

**ORIGINAL ARTICLES**

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**FUNCTIONAL PERFORMANCE, DEPRESSION, ANXIETY, AND STRESS  
IN PEOPLE WITH SPINAL CORD INJURIES IN THAILAND:  
A TRANSITION FROM HOSPITAL TO HOME**

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**ABSTRACT**

*The numbers of people with spinal cord injuries (SCI) in Thailand are on the increase. Thai traditional rehabilitation focuses its treatment in acute care with little attention to the lives of clients after their discharge from institutions. In addition to functional disability, emotional states of depression, anxiety, and stress are often involved in SCI. The purpose of this study is to identify and compare the outcomes of functional performance, depression, anxiety and stress of people with SCI, both at discharge and at post-discharge from hospital. It also identifies factors influencing these issues, for this group. The study participants were 121 people with SCI, recruited from ten major hospitals in Thailand. Data was collected at 48 hours pre-discharge and again at three months post-discharge, using the Functional Independence Measure (FIM) and the Depression, Anxiety, and Stress Scale (DASS). The results demonstrated that functional performance at discharge was significantly higher, than at three months post-discharge. Depression and anxiety at discharge were significantly lower than depression and anxiety at three months post-discharge. However, stress had not significantly changed from discharge to post-discharge. Factors influencing functional performance were marital status, number of architectural barriers, fulfilment of occupational therapy (OT) needs, and the number of service needs remaining unmet. Factors influencing depression, anxiety and stress were marital and economic status, education level, fulfilment of OT needs, and numbers of service needs remaining unmet. Rehabilitation professionals can eliminate these problems by bridging the gap of transition from hospital to home, for people with SCI.*

**INTRODUCTION**

The number of people with spinal cord injuries (SCI), is increasing in Thailand (1, 2). These people are generally admitted for rehabilitation mainly for motor function training (3). The

role of health providers, such as occupational therapy (OT) professionals, is to support each person with disability, to resume living their life as normally as possible, within the constraints of disease or the aftermath of trauma. In this sense, “living,” involves functional performance (4). The principal measure of functional performance relevant to medical rehabilitation is the ability to perform activities of everyday life (4, 5). In addition, early studies identify that adjustment to SCI is accompanied by depression, anxiety, and stress (6, 7, 8, 9). Kennedy and Rogers (7) stated that there were as many as 100 per cent of people with SCI in their study, suffering from deep depression and anxiety. Therefore, functional performance and the emotional states of depression, anxiety, and stress as rehabilitation outcomes, are important issues for rehabilitation professionals involved in service delivery.

Factors considered most relevant to rehabilitation outcomes in people with SCI, include various personal, medical, and environmental components (10, 11). These factors as independent variables in this study, can be classified into five dimensions, including socio-demographic, disability-related, environmental, interface, and service related variables. Table 1 summarises the factors associated with each dimension, adapted from the model proposed by DeJong et al (10).

**Table 1: Model of factors influencing rehabilitation outcomes of people with SCI (10)**

| Outcome variables   | Independent variables                     |  |   |                       |   |
|---|---|--|---|-----------------------|---|
|   | Socio-demographic                         | Disability-related   | Environmental   | Interface             | Service-related                             |
| -Functional performance<br>-Depression<br>-Anxiety<br>-Stress | Age<br>Sex<br>Education<br>Marital status | Age at onset<br>Duration of disability<br>Communication problems<br>Discharge status | Attendant care<br>Housing<br>Transportation<br>Hospitalisation<br>Medical supervision<br>Services received/<br>needed | Unmet equipment needs | Vocational services<br>Presence of OT needs |

Data shown in Table 1 demonstrate five groups of independent variables that potentially influence rehabilitation outcomes in people with SCI (10). These variables can be explained as follows:

