Self-Efficacy Predicts Personal and Family Adjustment Among Persons With Spinal Cord Injury or Acquired Brain Injury and Their Significant Others: A Dyadic Approach

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Abstract

Objectives: To investigate whether the combination of self-efficacy levels of individuals with spinal cord injury (SCI) or acquired brain injury (ABI) and their significant others, measured shortly after the start of inpatient rehabilitation, predict their personal and family adjustment 6 months after inpatient discharge.

Design: Prospective longitudinal study.

Setting: Twelve Dutch rehabilitation centers.

Participants: Volunteer sample consisting of dyads (N = 157) of adults with SCI or ABI who were admitted to inpatient rehabilitation and their adult significant others.

Interventions: Not applicable.

Main Outcome Measures: Self-efficacy (General Competence Scale) and personal and family adjustment (Hospital Anxiety and Depression Scale and McMaster Family Assessment Device General Functioning).

Results: In 20 dyads, both individuals with SCI or ABI and their significant others showed low self-efficacy at baseline. In 67 dyads, both showed high self-efficacy. In the low-self-efficacy dyads, 61% of the individuals with SCI or ABI and 50% of the significant others showed symptoms of anxiety 6 months after discharge, vs 23% and 30%, respectively, in the high-self-efficacy dyads. In the low-self-efficacy dyads, 56% of individuals with SCI or ABI and 50% of the significant others reported symptoms of depression, vs 20% and 27%, respectively, in the high-self-efficacy dyads. Problematic family functioning was reported by 53% of the individuals with SCI or ABI and 42% of the significant others in the low-self-efficacy dyads, vs 4% and 12%, respectively, in the high-self-efficacy dyads. Multivariate analysis of variance analyses showed that the combination of levels of self-efficacy of individuals with SCI or ABI and their significant others at the start of inpatient rehabilitation predict personal (V = 0.12; F6,302 = 2.8; P = .010) and family adjustment (V = 0.19; F6,252 = 4.3; P < .001) 6 months after discharge.

Conclusions: Low-self-efficacy dyads appear to be more at risk for personal and family adjustment problems after discharge. Screening for self-efficacy may help healthcare professionals to identify and support families at risk for long-term adjustment problems.

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Chronic conditions such as spinal cord injury (SCI) or acquired brain injury (ABI) affect not only the persons with SCI (pwSCI) or ABI (pwABI) themselves, but also their significant others (often family members, but a close friend can also be considered a significant other). The theory of dyadic illness management suggests that the ways in which dyads appraise the illness of the person as a unit influences the ways in which they engage in behaviors to manage the illness together. Adjustment outcomes are the results of how dyads manage the illness. On a personal level, an often reported negative adjustment outcome among pwSCI and pwABI and significant others is psychological distress (ie, anxiety and depression). On a family level, problems regarding family functioning (eg, when they are not able to support each other) are common.

Previous research among pwSCI and pwABI and their informal caregivers has shown that personal adjustment outcomes such as stress, mental health, and quality of life of persons in a dyad are inter-related. Furthermore, it is known that persons with low self-efficacy (ie, the belief about one’s ability to cope with a variety of difficult situations in life) are more at risk for later distress. Based on the theory of dyadic illness management, it can be supposed that characteristics of both persons within a dyad will influence the adjustment outcomes of both. However, whether self-efficacy of both persons within a dyad contributes to the explanation of personal and family adjustment within the dyad is still unclear. In this study it is hypothesized that the combination of levels of self-efficacy of pwSCI and pwABI and their significant others measured shortly after the start of inpatient rehabilitation predict both personal and family adjustment 6 months after clinical discharge. Additionally, differences with respect to subgroups (SCI, ABI, and partners only) will be investigated. The results provide insight in the dyadic impact between individuals within a dyad in the prediction of adjustment which will help to develop a substantiated family-centered approach. This is in line with the increasing awareness of the need to adopt a family-centered approach to support pwSCI and pwABI and their significant others in rehabilitation care.

Methods

Design

We used data from the cohort part of the POWER study, which was a study conducted in 12 Dutch rehabilitation centers. The overall aim of this cohort study was to identify predictors at the time of admission to inpatient rehabilitation of long-term empowerment and adjustment problems among dyads of pwSCI or pwABI and their significant others (usually the partner, but sometimes a child, parent, sibling, other family member, or close friend). Dyads were recruited between April 2016 and July 2018. The Medical Ethics Committee of the University Medical Center Utrecht declared that this study did not require approval according to the Dutch Law on Medical Research (protocol number 15-617/C). Boards of all study sites granted permission to perform the study.

