



HERALD

Research Article

# Rehabilitation Services, Self-Advocacy and Psychosocial Adaptation as Determinants of Employment among Persons with Spinal Cord Injury

Veronica I Umeasiegbu<sup>1\*</sup> and Malachy L Bishop<sup>2</sup>

<sup>1</sup>School of Rehabilitation Services and Counseling, College of Health Affairs, University of Texas Rio Grande Valley, Texas, USA

<sup>2</sup>Early Childhood, Special Education, and Rehabilitation Counseling, University of Kentucky, Lexington, KY, USA

## Abstract

### Objectives

The purpose of this study was to investigate the factors that determine employment in adults with Spinal Cord Injury (SCI).

### Methods

Participants were community-dwelling adults with SCI from three states of the United States. Participants included 101 adults who have lived with SCI for at least one year before the onset of the study. Cross-sectional design through the use of questionnaire was used in this research. Participants were recruited through purposive sampling. Descriptive analysis, correlation analysis, regression analysis, and path analysis were used to analysis the study data.

### Results

The results of this study suggest that age, education, and psychosocial adaptation are the predictors of employment in this sample of persons with SCI.

**Keywords:** Employment; Psychosocial adaptation; Rehabilitation services; Self-advocacy; Spinal cord injury

## Introduction

Spinal Cord Injury (SCI) often results in devastating impacts on physical, psychological, and social well-being of individuals. In the United States, the prevalence of SCI in 2016 has been estimated at approximately 282,000 persons with incidence at approximately 54 cases per million populations [1]. Although, medical care for individuals

**\*Corresponding author:** Veronica I Umeasiegbu, School of Rehabilitation Services and Counseling, College of Health Affairs, University of Texas Rio Grande Valley, Texas, USA, Tel: +1 9566652949; E-mail: veronica.umeasiegbu@utrgv.edu

**Citation:** Umeasiegbu VI, Bishop ML (2017) Rehabilitation Services, Self-Advocacy and Psychosocial Adaptation as Determinants of Employment among Persons with Spinal Cord Injury. J Phys Med Rehabil Disabil 3: 020.

**Received:** February 09, 2017; **Accepted:** May 30, 2017; **Published:** June 13, 2017

with SCI has improved considerably in recent decades, resulting in longer life expectancy; measures of psychosocial adaptation and community participation, such as employment or work have not improved [2,3].

Employment is central and critical for overall wellbeing of individuals. The significance of employment to life satisfaction has been found to be a critical factor to adjustment after a disability [4]. Historically, employment of persons with disabilities in general, and among people with SCI in particular, is considered an important rehabilitation goal, although difficult to achieve. For persons with SCI, employment is fundamental to regaining their lives after the injury. According to research, [5-7] return to work by persons with SCI is regarded a mark of successful rehabilitation and adjustment to the disability. Despite the importance and need for participation in the community such as in employment multiple barriers hinder such essential activity. These barriers to employment of persons with SCI include functioning limitations due to the SCI, negative societal attitudes toward disabilities, psychological and adjustment issues related to the disability [8], and lack of appropriate type of rehabilitation services (such as self-advocacy skills training; Umeasiegbu [7]). According to Craig, Perry, Guest, Tran, and Middleton [9] "restrictions in social participation can become significant barriers to employment or educational activity".

Despite the importance of employment to overall wellbeing and high unemployment rate among individuals with SCI, little research attention has been committed to understanding the interactions between multiple environmental and personal factors such as rehabilitation services, self-advocacy, and psychosocial adaptation and how these factors facilitate or hinder employment of individuals with SCI. For example, very little is known about the impacts of self-advocacy after SCI. The unsatisfactory participation in employment calls for re-evaluation of the rehabilitation services that individuals with SCI receive after their injury and how rehabilitation outcomes can be improved. The objective of this study was to explore the associations between multiple variables (demographic characteristics, SCI-related variables, and rehabilitation-related variables) and employment among a sample of persons with SCI. The following research questions were investigated in this study:

1. What associations exist between SCI-related variables (level of injury, SCI-complications, use of wheelchair) and rehabilitation-related variables (received rehabilitation services, self-advocacy, and psychosocial adaptation) and employment among persons with SCI?
2. What demographic characteristics of persons with SCI predict employment among a sample of persons with SCI?

