Krause, Tulsy & Tate, 2004), which further justifies the need to improve the

screening and diagnosing of depression in medical patients so that adequate treatment can be provided.

Another approach to the measurement of depression that has been studied thoroughly with medical populations is the exclusive approach. This approach advocates elimination of somatic symptoms from the diagnostic criteria for depression in medical patients. This approach will result in increased specificity but low sensitivity, resulting in an increase in false negatives. This approach eliminates the issue of determining if physical symptoms are inflating depression scores and the debate on whether the physical symptoms are related to the depression or underlying physical illness. However, considering the consequences of untreated depression in patients with SCI (i.e., self-neglect, increased medical complications, longer hospital stays, poor quality of life), the increase in false negatives has critical clinical implications. Jacob, Zachariah, and Bhattacharji (1995) noted that inclusion of somatic symptoms related to acute SCI in assessment may result in incorrect diagnoses, but exclusion may result in a failure to diagnose and treat individuals who are clinically depressed.

Several studies have found somatic items to be good predictors of depression in medical patients, therefore, eliminating these items may deprive a clinician of potentially valuable information (Elliott & Frank, 1996). Clay, Hagglund, Rank, Elliott, and Chaney (1995) found that among people with SCI, psychomotor disturbance, appetite change and sleep disturbance were important contributors to an accurate diagnosis of major depressive disorder. Therefore, they concluded that elimination of these items would remove possible indicators of depression.

Alternatively, another diagnostic approach is the substitutive approach, which

attempts to account for the possibility of the underdiagnosis problem of the exclusive approach. This approach suggests the substitution of additional psychological symptoms, such as self-pity, crying spells, and pessimism to replace somatic symptoms (Jacob, Zahariah, & Bhattacharji, 1995). However, substituting these physical symptoms with psychological symptoms has not been evaluated for reliability and validity.

A fourth diagnostic strategy is the etiological approach which advocates that a symptom be counted toward a diagnosis of depression only if it clearly is not due to a medical illness (Jacob, Zahariah, & Bhattacharji, 1995). Only counting symptoms that are not due to physical illness requires inference and has low reliability (Jacob, Zahariah, & Bhattacharji, 1995).

When weighing the advantages and disadvantages of the four diagnostic approaches, the inclusive and exclusive approaches are the most straightforward and the easiest to implement. Deciding on the most appropriate approach depends upon whether diagnostic specificity or diagnostic sensitivity should be maximized. Due to the adverse outcomes in medical patients with depression along with the benefits of treatment for depression, the inclusive approach appears to be preferable in the clinical setting (Vahle, Anderson, Kristofer, & Hagglund, 2000). Assessment measures that include somatic symptoms may be of benefit for clinical use. Prior to making a diagnosis, the clinician can follow-up a positive depression screen with a clinical interview to clarify the source and contribution of the depressive symptoms.

QIDS-SR Description

The QIDS-SR may be an alternative measure for determining depression in SCI patients that removes some of the above mentioned barriers in assessing depression in SCI patients. To date, this measure has not been evaluated with the SCI population. The measure is a shortened version of the 30-item Inventory of Depressive Symptoms (IDS). All 16 questions on the IDS are included on the QIDS-SR. To further understand the development and application of the QIDS-SR, an exploration of the IDS from which the QIDS-SR was developed and evaluated is important.

The IDS consists of 30 items that assess all *DSM-IV* diagnostic criteria for major depressive disorder: sad mood, concentration, self-criticism, suicidal ideation, interest, energy/fatigue, sleep disturbance, change in weight, and psychomotor agitation or retardation (Rush, Triveldi, Ibrahim, Carmody, Arnow, et al., 2003). The IDS also includes items such as anxiety, irritability, and melancholic and atypical symptom features. The IDS was developed to improve upon the available clinician and patient rating scales by providing equivalent weightings (0-3) for each of the symptom items, provide clearly stated anchors for each item, include all *DSM-IV* criterion items required to diagnose major depressive disorder, and to provide an equivalent clinician-rated form and patient-rated form (Rush, Gullion, Basco, Jarrett, & Triveldi, 1996). The Inventory of Depressive Symptomatology-Self-Report (IDS-SR) and the Inventory of Depressive Symptomatology Clinician (IDS-C) versions have identical items and are highly correlated. The IDS has many uses, including screening for depression and to measure symptom severity. The measure uses a 7-day time frame prior to the assessment to assess for symptom severity (Rush, Gullion, Basco, Jarrett, & Triveldi, 1996).

The IDS has been subjected to numerous psychometric evaluations, including a

factor analysis of the IDS, Hamilton Depression Rating Scale of Depression (HDRS), and the BDI in outpatients with major depressive disorder. The IDS appeared to provide more complete factor coverage than the HDRS and the BDI (Gullion & Rush, 1998). The IDS is highly correlated with the HDRS and the BDI. The IDS and the HDRS had a correlation of 0.88 and there was a correlation of 0.93 between the IDS and BDI in outpatients with major depressive disorder (Rush, Gullion, Basco, Jarrett, & Triveldi, 1996).

The IDS has been administered to patients with major depressive disorder, bipolar disorder, and dysthymic disorders. Rush, Hiser, and Giles (1987) found that the IDS was able to distinguish between endogenous and nonendogenous depression. It has also been shown that the IDS can differentiate between those with major depressive disorder and those with dysthymia (Rush, Hiser, & Giles, 1987). The IDS was found to be a valid measure with cocaine dependent inmates (Suris, Kashner, Gillapsy, Biggs, & Rush, 2001). The IDS had excellent concurrent validity with the BDI and HRSD and there was a strong correlation between the IDS-SR and IDS-C. The IDS was able to effectively classify different levels of depression in prison inmates (Suris, Kashner, Gillapsy, Biggs, & Rush, 2001). The authors (Suris, Kashner, Gillapsy, Biggs, & Rush, 2001) concluded that the IDS has several advantages: 1) more accurately represents the *DSM-IV* criteria than the BDI and HRSD, 2) is more sensitive at picking up depression in outpatient populations and 3) allows for flexibility in assessment choices due to having an identical self-report and clinician rated form.