1. Socio-demographic data consisting of age, gender, education level, and marital status.
2. Disability-related variables consisting of age at onset, duration of disability, communication problems, and discharge status.
3. Environmental variables consisting of attendant care, as measured by the presence or absence of needed in-home assistance; housing as determined by the number of architectural barriers; transportation as measured by availability of accessible public or private transportation; assumption of the patient's role as measured by the length of hospitalisation and the degree of medical supervision; and services received/needed as determined by the number of services received and number of service needs remaining unmet. Services needed for people with SCI basically include occupational therapy (OT), physiotherapy (PT), psychotherapy, and services from medical doctors, nurses, prosthetists, orthotists, vocational counsellors, and social workers (12).
4. An interface variable measured by whether the respondents reported unmet equipment needs. This variable reflected the role of assistive devices needed to bridge the gap between functional limitations and environmental barriers.
5. Service-related variables consisting of vocational rehabilitation services received, as measured by the number of vocational services received during rehabilitation and occupational therapy (OT) needs, as measured by the presence or absence of unmet OT needs. OT interventions for people with SCI usually include activities of daily living (ADL) training, physical endurance training, prevocational assessment, recreational skill programmes, adaptive equipment for ADL, and home visiting and environmental adaptation (12).

Community integration and return to previous roles, are rehabilitation goals for clients with SCI. Achievement of such goals is known to require continued provision of services following discharge (13). In Thailand, however, emphasis on follow-up community based service is only now emerging. The major purpose of this study, is to identify and compare functional performance, depression, anxiety and stress, both, at discharge and at three months post-discharge of people with SCI. It also identifies factors influencing these issues within this group.

## **RESEARCH QUESTIONS**

1. Is there a difference in the functional performance and the emotional states of depression, anxiety, and stress of people with SCI at discharge and at three months post-discharge from hospitals?
2. What factors influence these rehabilitation outcomes?

## **METHODS**

This descriptive and exploratory study followed a cohort of 121 males with SCI, prospectively for three months. The primary rehabilitation outcomes included functional performance and emotional states of depression, anxiety, and stress. Based on the literature, key variables influencing rehabilitation outcomes (socio-demographic, disability-related, environmental, an interface, and service-related variables) were measured to examine their relationship to the primary rehabilitation outcomes.

**Sample:** Participants were recruited from rehabilitation units in ten major hospitals in northern Thailand, using purposive sampling techniques. One hundred and twenty one males between the ages of 15 and 60, with a primary diagnosis of traumatic SCI, with good orientation, and willing to participate, were selected. Subjects with additional medical problems were excluded. The majority of subjects (57 %) ranged from age 15-30 and many had completed secondary school (42.1 %). Almost half (48.8 %) of the subjects were single at the time of the accident and most (88.5 %) lived with parents and families after leaving hospitals. The main cause of injuries was motor vehicle accident (61.2 %).

**Instruments:** The Functional Independence Measure (FIM) is one of the most widely used instruments to measure functional performance (14). The FIM includes 18 items, each with a maximum score of 7 and a minimum score of 1. Total possible FIM scores range from 18 to 126. The intra-class correlation of the FIM is 0.96 (15). The Depression, Anxiety, and Stress Scale (DASS) was used to measure depression, anxiety, and stress (16). The DASS is a 21-item self-report inventory (short version), developed in Australia, that yields three factors including depression, anxiety, and stress. Each item was measured on a likert scale with a maximum score of 4 and a minimum score of 1. This instrument had high internal consistency for all subscales, with Cronbach's alpha ranging from 0.73 to 0.81 (16). A semi-structured interview, developed from a model proposed by DeJong et al. (10), provided measures of the independent variables. Three bi-lingual translators translated these instruments into Thai and the transcripts were compared and any discrepancies resolved. Back translation confirmed validity (17, 18). A pilot study involving 15 participants was conducted in Thailand, providing an opportunity to evaluate the accuracy of the translated questionnaires in terms of wording, assessment time, and cultural aspects.

**Data collection and analysis:** Data were collected in two stages. The first measure was collected at the hospitals 48 hours before discharge and the second collected in individuals' homes, three months post-discharge. A paired t-test identified differences between discharge and post-discharge outcome measures of functional performance, depression, anxiety and stress. The DASS severity ratings provided a simple means of converting raw scores to Z scores, enabling comparisons between depression, anxiety, and stress (16). There are five levels of emotional status according to the DASS severity ratings including normal, mild, moderate, severe, and extremely severe, based on normative samples.

In addition, multiple regression analysis was conducted to explore the predictive nature of the independent variables on the four outcome measures and to assess the significance and strength of these predictors. Four regression models were tested in total and the fit of these models is reported with a coefficient of determination, indicating the total variance in the outcome measures explained by the individual models.

## RESULTS

1. The comparisons of functional performance, depression, anxiety, and stress at discharge and at three months post-discharge.