## Materials and Methods

### Study design

A quantitative research method was used in this study; specifically, a cross-sectional design was used. Purposive sampling technique was used to recruit the study participants. Sample size determination was in accordance with Kline [10,11]. There is debate in the Structural Equation Modeling (SEM) literature regarding the sample size

determination. Some SEM researchers recommend sample size of 200 and above while others posit that a sample size of 100 and above is an adequate sample size [10-14] and Schumacker and Lomax [15] posit that a ratio of the number of participants to the number of model parameters can be used as a guide for sample size in SEM. A ratio of 20:1 (20 participants to every model parameter) is regarded a large effect while a ratio of 10:1 (10 participants to every model parameter) is considered a medium effect. Path analysis which is a type of SEM is used in the current study. Since path analysis was used for data analysis, a ratio of the number of participants to the number of model parameters can be used as a guide for sample size in path analysis. Hence, a 10 parameters model will need a minimum sample size of 100 for a medium statistical effect. This study involves 7 parameters model, hence a sample size of 101 is deemed adequate for path analysis.

### Procedure

This study was approved by the University of Kentucky Institutional Review Board (IRB protocol #: 12-1016-X4B). Following approval from the IRB, data were collected using two formats; paper-and-pencil (survey package mailed to the participants) and web-page hosting of the survey link. The questionnaire was posted on a web page concurrently with the mailing of the paper-and-pencil questionnaire. The participants were recruited from the patient and member mailing lists of the SCI rehabilitation hospitals and National Spinal Cord Injury chapter of two Southeastern states and one Northeastern state of USA. The researchers provided the rehabilitation hospitals and chapter staff with research packages (including informed consent information, a paper survey with business-reply envelope, and a web address for participants wishing to complete the survey via the web) for distribution to 500 selected mailing-list members. An optional \$10 gift-card was provided to participants who completed the survey in its entirety, and who indicated that they wanted the gift-card. This optional gift-card was in order to increase interest and participation in the study. The optional gift-card was included in the research protocol and received IRB approval.

### Instruments and measures

The following instruments were used for data collection (a) Community Integration Questionnaire; (b) Self-advocacy Questionnaire; (c) Disability Centrality Scale; and (d) Received Rehabilitation Services Scale. The Cronbach's alpha of these instruments can be found on table 1.

### Community integration questionnaire

Community Integration Questionnaire (CIQ) [16] was used to measure community participation; in this case, employment (employment is regarded in this study as a measure of community participation). CIQ was initially designed for assessment of community integration in persons with traumatic brain injury, but the instrument has been used in the population of persons with SCI [17] and adults with physical disabilities [18].

### Self-advocacy questionnaire

Self-Advocacy (SA) was assessed using a modified version of Self-Advocacy Questionnaire (SAQ) [19]. SAQ is a questionnaire initially developed for studying of self-advocacy among college students with disabilities. The SAQ asks participants to rate their perceived self-advocacy level based on a 7-point Likert scale (1 = Little Knowledge/Skill; 7 = Full Knowledge/Expert Skill).

|        |                    | Education                          |   |                     |        |
|--------|--------------------|------------------------------------|---|---------------------|--------|
|        |                    | Vocational/<br>Technical<br>School | Some<br>College/<br>Associate<br>Degree | College<br>Graduate |        |
| Gender | Male               | Count                              | 2                                       | 20                  | 12     |
|        |                    | % within gender                    | 3.20%                                   | 32.30%              | 19.40% |
|        |                    | % within education                 | 28.60%                                  | 66.70%              | 60.00% |
|        |                    | % of total                         | 2.00%                                   | 20.00%              | 12.00% |
|        | Female             | Count                              | 5                                       | 10                  | 8      |
|        |                    | % within gender                    | 13.20%                                  | 26.30%              | 21.10% |
|        |                    | % within education                 | 71.40%                                  | 33.30%              | 40.00% |
|        |                    | % of total                         | 5.00%                                   | 10.00%              | 8.00%  |
| Total  | Count              | 7                                  | 30                                      | 20                  |        |
|        | % within gender    | 7.00%                              | 30.00%                                  | 20.00%              |        |
|        | % within education | 100.00%                            | 100.00%                                 | 100.00%             |        |
|        | % of total         | 7.00%                              | 30.00%                                  | 20.00%              |        |

Table 1: gender and education.

Gender \* Education cross tabulation

### Disability centrality scale

Psychosocial Adaptation (PA) was assessed using Disability Centrality Scale (DCS) [20]. DCS is a multidimensional, quality of life-based model of psychosocial adaptation. The DCS is designed to measure the level of satisfaction, Chronic Illness and Disability (CIAD) related impact, and perceived control within 10 life domain, as well as the level of importance attributed to each of the domains. In two separate studies [21,22], the Cronbach alpha of DCS were 0.73 and 0.82 respectively.

### Received rehabilitation services scale

Information on the types of rehabilitation services received by persons with SCI during inpatient and outpatient rehabilitation was collected using Received Rehabilitation Services Scale (RRSS). The RRSS is a 9-item questionnaire designed to measure types of rehabilitation-related services received by persons with SCI [7].

