Influence of self-efficacy and coping on quality of life and social participation after acquired brain injury: a 1-year follow-up study

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ORIGINAL ARTICLE

Influence of Self-Efficacy and Coping on Quality of Life and Social Participation After Acquired Brain Injury: A 1-Year Follow-Up Study

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Abstract

Objectives: To investigate the relations linking self-efficacy and coping to quality of life (QOL) and social participation and what effect self-efficacy, changes in self-efficacy, and coping style have on long-term QOL and social participation.

Design: Prospective clinical cohort study.

Setting: General hospitals, rehabilitation centers.

Participants: Patients with newly acquired brain injury (ABI) (N=148) were assessed at baseline (start outpatient rehabilitation or discharge hospital/inpatient rehabilitation; mean time since injury, 15wk) and 1 year later (mean time since injury, 67wk).

Interventions: Not applicable.

Main Outcome Measures: QOL was measured with the EuroQuol 5D (the EQ-5D index and the EQ-5D visual analog scale [EQ VAS]) and the 9-item Life Satisfaction Questionnaire (LiSat-9), social participation with the modified Frenchay Activities Index, coping with the Coping Inventory for Stressful Situations, and self-efficacy with the Traumatic Brain Injury Self-efficacy Questionnaire.

Results: At baseline, self-efficacy moderated the effect of emotion-oriented coping on the EQ-5D index and of avoidance coping on the EQ VAS. Self-efficacy mediated the relation between emotion-oriented coping and LiSat-9. An increase in self-efficacy over time predicted better scores on the EQ-5D index ($\beta = .30$), the EQ VAS ($\beta = .49$), and LiSat-9 ($\beta = .44$) at follow-up. In addition, higher initial self-efficacy ($\beta = .40$) predicted higher LiSat-9 scores at follow-up; higher initial emotion-oriented coping ($\beta = -.23$) predicted lower EQ VAS scores at follow-up. Higher modified Frenchay Activities Index scores at follow-up were predicted by higher self-efficacy ($\beta = .19$) and higher task-oriented coping ($\beta = .14$) at baseline (combined $R^2 = 5.1\%$).

Conclusions: Self-efficacy and coping predict long-term QOL but seem less important in long-term social participation. High self-efficacy protects against the negative effect of emotion-oriented coping. Enhancing self-efficacy in the early stage after ABI may have beneficial long-term effects.

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Self-efficacy and coping may play an important role in the process of adaptation to the consequences of acquired brain injury (ABI) and regaining quality of life (QOL).¹ *Self-efficacy* refers to the belief in one's ability to achieve goals.² Efficacy beliefs influence

the activities people choose to engage in, the level of effort they make, and their perseverance in the face of difficulties.² Self-efficacy beliefs are domain-specific, but various experiences of success and failure in different domains of functioning may generate a generalized belief of self-efficacy.

As a domain-oriented concept, higher self-efficacy in maintaining balance has been associated with improved activities of

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daily living performance,³ better walking,⁴ and less falling.⁵ In patients with traumatic brain injury (TBI), higher self-efficacy for the management of specific TBI-related symptoms, such as cognitive, physical, emotional, and social problems, was related to higher QOL.⁶

As a general concept, higher general self-efficacy has been related to better QOL and social participation in TBI.⁷⁻⁹ However, because all studies were conducted cross-sectionally in the chronic stage after TBI, one cannot determine whether self-efficacy in the early stage after brain injury is predictive for better long-term QOL and social participation.

High general self-efficacy has been associated with higher use of active and problem-focused coping in persons with ABI and healthy persons.¹⁰⁻¹² In chronic diseases, the relation between low self-efficacy and increased use of emotion-oriented coping is well documented.^{13,14}

The relations between coping and self-efficacy and their relation to psychosocial outcome have not been studied yet in ABI. Self-efficacy might influence the relation between coping and psychosocial outcome in different ways.