Participants

Inclusion criteria for pwSCI and pwABI were: first inpatient rehabilitation after onset of injury, expected stay in rehabilitation center of 4 weeks or longer, age of 18 years or older, and ability to name a significant other. Patients were excluded when the level of physical and cognitive functioning was expected to return to the level it was before onset of the recently acquired injury, when no return to home was expected, in case of limited life expectancy (all based on clinical judgement by rehabilitation physicians), or when they were not able to complete the questionnaires because of severe cognitive or intellectual problems. Cognitive or intellectual problems were defined as restrictions in expression or understanding of language and were assessed by nurses based on their clinical view and the Dutch aphasia scale. Significant others had to be 18 years old or older. PwSCI or pwABI and significant others were included as dyads, and both signed informed consent.

Procedure

Shortly after admission to 1 of the participating rehabilitation centers, the pwSCI and pwABI and their significant others completed a self-report questionnaire (print or electronic). Follow-up questionnaires were completed shortly before discharge from inpatient rehabilitation, and again at 3 and 6 months after discharge. Baseline and 6-month follow-up data were used in this study. Diagnosis-specific information was extracted from the patient’s file at baseline.

Measures

Dependent

Dependent variables were assessed at 6 months after discharge from inpatient rehabilitation. Personal adjustment was operationalized as psychological distress and measured with the Hospital Anxiety and Depression Scale (HADS), which is considered an effective measure of general psychological distress. The HADS consists of 14 items reflecting symptoms of anxiety and depression (7 items each) scored on a 4-point scale ranging 0 (no symptoms) to 3 (maximum impairment). We aimed to focus on personal adjustment in general. Therefore in our assessment of psychological distress, we included anxiety and depression in a combined total HADS score (0–42 points). Higher scores indicated greater distress. The HADS has shown good psychometric properties in various populations. The anxiety and depression subscales were strongly correlated and Cronbach’s alpha of the total score in the current study was 0.86 and 0.91 for the pwSCI or pwABI and significant others respectively. Because no clear cutoff score exists for the total HADS, we used cutoff scores of the anxiety and depression subscales. Scores of 8 or more indicated symptoms of anxiety or depression.

Family adjustment was measured with the General Functioning subscale of the McMaster Family Assessment Device (FAD-GF), which has been widely used as a brief method of assessing

List of abbreviations:

- ABI: acquired brain injury
- ALCOS-12: General Competence Scale, the Dutch version of the General Self Efficacy Scale
- FAD-GF: McMaster Family Assessment Device General Functioning subscale
- HADS: Hospital Anxiety and Depression Scale
- MANOVA: multivariate analysis of variance
- pwABI: persons with ABI
- pwSCI: persons with SCI
- SCI: spinal cord injury
- USER: Utrecht Scale for Evaluation of Rehabilitation
overall family functioning. The subscale consists of 12 questions rated on a 4-point scale ranging from 1 (strongly agree) to 4 (strongly disagree). An example item is: “In times of crisis we can turn to each other for support.” Total mean scores were calculated (1-4), with higher scores indicating worse family functioning. A score of more than 2 indicated problematic family functioning.25,26 Cronbach’s alpha was 0.86 to 0.87 in the current study. Participants only completed the FAD-GF if they did not live alone. They were instructed to answer the questions with their own family in mind.

Independent
Self-efficacy was assessed at baseline with the abbreviated Dutch version of the Sherer’s General Self Efficacy Scale (ALCOS-12).9,24,25 The ALCOS-12 assesses the extent to which someone believes themselves to be able to cope with a variety of difficult situations and consists of 12 questions scored on a 5-point scale ranging from 1 (disagree) to 5 (agree). A total sum score was calculated (range, 12-60), with higher scores indicating higher self-efficacy. Scores were dichotomized in low (≤46) or high (≥47) self-efficacy groups based on a mean score of 46.3 found in a Dutch community study.26 The ALCOS-12 showed good internal consistency among the elderly.25 Cronbach’s alpha was 0.75 to 0.80 in the current study.

Demographic and injury-specific information
Demographic information was assessed at baseline: sex (male, 0; female, 1), age (y), nationality (Dutch, 0; non-Dutch, 1), and education (low, 0; high, 1 [ie, bachelor degree or higher]). Significant others indicated their relationship with the pwSCI or pwABI (no partner, 0; partner, 1). Demographic and injury-specific information are shown in table 2.