### Data analysis

Data analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 21.0. The various statistical analyses performed include descriptive statistics, correlation analysis, regression analysis, and path analysis. We used descriptive statistics to summarize the data. Correlation analysis was used to investigate the associations between selected domains of the study. Regression analysis was used to determine predictive functions of selected demographic information. Path analysis (SPSS's Analysis of Moment Structures; AMOS) was used to estimate the strengths of the direct and indirect relationships among the select variables of the study. The goodness of fit for the current study was assessed using the chi square test, Bentlers' Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI) and the Root-Mean-Squared Error of Approximation (RMSEA). The use of multiple measures of goodness of fit was to determine the overall fit from different perspectives [23].

## Results

### Descriptive statistics

A total of 101 individuals with SCI completed the questionnaire battery for this study. Summarized in table 1 is demographic and SCI-related information of the participants. Approximately 66% of the sample was between the ages of 30 and 59. Mean age of participants was 49 years (SD = 15.0). White (non-Hispanic) participants made up 84% of the sample. Concerning SCI-related characteristics of the sample, 62% of the sample sustained their injury between the ages of 20 and 39, and approximately 47% of the injuries were caused by automobile/vehicle accident. About 96% of the sample had medical complications related to SCI. Mean duration since injury was 13.94 years (S.D = 11.73). In addition, the gender distribution of selected variables (education, employment status before injury, and employment status after injury) is represented in tables 2-4.

### Correlation analysis

Table 5 represents the Spearman's Rank Order inter-correlations of the primary survey data. The correlation analysis was performed to assess the ability of the primary survey items to reproduce the proposed study model. Several of the study variables exhibited high correlation. High correlation existed between the productivity subscale (CIQPD) and being employed full-time ( $r = 0.61, p = 0.01$ ). Wheelchair use exhibited high correlation with level of injury as well ( $r = 0.37, p = 0.01$ ).

### Reliability analysis

The researchers explored the reliability of the survey instruments used in the study. Table 6 represents the reliability information of the study instruments.

### Path analysis

Research question 1: What associations exist between SCI-related variables (level of injury, SCI-complications, use of wheelchair) and rehabilitation-related variables (received rehabilitation services, self-advocacy, and psychosocial adaptation) and employment among persons with SCI?

Research question 1 was investigated using path analysis. The researchers hypothesized that all the selected variables; level of injury, SCI-complications, use of wheelchair, received rehabilitation services, self-advocacy, and psychosocial adaptation will have direct association with employment after SCI. The results of several re-specifications of the hypothesized associations are represented in figure 1. After the re-specification of this model, the chi square test became nonsignificant ( $\chi^2(5) = 4.597, p = 0.467$ ). The CFI = 1.000; TLI = 1.022, and RMSEA = 0.000, indicating that this model represents a good fit to the data. The re-specified model is shown in figure 1.

### Regression analysis

In order to address research question #2, data were analyzed using multiple regression analysis with stepwise method of entry for predictive variables. The criterion variable was employment and the predictor variable was the demographic information (age, education, gender, ethnicity, marital status, years since injury and residential location). Of the 7 predictor variables only education and age in years predicted employment. The linear combination of predictor variables (age and education) accounted for approximately 9% of the variance in employment; adjusted  $R^2 = 0.094$ ;  $F(2, 87) = 5.63, p = 0.005$ . The results show that education significantly predicted employment ( $\beta = 0.288, p = 0.005$ ), as did age ( $\beta = 0.221, p < 0.005$ ).

| Characteristic                                  | N  | (%) |
|---|----|-----|
| <b>Current age category</b>                     |    |     |
| 21-29   | 9  | 8.9 |
| 30-39   | 20 | 20  |
| 40-49   | 21 | 21  |
| 50-59   | 26 | 26  |
| 60-69   | 16 | 16  |
| 70 or older                                     | 9  | 8.9 |
| <b>Age at injury category</b>                   |    |     |
| 18-20   | 20 | 20  |
| 21-29   | 28 | 28  |
| 30-39   | 14 | 14  |
| 40-49   | 16 | 16  |
| 50-59   | 14 | 14  |
| 60-69   | 4  | 4   |
| 70 or older                                     | 4  | 4   |
| <b>Gender</b>                                   |    |     |
| Male  | 63 | 62  |
| Female  | 38 | 38  |
| <b>Race/Ethnic group</b>                        |    |     |
| White   | 84 | 84  |
| African American                                | 13 | 13  |
| Native American/American Indian/Alaskan natives | 1  | 1   |
| Others  | 2  | 2   |
| <b>Marital status</b>                           |    |     |
| Married   | 48 | 50  |
| Never married                                   | 30 | 31  |
| Divorced  | 6  | 6.2 |
| Widowed   | 8  | 8.2 |
| Living with partner/significance other          | 5  | 5.2 |
| <b>Education</b>                                |    |     |
| 9 <sup>th</sup> grade or less                   | 1  | 1   |
| Grades 10-12 (some high school)                 | 5  | 5   |
| High school graduate/GED                        | 20 | 20  |
| Vocational/technical school                     | 7  | 6.9 |
| Some college/associate degree                   | 30 | 30  |
| College graduate                                | 20 | 20  |
| Graduate school or professional school          | 18 | 18  |
| <b>Residential location</b>                     |    |     |
| Urban   | 17 | 18  |
| Suburban  | 38 | 40  |
| Rural   | 40 | 42  |
| <b>Employment at injury</b>                     |    |     |
| Full-time                                       | 62 | 61  |
| Part-time                                       | 9  | 8.9 |
| Student   | 18 | 18  |
| Unemployed (not student, not retired)           | 9  | 9   |
| Retired   | 3  | 3   |
| <b>Employment after injury</b>                  |    |     |
| Full-time                                       | 17 | 17  |

