

Depression and Quality of Life in Spinal Cord Injury Patients Living in the Community After Hospital Discharge

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ABSTRACT

Objective: To investigate quality of life (QoL) and the prevalence of depression, and to identify factors significantly associated with QoL and depression in spinal cord injury (SCI) patients living in the community after hospital discharge.

Methods: This prospective study included SCI patients that have a follow-up evaluation and care at the Siriraj Spinal Unit of the Department of Orthopaedic Surgery, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand during April 2015 to February 2018. Presence and level of depression and QoL were assessed using Patient Health Questionnaire-9 (PHQ-9) and World Health Organization Quality of Life Brief-Thai (WHOQOL-BREF-THAI), respectively. Age, gender, education level, income, marital status, level of impairment, injury severity, cause of injury, and time since injury were collected and recorded.

Results: One hundred and twelve spinal injury patients (64.3% male) with a mean age of 44.3 ± 15.3 years were enrolled. The prevalence of depression was 39.3%, and the mean overall QoL was a moderate 90.3 ± 14.7 . Multivariate analysis revealed marital status to be the only independent predictor of depression after hospital discharge (odds ratio [OR]: 2.99, 95% confidence interval [CI]: 1.19-7.51; $p=0.020$). Regarding QoL, multivariate analysis revealed educational level (OR: 16.18, 95% CI: 3.01-87.03; $p=0.001$), level of impairment (OR: 9.20, 95% CI: 1.84-46.13; $p=0.007$), and depression (OR: 50.39, 95% CI: 7.94-319.83; $p<0.001$) to be independent predictors of quality of life.

Conclusion: Depression was observed in 39.3% of SCI, and most study patients had moderate QoL. Marital status predicts depression; and, educational level, level of impairment, and presence of depression predict QoL.

Keywords: Quality of life; depression; spinal cord injury; community; postdischarge (Siriraj Med J 2020; 72: 59-66)

INTRODUCTION

Depression is a psychological complication that is regularly observed among spinal cord injury (SCI) patients.¹ Early onset depression may be found after SCI and is considered a normal part of the patient adaptation process². Prevalence of depressive symptoms in SCI in in-patient ward (clinic) was report about 30%.³ Moreover, almost 20% of patients were found to have a continuation

of depressive symptoms after hospital discharge⁴, and that percentage increased to 25-30% after these patients returned to live in a community setting.⁵ The prevalence of depression was reported to be three times higher among SCI patients living in the community than among general population.⁶

One of the negative consequences of depression in SCI patients is reduced quality of life.⁷ Craig, *et al.*

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reported a decrease in quality of life and an increase in anxiety and/or depression in patients who sustained a spinal cord injury.³ Several studies found depression to be associated with reduced quality of life in SCI patients.^{8,9,10,11} Holicky and Charlifue studied 225 English SCI patients who had lived with SCI for 26 or more years. They found a decrease in the level of depression among patients who got married. They also found a higher level of life satisfaction, overall mental health, and quality of life in married SCI compared to unmarried SCI.¹²

Depression in SCI patient does not spontaneously resolve, therefore continuation of treatment is necessary for SCI patients after hospital discharge.¹³ Accordingly, follow-up to monitor for depressive symptoms among SCI patients living in the community is essential. Moreover, SCI patients are now living longer¹⁴, which highlights the need for long-term support to improve in patient quality of life. Improved understanding about depression and quality of life in this patient population will improve the mental health evaluation and treatment processes among SCI patients living in a community setting. The aim of this study was to investigate quality of life and the prevalence of depression, and to identify factors significantly associated with quality of life and depression in SCI patients living in the community after hospital discharge.

MATERIALS AND METHODS

Participants

The study population consisted of SCI patients who received follow-up evaluation and care at the Siriraj Spinal Unit of the Department of Orthopaedic Surgery, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand during the April 2015 to February 2018. Patients that met all of the following criteria were included: (1) age greater than 18 years; (2) having good consciousness; and, (3) having good ability and a willingness to answer the PHQ-9 questionnaire and the WHOQOL-BREF-THAI. Patients that have a history or diagnosis of depression before SCI occurred and active psychosis patients were excluded.