To date, the IDS has been explored with a few medical populations. It has been used in a study of clinical features of depressed outpatients with and without co-

occurring general medical conditions (Yates, Mitchell, Rush, Triveldi, Wisnieski, et al., 2004). No difference was found between the two groups on responses to items regarding sleep complaints, and appetite and weight changes. Fatigue was highly endorsed among both groups, suggesting that fatigue specifically of a physical origin is unlikely to pose a diagnostic problem (Yates, Mitchell, Rush, Triveldi, Wisnieski, et al., 2004). The authors conclude that using different depression diagnostic criteria for those with and without medical comorbidities is not necessary.

The IDS was used to evaluate depression in radiation oncology patients. About one-third of the patients were classified as having clinically significant levels of depression symptomatology (Jenkins, Carmody, & Rush, 1998). A cutoff score of 20 was used to differentiate between euthymic and medically healthy patients in major depressive episodes (Rush, Gullion, Basco, Jarrett, & Triveldi, 1996). It was found that the vegetative symptoms (sleep, appetite and weight changes, decreased energy, and decreased libido) were not useful in distinguishing between the depressed and nondepressed patients. The authors proposed that the failure of these items to differentiate the two groups, was most likely due to their inclusion in the cancer or radiation complex (Jenkins, Carmody, & Rush, 1998).

The IDS was also used with asthma patients (Brown, Khan, Nejtek, Thomas, & Mahadi, 2000). A rate of 28% of asthma patients had scores in the moderately to severely depressed range. Significant negative relationships were found between mental and physical functioning scales on the Short Form 12-item (SF-12) health survey and IDS-SR scores.

The QIDS-SR (Rush, Trivedi, Ibrahim, Carmody, & Arnow, 2003) was developed to assess depressive symptom severity in a time efficient manner. The QIDS-SR is a brief 5-7 minute self-report that reflects symptom severity, as well as symptomatic change. It contains fewer items (16 total, in which the respondent answers 14) than many self-report measures. The item content was designed to cover all diagnostic criteria for major depressive disorder outlined by the *DSM-IV*.

The QIDS-SR has been shown to be highly correlated to the IDS with a coefficient of 0.96 in adult outpatients with major depressive disorder (Rush, Tirveldi, Ibrahim, Carmody, Arnow, et al., 2003). The QIDS-SR has been shown to have a sensitivity to change that closely parallels results obtained with the longer clinician ratings (HRSD) in outpatients treated for chronic, nonpsychotic major depressive disorder (Rush, Tirveldi, Ibrahim, Carmody, Arnow, et al., 2003). The IDS-SR and the QIDS-SR have been shown to be equivalent in detecting symptom change, when viewed as a discontinuous variable (response or remission); however, the QIDS-SR may be slightly less sensitive to residual symptoms than the IDS-SR (Rush, Tirveldi, Ibrahim, Carmody, Arnow, et al., 2003). The authors suggest that the QIDS-SR may be helpful in monitoring symptom outcome changes during treatment for patients and for health care systems (Rush, Tirveldi, Ibrahim, Carmody, Arnow, et al., 2003).

The QIDS-SR has been used in a variety of research and clinical settings, including inpatient and outpatient psychiatric clinics and primary care settings. Rush, Tirveldi, Carmody, Ibrahim, Markowitz, et al. (2006) state that the IDS and QIDS-SR are under investigation with elderly and adolescent patients and have begun to be utilized as outcomes in randomized controlled trials.

Rush, Triveldi, Ibrahim, Carmody, Arnow, et al. (2003) suggest that the QIDS-SR has advantages over the BDI in that it covers all *DSM-IV* (the BDI excludes weight), is shorter, and is available in a clinician-rated format (QIDS-C). The QIDS-SR and QIDS-C are highly correlated and have identical items. Rush, Carmody, Ibrahim, Triveldi, Biggs, et al. (2006) state that clinical practice and clinical trial research would benefit greatly if a self-report rating of depression severity and specific depressive symptoms could be found that reasonably reflects findings obtained from more time-consuming clinician ratings.

Vahle, Andersen, Kristofer, and Hagglund (2000) recommend that more exploratory research be done on the psychometric performance of various depression screening measures among people with disabilities. These authors also state that the field of outcomes research is hampered by the lack of information on the reliability and generalizability of specific depression screening measures among people with various medical impairments. They also suggest that generating normative data from people having various medical conditions or from persons with different levels of severity of SCI may facilitate development of impairment specific cutoffs and depression severity scores. A psychometric evaluation of the QIDS-SR in the SCI population has yet to be conducted so it is unclear if the somatic items will affect the reliability and validity of this measure of depression in this population. Given the evidence that affective status following SCI affects rehabilitation outcomes, it is important that an easy-to-administer tool be available for clinicians to screen for possible depression.

Purpose of Current Study

The primary goal of this study was to evaluate the Quick Inventory of Depressive Symptomatology-Self Report (QIDS-SR) to provide psychometric properties and descriptive analyses of this measure with persons with SCI. Information regarding internal consistency and validity of this measure was gathered. The QIDS-SR scores were compared to depression diagnoses in participants' medical charts as an external criterion. For construct validity, the QIDS-SR scores were compared to the scores on the Veteran's Rand 36-Item Health Survey (VR-36). Items on the QIDS-SR were analyzed to explore endorsement of somatic and psychological symptoms of depression in this sample. The following are specific hypotheses that were tested:

Hypothesis 1: Scores on the QIDS-SR will be associated with a depression diagnosis in the patient's medical chart, demonstrating convergent validity.

Hypothesis 2: QIDS-SR scores will correlate inversely with quality of life scores on the VR-36, demonstrating construct validity.