Statistics
Dyads in which the ALCOS-12 and HADS or FAD-GF scores of both persons were available were included. Independent samples t tests and Pearson chi-square tests were conducted to investigate demographic and injury-specific differences between dropped and included dyads and between SCI and ABI. The HADS scores were transformed because of a positively skewed distribution (square root). Descriptive statistics (eg, means) report raw data, and statistical analyses were conducted on transformed data.

The dyads of pwSCI or pwABI and their significant others were divided into 4 groups based on the combinations of their self-efficacy scores (ALCOS-12) at admission: (1) both low self-efficacy (≤46), (2) pwSCI or pwABI low self-efficacy and the significant other high (≥47), (3) pwSCI or pwABI high self-efficacy and the significant other low, or (4) both high self-efficacy. Multivariate analyses of variance (MANOVA) were performed to test differences in HADS and FAD-GF scores 6 months after discharge between these 4 groups. Pillai’s trace F-ratio was used to test the overall effect, and Tukey’s honestly significant difference post hoc test was used to investigate group differences. Effect sizes of differences between groups were calculated by dividing the differences in means by the standard deviation of the total group. We used Cohen’s standards to interpret the effect sizes (0.10 = weak, 0.30 = moderate, 0.50 = strong).29 MANOVA analyses were repeated for both diagnosis groups (SCI and ABI) separately and for a selection including only dyads in which the significant other was the partner. Data were analyzed with IBM SPSS Statistics 25. A significance level of P < .05 (2-tailed) was used.

Results
Participants
Figure 1 shows a flowchart of the inclusion of dyads of pwSCI or pwABI and their significant others in the study. Of the 157 dyads that completed the last questionnaire, 155 completed the HADS and 130 completed the FAD-GF. The main reasons for exclusion were: expected stay in inpatient rehabilitation less than 4 weeks (26.0%), limited life expectancy (16.3%), no significant other (15.2%), or severe cognitive or intellectual problems (13.3%). The main reasons to decline participation were “no interest” (45.2%) or “too burdensome” (34.0%). Significant others of dyads included in the analyses were more often men, older, and more often a partner than significant others in dyads that dropped out during the study’s follow-up period. PwSCI and pwABI included in the analyses reported higher physical independence and had ABI more often compared with those who dropped out during follow-up. Table 1 lists the demographic and injury-specific information of the included dyads. In half of the cases, the person with a disability had an SCI. The median number of weeks between onset of injury and completing the questionnaire was 5 weeks (for both diagnoses). Most significant others were partners (78.1%), followed by parents (9.3%), children (7.3%), and other family members or friends (5.3%).

Psychological distress, family functioning, and self-efficacy
Of all the pwSCI and pwABI, 34.4% demonstrated symptoms of anxiety and 34.4% demonstrated symptoms of depression 6 months after discharge. Among significant others, 39.6% demonstrated symptoms of anxiety and 34.9% demonstrated symptoms of depression. In total, 16.2% of the pwSCI and pwABI and 23.1% of their significant others reported problematic family functioning. In a minority of the dyads (n = 20; 12.9%), both persons reported low self-efficacy. In 67 (43.2%) dyads, both persons reported high self-efficacy. The percentages of pwSCI or pwABI and significant others per self-efficacy group who reported anxiety or depressive symptoms and problematic family functioning are shown in figures 2 to 4. Score distributions of the independent and dependent variables are shown in table 2.
**Self-efficacy as predictor of psychological distress**

Psychological distress scores of pwSCI or pwABI and significant others per self-efficacy group are shown in table 3. MANOVA analysis showed significant differences in psychological distress between the 4 self-efficacy groups ($V = 0.12; F_{6.302} = 2.8; P = .010$). Results of the post hoc tests investigating which self-efficacy groups differed from each other with the corresponding effect size are shown in table 3.

Repeating the MANOVA analysis in the 2 diagnostic groups separately showed no main effect of self-efficacy on psychological distress (SCI: $V = 0.10; F_{6.150} = 1.4; P = .236$; ABI: $V = 0.11; F_{6.144} = 1.4; P = .240$), which was also the case when including only dyads with partners ($V = 0.10; F_{6.226} = 2.1; P = .058$).

**Self-efficacy as predictor of family functioning**

Family functioning scores of pwSCI or pwABI and their significant others per self-efficacy group are shown in table 4. MANOVA analysis showed significant differences in family functioning between the 4 self-efficacy groups ($V = 0.19; F_{6.252} = 4.3; P < .001$). Results of the post hoc tests investigating which self-efficacy groups differed from each other with the corresponding effect sizes are shown in table 4.