|                                       |    |     |
|---------------------------------------|----|-----|
| Part-time                             | 11 | 11  |
| Student                               | 3  | 3   |
| Unemployed (not student, not retired) | 48 | 49  |
| Retired                               | 20 | 20  |
| <b>Level of injury</b>                |    |     |
| Cervical 1 (C1)-Cervical 3 (C3)       | 10 | 9.9 |
| C3-C7                                 | 36 | 36  |
| Thoracic 1 (T1)-Thoracic 5 (T5)       | 12 | 12  |
| T6-T12                                | 38 | 38  |
| Lumbar region                         | 5  | 5   |
| <b>SCI-related complications</b>      |    |     |
| Pressure ulcer                        | 31 | 31  |
| Low blood pressure                    | 15 | 15  |
| Depression                            | 41 | 41  |
| Infections                            | 37 | 37  |
| Bowel and bladder problems            | 64 | 63  |
| Sexual dysfunction                    | 38 | 38  |
| Pain                                  | 65 | 64  |
| Spasticity                            | 56 | 55  |
| Respiratory problems                  | 6  | 5.9 |
| Osteoporosis                          | 17 | 17  |
| Diabetes                              | 1  | 1   |
| <b>Years since injury</b>             |    |     |
| 1-3 years                             | 12 | 12  |
| 4-6 years                             | 22 | 22  |
| 7-10 years                            | 20 | 20  |
| 11-15 years                           | 15 | 15  |
| 16 years and over                     | 31 | 31  |

**Table 2:** Demographic and SCI-related characteristics of the participants.

|        |                            |                            | Employ Yes 1 no 0 |         | Total   |
|--------|----------------------------|----------------------------|-------------------|---------|---------|
|        |                            |                            | No                | Yes     |         |
| Gender | Male                       | Count                      | 44                | 18      | 62      |
|        |                            | % within gender            | 71.00%            | 29.00%  | 100.00% |
|        |                            | % within employ yes 1 no 0 | 60.30%            | 66.70%  | 62.00%  |
|        | Female                     | % of total                 | 44.00%            | 18.00%  | 62.00%  |
|        |                            | Count                      | 29                | 9       | 38      |
|        |                            | % within gender            | 76.30%            | 23.70%  | 100.00% |
| Total  | % within employ yes 1 no 0 | 39.70%                     | 33.30%            | 38.00%  |         |
|        | % of total                 | 29.00%                     | 9.00%             | 38.00%  |         |
|        | Count                      | 73                         | 27                | 100     |         |
|        | % within gender            | 73.00%                     | 27.00%            | 100.00% |         |
|        |                            | % within employ yes 1 no 0 | 100.00%           | 100.00% | 100.00% |
|        |                            | % of total                 | 73.00%            | 27.00%  | 100.00% |

**Table 4:** Gender and employment status after SCI.

Gender \* employ-after-injury: Cross tabulation

service-related characteristics, and employment. The findings of this study suggest significant positive associations between level of injury and wheelchair use; received rehabilitation services and self-advocacy; self-advocacy and psychosocial adaptation; and psychosocial adaptation and employment (as depicted in figure 1).

A surprising result of this study is the lack of association between level of injury and employment. A review of the literature shows that several past studies had inconsistency in the reported relationships between severity of injury and employment. In some studies, it was reported that employment is not dependent on severity of injury [24,25], while in others contrary results were reported [26,27]. Since there is no consensus in the literature on the relationship between level of injury and employment, it is possible that there are some other unidentified variables that either mediate or moderate this relationship in certain situations. In this current study level of injury had a strong effect on wheelchair use, although this study did not explore details about this relationship such as whether this relationship differs between users of motorized wheelchairs and manual wheelchairs.