On the one hand, the strength of the effect of coping on psychosocial outcome might be different for patients with high versus low self-efficacy. High self-efficacy may act as a buffer and protect against the negative effect of passive, emotion-oriented coping styles on QOL,¹⁵⁻¹⁸ whereas this protective effect might be absent when self-efficacy is low. This is called *effect moderation*. On the other hand, successful coping experiences might increase a patient's self-efficacy, which might, in turn, lead to better outcome. This is called *effect mediation*.

Therefore, the objectives of the present study were (1) to explore how self-efficacy for managing brain injury—specific symptoms contributes to the effect of coping style on QOL and social participation in patients with ABI and (2) to investigate the influence of baseline self-efficacy, changes in self-efficacy, and baseline coping style on long-term QOL and social participation.

Methods

Patients

Between January 2011 and January 2012, rehabilitation physicians and neurologists of the participating institutes (2 rehabilitation centers and 2 hospitals in the South of The Netherlands) recruited patients eligible for participation in this study. Patients were included consecutively on return to the home environment, either at the start of outpatient neurorehabilitation or at discharge home from hospital or inpatient neurorehabilitation. Inclusion criteria were as follows: (1) age 18 years or more; (2) newly acquired, nonprogressive brain injury of any etiology confirmed by

neurological and/or neuroimaging data; and (3) the maximum time since injury 4 months for patients recruited at the start of outpatient rehabilitation. Exclusion criteria were as follows: (1) any premorbid progressive brain disease; (2) insufficient command of the Dutch language; and (3) inability to complete questionnaires on the basis of clinical judgment (aphasia and severe cognitive impairment).

The medical ethics committees of the Maastricht University Medical Center and all participating hospitals and rehabilitation centers approved this study. All patients gave written informed consent.

Measures

To measure self-efficacy, we used the 13-item TBI Self-efficacy Questionnaire,⁶ which contains 4 subscales—Social, Physical, Cognitive, Emotional—measuring self-efficacy for obtaining help and emotional support, managing physical symptoms, managing and compensating for cognitive symptoms, and managing emotional symptoms, respectively. Items are rated on a 10-point scale (1 = not at all confident to 10 = totally confident). Subscale scores are summed to a total score. Higher scores indicate greater self-efficacy. We carried out a formal translation procedure to obtain a Dutch version. Using our data, we found good internal reliability (Cronbach α = .81–.95).

Basic coping strategies were measured using the Coping Inventory for Stressful Situations (CISS).¹⁹ We used the Dutch validated version.²⁰ The 48-item CISS has 3 CISS Avoidance scale (CISS-A), CISS Emotion-oriented scale (CISS-E), and CISS Task-oriented scale (CISS-T). The avoidance scale contains 2 subscales: social diversion and distraction. Item scores (1 = not at all to 5 = very much) are summed per scale; higher scores indicate a greater use of that particular coping style. Psychometric properties of the CISS for use in patients with ABI have been shown to be good.²¹ Because confirmatory factor analysis showed a 3-factor structure (T, E, A),²¹ we did not use the avoidance subscales.

The 9-item Life Satisfaction Questionnaire (LiSat-9) was used as a generic instrument for measuring QOL.²² We used the Dutch version.^{23,24} One public domain and 8 specific fields are assessed. The mean of all item scores (1 = very unsatisfactory to 6 = very satisfactory) was calculated. Higher scores indicate better general QOL. Using our data, we found good internal reliability (Cronbach α = .83). To measure health-related QOL, the EuroQuol 5D (EQ-5D)^{25,26} was used, which consists of the 5-item EQ-5D index and the EQ-5D visual analog scale (EQ VAS). The Dutch version has good psychometric properties.²⁷ The 5 EQ-5D index items are summarized into 1 weighted overall score ranging from 0 to 1.00 (death to full health). The EQ VAS ranges from 0 to 100 (worst to best imaginable health state).