Hypothesis 3: Somatic and psychological symptoms will be equally endorsed as depressive symptoms on the QIDS-SR

CHAPTER II

METHOD

Participants

Participants in this study included subjects taking part in a larger research project titled Spinal Cord Injury-Vocational Integration Program: Implementation and Outcomes (SCI-VIP). This larger research project consisted of participants from six Veteran Affairs Medical Centers (VAMC) Spinal Cord Injury Centers (SCI) located in the following cities: Dallas, TX, San Diego, CA, Houston, TX, Milwaukee, WI, Chicago, IL, and Cleveland, OH. The Dallas location was the coordinating site for the research project. The purpose of the SCI-VIP research project was to test a new vocational rehabilitation program for patients with spinal cord injuries. Participants were placed in an experimental group (the new program) or a control group (treatment as usual). Four of the VAMCs (Dallas, Cleveland, Houston, and San Diego) included participants in both the experimental and control groups and two sites (Milwaukee and Chicago) included participants from the control group only. Therefore, this current study was restricted to patients with a spinal cord injury who received treatment at one of the above-mentioned VAMCs and who were participating in the SCI-VIP study as part of the experimental or control group. The target population from these six locations included males and females with spinal cord injuries from diverse ethnic backgrounds.

Given that the participants for this current study were part a larger study, eligible participants met the same criteria for the SCI-VIP research project. Inclusion criteria included the following: be between the ages of 18 and 55 years old, have a spinal cord injury as a result of trauma or disease, be medically and neurologically stable, live within

100 miles of the VAMC in which the participant receives medical treatment, have access to transportation, expressed an interest in competitive employment, and willingly sign a consent form indicating voluntary participation. Exclusion criteria included the following: medically and/or surgically unstable, unwilling to complete the consenting process, mentally impaired to the extent that judgment and reasoning jeopardize the safety of self and others, currently untreated alcohol or drug dependent, and employed in a compensated job at the time of recruitment.

Procedure

Data were collected from subjects participating in the SCI-VIP research project at all the six VAMC locations. Each location had a Site Coordinator collecting data from each participant. Data were collected after each participant voluntarily signed a consent form to participate in the study. The larger SCI-VIP research project gathered data from participants at several different time points over a twelve-month period. Data collected as part of the larger research project included: initial contact information, eligibility screening, medical chart review, benefits analysis summary, baseline demographics, income and patient perceptions of benefits, utilization of health care, alcohol and drug use (AUDIT-C), vocational rehabilitation history, employment history, barriers and supports, level of handicap (CHART), depression (QIDS-SR), and health related quality of life (VR-36).

The current study specifically examined the data regarding depression (QIDS-SR), health related quality of life (VR-36), demographic information, and a medical chart review collected at one point in time during the twelve-month period.

Materials

Demographics Questionnaire

A demographic questionnaire was developed for use for the SCI-VIP study that included information on age, sex, race, education level, marital status, training received in the military, and various questions regarding transportation to the VAMC. The information was collected in an interview format by the site coordinator.

Medical Chart Review

The Medical Chart Review form was developed by the investigators of the SCI-VIP research project. This form was in a checklist format to be filled out by the Site Coordinator. The Site Coordinator completed the form by reviewing the participant's medical chart. The information gathered included: date and cause of injury, other injuries at the time of SCI injury, current comorbidities (including diagnosis of depression), and Functional Independence Scores (FIM).

Quick Inventory of Depressive Symptomatology –Self-Report (QIDS-SR)

The QIDS-SR was designed to assess the severity of depressive symptoms. The QIDS-SR was developed to provide a shorter, time-efficient, 16-item self-report version of the Inventory of Depressive Symptomatology (IDS). It was intended for use in clinical research and clinical practice, with a focus on the 9 *DSM-IV* criteria symptom domains (Dunn, Trivedi, Kampert, Clark, & Chambliss, 2002). These domains included sad mood; concentration; self-criticism; suicidal ideation; interest; energy/fatigue; sleep

disturbance (initial, middle, and late insomnia or hypersomnia); decrease or increase in appetite or weight; and psychomotor agitation or retardation (Rush, 2003).

The 16 items were used to rate the 9 *DSM-IV* domains; 4 items for sleep disturbance; 2 items for psychomotor disturbance; 4 items to rate appetite/weight disturbances; 1 item to rate the remaining 6 domains (depressed mood, decreased interest, decreased energy, worthlessness/guilt, concentration/decision making and suicidal ideation). Each item was scored for rating symptoms over the past 7 days. Each item was rated from 0-3, for a total score ranging from 0-27. The total score was obtained by adding scores for each of the nine domains. Scores were classified as the following: scores between 0-5 were considered normal; 6-10 were considered mild; 11-15 were classified as moderate; 16-20 were considered moderate to severe; and 21+ were classified as severely depressed.

Several types of validity and reliability have been established for the QIDS-SR. Internal consistencies ranged from 0.81 to 0.94 for the QIDS-C, QIDS-SR, IDS-C, and IDS-SR in both major depressive disorder and bipolar disorder patients (Triveldi, Rush, Ibrahim, Carmody, & Biggs, et al., 2004). The QIDS-SR total score was highly correlated with the IDS-SR total score for outpatients with major depressive disorder (Triveldi et al., 2004). The QIDS-SR was compared to the Hamilton Rating Scale for Depression (HRSD) in patients with major depressive disorder that were assigned to three treatment groups (medication alone, medication and psychotherapy, and psychotherapy alone). Comparable change scores within groups were found (Rush, Triveldi, Ibrahim, Carmody, Arnow, et al., 2003). Therefore, the QIDS-SR was found to be as sensitive to symptom change as the IDS-SR and HRSD, indicating high

concurrent validity for all three scales. Internal consistency was high for the QIDS-SR (0.86) the IDS-SR (0.92), and the HRSD (0.88).

Veterans Rand 36-Item Health Survey (VR-36)

The VR-36 is a generic measure of health-related quality of life. The VR-36 builds on a well established widely used instrument, the Medical Outcomes Study (MOS) SF-36, which was modified for use in VA ambulatory care patients (Ware & Sherbourne, 1992; Kazis, Miller, Clark, Skinner, & Lee, 2000). The VR-36 contains 36 items that yield 8 scales (physical functioning, role limitations due to physical problems, bodily pain, general health perceptions, energy/vitality, social functioning, role limitations due to emotional problems, and mental health). Each scale is a weighted combination of between 2 and 10 items, and is scored as a 0 to 100 percentage score; with 0 representing severe pain or disability and 100 representing no pain or disability. Modifications to the original MOS SF-36 include changes to the role items (role limitations due to physical and emotional problems), where response choices that were originally dichotomized, two-point yes/no choices were changed to five-point ordinal choices (ranging from *no, none of the time* to *yes, all of the time*).