Strong positive associations are noted between received rehabilitation services and self-advocacy; between self-advocacy and psychosocial adaptation; and between psychosocial adaptation and employment. In the past, rehabilitation researchers have suggested that psychosocial adaptation to disability and chronic illness has a relationship with Quality of Life (QOL) [28-30]. In a study Livneh and Martz [31] posit that coping strategies and coping resources increase psychosocial adaptation to SCI. The findings of this current study aligns with previous literature. Particularly, the findings of our study suggest that self-advocacy (a form of coping strategy) has a direct association to psychosocial adaptation. This study has shown that since psychosocial adaptation correlates positively with both self-advocacy and employment; psychosocial adaptation can directly or indirectly increase community participation and hence QOL of persons with SCI. In other words, an individual with increased self-advocacy skills may adapt better to psychosocial impacts of SCI. Increased psychosocial adaptation will more likely lead to employment and employment retention, and hence increase in QOL.

|               |  | Count  |        |       |
|---------------|--|--------|--------|-------|
|               |  | Gender |        | Total |
|               |  | Male   | Female |       |
| Emp at injury | Employed full-time (more than 30 hours a week) | 39     | 23     | 62    |
|               | Employed part-time (less than 30 hrs a week)   | 7      | 2      | 9     |
|               | Volunteer employment                           | 0      | 1      | 1     |
|               | Unemployed, seeking employment                 | 3      | 0      | 3     |
|               | Unemployed, not seeking employment             | 2      | 2      | 4     |
|               | Student  | 10     | 7      | 17    |
|               | Homemaker (manage home/family)                 | 0      | 1      | 1     |
|               | Retired  | 1      | 2      | 3     |

**Table 3:** Gender and employment status before SCI.

Emp-at-Injury \* Gender cross tabulation

## Discussion

### Rehabilitation services, self-advocacy, psychosocial adaptation, and employment

Research question 1 focused on exploring the associations between multiple factors of SCI-related characteristics, rehabilitation



| Measure   | 1       | 2      | 3       | 4        | 5       | 6       | 7       | 8       | 9      | 10      |
|-----------|---------|--------|---------|----------|---------|---------|---------|---------|--------|---------|
| LI        |         |        |         |          |         |         |         |         |        |         |
| WC        | 0.372** |        |         |          |         |         |         |         |        |         |
| Emp-FT    | -0.038  | 0.039  |         |          |         |         |         |         |        |         |
| DCS       | -0.161  | -0.033 | 0.313** |          |         |         |         |         |        |         |
| Comp      | 0.048   | -0.084 | -0.201* | -0.504** |         |         |         |         |        |         |
| SAQ       | 0.039   | 0.048  | 0.171   | 0.499**  | -0.193  |         |         |         |        |         |
| RRS       | -0.057  | 0.174  | 0.217*  | 0.265*   | 0.014   | 0.241** |         |         |        |         |
| CIQH      | 0.049   | 0.183  | 0.207*  | 0.200*   | -0.246* | 0.134   | -0.024  |         |        |         |
| CIQS      | -0.007  | -0.039 | -0.057  | -0.224** | 0.172   | -0.194  | -0.212* | -0.19   |        |         |
| CIQPD     | 0.071   | 0.115  | .611**  | 0.333**  | -0.251* | 0.161   | 0.168   | 0.301** | -0.134 |         |
| CIQ Total | 0.09    | 0.189  | 0.396** | 0.217*   | -0.212* | 0.088   | -0.037  | 0.739** | 264**  | 0.659** |

Table 5: Spearman rank order coefficients for primary questionnaire data.

Note: LI = Level of Injury, WC = Wheelchair Use, Emp-FT = Employed Full-Time, DCS = Disability Centrality Scale, Comp = SCI-related Complications, SAQ = Self-advocacy Questionnaire, RRS = Received Rehabilitation Services Scale, CIQH = Community Integration-home integration, CIQS = Community Integration-social integration, CIQPD = Community Integration Questionnaire-productivity, CIQ Total = Community Integration Questionnaire Total Scores

\*\*p = 0.01, \*p = 0.05

| Variable | No of Items | Cronbach's Alpha |
|----------|-------------|------------------|
| SAQ      | 11          | 0.88             |
| RRSS     | 9           | 0.84             |
| CIQ      | 14          | 0.7              |
| DCS      | 10          | 0.89             |

Table 6: Cronbach's alpha scores for instrument scales.