Repeating the MANOVA analysis in the 2 diagnostic groups separately showed a main effect of self-efficacy on family functioning in the SCI-group ($V = 0.31 F_{6.123} = 3.8, P = .002$), but not in the ABI-subgroup ($V = 0.15 F_{6.120} = 1.6, P = .155$).

Repeating the MANOVA analysis including only dyads with partners showed a similar main effect of self-efficacy on family functioning ($V = 0.22 F_{6.214} = 4.3; P < .001$), as was found in the total group.

**Discussion**

In this study, it was hypothesized that the combination of levels of self-efficacy of pwSCI or pwABI and their significant others measured shortly after the start of inpatient rehabilitation predict personal and family adjustment of both 6 months after clinical discharge. MANOVA results showed a dyadic effect of self-efficacy in the prediction of later psychological distress and family functioning among pwSCI or pwABI and their significant others, supporting our hypothesis. To our knowledge, this is the first study in which the combination of levels of self-efficacy among affected persons and their significant others on adjustment outcomes was investigated.

Two previous reviews demonstrated that self-efficacy is an important predictor of personal adjustment among pwSCI and pwABI. Our study adds the insight that there is a combined effect of self-efficacy of pwSCI or pwABI and that of their significant others on personal and family adjustment. These results emphasize the importance of focusing on both individuals in a dyad and to consider dyadic relationships. Regarding family adjustment, post hoc tests showed that pwSCI or pwABI and their significant others in the low-self-efficacy dyads reported higher levels of problematic family functioning than those in the high-self-efficacy dyads. The effect sizes found were strong. Regarding personal adjustment, only 1 post hoc test showed significant differences in means between the groups. However, the apparently small differences in mean scores hide large differences in the percentages of individuals within the different self-efficacy groups reporting symptoms of psychological distress. These percentages were considerably higher in the low-self-efficacy group compared with those in the high self-efficacy group. This appears to indicate that low self-efficacy dyads are more at risk for personal and family adjustment problems 6 months after discharge from inpatient rehabilitation.
According to the theory of dyadic illness management, it was assumed that adjustment among pwSCI or pwABI and their significant others is the result of how they appraise and manage the illness together. In theory, it is further described that factors at different levels (eg, individual, dyad, family/social, or cultural) within which the patient and care partner are situated may act as

### Table 1: Characteristics of pwSCI or pwABI and their significant others at the start of inpatient rehabilitation

| Variables | Total (N = 157) | SCI (n = 79) | ABI (n = 78) |
|-----------|----------------|-------------|-------------|
| pwSCI/pwABI | n (%) or Mean ± SD, Range | n (%) or Mean ± SD, Range | n (%) or Mean ± SD, Range |
| Sex (female) | 157 66 (42.0) | 79 28 (35.4) | 78 38 (48.7) |
| Age, y | 157 56.7±14.9, 18-87 | 79 55.0±16.8, 18-81 | 77 58.5±12.4, 29-87 |
| Nationality (non-Dutch) | 149 25 (16.4) | 76 13 (16.5) | 76 12 (15.8) |
| Education (high) | 151 58 (38.4) | 75 25 (33.3) | 76 33 (43.4) |
| Physical independence | 150 36.8±18.9, 1-70 | 77 29.5±17.5, 1-70 | 73 44.5±17.2, 5-70 |
| Cause of injury | 150 107 (68.2) | 79 39 (49.4) | 78 68 (87.2) |

- **AIS (SCI only)**
  - A: 9 (11.5)
  - B: 11 (13.9)
  - C: 16 (20.3)
  - D: 43 (54.4)

- **Level/location**
  - Paraplegia: 35 (44.3)
  - Tetraplegia: 44 (53.7)

- **Significant Other**
  - Sex (female) | 157 98 (62.4) | 79 55 (69.6) | 78 43 (55.1) |
  - Age, y | 149 55.9±12.2, 25-82 | 77 56.4±13.1, 25-82 | 72 55.5±11.3, 27-75 |
  - Nationality (non-Dutch) | 149 12 (8.1) | 76 6 (7.6) | 73 6 (8.2) |
  - Education (high) | 149 61 (40.9) | 76 30 (39.5) | 73 31 (42.5) |
  - Partner of pwSCI/pwABI | 151 118 (78.1) | 77 58 (75.3) | 74 60 (81.1) |

**Abbreviation:** AIS, American Spinal Injury Association Impairment Scale.

* Total overall, N = 157; personal adjustment (HADS), n = 155; and family adjustment (FAD-GF), n = 130.
1. Finished bachelor degree or higher.
2. Utrecht Scale for Evaluation of Rehabilitation (0-70).
3. Independent samples t test and Pearson χ² tests showed a difference in physical independence of the pwSCI and pwABI (t(148) = -5.3; P < .001) and cause of injury (χ²(1) = 22.8; P < .001) between SCI and ABI.