Assessment instrument

The PHQ-9 questionnaire is a self-report depression screening tool that consists of 9 items that are derived from DSM-IV depression diagnostic criteria. There are four levels of scoring for each item that include: "Not at all" (score = 0); "Some days, not often" (score = 1); "Quite regularly" (score = 2); and, "Nearly every day" (score = 3). The overall score can range from 0-27. Based on studies conducted in Thailand, a participant with a

score of 9 or more was diagnosed as having depression (sensitivity = 0.84, specificity = 0.77).¹⁵ In the present study, a participant with a score higher than 7 was considered to have depressive symptoms.

World Health Organization Quality of Life Brief-Thai (WHOQOL-BREF-THAI) is a 5-point rating scale instrument. It is comprised of 26 items, of which 23 questions are positive, and 3 questions are negative. The positive questions are scored, as follows: "Not at all" (score = 1), "Slightly" (score = 2), "Moderate" (score = 3), "Very" (score = 4), and "Extremely" (score = 5). The 3 negative questions are scored, as follows: "Not at all" (score = 5), "Slightly" (score = 4), "Moderate" (score = 3), "Very" (score = 2), and "Extremely" (score = 1). The instrument measures four domains of quality of life, including: physical health, psychological well-being, social relationships, and environment. Quality of life is classified by score into one of the three following categories, including: poor quality of life (score 26-60), moderate quality of life (score 61-95), or good quality of life (score 96-130). Its reliability (Cronbach's alpha coefficient) was 0.84, and the validity was 0.65 when tested against the Thai version of the WHOQOL-100. This questionnaire is officially approved by WHO.¹⁶ Moreover, the WHOQOL-BREF-THAI is widely used in the study of SCI patients. Thus, it is considered a suitable tool for assessing the QoL of patients who have sustained a spinal cord injury.¹⁷

After receiving study approval from the Siriraj Institutional Review Board (SIRB), Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand (Si 233/2015), written informed consent was obtained from all enrolled study participants. The following data were collected from patient medical records: age, gender, education level, income, marital status, level of impairment, injury severity, cause of injury, and time since injury. Patient level of depression and quality of life was assessed using the PHQ-9 questionnaire and WHOQOL-BREF-THAI, respectively.

Statistical analysis

The prevalence of depression among spinal injury patients was reported as number and percentage, and the depression and quality of life scores were reported as mean \pm standard deviation (SD). Student's t-test was used to compare continuous data, and chi-square test or Fisher's exact test was used to compare categorical data. Factors with a *p*-value less than 0.20 in univariate analysis were included in multivariate analysis. The results of multivariate analysis are presented as adjusted odds ratio (OR) and 95% confidence interval (CI). All data

analyses were performed using SPSS Statistics version 18 (SPSS, Inc., Chicago, IL, USA), and a p -value <0.05 was regarded as being an indicator of statistical significance.

RESULTS

One hundred and twelve spinal injury patients with a mean age of 44.3 ± 15.3 years (range: 18-84) were enrolled. Of those, 64.3% were male and 35.7% were female. One-quarter (25.9%) of patients had an elementary-level education, 40.2% were married, and the average income was $11,810.9\pm 18,197.7$ Thai baht per month (range: 0-100,000). Regarding the cause of injury and outcome, 57.1% of patients were injured in traffic accidents and 37.1% became paraplegic. The majority of patients (41.1%) had incomplete injury, and the mean duration of disease after injury was 55.8 ± 64.4 months (range: 1 month to 28 years), as shown in Table 1.

The prevalence of depression was 39.3%, and the mean depression score was 5.8 ± 4.4 . Regarding quality of life, the majority of patients (59.8%) had a moderate level of quality of life, followed by good quality of life (38.4%) and poor quality of life (1.8%). The mean quality of life score was 90.3 ± 14.7 . The mean quality of life score in each domain was, as follows: physical domain: 23.4 ± 4.9 , psychological domain: 22.2 ± 3.8 , social relationship domain: 9.8 ± 2.2 , and environmental domain: 28.2 ± 4.9 . The quality of life in each domain was observed to be moderate (Table 2).