Two summary components, the physical component score (PCS) and mental component score (MCS) are derived from the 8 VR-36 scales. The PCS and MCS are adjusted by the population mean and standard deviation to produce norm-based scores with a common mean of 50 and standard deviation of 10, with lower scores representing poorer health (Walsh, Dip, Homa, Hanscom, & Lurie, 2006). Internal consistency has been found to range from 0.88 to 0.93 for physical functioning, 0.60 to 0.80 for social

functioning, 0.80 to 0.95 for general health, 0.79 to 0.86 for bodily pain, 0.73 to 0.80 for mental health, 0.76 to 0.90 for role limitations due to physical health, 0.80 to 0.96 for role limitations to due to emotional health, 0.62 to 0.96 for vitality (Brazier, Harper, Jones, O’Cathian, Thomas, & Usherwood, 1992; Jenkinson, Coultier, & Wright, 1993; & Garrett, Rulta, Abdalla, Buckingham, & Russell, 1993).

Data Analysis

The data derived from the instruments and interviews were analyzed using SPSS 11.5. Univariate descriptive statistics on demographic variables and scores on the QIDS-SR were performed. For Hypothesis 1, A Man-Whitney U-test was performed to test the association between scores on the QIDS-SR and a depression diagnosis in the patient’s medical chart. Reliability analyses were computed. To examine internal consistency of the QIDS-SR, Cronbach’s α , inter-item correlations, and item-total correlation statistics were performed. For Hypothesis 2, a Spearman rank-order correlation coefficient was performed to analyze the association between QIDS-SR total scores and scores on the VR-36 quality of life measure.

Several analyses were completed to provide descriptive information on the QIDS-SR and to test Hypothesis 3. First, descriptive statistics were used to obtain frequencies of endorsement of items on the QIDS-SR. A paired *t*-test was then performed to compare means between somatic and psychological items on the QIDS-SR. Depressed and nondepressed groups were categorized based on cut-off scores of 0-5 for the nondepressed range and 6 and above in the depressed range. These cut-off scores were based on the cut-off scores developed for scoring the QIDS-SR. Somatic

and psychological items were examined further by performing an independent sample t-test to compare means of somatic and psychological scores of those who were categorized in the depressed or nondepressed range on the QIDS-SR. Chi-square analyses were then performed on depressed and nondepressed groups based on QIDS-SR scores and patient characteristics, including level of injury, severity of injury, ethnicity, marital status, age, medical co-morbidities, and history of depression (depression diagnosis in medical chart).

CHAPTER III

RESULTS

Descriptive analyses were performed on demographic variables to include percentages, means, and standard deviations, when appropriate, and are provided in Table 1. A total of 133 individuals were included in this sample. This sample consisted of 126 males (95%) and 6 females (5%) with an average age of 44 years. The ethnic breakdown of this sample was predominantly Caucasian (56%), followed by African American (28%), Hispanic (6%), Native American (1.5%), Other (6%) and Asian and Native Hawaiian (1% each). All veterans were unemployed at the time of data collection since unemployment was a criterion for participation in the larger vocational rehabilitation study from which the data were obtained. The average for years of education was 13.5 years. Approximately 25% of the participants were married, 26% had never been married, 37% were divorced, 7% were separated, and 3% were widowed.

With regard to level of injury, 58% were classified as paraplegic and 42% were classified as tetraplegic. Motor vehicle accidents (MVA) accounted for the highest percentage of injury etiology (56.2%), followed by other (21.8%), gun shot wound (17.4%), falls (11.6%), and medical related causes (stroke, infection, tumor, iatrogenic) at 5%. Years since injury varied in this sample, from 1 year to 39 years since time of injury. The largest percentage of participants' injuries occurred over 15 years prior (35%), followed by 5-10 years (26.6%), less than 5 years (25.8%), and 11-15 years since injury (12.5%).

Approximately 40% of the sample had a medical co-morbidity, with the majority of these being hypertension, heart disease, diabetes mellitus, and spinal canal stenosis. Additionally, 25% had a history of substance abuse or dependence, 29% had a depression diagnosis in their medical chart, and 15% had a history of other mental health co-morbidities per medical chart review.

Descriptive analyses for the Quick Inventory of Depressive Symptomatology – Self-Report (QIDS-SR) total scores and Veterans Rand 36-item Health Survey (VR-36) Physical Health Mental Health component scores are presented in Table 2. The mean score for the entire sample on the QIDS-SR was 5.7 (range = 0-21; $SD = 4.13$), indicating a mild level of reported depression in this sample. The majority of the sample (57.5%) scored in the nondepressed range (0-5 on the QIDS-SR) and 42% of participants scored in the depressed range (6 and above on the QIDS-SR). The mean score for the VR-36 Physical component was 38.3 (range = 29-52; $SD = 5.42$); placing this sample in the below average range on physical functioning. Additionally, this sample placed in the lower than average range on the Mental Health component of the VR-36, which assesses mental functioning, with a mean score of 42 (range = 28-55; $SD = 6.85$).

To test for internal consistency of the QIDS-SR, overall Cronbach's α was calculated. The QIDS-SR was found to have good reliability, with a Cronbach's α of 0.78. Inter-Item correlations are presented in Table 3. All items were positively correlated. The lowest inter-item correlations were between sleep and view of self (.020) and sleep and suicidal ideation (.079). The highest inter-item correlations were found between general interest and view of self (.601) and suicidal ideation and view of self

(.520). Corrected Item-Total Correlations above .3 indicate good internal consistency. Corrected Item-Total Correlations for the QIDS-SR ranged from .26 (sleep) to .64 (psychomotor disturbance). Sleep was the only item to fall below .3. However, if deleted from the calculations, none of the items, including sleep, substantially affected Cronbach's α . Item-Total statistics are presented in Table 4.

Convergent validity was analyzed with the Man-Whitney U-test which tested the association between scores on the QIDS-SR with a depression diagnosis in the participant's medical chart. The test was significant with $U = 595.00$, $p < .05$, $d = -.28$, demonstrating convergent validity of the QIDS-SR. For those with a depression diagnosis in their medical chart, QIDS-SR scores were higher ($M = 59.25$) than for participants with no depression diagnosis in their medical chart ($M = 42.52$). However, the effect size of this test was low at $-.28$.