Fig 2  Symptoms of anxiety (%) among pwSCI or pwABI and their significant others at 6 months after discharge by self-efficacy group (n = 155). Abbreviations: SE, self-efficacy; SO, significant other.

Fig 3  Symptoms of depression (%) among pwSCI or pwABI and their significant others at 6 months after discharge by self-efficacy group (n = 155). Abbreviations: SE, self-efficacy; SO, significant other.
We have compared some basic baseline characteristics such as age, sex, and injury-specific information (completeness and level of injury [SCI], physical independence [ABI]) with the characteristics found in the general Dutch SCI and stroke population in an inpatient rehabilitation setting. Based on these characteristics, our sample appears to be representative. Furthermore, the prevalence of symptoms of psychological distress found in the present study were highly comparable to results found in earlier research among pwSCI or pwABI and their significant others. We decided to use total HADS scores because we wanted to assess general psychological distress instead of anxiety and depression separately. However, because there are no clear cutoff scores for self-efficacy was found to be a predictor of later adjustment, our results may underestimate adjustment problems. The relatively high self-efficacy scores could probably be explained by the relatively high educational level of our participants. Third, we decided to use total HADS scores because we wanted to assess general psychological distress instead of anxiety and depression separately. However, because there are no clear cutoff scores for self-efficacy was found to be a predictor of later adjustment, our results may underestimate adjustment problems. The relatively high self-efficacy scores could probably be explained by the relatively high educational level of our participants. Therefore, we do not have any information regarding the excluded dyads, which limits the possibilities to compare their characteristics with the characteristics of the included dyads.

## Study limitations

This study has some limitations. First, regarding the representativeness of our sample, we should note that excluding pwSCI and pwABI with an expected stay in inpatient rehabilitation of less than 4 weeks will have resulted in an overrepresentation of more severely affected pwSCI and pwABI, although the majority of the inpatient rehabilitation trajectories in the Netherlands take longer than 4 weeks. On the other hand, pwSCI and pwABI with severe cognitive or intellectual problems or a limited life expectancy were excluded, which could result in the opposite effect. Furthermore, pwSCI and pwABI with a significant other were over-represented because participants were included as dyads, resulting in the exclusion of pwSCI and pwABI who did not have a significant other. Unfortunately, we do not have any information regarding the excluded dyads, which limits the possibilities to compare their characteristics with the characteristics of the included dyads.

### Table 2: Scores and differences in self-efficacy (at the start of inpatient rehabilitation), psychological distress, and family functioning (at 6mo after discharge)

| Variable (Range of Scores) | pwSCI/pwABI | Significant Others |
|----------------------------|-------------|---------------------|
| Total group (N=157)        |             |                     |
| Self-efficacy (12-60)*     | 157         | 48.1±8.1            | 49.6±6.6            |
| Psychological distress (0-42) | 155        | 11.6±7.4            | 10.1±7.2            |
| Family functioning (1-4)   | 130         | 1.6±0.4             | 1.7±0.5             |
| SCI (n=79)                 |             |                     |
| Self-efficacy (12-60)*     | 79          | 49.1±7.9            | 48.8±6.6            |
| Psychological distress (0-42) | 79          | 11.2±7.6            | 11.4±7.0            |
| Family functioning (1-4)†  | 66          | 1.7±0.4             | 1.7±0.4             |
| ABI (n=78)                 |             |                     |
| Self-efficacy (12-60)*     | 78          | 47.1±8.3            | 50.3±6.6            |
| Psychological distress (0-42) | 76          | 11.9±7.3            | 8.7±7.3             |
| Family functioning (1-4)†  | 64          | 1.6±0.4             | 1.7±0.5             |

* Higher scores indicate higher self-efficacy.
† Higher scores indicate worse family functioning.