Univariate analysis that included age, gender, educational level, marital status, income, cause of injury, time since injury, severity of impairment, and severity of injury as factors potentially associated with depression revealed only marital status to be significantly associated with depression ($p=0.026$). We then included all factors from univariate analysis with a p -value less than 0.20 in multivariate analysis (i.e., gender, marital status, and time since injury). That analysis revealed marital status to be the only independent predictor of depression after hospital discharge. More specifically, patients who were married had a 2.99 times (95% CI: 1.19-7.51, $p=0.020$) greater probability of developing depression than patients who were single (Table 3).

Univariate analysis revealed educational level ($p=0.001$), income level ($p=0.019$), level of impairment ($p=0.004$), severity of injury ($p=0.005$), and depression ($p<0.001$) to be significantly associated with quality of life. Multivariate analysis that included factors from univariate analysis with a p -value less than 0.20 (i.e., educational level, income level, time since injury, depression, severity of injury, and level of impairment) revealed educational level, level of impairment, and depression

to be independent predictors of quality of life. Patients with an undergraduate degree or higher had a 16.18 times (95% CI: 3.01-87.03, $p=0.001$) greater probability of having good quality of life when compared to patients with a lower level of education. Patients with non-severe disability had a 9.20 times (95% CI: 1.84-46.13, $p=0.007$) greater probability of having good quality of life when compared to patient with tetraplegia. Lastly, patients with an absence of depressive symptoms had a 50.39 times (95% CI: 7.94-319.83, $p<0.001$) greater probability of having good quality of life when compared with patients with depression (Table 4).

DISCUSSION

The present study found the prevalence of depression among SCI patients after discharge from Siriraj Hospital to be 39.3%. The prevalence of depression reported in this study is far higher than the 18%⁴, 20%¹⁸, and 22% rates reported from other countries.¹⁹ However and importantly, a score of 10 or greater reflected the presence of depressive symptoms in those studies, while a score greater than 7 reflected the presence of depressive symptoms in our study. Moreover, we used diagnostic criteria established and recommended by the Thailand Department of Mental Health. Concerning the measurement of quality of life among SCI patients after discharge from the hospital, we selected the WHOQOL-BREF Questionnaire as a tool to demonstrated level of QOL, because it is widely used in the study of SCI patients and it has proven acceptable reliability.²⁰ The results of our study showed the overall QoL and the QoL for each domain to be at moderate level, which is similar to the results from previous studies conducted in Thai SCI population.^{17,21,22,23,26}

Considering factors related to depression among SCI patients, the current study found marital status to be significantly associated with depression. More specifically, we found that married patients were more likely to develop depression than unmarried SCI. Similarly, Tzanos, *et al.*²⁵ investigated depressive mood among SCI patients in Greece, and they found that having a spouse did not play an important role in the prevention of depression. On the contrary, In some previous study found marriage to be significantly associated with a low level of emotional distress.²⁶ In some instances, SCI patients experience an adverse change in marital status – a divorce. A previous study found that divorced SCI patients were more likely to have depressive mood when compared with other groups of SCI patients.²⁷ Other previous findings revealed family relationship and family support are represent key factors that influence a reduction in depression among SCI patients.²⁸

TABLE 1. Demographic and clinical characteristics of included spinal injury patients.

Variables	Mean \pm SD or n (%)
Age (years)	44.3 \pm 15.3
Male gender	72 (64.3%)
Education	
No education	3 (2.7%)
Primary school	29 (25.9%)
Secondary school	27 (24.1%)
Vocational certificate	20 (17.9%)
Undergraduate	27 (24.1%)
Postgraduate	6 (5.4%)
Marital status	
Single	41 (36.6%)
Married	51 (45.5%)
Divorced/Separated/Widowed	20 (17.9%)
Income (Thai baht/month)	11,810.9 \pm 18,197.7
Cause of injury	
Traffic accident	64 (57.1%)
Fall	36 (32.1%)
Violence	7 (6.3%)
Other	5 (4.5%)
Level of impairment	
No	37 (33.0%)
Paraplegia	43 (38.4%)
Tetraplegia	32 (28.6%)
Severity of injury (n=75)	
Complete	29 (25.9%)
Incomplete	46 (41.1%)
Time since injury (months)	55.8 \pm 64.4

Abbreviation: SD = standard deviation

TABLE 2. Quality of life scores of included spinal injury patients.