Assumptions of linearity, normality, and homogeneity were tested prior to statistical operation, by exploring the data and confirmed the use of parametric analysis. The effect size statistics provide an indication of the magnitude of the differences of means between groups. The most commonly used is eta squared, with values ranging from 0 to 1 (19). Cohen (20) interpreted the strength of eta squared values into three levels, .01 as small effect, .06 as moderate effect, and .14 as large effect. The larger effect sizes the better results.

**Table 2: Functional performance, depression, anxiety, and stress in participants with SCI at discharge and at three months post-discharge (N = 121)**

| Variables              | Mean (SD)     |                | T-value | Sig. (2-tail) | Eta squared |
|------------------------|---------------|----------------|---------|---------------|-------------|
|                        | Discharge     | Post-discharge |         |               |             |
| Functional performance | 96.74 (18.42) | 91.17 (19.79)  | 7.02    | 0.00          | 0.30        |
| Depression             | 16.13 (5.69)  | 19.52 (5.97)   | -6.08   | 0.00          | 0.24        |
| Anxiety                | 10.73 (5.01)  | 14.40 (4.29)   | -8.75   | 0.00          | 0.39        |
| Stress                 | 16.20 (4.47)  | 17.24 (5.66)   | -1.92   | 0.06          | 0.03        |

Results of paired t-test reported in Table 2 demonstrate that the mean of functional performance at discharge ( $M = 96.74$ ) is significantly higher, than at three months post-discharge ( $m = 91.17$ ) at  $p < .05$ . The large effect size shown by the eta squared value of .30 further supports these findings. The mean score of depression at discharge ( $M = 16.13$ ) is significantly lower than the mean score at three months post-discharge ( $M = 19.52$ ). This suggests that this group of participants tends to have a greater level of depression when they re-entered their community, than when in hospital settings. The large effect size shown by the eta squared at .24 indicates a substantial difference between these two means. In addition, the mean score of anxiety at discharge ( $M = 10.73$ ) is also significantly lower than at three months post-discharge ( $M = 14.40$ ). This confirms that these participants are not only depressed at home, but also have higher level of anxiety. The large effect size of the eta squared of .39 also supports this result. Data also reveal that the mean stress score at discharge ( $M = 16.20$ ) is lower than the mean stress score at three months post-discharge ( $M = 17.24$ ), but this is not statistically significant.

## 2. Tests of factors influencing functional performance, depression, anxiety, and stress.

Multiple regression analysis was used to identify factors (independent variables) affecting rehabilitation outcomes (dependent variables), in this study. Potential independent variables included in the final models were marital and economic status, education level, number of architectural barriers, fulfillment of OT needs, and number of service needs remaining unmet. Table 3 demonstrates variables in their abilities to predict changes of functional performance, depression, anxiety, and stress.

**Table 3: Multiple regression models of factors influencing functional performance, depression, anxiety, and stress in participants with SCI (N = 121)**

| Variables                           | Functional performance | Depression  | Anxiety     | Stress      |
|-------------------------------------|------------------------|-------------|-------------|-------------|
| Marital status                      | -0.14*                 | -0.29*      | -0.25*      | -0.35*      |
| Economic status                     | -0.08                  | -0.32*      | -0.05       | -0.24*      |
| Education level                     | 0.11                   | -0.26*      | -0.38*      | -0.24*      |
| No of architectural barriers        | -0.20*                 | 0.04        | 0.04        | 0.04        |
| Fulfilment of OT needs              | 0.46*                  | -0.19*      | -0.04       | -0.08       |
| No of service needs remaining unmet | -0.18*                 | 0.10        | 0.45*       | 0.07        |
| $R^{2**}$                           | <b>0.51</b>            | <b>0.59</b> | <b>0.66</b> | <b>0.42</b> |

\* $p < .05$

\*\* $R^2$  = the coefficient of determination

The results reported in Table 3 indicate four factors influencing functional performance. Fulfillment of OT needs had a significant positive effect ( $b = 0.46$ ) while marital status ( $b = -0.14$ ), number of architectural barriers ( $b = -0.20$ ), and number of service needs remaining unmet ( $b = -0.18$ ), all had significant negative effects on functional performance. Outcomes demonstrated that participants who had their OT needs met, had higher scores of functional performance than participants who did not have these needs met. Participants who were not married had higher scores than participants who were married. In addition, participants who reported greater numbers of architectural barriers at home, tended to have lower scores of functional performance than participants who had fewer numbers of architectural barriers. Participants who had greater unmet service needs, had lower scores of functional performance than participants who had fewer service needs remaining unmet.