![Fig 4](https://www.archives-pmr.org)
although exceptional, it was possible that individuals within a dyad answered the questions for different families (eg, when the significant other was a friend). Fifth, despite the longitudinal study design, we were not able to rule out confounding or reverse causation. When a certain variable has impact on the dependent and independent variable, this may disrupt study results (ie, confounding). We believe confounding is not likely in our study, because self-efficacy is assumed to be a highly stable characteristic which is not or hardly subjected to the influence of confounders. 39,40 For that reason, reverse causation also appears to be unlikely. Lastly, we are not able to present figures on the psychological care received by pwSCI or pwABI and their significant others because we have not monitored the specific services received by our participants during inpatient and outpatient rehabilitation. In general, pwSCI and pwABI in our study received regular care, which includes psychological assessment and intervention by psychologists (if needed) during inpatient rehabilitation and sometimes also during outpatient rehabilitation. Significant others are usually in contact with social work and only occasionally receive psychological support.

**Implications**

The main clinical message for healthcare professionals is to recognize the interdependence between pwSCI or pwABI and their significant others. 8 Therefore, in addition to individual attention for pwSCI or pwABI, attention is also required for the dyadic relationships, eg, by introducing a joint anamnesis. Furthermore, because our results indicate that combined self-efficacy scores shortly after the start of inpatient appear to predict later personal and family adjustment, it is advised to implement screening for low self-efficacy of both pwSCI or pwABI and their significant others, for example, by administering a short self-report questionnaire, which is a relatively easy and inexpensive way to quickly assess self-efficacy. Screening may help healthcare professionals to identify and support families that are more at risk at an early stage, which may help to prevent later adjustment problems and related costs. Using the ALCOS-12 as screening tool appears useful, but other measures of self-efficacy are available, and more knowledge is desirable about clear cutoff scores. 19,20

Research giving more attention for dyadic relationships between people is desirable to obtain more insight into how people interact and influence each other. 31 This information may also help to give direction to the development of family-based interventions, which take the interdependence of individuals into account. Effective family-centered interventions are still limited.41,42

**Conclusions**

There is a dyadic relationship between the self-efficacy of pwSCI or pwABI and that of their significant others at the start of inpatient rehabilitation and personal and family adjustment 6 months after discharge. Low self-efficacy appears to be a risk factor for adjustment problems. It is important to identify and support individuals for whom it is difficult to adjust to changed conditions as a result of disease with a chronic impact.

**Keywords**

Brain injuries; Mental health; Rehabilitation; Self efficacy; Spinal cord injuries

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**Table 4** Problematic family functioning among pwSCI or pwABI and their significant others at 6 months after discharge based on self-efficacy level at the start of inpatient rehabilitation (n = 130)

| Self-Efficacy | Psychological Distress | Problematic Family Functioning |
|---------------|------------------------|--------------------------------|
| pwSCI/pwABI   | Significant            | Low                            |
|               | Other                  | Mean ± SD                      |
| Low           | Low                    | 14.1 ± 7.7                     | 1.9 ± 0.5 |
|               | High                   | 12.9 ± 7.5                     | 1.8 ± 0.4 |
| High          | Low                    | 12.2 ± 7.3                     | 1.6 ± 0.4 |
|               | High                   | 9.7 ± 7.1                      | 1.5 ± 0.4 |

* Indicates significant difference based on Tukey's honestly significant difference post hoc test, effect size = 0.79.

**Table 3** Psychological distress among pwSCI or pwABI and their significant others at 6 months after discharge based on self-efficacy level at the start of inpatient rehabilitation

| Self-Efficacy | Psychological Distress |
|---------------|------------------------|
| pwSCI/pwABI   | n (Total n = 155)      |
| Low           | Low                    | Mean ± SD                      |
|               | High                   | 14.5 ± 8.5                     |
| High          | Low                    | 12.9 ± 6.9                     |
|               | High                   | 12.2 ± 6.6                     |

* Indicates significant difference based on Tukey's honestly significant difference post hoc test, effect size = 0.79.

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![Table 3](image-url)
E.M. Maas; Rehabilitation Center Merem/De Trappenberg: H. van der Werf, C.E. de Boer; Rehabilitation Center Reade: M. Beurskens; Rehabilitation Center Sint Maartenskliniek: I. van Nes, T. van Die- men; Rehabilitation Friesland: K.H. Woldendorp, J. Hurkmans; Revant Rehabilitation Center: M. Luijks; Rijndam Rehabilitation: D.C.M. Spikerman, R. Osterhut; UMCG Rehabilitation Center Beatrixoord: J. Sprik-Bakker; and Vogelranden Center for Rehabili- tation: M. Hoonhorst.