Social participation was measured with the modified Frenchay Activities Index (FAI). The original FAI is a 15-item measure developed for patients with stroke, assessing the frequency of performance of activities such as housekeeping, recreation, transportation, and work during the last 3 to 6 months.²⁸ We used the Dutch-adapted version, modified FAI, which covers a more circumscribed period spanning the past 4 weeks with answering categories adapted correspondingly.²⁹ Psychometric properties have been shown to be good.^{29,30} Items are scored on a 4-point scale. Higher scores indicate a higher level of participation (maximum score = 45).

Data on age, sex, and diagnosis were extracted from the medical files. Level of educational attainment was asked during

List of abbreviations:

ABI	acquired brain injury
CISS	Coping Inventory for Stressful Situations
CISS-A	CISS Avoidance scale
CISS-E	CISS Emotion-oriented scale
CISS-T	CISS Task-oriented scale
EQ-5D	EuroQuol 5D
EQ VAS	EQ-5D visual analog scale
FAI	Frenchay Activities Index
LiSat-9	9-item Life Satisfaction Questionnaire
QOL	quality of life
TBI	traumatic brain injury

baseline interview and classified according to a 3-level system often used in The Netherlands: primary education (low), junior vocational training (medium), and senior vocational or academic training (high), corresponding to 8.6 ± 1.9 , 11.4 ± 2.5 , and 15.2 ± 3.3 years of full-time education, respectively.³¹

Procedure

After inclusion, patients were contacted. A telephone interview with the first author (I.B.) or research assistant was planned when the patient had been at home for at least 2 to 4 weeks. During this interview, the modified FAI was completed and patients were asked about the 3 most stressful situations that they had encountered as a consequence of their brain injury during the previous 2 weeks. For each of the 3 stressful situations, a separate coping questionnaire (CISS) was prepared in which the instruction for completion was made specific: "How much do you engage in these types of activities when you are confronted with ... (one of 3 situations)." After the interview, each patient received 3 situation-specific coping questionnaires (CISS) by post along with questionnaires about self-efficacy (TBI Self-efficacy Questionnaire) and QOL (EQ-5D and LiSat-9) to complete via self-report. One year (± 4 wk) after inclusion, patients were contacted again to plan the telephone interview. During this interview, the modified FAI was completed and the patient again identified 3 brain-injury-related stressful situations of importance at that time. Afterward, the same set of questionnaires (CISS, TBI Self-efficacy Questionnaire, EQ-5D, LiSat-9) was sent to complete via self-report.

If a participant requested a live interview or asked for assistance to complete the questionnaires, a face-to-face appointment with the first author (I.B.) or research assistant was arranged (baseline: $n = 26$ [18%]; follow-up: $n = 26$ [18%]).

Data analysis

The CISS completed for the first stressful situation was used in all analyses reported in this article. CISS results for second and third situations (collected for a different research purpose) were not included to avoid problems of intercorrelation. Using paired-sample *t* tests, baseline and follow-up scores of all outcome variables, self-efficacy, and coping style were compared. Using one-sample *t* tests, EQ-5D scores of our study sample and of the general Dutch population (EQ-5D index score = .843; EQ VAS score = 81.36)^{26,32} were compared.

To answer our first research question about the relations between baseline coping style and self-efficacy and their relation to baseline QOL and participation, we first selected from the clinical variables (TBI Self-efficacy Questionnaire, CISS-T, CISS-E, CISS-A) those variables that had an independent effect on each outcome variable (EQ-5D index, EQ VAS, LiSat-9, modified FAI). Therefore, we conducted 4 hierarchical multiple regression analyses. After entering demographic variables, clinical variables were tested separately and those showing associations at a *P* value of $< .10$ were retained. Then, we tested whether the relation between coping and outcome was dependent on the level of self-efficacy (moderation). For each outcome variable, demographic variables, retained clinical variables, and their respective interaction terms (TBI Self-efficacy Questionnaire $\times$ Coping style) were entered into the regression model. Evidence for moderation was indicated by a significant interaction term. In the absence of moderation, we tested whether self-efficacy mediated the relation between coping style and outcome variable using structural equation modeling. All the variables that were present in the

multivariable regression model to test for moderation were now included in the SEM model (except the respective nonsignificant interaction terms). Evidence for mediation was indicated by a significant indirect pathway between coping style and outcome variable.