Note: SAQ = Self-Advocacy Questionnaire, RRSS = Received Rehabilitation Services Scale, CIQ = Community Integration Questionnaire, DCS = Disability Centrality Scale (Satisfaction mean)

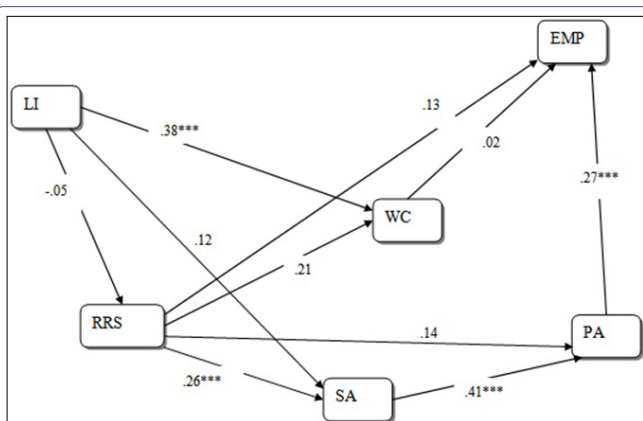


Figure 1: Path diagram of re-specified path model (standardized estimates).

\*\*\*p < 0.001

Note: LI = Level of Injury; RRS = Received Rehabilitation Services; WC= Wheelchair Use; SA = Self-Advocacy; PA = Psychosocial Adaptation; EMP = Employment

This study suggests a strong positive association between received rehabilitation services and self-advocacy (Figure 1). Received rehabilitation services also show minimal positive associations with wheelchair use, psychosocial adaptation, and employment. These minimal associations should be interpreted with caution due to small sample size and the self-report nature of the study. These associations underscore the importance of rehabilitation during inpatient and outpatient phases of SCI to employment post SCI. Unfortunately, very little is

known in the research literature on comprehensive rehabilitations needs of individuals with SCI or the impacts of rehabilitation services on community participation such as employment of persons with SCI. According to Gutenbrunner, Blumenthal, Geng, and Egen [32] individuals with SCI need long term rehabilitation services that is interdisciplinary in nature. Such rehabilitation services include services that address community re-entry issues such as assistive technology, mental health issues, vocational rehabilitation, education, adaptation to living environment, and others. The results of this current study suggest that rehabilitation professionals who work with persons with SCI need to consider a wide range of variables in both acute and post-acute phases of rehabilitation in order to promote community participation such as employment. Exploring the relationships between this study's variables (level of injury, SCI-related complications, and wheelchair use, self-advocacy, psychosocial adaptation, employment, received rehabilitation services, and community reintegration) in rehabilitation process can facilitate and increase positive rehabilitation outcomes. The results of this study can be valuable in addressing the psychosocial concerns of persons with SCI by rehabilitation counselors and other rehabilitation professionals. Areas of to focus on can include case management, self-advocacy training, vocational service, and adjustment counseling.

### Demographic variables as predictors of employment

This study explored a second research question that examined the demographic information that may predict employment among persons with SCI. The results of multiple regression analysis (stepwise method) show that demographic variables of age and education were found to be significant predictors of employment. Employment is regarded as a measure of successful rehabilitation and community reintegration after SCI, but employment can be impacted by multiple factors [33], such as level of education. In this study, age and education accounted for 9% of the variance in employment with older age being associated with having a college degree and being employed full-time. This finding supports prior research that has suggested that age at time of injury plays a role in vocational functioning, and that persons who sustained SCI at a younger age have a greater probability of securing employment [4,34,35]. According to Crewe [36] young adults generally have been thought to have more adaptability and flexibility to

change. In a 2015 study, Craig, Perry, Guest, Tran, and Middleton [9] posit that the demographic factor of age predicted social participation (employment is a type of social participation), although surprisingly, education did not predict social participation in their study.

Furthermore, several prior studies have found a wide range of demographic variables to predict employment status. These variables include age, level of education, gender, severity of injury, and marital status [37-39]. With the exception of age and education, these demographic variables were not predictive of employment in this current study. James, DeVivo, and Richards [40] found a relationship between race and gender in employment; their study reported that White women were less likely than White men to be employed, whereas African American women were more likely than African American men to be employed. The inability of other demographic information to predict employment in this study could be the result of the small sample size ( $n = 101$ ). Education is a key determinant of economic independence and quality of life. According to NSCISC (2016), "over half of persons with SCI are high school graduates (51.5%) at time of their injury" (p. 2). The report of the NSCISC is consistent with the finding in this study; 59.5% of the participants of this study have at least a high school diploma at the time of injury. According to Bryce et al., [41] "education has been found to be the factor most strongly associated with post injury employment. Only 5% of persons in the National SCI Database with less than 12 years of education were found to be employed" (p. 1315) compared to 68.8% among individual with SCI who had doctoral degrees.

## Limitations

The findings of this study should be interpreted with caution for a couple of reasons. First, the descriptive and correlational nature of the study design through the use of self-report (questionnaires) may lead to self-report errors and bias. Due to the descriptive and correlational nature of this study, no definitive causal attribute can be obtained from the relationships between the independent variables and employment. Secondly, the recruitment of participants through convenience (purposive) sampling instead of random sampling further limits the generalization of the results.