Supplier

a. SPSS; IBM Corporation.

References

1. Lynch J, Cahalan R. The impact of spinal cord injury on the quality of life of primary family caregivers: a literature review. Spinal Cord 2017;55:964-78.
2. Visser-Meily A, Post M, Gorter JW, Van Berelkom SB, Van den Bos T, Lindeman E. Rehabilitation of stroke patients needs a family-centred approach. Disabil Rehabil 2006;28:1557-61.
3. Lyons KS, Lee CS. The theory of dyadic illness management. J Fam Nurs 2018;24:8-28.
4. DeJean D, Giacomini M, Vanstone M, Brundisini F. Patient experiences of depression and anxiety with chronic disease: A systematic review and qualitative meta-synthesis. Ont Health Technol Assess Ser 2013;13:1-33.
5. Kitzmüller G, Asplund K, Häggström T. The long-term experience of family life after stroke. J Neurosci Nurs 2012;44:e1-13.
6. Godwin KM, Swank PR, Vaeth P, Ostwald SK. The longitudinal and dyadic effects of mood on perceived stress for stroke survivors and their spousal caregivers. Aging Ment Health 2013;17:423-31.
7. Scholten EWM, Tromp MEH, Hillebregt CF, et al. Mental health and life satisfaction of individuals with spinal cord injury and their partners 5 years after discharge from first inpatient rehabilitation. Spinal Cord 2018;56:598-606.
8. Pucciarelli G, Vellone E, Savini S, Simeoni S, Ausili D, Alvaro R, et al. Roles of changing physical function and caregiver burden on quality of life in stroke: A longitudinal dyadic analysis. Stroke 2017;48:733-9.
9. Sherer M, Maddux JE, Mercandante B, Prentice-Dunn S, Jacobs B, Rogers RW. The Self-Efficacy Scale: construction and validation. Psychol Rep 1982;51:663-71.
10. Van Diemen T, Crul T, Van Nes I. SELF-SCI, Geertzen JH, Post MW. Associations between self-efficacy and secondary health conditions in people living with spinal cord injury: a systematic review and meta-analysis. Arch Phys Med Rehabil 2017;98:2566-77.
11. Koopershoek C, Van der Bijl J, Hafsteinsson TB. Self-efficacy and its influence on recovery of patients with stroke: a systematic review. J Adv Nurs 2011;67:1876-94.
12. Hillebregt CF, Scholten EWM, Ketelaar M, Post MWM, Visser-Meily JMA. Effects of family group conferences among high-risk patients of chronic disability and their significant others: a study protocol for a multicentre controlled trial. BMJ Open 2018;8:e026768.
13. Deelman BG, Koning-Haanstra M, Liebrand WBG, Van den Burg W. SAN Test, een fasie test voor auditiief en mondeling taalgebruik [SAN Test, an aphasia test for auditory and oral language] [in Dutch]. Lisse, the Netherlands: Swets & Zeitlinger; 1981.
14. Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. Acta Psychiatr Scand 1983;67:361-70.
15. Cosco TD, Doyle F, Ward M, McGhee H. Latent structure of the Hospital Anxiety and Depression Scale: a 10-year systematic review. J Psychosom Res 2012;72:180-4.
16. Norton S, Cosco T, Doyle F, Done J, Sacker A. The Hospital Anxiety and Depression Scale: a meta confirmatory factor analysis. J Psychosom Res 2013;74:74-81.
17. Spinhoven P, Ormel J, Sloekers PPA, Kempen GJM, Speckens AEM, Van Hemert AM. A validation study of the Hospital Anxiety and Depression Scale (HADS) in different groups of Dutch subjects. Psychol Med 1997;27:363-70.
18. De Wit L, Putman K, Baert L, et al. Anxiety and depression in the first six months after stroke: a longitudinal multicentre study. Disabil Rehabil 2008;30:1858-66.
19. Epstein NB, Baldwin LM, Bishop DS. The McMaster Family Assessment Device. J Marital Fam Ther 1983;9:171-80.
20. Mansfield AK, Keitner GI, Dealy J. The Family Assessment Device: an update. Fam Process 2015;54:82-93.
21. Miller IW, Bishop DS, Epstein NB, Keitner GI. The McMaster Family Assessment Device: reliability and validity. J Marital Fam Ther 1985;11:345-56.
22. Hamilton E, Carr A. Systematic review of self-report family assessment measures. Fam Process 2016;55:16-30.