To answer our second research question whether baseline self-efficacy (TBI Self-efficacy Questionnaire), changes in self-efficacy (an increase in self-efficacy over time as measured by the TBI Self-efficacy Questionnaire score from baseline to follow-up), and baseline coping style (CISS-T, CISS-E, CISS-A) were predictive for QOL and participation at follow-up, 4 hierarchical multiple regressions were carried out with the EQ-5D index, the EQ VAS, LiSat-9, and modified FAI as outcome variables. Because we had no prespecified prediction hypothesis, we used a stepwise approach to enter the independent variables into the regression models. First, all demographic variables and baseline scores of the respective outcome variables were entered. Second, the predictors were tested separately, and those showing associations at a *P* value of $< .10$ were retained in the full multivariable model. Finally, in a backward selection procedure, any clinical variable in the full multivariable model that was not significant at a *P* value of $< .05$ was manually removed.

All analyses were carried out in Stata 12.1,^a using 2-sided hypothesis testing with an alpha level of .05.

Results

Initially 190 patients were approached, of whom 37 refused to participate. Of the 153 patients willing to participate, we excluded 5 patients because of nonmatching inclusion criteria. Overall, 148 patients (78%) underwent baseline assessment, of whom 143 participated in follow-up assessment. Too much burden was the reason for all dropouts. Table 1 presents the demographic and injury-related characteristics of the sample at baseline. At follow-up, mean $\pm$ SD time since injury was 67 ± 9.12 weeks.

Table 1 Patients' characteristics at baseline (N = 148)

Characteristic	Value	Range
Age (y)	56 ± 12.3	19–84
Time since injury (wk)	15.1 ± 9.6	2.0–43.7
Sex (male)	95 (64.2)	
Education level		
Low	41 (27.7)	
Medium	61 (41.2)	
High	46 (31.1)	
Type of lesion		
Infarction	98 (66.2)	
SAH	10 (6.8)	
ICH	9 (6.1)	
Diffuse vascular lesions	2 (1.4)	
TBI	14 (9.5)	
Anoxic encephalopathy	3 (2.0)	
Tumor benign	5 (3.4)	
Meningitis/encephalitis	1 (0.7)	
Other	6 (4.1)	

NOTE. Values are mean $\pm$ SD or *n* (%).

Abbreviations: ICH, intracerebral hemorrhage; SAH, subarachnoid hemorrhage.

Table 2 Descriptive data of all clinical variables

Clinical variable	Baseline	1-y follow-up	t	P
SEsx	83.98±22.37	87.40±21.29	2.14	.013*
CISS-T	49.98±10.69	49.35±12.39	-0.12	.91
CISS-E	34.75±12.93	33.56±11.68	-1.48	.14
CISS-A	39.20±12.21	41.09±12.10	1.58	.12
Modified FAI	19.21±6.97	27.27±6.92	15.16	<.001*
LiSat-9	4.49±0.73	4.54±0.85	0.85	.40
EQ-5D index	0.74±0.20	0.78±0.19	2.51	.013*
EQ VAS	66.37±16.35	71.01±15.72	3.32	.001*

NOTE. Values are mean ± SD unless indicated otherwise.

Abbreviation: SEsx, Traumatic Brain Injury Self-efficacy Questionnaire.

* Associations remaining significant after Benjamini-Hochberg correction for multiple comparisons (.013<.025, .013<.01875, .001<.0125, .0009<.00625).

All clinical variables are described in table 2. Compared with the general population in The Netherlands, our study sample showed for both measurements significantly lower EQ-5D index scores ($t_{147} = -6.07$, $P < .001$, and $t_{142} = -4.02$, $P < .001$, respectively) and lower EQ VAS scores ($t_{147} = -11.16$, $P < .001$, and $t_{141} = -7.85$, $P < .001$, respectively).