For construct validity, a Spearman rank-order correlation coefficient was performed to test the association between QIDS-SR total scores ($M = 5.78$, $SD = 4.14$) and scores on the VR-36 quality of life physical component score ($M = 38.4$, $SD = 5.4$) and mental health component score ($M = 41.8$, $SD = 6.85$). With an alpha level of .05, the correlation between the physical component score and QIDS-SR scores was found to be not significant, $r_s = -.150$, $p = .331$. Additionally, there was not a significant correlation between QIDS-SR scores and the mental health component, with $r_s = .168$, $p = .277$.

Further descriptive analyses providing information on the QIDS-SR are presented in Table 4. Items are presented in descending order for the means and standard deviations of each item. Scores over 1 indicate endorsement of a symptom

related to that particular item. This present sample scored low on the total QIDS-SR scores, with endorsement of items scoring in the low range as well. Two items were endorsed with a mean over 1. These items included sleep ($M = 2.28$, $SD = .82$), and appetite/weight fluctuations ($M = 1.02$, $SD = 1.23$). Other items with the highest means for this sample, but below the score of 1, included sadness, psychomotor disturbance, and decreased energy. Four out of the top five means were on somatic items. However, overall scores remained low.

Means for the somatic and psychological items were then compared. For the somatic items, sleep, appetite/weight disturbance, psychomotor disturbance, and energy were summed for each participant. For the psychological items, sadness, concentration, general interest, view of self, and suicidal ideation were summed for each participant. A paired samples t -test was performed to test the differences between the mean for the somatic ($M = 4.16$, $SD = 2.35$) and psychological items ($M = 1.62$, $SD = 2.27$). The alpha level was .05. This test was significant: $t(196) = 7.76$, $p < .01$, $r = .48$. Results, represented in Table 5, indicated the means of the somatic related items were significantly greater than the means of the psychological items.

An independent samples t -test was conducted to compare means on somatic and psychological items between those participants that scored in the nondepressed range and depressed range on the QIDS-SR. Results can be found in Table 6. The mean of the somatic items of the depressed group ($M = 6.21$, $SD = 1.89$) was compared to the mean of the somatic items of the nondepressed group ($M = 2.65$, $SD = 1.25$). The alpha level was .05. This test was significant: $t(97) = 11.29$, $p < .01$, $r = .74$. Results indicate that the means of the somatic related items were significantly greater in the

depressed group than in the nondepressed group. The mean of the psychological items of the depressed group ($M = 3.3$, $SD = 2.54$) was compared to the mean of the psychological items of the nondepressed group ($M = .39$, $SD = .72$) in an independent samples t-test. These results can be found in Table 7. The alpha level was .05. This test was found to be significant, $t(97) = 8.30$, $p < .01$, $r = .61$. Results indicate that the means of the psychological related items were significantly greater in the depressed group than the nondepressed group.

Chi-square tests and crosstabulations were then performed to compare differences between depressed and nondepressed groups (based on QIDS-SR scores) on patient characteristics, including level of injury, severity of injury, ethnicity, marital status, age, medical co-morbidities, and history of depression (depression diagnosis in medical chart). These results can be found in Table 8. Alpha level was .05 for all tests. The only test found to be significant was history of a depression diagnosis, $\chi^2(1, N = 94) = 4.74$, $p < .05$. This indicates that scoring in the depressed or nondepressed range was dependent on the history of patients' depression. There was no association between nondepressed and depressed groups and level of injury, $\chi^2(1, N = 94) = 1.90$, $p = .169$; ethnic minority, $\chi^2(1, N = 98) = .028$, $p = .867$; marital status, $\chi^2(5, N = 98) = 6.3$, $p = .278$; age, $\chi^2(3, N = 97) = 1.09$, $p = .780$; and medical comorbidities, $\chi^2(1, N = 94) = .950$, $p = .330$.

CHAPTER IV

DISCUSSION

Depression has been the most frequently studied psychological variable among persons with a spinal cord injury (SCI). A large portion of the literature on depression and SCI has focused on whether depression is a necessary part of the adjustment process, as well as how to accurately measure depression in this population. Measurement of depression in the SCI population involves a variety of methodological problems, including inconsistent assessments used (self-report versus clinical interviews) and varying definitions of depression. Additionally, exploration of the endorsement of somatic items in persons with SCI has been explored in the literature with varying results. When using a measure for clinical purposes, it is important to use a measure that has been validated and found to be reliable with the population in which it is to be used. The primary goal of this study was to provide preliminary information on the psychometric properties of the Quick Inventory of Depressive Symptomatology – Self-Report (QIDS-SR) with additional descriptive analysis of the QIDS-SR in a SCI population, with particular focus on the contribution of items.

Internal consistency, convergent validity, and construct validity of the QIDS-SR were evaluated to provide information on the psychometric properties of this measure with a SCI population. The QIDS-SR was shown to have good internal consistency in the current study. Adequate levels of item-total coefficients are scores between 0.3 and 0.9 (Steiner & Norman, 1995). The item-total correlations for all items were above 0.3 except for sleep. This brings into question whether sleep is measuring something different from what the other items of the scale measure, which would violate internal

consistency. However, removing sleep from the total score of the QIDS-SR did not substantially change the internal consistency, indicating that the scale showed internal consistency even with sleep included.

This study showed mixed results regarding the validity of the QIDS-SR in this SCI sample. Convergent validity was demonstrated with a significant association between a depression diagnosis in the medical chart and total QIDS-SR scores. It was expected that if the QIDS-SR was a valid measure of depression in this sample, there would be a significant association with the external criterion of the depression diagnosis in the medical chart. This significant association found in this study supports the QIDS-SR as a valid measure of depression in this sample. This finding is consistent with literature that has shown that individuals with pre-injury histories of psychological disorders and maladjustment have particular difficulties adjusting to SCI, and depressive behavior is often manifested in these cases (Judd, Stone, Webber, Brown & Burrows, 1989; Tate, Forchheimer, Maynard, & Dijkers, 1994).