## Conclusion

SCI is a condition that brings multiple adverse implications that affect the physical, functional and psychosocial aspects of a person's life; and requires interventions in multiple areas. The results of this study suggest that psychosocial adaptation (strongest predictor), age, and education are strong predictors of employment in a sample of adults with SCI. In addition, received rehabilitation services increase both self-advocacy and psychosocial adaptation. This study has implications for both SCI-related clinical practice and research include the need to examine the impacts of self-advocacy and psychosocial adaptation on rehabilitation outcomes. Issues of self-advocacy among individuals with SCI have not been given adequate attention. Self-advocacy could lead to improved psychosocial adaptation to the impacts of SCI. Understanding the impact of self-advocacy on psychosocial adaptation and community participation such as employment may provide insights into areas where skill development for individuals with SCI may prove beneficial. Self-advocacy skills among individuals with SCI are crucial particularly in areas such as employment, acquiring assistive technology, and closing gaps of health disparities.

## Acknowledgment

This study was funded by the University of Kentucky's Arvle and Ellen Turner Thacker research fund and the Blackhurst student research fund. The authors thank the University of Kentucky for funding the research and the participants of this study for their willingness and voluntary participation in the study.

## References

1. National Spinal Cord Injury Statistical Center (2016) Facts and figures at a glance. National Spinal Cord Injury Statistical Center, Birmingham, UK.
2. Blake J, Brooks J, Greenbaum H, Chan F (2017) Attachment and employment outcomes for people with spinal cord injury: The intermediary role of hope. *Rehabilitation Counseling Bulletin* 60: 77-87.
3. Richards JS, Kewman DG, Richardson E, Kennedy P (2010) Spinal cord injury. Frank RG, Rosenthal M, Caplan B (eds.). *Handbook of rehabilitation psychology*, Washington, D.C., USA.
4. Crewe NM, Krause JS (2002) Spinal cord injuries. In: Brodwin MG, Tellez F, Brodwin SK (eds.). *Medical, Psychosocial and Vocational Aspects of Disability* (2<sup>nd</sup> edn). Elliott & Fitzpatrick, Inc, Athens, Georgia.
5. Krause JS (1996) Employment after spinal cord injury: Transition and Life adjustment. *Rehabilitation Counseling Bulletin* 39: 244-255.
6. Krause JS, Saunders L, Stalen D (2010) Race-ethnicity, education, and employment after spinal cord injury. *Rehabilitation Counseling Bulletin* 53: 78-86.
7. Umeasiegbu VI (2013) Exploring the Use of the International Classification of Functioning, Disability and Health as a Community Reintegration Model After Spinal Cord Injury. University of Kentucky, Kentucky, USA.
8. Yuen HK, Wolf BJ (2010) Factors that limit access to dental care for adults with spinal cord injury. *Spec Care Dentist* 30: 151-156.
9. Craig A, Perry KN, Guest R, Tran Y, Middleton J (2015) Adjustment following chronic spinal cord injury: Determining factors that contribute to social participation. *Br J Health Psychol* 20: 807-823.
10. Kline RB (2005) *Principles and Practice of Structural Equation Modeling*, (2<sup>nd</sup> edn), Guilford Press, New York, USA.
11. Kline RB (2011), *Principles and Practice of Structural Equation Modeling* (3<sup>rd</sup> edn), Guilford Press, New York, USA.
12. Chan F, Lee GK, Lee E, Kubota C, Allen CA (2007) Structural equation modeling in rehabilitation counseling research. *Rehabilitation Counseling Bulletin* 51: 44-57.
13. Weston R, Gore Jr PA, Chan F, Catalano D (2008) An introduction to using structural equation modelings in rehabilitation psychology. *Rehabilitation Psychology* 53: 340-356.
14. Wolf EJ, Harrington KM, Clark SL, Miller MW (2013) Sample size requirements for structural equation models: an evaluation of power, bias, and solution propriety. *Educ Psychol Meas* 76: 913-934.
15. Schumacker RE, Lomax RG (2010) *A Beginner's Guide to Structural Equation Modeling*. Routledge, New York, USA.
16. Willer B, Rosenthal M, Kreutzer J, Gordon WA, Rempel R (1993) Assessment of community integration following rehabilitation for traumatic Brain inj 8: 75-87.
17. Gontkovsky ST, Russum P, Stokic DS (2009) Comparison of the CIQ and chart short form in assessing community reintegration in individuals with chronic spinal cord injury: A pilot study. *Neuro Rehabilitation* 24: 185-192.
18. Hirsh AT, Braden AL, Craggs JG, Jensen MP (2011) Psychometric properties of the community integration questionnaire in a heterogeneous sample of adults with physical disability. *Arch Phys Med Rehabil* 92: 1601-1610.
19. Adams KS (2007) Visibility of disability, attritional style, psychosocial adjustment to disability, and self-advocacy skill in relation to student adaptation to college. Florida State University Pro-Quest Database.