Domains	Level of QOL			QOL score		
	Poor (%)	Moderate (%)	Good (%)	Mean \pm SD	Range	Level
Physical health	31 (27.7%)	73 (65.2%)	8 (7.1%)	23.4 \pm 4.9	11-34	Moderate
Psychological	50 (44.6%)	60 (53.6%)	2 (1.8%)	22.2 \pm 3.8	12-30	Moderate
Social relationship	25 (22.3%)	67 (59.8%)	20 (17.9%)	9.8 \pm 2.2	4-15	Moderate
Environmental	48 (42.9%)	63 (56.3%)	1 (0.9%)	28.2 \pm 4.9	18-40	Moderate
Overall QOL	43 (38.4%)	67 (59.8%)	2 (1.8%)	90.0 \pm 14.7	52-126	Moderate

Abbreviations: QOL= quality of life; SD = standard deviation

TABLE 3. Univariate and multivariate analysis for factors significantly associated with depression.

Factors	No depression (n=68)	Depression (n=44)	P-value	Adjusted odds ratio (95% CI)	P-value
Gender			0.160		0.301
Male	40 (55.6%)	32 (44.4%)		1.59 (0.66-3.81)	
Female	28 (70.0%)	12 (30.0%)		1.00	
Education			0.832		
Lower than bachelor's degree	47 (59.5%)	32 (40.5%)			
Bachelor's degree or higher	21 (63.6%)	12 (36.4%)			
Marital status			0.026		
Single	30 (73.2%)	11 (26.8%)		1.00	
Married	24 (47.1%)	27 (52.9%)		2.99 (1.19-7.51)	0.020
Divorced/separated/widow	14 (70.0%)	6 (30.0%)		1.00 (0.29-3.40)	0.997
Income level (Thai baht/month)			0.377		
No income	21 (55.3%)	17 (44.7%)			
<15,000	21 (56.8%)	16 (43.2%)			
≥15,000	26 (70.3%)	11 (29.7%)			
Cause of injury			0.209		
Fall	40 (62.5%)	24 (37.5%)			
Traffic accident	24 (66.7%)	12 (33.3%)			
Violence	2 (28.6%)	5 (71.4%)			
Other	2 (40.0%)	3 (60.0%)			
Level of impairment			0.233		
Paraplegia	26 (60.5%)	17 (39.5%)			
Tetraplegia	16 (50.0%)	16 (50.0%)			
Normal	26 (70.3%)	11 (29.7%)			
Severity of injury			0.235		
Complete	18 (62.1%)	11 (37.9%)			
Incomplete	24 (52.2%)	22 (47.8%)			
Normal	26 (70.3%)	11 (29.7%)			
Time since injury (months)			0.137		
<60	48 (57.8%)	35 (42.2%)		1.00	
60-120	6 (50.0%)	6 (50.0%)		2.81 (0.71-11.12)	0.141
>120	14 (82.4%)	3 (17.6%)		4.89 (0.81-29.41)	0.083

Factors with a *p*-value <0.2 in univariate analysis were included in multivariate analysis

A *p*-value<0.05 in multivariate analysis indicates statistical significance

Abbreviation: CI = confidence interval

TABLE 4. Univariate and multivariate analysis for factors significantly associated with quality of life.