However, construct validity was not established when the association between the QIDS-SR and the Veterans Rand 36-Item Health Survey (VR-36) was tested. Failure to establish construct validity was an unexpected result. It was hypothesized that the QIDS-SR would be inversely related to the VR-36 quality of life measure. Results of this study did not support a relationship between depression as measured by the QIDS-SR and the physical or mental health functioning components as measured by the VR-36. This is inconsistent with the literature that has shown that in the SCI population, depressive symptoms have been associated with decreased physical health and well-being (Bombardier, Richards, Krause, Tulsy & Tate, 2004; Schultz & Decker, 1985).

Investigation into the reasons for the lack of demonstration of construct validity found in this study focused on several factors. First, the main issue considered was whether the lack of construct validity was due to the QIDS-SR not measuring the construct of depression. However, The fact that the QIDS-SR demonstrated convergent validity in this study does not support a conclusion that the QIDS-SR is not measuring depression. Additionally, the QIDS-SR has been shown to have high concurrent validity with a quality of life measure in asthma patients (Brown, Murray, Carmody, Keenard, Highes, et al., 2008) demonstrating validity of the QIDS-SR with medical patients.

Due to the strong convergent validity found for the QIDS-SR in the current study, the lack of support found for construct validity may be due to characteristics of the data and type of analysis employed. Validity has been described as a characteristic of the data produced by a measuring instrument and not a characteristic of the measuring instrument itself (Hood & Johnson, 2006). It is possible that the skewed distribution of QIDS-SR scores derived from this sample, could have distorted the results for construct validity. Additionally, there was a large amount of missing data for the VR-36 scores. The data collected for this study were gathered from a larger study that is still in progress and data continue to be gathered. Therefore, missing data had not been adjusted for at the time of the data collection for the present study. Exploration of the association between the QIDS-SR and VR-36 was limited due to the type of analysis employed. A correlation coefficient was used to analyze construct validity in the current study. Other methods of analysis, such as factor analysis, could have provided further information about this relationship.

In addition to exploring the psychometric properties of the QIDS-SR, descriptive information of the QIDS-SR in this sample was analyzed. It was hypothesized that participants would equally endorse somatic and psychological items. This hypothesis was based on more recent studies that have shown that patients with SCI endorsed both somatic and psychological items of depression (Bombardier, Richards, Krause, Tulskey & Tate, 2004; Davidoff, Roth, Thomas, Doljanac, Dijkers, et al., 1990.) Examination of the specific items on the QIDS-SR, indicated that this sample had higher means on somatic items regardless of whether they scored in the depressed or nondepressed range on the QIDS-SR. This does not support the hypothesis that somatic items would be endorsed equally with psychological items in this study. Specifically, the top four out of five symptoms endorsed were somatic items and included sleep disturbance, appetite/weight fluctuations, psychomotor disturbance, and fatigue. Sadness was the third highest endorsed item and rounded out the top five. It is not clear, though, if endorsement of somatic items was reflective of symptoms of depression or due to medical aspects of SCI. Even though this sample had higher means on somatic items, these means reflected mild severity for all items except for sleep, which was in the moderate range.

The literature has reported that many depressed patients present to primary care with somatic symptoms, which brings into question whether this sample expressed depression through more physical symptoms rather than acknowledgement of psychological symptoms. The majority of this sample included male veterans. It has been reported that men are more unlikely to acknowledge and seek assistance for depressive symptoms (Cochran & Rabinowitz, 2003). Also, it has been suggested in the

literature that men may express their depression in more physical symptoms, such as fatigue and sleep disturbances (Cochran & Rabinowitz, 2003). Males with a military background may be even more likely to exhibit emotional inhibition, with less expression of traditional depressive symptoms and more frequent expression of depression through physical symptoms. Therefore, it is possible that this particular sample was endorsing more somatic symptoms as indicators of depression.

The results of this study showed that the 42% of participants scored in the depressed range on the QIDS-SR. This is higher than reported in previous literature for the general SCI population, which has ranged from 15-35% (Frank, Chaney, & Clay, 1992; Fuhrer, Rintala, Hart, Clearman, & Young, 1993; Mccoll & Rosenthal, 1994). Additionally, this is higher than the 22% that was found in veterans with SCI (Smith, Weaver & Ulrich, 2007). However, other studies have found prevalence rates of 42% (Krause, Kemp, & Coker, 2000) and 60% (Kennedy & Rogers, 2000).

The high percentage of scores in the depressed range on the QIDS-SR found in this current study could be due to the characteristics of this sample. One factor may be the unemployment status of the veterans in this sample. Employment has been linked to greater quality of life, perceived control, and social support in persons with SCI. These variables have been shown in the literature to be related to less depression in persons with SCI (Tate, Haig, & Krause, 2002). Not only were the participants in this study unemployed, they were seeking employment by participating in a vocational rehabilitation research study. So not only were they unemployed but they had the motivation and desire to change their unemployment status. The fact that these participants are seeking employment may have several implications. It is possible that

some participants were unsatisfied with their financial situation and needed employment for financial reasons. Also, participants may have been seeking employment to increase social interaction and to provide more meaning and satisfaction in their lives. Therefore, it is possible that the prevalence rate of depression in this sample was high due to the unemployment status of the participants.

For this study, the relationship between scoring in the depressed or nondepressed group was not found to be dependent on patient characteristics, such as level of injury, age, ethnic minority, and marital status, which is consistent with the literature. The literature has not consistently shown that level and severity of injury is associated with depression (Davidoff, Roth, Thomas, Doljanac, Dijkers, et al., 1990; Judd, Burrows, & Brown, 1986; Fullerton, Harvey, Klein, and Howell, 1981; Fuhrer, Rintala, Hart, Clearman & Young, 1993). Additionally, education, ethnicity, and age have not been associated with depression in SCI in other studies (Davidoff, Roth, Thomas, Doljanac, Dijkers, et al., 1990; Judd, Burrows, & Brown, 1986).