20. Bishop M (2005) Quality of life and psychosocial adaptation to chronic illness and disability: Preliminary analysis of a conceptual and theoretical synthesis. *Rehabilitation Counseling Bulletin* 48: 219-231.
21. Bishop M, Shepard L, Stenhoff DM, Shepard L (2007) Psychosocial adaptation and quality of life in multiple sclerosis: Assessment of the disability centrality model. *Journal of Rehabilitation* 73: 3-12.
22. Bishop M, Frain MP, Tschopp MK (2008) Self-management, perceived control and subjective quality of life in multiple sclerosis: An exploratory study. *Rehabilitation Counseling Bulletin*.
23. Hatcher L (2013) *Advanced Statistics in Research: Reading, Understanding, and Writing Up Data Analysis Results*. Shadow Finch Media, Saginaw, USA.
24. Krause JS, Crewe NM (1990) Long-term prediction of self-reported problems following spinal cord injury. *Paraplegia* 28: 186-202.
25. Wang RY, Yang YR, Yen LL, Lieu FK (2002) Functional ability, perceived exertion and employment of the individuals with spinal cord lesion in Taiwan. *Spinal Cord* 40: 69-76.
26. Krause JS, Broderick LE, Saladin LK, Broyles J (2006) Racial disparities in health outcomes after spinal cord injury: Mediating effects of education and income. *J Spinal Cord Med* 29: 17-25.
27. Young ME, Alfred W (1994) Vocational status of persons with spinal cord injury living in the community. *Rehabilitation Counseling Bulletin* 37: 229-244.
28. Livneh H, Bishop ML (2012) The psychological impact of chronic illness and disability. In: Parker RM, Patterson JB (eds.). *Rehabilitation Counseling: Basics and Beyond* (5<sup>th</sup> edn), Pro-ED, Texas, USA.
29. Livneh H, Martz E, Wilson LM (2001) Denial and perceived visibility as predictors of adaptation to disability among college students. *Journal of Vocational Rehabilitation* 16: 227-234.
30. Viney LL, Westbrook MT (1982) Patients' psychological reactions to chronic illness: Are they associated with rehabilitation? *Journal of Applied Rehabilitation Counseling* 13: 38-44.
31. Livneh H, Martz E (2014) Coping strategies and resources as predictors of psychosocial adaptation among people with spinal cord injury. *Rehabil Psychol* 59: 329-339.
32. Gutenbrunner C, Blumenthal M, Geng V, Egen C (2017) Rehabilitation Services Provision and Payment. *Am J Phys Med Rehabil* 96: 35-40.
33. Ramakrishnan K, Mazlan M, Julia PE, Latif LA (2011) Return to work after spinal cord injury: factors related to time to first job. *Spinal Cord* 49: 924-927.
34. Reinhardt JD, Post MW, Fekete C, Trezzini B, Brinkhof MW (2016) Labor market integration of people with disabilities: Results from the Swiss spinal cord injury cohort study. *PLoS One* 11: 0166955.
35. Tsai IH, Graves DE, Chan W, Darkoh C, Lee MS, et al. (2017) Environmental barriers and social participation in individuals with spinal cord injury. *Rehabil Psychol* 62: 36-44.
36. Crewe NM (2000) A 20-year longitudinal perspective on the vocational experiences of persons with spinal cord injury. *Rehabilitation Counseling Bulletin* 43: 122-133.
37. DeVivo M, Fine P (1982) Employment status of spinal cord injured patients 3 years after injury. *Arch Phys Med Rehabil* 63: 200-203.
38. Hess D, Ripley D, McKinley W, Tewksbury M (2000) Predictors for return to work after spinal cord injury: a 3-year multicenter analysis. *Arch Phys Med Rehabil* 81: 359-363.
39. Krause J, Sternberg M, Maides J, Lottes S (1998) Employment after spinal cord injury: differences related to geographic region, gender, and race. *Arch Phys Med Rehabil* 79: 615-624.
40. James M, DeVivo MJ, Richards JS (1993) Postinjury employment outcomes among African-American and White persons with spinal cord injury. *Rehabilitation Psychology* 38: 151-164.
41. Bryce TN, Ragnarsson KT, Stein AB (2007) Spinal cord injury. In: Braddom RL (ed.). *Physical Medicine and Rehabilitation* (3<sup>rd</sup> edn), Saunders Elsevier, Philadelphia, USA.