Factors	Good (n=43)	Poor/moderate (n=69)	P-value	Adjusted odds ratio (95% CI)	P-value
Gender			0.547		
Male	26 (36.1%)	46 (63.9%)			
Female	17 (42.5%)	23 (57.5%)			
Education			0.001		
Lower than bachelor's degree	22 (27.8%)	57 (72.2%)		1.00	
Bachelor's degree or higher	21 (63.6%)	12 (35.4%)		16.18 (3.01-87.03)	0.001
Marital status			0.560		
Single	18 (43.9%)	23 (56.1%)			
Married	19 (37.3%)	32 (62.7%)			
Divorced/separated/widow	6 (30.0%)	14 (70.0%)			
Income level (Thai baht/month)			0.019		
No income	11 (28.9%)	27 (71.1%)		0.79 (0.18-3.54)	0.756
<15,000	11 (29.7%)	26 (70.3%)		0.84 (0.19-3.67)	0.817
≥15,000	21 (56.8%)	16 (43.2%)		1.00	
Cause of injury			0.379		
Fall	28 (43.8%)	36 (56.3%)			
Traffic accident	13 (36.1%)	23 (63.9%)			
Violence	1 (14.3%)	6 (85.7%)			
Other	1 (20.0%)	4 (80.0%)			
Level of impairment			0.004		
Tetraplegia	7 (21.9%)	25 (78.1%)		1.00	
Paraplegia	14 (32.6%)	29 (67.4%)		2.97 (0.81-10.94)	0.102
Normal	22 (59.5%)	15 (40.5%)		9.20 (1.84-46.13)	0.007
Severity of injury			0.005		
Complete	9 (31.0%)	20 (69.0%)			
Incomplete	12 (26.1%)	34 (73.9%)			
Normal	22 (59.5%)	15 (40.5%)			
Time since injury (months)			0.142		
<60	32 (38.6%)	51 (61.4%)		0.83 (0.18-3.89)	0.813
60-120	2 (16.7%)	10 (83.3%)		0.21 (0.02-2.06)	0.181
>120	9 (52.9%)	8 (47.1%)		1.00	
PHQ-9			<0.001		
Depression	3 (6.8%)	41 (93.2%)		1.00	
No depression	40 (58.8%)	28 (41.2%)		50.39 (7.94-319.83)	<0.001

Factors with a p -value <0.2 in univariate analysis were included in multivariate analysis

A p -value <0.05 in multivariate analysis indicates statistical significance

Abbreviations: CI = confidence interval; PHQ-9 = Patient Health Questionnaire-9

Concerning factors related to the QoL of SCI patients, the present study found having a bachelor degree or higher, having non-severe disability, or having no depressive symptoms to be significantly associated with patients having a good QoL score. Similarly, previous studies conducted in other countries and in Thailand found the factors that influence QoL are the educational level²⁴, severity of disability^{21,30,31}, and presence of depression. Tzanos, *et al.*^{25,29} found that high educational level enabled SCI patients to acquire skills necessary for learning new knowledge, and to better understand the steps required for using assisting technology. Furthermore, higher education level promoted greater access to technology, and influenced a tendency toward higher income. Employment and sufficient income were factors that helped to facilitate a better QoL. In contrast, low educational level may effectuate or worsen social barriers among SCI patients, and this may further limit all varieties of potential opportunities that could improve their state of mind and overall well-being. Regarding severity of disability, people who become disabled due to an injury are more likely to have a lower level of quality of life than people in the general population.²¹ After sustaining an injury, the physical performance of patients decreases, and this adversely affects their coping skills, which consequently decreases their quality of life their quality of life.²³ An absence of depressive symptoms was reported to be a factor significantly associated with good quality of life.²⁶ Tzanos, *et al.*²⁵ found the PHQ-9 score to be negatively related with the QoL score in every domain (WHOQOL-BREF). Similarly, Tate, *et al.*³² also found good quality of life to be significantly related to reduced prevalence of depression.

The limitation of this study is its cross-sectional design, which means that the data was collected at one point in time. However, the study participants selected the answers that they felt best described their situation and state of mind, so further elicitation to extract additional information was not required.

CONCLUSION

The prevalence of depression among study participants was 39.3% according to PHQ-9. Primary care, based on the depression diagnostic criteria of the Thailand Department of Mental Health, includes managing emotions and consulting a psychiatrist, psychologist or some other type of training mental health professional. Moreover, self-assessment must be elicited when a patient is receiving follow-up services. Having an undergraduate degree or higher, presence of non-severe disability, and no presence of depressive symptoms were found to be significantly

related with good quality of life among SCI. Moreover, the educational level and severity of disability variables were personal and illness-related factors that cannot be easily prevented or treated among these patients. However, depression, which is a factor that was found to be associated with good quality of life, can be screened for and prevented prior to its development. If depression is identified, it can be treated, and this will lead to improved QoL in patients with SCI that return to living in the community after their discharge from the hospital.

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