The results also indicate that a person's marital and economic status, education level, and fulfillment of OT needs, significantly affected the emotional states of depression, anxiety, and stress. This meant that participants who were married had lower levels of depression, anxiety, and stress. The higher the education level and the better the economic circumstances of these people, the lower the levels of depression, anxiety, and stress. The fulfillment of OT needs also had a positive effect in reducing levels of depression, anxiety, and stress. The coefficient of determination ( $R^2$ ), indicates how much of the variance in the outcome measures is explained by the independent variables included in the models.

## **DISCUSSION**

The comparisons of rehabilitation outcomes in this study, revealed better functional performance at hospital than at home. This could be explained by the different environments between these two places. Environments at rehabilitation hospitals are designed for people with disabilities, while individuals' homes are not environmentally modified to accommodate the needs of a person with a disability (21, 22, 23). In addition, family members, relatives and even neighbours, volunteer to give physical assistance to people with disabilities, in almost all activities of daily living as a result of Thai societal expectations (22, 24). This situation results in low motivation of persons with disability, to be independent in their daily lives (25). Furthermore, Buddhism, the major religion in Thailand, promotes a belief whereby, helping others, will lead to personal benefit and this encourages able-bodied persons to try to physically assist people with disability, in order to be rewarded in the next life (26). Education and training programmes that demonstrate the value of fostering independence for persons with disability, should be provided for individuals, together with family members, neighbours and other relatives.

Comparisons of emotional states of people with SCI in this study, revealed that these participants suffered more depression and anxiety at home, than at hospital and also reported stress, both at discharge and post-discharge. However, the mean score of depression at discharge was 16.13 and at three months post-discharge was 19.52, both falling into the moderate level of the DASS severity ratings, which range from 14 to 20 (16). In addition, the mean score of anxiety at discharge was 10.73 and at three months post-discharge was 14.40, both falling into the moderate level of the DASS severity ratings, which range from 10 to 14 (16). The mean score of stress at discharge was 16.20 and at three months post-discharge was 17.24, both falling into the mild level of the DASS severity ratings, which range from 15 to 18 (16). Although scores of depression and anxiety appear to have increased from discharge to three months post-discharge, when using a paired t-test, they are still of the same level when using the DASS severity ratings as the measurement tool. However, the study provides certain evidence that depression, anxiety and stress existed, both at discharge and at three months post-discharge. This can be explained by people becoming more dependent and lacking social supports external to the family, such as work opportunity, availability of transportation and recreational pursuits, especially on returning home after institutional rehabilitation (13). A study of the personal experience of persons with paraplegia in Thailand (27), revealed that these people experienced intense grief due to the loss of their ability to walk. Chuenklin (27), stated that people with disability had depression while they were at home, because they could not perform activities properly and were frequently left alone for most of their days. In addition, most people became unemployed after sustaining a disability, that caused the loss of income to support their families (23). Occupational therapists can have a major impact in this area, by providing pre-vocational assessment to ascertain work abilities and supplying information about the issues surrounding seeking gainful employment.

In looking at factors influencing rehabilitation outcomes, the strongest variable affecting functional performance is the fulfillment of OT needs. Occupational therapy is directly connected with the day-to-day activities of people and encourages these individuals to pursue independence (28). A person's marital status and education level are strong variables influencing emotional states of depression, anxiety, and stress. People who were married, received support and assistance from their spouses and this had a positive effect on the individual's emotional status. People with higher education tended to believe that they could be independent in their lives and were more optimistic than people with lower education and this increased self-worth and decreased depression (29). In addition, educated people were more likely to be involved in community organisations and hold leadership positions and these roles increased self-esteem and helped reduce anxiety and stress (10).

In conclusion, rehabilitation professionals, policy makers and service planners in Thailand should pay attention to lives of people with disability not only in institutional settings, but also

at home and in the community. Rehabilitation services such as occupational therapy, should address the entire needs of people with SCI. Follow-up programmes from rehabilitation team members are essential to fulfill rehabilitation outcomes. Rehabilitation services need to address the key issues of reachable OT and other rehabilitation services, environmental considerations, educational opportunity, and retraining for income-generating occupations.

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