However, this study also did not find a relationship between medical co-morbidities and scoring in the depressed or nondepressed range on the QIDS-SR. This result is surprising considering that the risk for major depression is increased by common medical disorders such as cancer, Parkinson's disease and cardiovascular disease (Casen, 1995); pain (Emptage, Sturm, & Robinson, 2005); and diabetes (Goldney, Phillips, Fisher, & Wilson, 2004). Previous research suggests that there is a higher prevalence of major depression in patients with chronic medical illness (Katon, 2003). However, lack of support for a relationship between depression and co-morbidities in this study may be due to characteristics of the data available to analyze

this relationship. This relationship was analyzed between depressed and nondepressed groups and those with or without co-morbidities using chi-square analyses. Analysis of specific comorbidities was not computed separately, which may have limited findings of a relationship. Also, 60% of this sample had no medical comorbidities. Lack of a relationship may also be due to the design of the questionnaire on medical comorbidities. The design of the questionnaire allowed participants to endorse multiple medical comorbidities, therefore, participants could be counted more than once. The comorbidity question on the questionnaire does not include all illness factors, such as pain and pressure sores that can be common issues in patients with SCI. Therefore, this data set may be limited in providing a wide variety of specific comorbidities.

Limitations of this Study

This study has several limitations. With regard to the issue of generalizability, this sample is not representative of the general SCI population. The population in this study consisted of unemployed veterans, the majority of whom are males and who are currently seeking employment. Additionally, this sample had a wide range of years since injury as opposed to those who have been more recently injured. Therefore, generalizing these results to nonveterans with spinal cord injuries, females, and those with recent injuries participating in acute rehabilitation is limited.

Another limitation is that only self-report measures were administered in this study, instead of multiple types of assessments. Self-report questionnaires are inherently limited in the fact that social desirability bias in the reporting may mask some symptoms that really exist especially in a population of male military personnel. Another

limitation is the external criterion for depression used in this study was a depression diagnosis in the participant's medical chart, which represented a history of depression and not necessarily a current depression diagnosis. The diagnosis of depression in the medical chart indicates that a diagnosis of depression was given to the person with SCI at some point in time and does not necessarily mean that the individual is currently experiencing depressive symptoms. Exactly when in the patients' history the diagnosis was given could not be determined so it could have been given anytime before or after the SCI as well as given years ago or near the time of data collection for this study. This uncertainty limits the ability to make further conclusions beyond the fact that there was an association between QIDS-SR scores and history of a depression diagnosis.

Therefore, further analyses on the QIDS-SR in this study were limited.

Studies using clinical interviews or other diagnostic methods may be preferred for determining prevalence of depression and their association with QIDS-SR scores in this population. Additionally, there was no comparison group, which limits the conclusions that can be drawn from this study.

Implications of the Current Research and Future Directions

This present study provided information on the psychometric properties of the QIDS-SR for assessing depression in a SCI population. Results suggest that further psychometric evaluation is needed to clarify utility of this measure with patients with SCI. Internal consistency was good and convergent validity was demonstrated.

Therefore, it has potential to be a valid measure with the SCI population. However, due to lack of support for construct validity in this study, further evaluation of construct

validity is recommended to clarify if this result is unique to this study. Additionally, comparison of the QIDS-SR with other depression measures that have been shown to be reliable and valid with patients with SCI (PHQ-9 and Zung Self-Rating Depression Scale) would provide further psychometric information for the QIDS-SR with persons with SCI. The QIDS-SR is shorter than numerous measures of depression (BDI-II, Zung Self-Rating Depression Scale), covers all 9 domains of the *DSM-IV* criteria for depression and has the potential to be a quick and simple measure to be used with persons with SCI. In addition to finding good internal consistency and convergent validity in the current study, the QIDS-SR was shown to have good reliability and construct validity, with good psychometric properties with other medical patients (Brown, Murray, Carmody, Keenard, Highes, et al., 2008).

This sample had higher means on somatic items than psychological items indicating that the clinician should take into account specific item endorsement in addition to the total QIDS-SR score, when determining if a patient is presenting with depression. This study provided data that showed that predominately male veterans with SCI may endorse more somatic symptoms. However, it is not clear if this endorsement in this sample was due to depression or medical factors. Further evaluation of the predictive utility of the somatic and psychological items on the QIDS-SR is recommended to provide additional information on item endorsement in patients with SCI. This may be done through the exploration of the sensitivity, specificity, positive predictive values and negative predictive values of the QIDS-SR items. Specifically, evaluation of the sensitivity and specificity compared with a criterion standard depression diagnostic measure such as the Structured Clinical Interview for the *DSM-IV*

is recommended. These analyses could provide information to show support for the inclusion or exclusion approach with the use of the QIDS-SR in persons with SCI.

A high percentage of participants in this study fell into the depressed range. There are numerous discrepancies in prevalence rates and methods of measurement throughout the literature, further complicating the understanding of assessment of depression in the SCI population and rendering results less generalizable. To further explore the high prevalence rate found in this study, it is recommended that analyses be completed to determine if more appropriate cut-off scores would increase the likelihood of more accurate detection and prediction of depression in this population. A similar study using the QIDS-SR with persons with SCI who are not veterans and not unemployed also might help clarify some of the ambiguous findings of this investigation.

With the depression prevalence rates found in this study to be higher than the general population, there is a need for screening to identify individuals with SCI and depressive symptoms so that a more in-depth evaluation can be performed. Also, the majority of the literature focuses on persons during acute rehabilitation to 1 to 2 years post rehabilitation. This study included participants with a wide range of years post-injury. However, more research is needed to determine differences in endorsement of somatic symptoms between those individuals in acute rehabilitation and those with several years of post acute injury. Additionally, this study showed that those with a history of depression may be more likely to have current depressive symptoms, suggesting that routine screening may be beneficial for those in that fall into this category. The assessment and diagnosis of depression in persons with SCI involves a multilayered process, complicated by the interplay of physiological, psychological, and

social factors that are unique to persons with SCI. Awareness of the inherent complexities in the diagnostic process is essential to the successful identification and treatment of depression in this population.