23. Staccini L, Tomba E, Grandi S, Keitner GI. The evaluation of family functioning by the Family Assessment Device: a systematic review of studies in adult clinical populations. Fam Process 2015;54:94-115.
24. Bosscher RJ, Smit JH, Kempen G. Algemene competентieverwachtingen bij ouderen [General competence expectations in the elderly] [in Dutch]. Ned Tijdschrift voor Psychol 1997;52:239-48.
25. Bosscher RJ, Smit JH. Confirmatory factor analysis of the General Self-Efficacy Scale. Behav Res Ther 1998;36:339-43.
26. Van der Veen DC. De psychometrische kwaliteiten van de Algemene Competentie Schaal (ALCOS-12) [The psychometric qualities of the General Competence Scale (ALCOS-12)] [in Dutch] (Dissertation); 2006.
27. Kirshblum SC, Burns SP, Biringer-Sorensen F, et al. International standards for neurological classification of spinal cord injury. Spinal Cord 2011;49:535-46.
28. Post MWM, Van de Port IGL, Kap B, Van Berelkom BSH. Development and validation of the Utrecht Scale for Evaluation of Clinical Rehabilitation (USER). Clin Rehabil 2009;23:909-17.
29. Cohen J. Statistical power analysis for the behavioural sciences. 2nd ed. New York: Academic Press; 1988.
30. Van-Fei K, Hassan STS, Sann LM, Ismail SIF, Raman RA, Ibrahim F. Depression, anxiety and quality of life in stroke survivors and their family caregivers: a pilot study using an actor/partner interdependence model. Electron Physician 2017;9:4924-33.
31. Kruithof WJ, Post MWM, Van Mierlo ML, Van den Bos GAM, De Man-van Ginkel JM, Visser-Meily JMA. Caregiver burden and emotional problems in partners of stroke patients at two months and one year post-stroke: determinants and prediction. Patient Educ Couns 2016;99:1632-40.
32. Revalidatie Nederland. Branchegegevens 2017 Revalidatie Nederland [Branch report 2017 Rehabilitation The Netherlands]; 2018. Available at: https://www.revalidatie.nl/userfiles/File/publicaties/Brancherapport_RN_2017_DIGI.pdf. Accessed July 16, 2020.
33. Post MWM, Nachtegaal J, Van Langeveld SA, et al. Progress of the Dutch spinal cord injury database: completeness of database and profile of patients admitted for inpatient rehabilitation in 2015. Top Spinal Cord Inj Rehabil 2018;24:141-50.
34. Ten Brink AF, Hajas TRS, Van Bennekoom C, et al. Predictors of physical independence at discharge after stroke rehabilitation in a Dutch population. Int J Rehabil Res 2017;40:37-45.
35. Post MWM, Van Leeuwen CMC. Psychosocial issues in spinal cord injury: a review. Spinal Cord 2012;50:382-9.
36. Loh AZ, Tan JS, Zhang MW, Ho RC. The global prevalence of anxiety and depressive symptoms among caregivers of stroke survivors. J Am Med Dir Assoc 2017;18:111-6.

37. Gregório GW, Stapert S, Brands I, Van Heugten C. Coping styles within the family system in the chronic phase following acquired brain injury: its relation to families’ and patients’ functioning. J Rehabil Med 2011;43:190-6.

38. Cox V, Mulder M, Nijland R, et al. Agreement and differences regarding family functioning between patients with acquired brain injury and their partners. Brain Inj 2020;34:489-95.

39. Van Leeuwen CM, Edelaar-Peeters Y, Peter C, Stiggelbout AM, Post MW. Psychological factors and mental health in persons with spinal cord injury: an exploration of change or stability. J Rehabil Med 2015;47:531-7.

40. Van Leeuwen CMC, Post MWM, Van Asbeck FWA, et al. Life satisfaction in people with spinal cord injury during the first five years after discharge from inpatient rehabilitation. Disabil Rehabil 2012;34:76-83.

41. Vloothuis JD, Mulder M, Veerbeek JM, et al. Caregiver-mediated exercises for improving outcomes after stroke. Cochrane Database Syst Rev 2016;12:CD011058.

42. Baker A, Barker S, Sampson A, Martin C. Caregiver outcomes and interventions: a systematic scoping review of the traumatic brain injury and spinal cord injury literature. Clin Rehabil 2017;31:45-60.