Table 1

Demographic Variable Summary

Variables	Mean	Standard Deviation	Range
Age (<i>N</i> = 131)	43.82	10.52	22.0 - 65.0
Years of Education (<i>N</i> = 99)	13.48	2.28	8.0 - 20.0

Variables	<i>N</i>	Percentage
Gender (<i>N</i> = 132)		
Male	126	95.5
Female	6	4.5
Ethnicity (<i>N</i> = 99)		
African American	28	28.3
Hispanic	6	6.0
Caucasian	55	55.6
Other	10	10.1
Marital Status (<i>N</i> = 99)		
Married	25	25.3
Single	27	27.3
Divorced	37	37.4
Widowed	3	3.0

(table continues)

Table 1 (continued).

Variables	N	Percentage
Time Since Injury (N = 120)		
< 5 years	31	25.8
5-10 years	32	26.6
11-15 years	15	12.5
> 15 years	42	35.0
Etiology (N = 121)		
MVA	53	56.2
Fall	14	11.6
Gun shot wound	21	17.4
Medical	6	5.0
Other	26	21.8
Neurological Level of Functioning (N = 121)		
High Tetraplegia	33	27.3
Low Tetraplegia	18	14.9
Paraplegia	70	57.9

(table continues)

Table 1 (continued).

Variables	<i>N</i>	Percentage
ASIA Impairment Scale (<i>N</i> = 119)		
A Complete	55	46.2%
B Sensory Incomplete	10	8.4%
C Motor Incomplete- Low Muscle Strength	22	18.5%
D Motor Incomplete- High Muscle Strength	29	24.4%
E Normal	3	2.5%
Medical Comorbidities (<i>N</i> = 122)		
Hypertension	30	25%
Diabetes	12	10%
Heart Disease	6	5%
Spinal Canal Stenosis	10	8%
Other	14	11%
None	48	60%
Mental Health Comorbidities (<i>N</i> = 122)		
Depression	36	29.5%
Substance Abuse	31	25%
Other	19	15%
None	74	60%

Table 2

QIDS-SR and VR-36 Summary

Variable	<i>N</i>	%	<i>M</i>	<i>SD</i>	Range
QIDS-SR total score	99		5.77	4.14	0-21.0
QIDS-SR ranges					
0-5 Normal	57	58%			
6-10 Mild	27	27%			
11-15 Moderate	13	13%			
16-20 Mod-severe	1	1%			
>21 Severe	1	1%			
VR-36	44				
Physical Health Component			38.36	5.42	28.76-51.97
Mental Health Component			41.82	6.85	28.79-55.36

Table 3

Inter-Item Correlation Matrix of QIDS-SR

Item	1	2	3	4	5	6	7	8	9
1. Sadness	1.00								
2. Concentration	.463	1.00							
3. View of self	.410	.190	1.00						
4. Suicidal ideation	.427	.108	.520	1.00					
5. General interest	.475	.405	.601	.462	1.00				
6. Energy level	.276	.475	.254	.169	.462	1.00			
7. Sleep	.326	.286	.020	.079	.153	.160	1.00		
8. Weight	.354	.297	.269	.207	.329	.353	.116	1.00	
9. Psychomotor disturbance	.456	.439	.345	.355	.463	.413	.240	.356	1.00

Table 4

QIDS-SR Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correction	Squared Multiple Correlations	Cronbach's Alpha if Item Deleted
1. Sadness	5.16	12.97	.62	.45	.74
2. Concentration	5.47	14.59	.54	.41	.75
3. View of self	5.46	13.96	.47	.45	.76
4. Suicidal ideation	5.69	16.0	.45	.37	.77
5. General interest	5.47	13.39	.64	.53	.74
6. Energy level	5.40	14.1	.50	.36	.75
7. Sleep	3.49	14.8	.25	.15	.79
8. Weight	4.75	11.8	.44	.22	.78
9. Psychomotor disturbance	5.29	13.3	.59	.38	.74

Table 5

QIDS-SR Item Endorsement

QIDS-SR Items (<i>N</i> = 99)	<i>M</i>	<i>SD</i>	Range
Sleep	2.28	0.82	0-3
Weight	1.02	1.23	0-3
Sadness	0.62	0.79	0-3
Psychomotor Disturbance	0.48	0.75	0-3
Fatigue	0.37	0.66	0-3
View of Self	0.31	0.75	0-3
Concentration	0.30	0.54	0-3
General Interest	0.30	0.69	0-3
Suicidal Ideation	0.08	0.27	0-3

Table 6

Comparison of t-Tests between Somatic and Psychological Item Means

Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>
Somatic Items	99	4.16	2.35		
Psychological Items	99	1.62	2.27		
				196	7.76*

* $p < .01$

Table 7

Comparison of t-Tests between Somatic and Psychological Item Means and Depression

Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>
Psychological Items					
Depressed	42	3.31	2.54		
Nondepressed	57	.368	.72		
				97	8.30*
Somatic Items					
Depressed	42	6.21	1.89		
Nondepressed	57	2.65	1.24		
				97	11.29*

* $p < .01$

Table 8

Chi-Square Crosstabulation Demographic Variables and Depression

Variable	Nondepressed Group		Depressed Group	
	<i>N</i>	Percentage	<i>N</i>	Percentage
ASIA (N = 94)				
Incomplete	25	27%	27	29%
Complete	27	27%	15	16%
Level of Functioning (N = 94)				
High Tetraplegia	12	12.7%	12	12.7%
Low Tetraplegia	9	9.6%	8	8.5%
Paraplegia	32	34%	21	22%
Ethnic Minority (N = 98)				
Caucasian	31	33%	23	23%
Other	3	3%	3	3%
Age (N =97)				
0-30 years	4	4%	5	5%
31-40 years	19	20%	11	11%
41-50 years	19	20%	15	15%
> 50 years	14	14%	10	10%

(table continues)

Table 8 (continued).

Variable	Nondepressed Group		Depressed Group	
	<i>N</i>	Percentage	<i>N</i>	Percentage
Medical Comorbidities				
No Comorbidities	31	33%	28	23%
Comorbidities	22	23%	13	14%
Depression Diagnosis in Chart				
No diagnosis	42	44%	24	12%
Diagnosis	11	21%	17	18%
Marital Status				
Single	19	19%	15	15%
Married	17	17%	8	8%
Divorced	20	20%	16	16%
Widowed	1	1%	2	2%

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