Relations linking self-efficacy and coping to outcome at baseline

The TBI Self-efficacy Questionnaire scores moderated the relation between EQ-5D index scores and CISS-E scores, as indicated by a significant interaction term (table 3). This means that the effect of emotion-oriented coping on QOL diminishes with increasing levels of self-efficacy (fig 1).

For EQ VAS scores, the multivariable regression model (see table 3) showed that the TBI Self-efficacy Questionnaire scores moderated both the relation between CISS-E and EQ VAS and the relation between CISS-A and EQ VAS, as indicated by significant interaction terms. This means that the contribution of avoidance coping to EQ VAS scores reduces with increasing levels of self-efficacy (fig 2). Furthermore, the effect of emotion-oriented coping on QOL decreases with increasing levels of self-efficacy (fig 3).

In contrast, the TBI Self-efficacy Questionnaire scores did not moderate the relation between CISS-E and LiSat-9 scores, as indicated by a nonsignificant interaction term (see table 3). Therefore, the effect of emotion-oriented coping on LiSat-9 did not differ between those with high self-efficacy and those with low self-efficacy. The structural equation model (fig 4), however, revealed that the effect of CISS-E on LiSat-9 scores was completely mediated by its association with TBI Self-efficacy Questionnaire scores, as indicated by a nonsignificant direct

Table 3 Hierarchical regressions of the association between clinical variables and QOL and social participation at baseline

Clinical variable	Crude model*				Multivariable model†			
	B	SE	β	P	B	SE	β	P
EQ-5D index								
CISS-T	-.0003	.0017	-.01	.87				
CISS-A	.0003	.0015	.02	.82				
SEsx	.0045	.0007	.48	<.001	-.00012	.0016	-.12	.52
CISS-E	-.0073	.0013	-.46	<.001	-.0138	.0035	-.87	<.001
SEsx × CISS-E					0.0001	.0000	.55	.003
EQ VAS								
CISS-T	.21	.13	.13	.13				
SEsx	.46	.05	.63	<.001	0.58	.17	.80	.001
CISS-E	-.53	.11	-.42	<.001	-.69	.26	-.55	.008
CISS-A	.23	.12	.17	.056	1.20	.36	.89	.001
SEsx × CISS-E					0.0065	.003	.36	.038
SEsx × CISS-A					-.011	.004	-.90	.007
LiSat-9								
CISS-T	.0045	.006	.07	.46				
CISS-A	.0006	.005	.01	.91				
SEsx	.018	.002	.56	<.001	0.0122	.006	.38	.042
CISS-E	-.022	.005	-.39	<.001	-.0155	.0127	-.27	.23
SEsx × CISS-E					0.0001	.0002	.16	.40
Modified FAI								
CISS-T	.073	.053	.11	.17				
CISS-E	-.056	.046	-.11	.23				
SEsx	.055	.026	.18	.038	0.085	.079	.28	.29
CISS-A	.105	.047	.19	.028	0.18	.19	.32	.33
SEsx × CISS-A					-.0009	.0021	-.17	.68

Abbreviations: B, unstandardized regression coefficient; β, standardized regression coefficient; SE, standard error; SEsx, Traumatic Brain Injury Self-efficacy Questionnaire.

* Based on separate models for each clinical variable adjusted for demographic variables.

† Based on the model in which all clinical variables with associations at a P value of <.10, when tested separately, were retained together with their respective interaction terms to test for effect moderation.

Fig 1 The moderating effect of self-efficacy (SEsx total score) on the relation between emotion-oriented coping (CISS-E) and the EQ-5D index. NOTE. Low represents scores -1 SD. Average represents mean scores. High represents scores $+1$ SD. Abbreviation: SEsx, Traumatic Brain Injury Self-efficacy Questionnaire.

effect of CISS-E on LiSat-9 scores and a significant indirect association between CISS-E and LiSat-9 scores ($\beta = -.30$; $P < .001$).

For baseline modified FAI scores, a significant effect of CISS-A scores ($\beta = .19$; $P = .025$) and TBI Self-efficacy Questionnaire scores ($\beta = .18$; $P = .037$) was observed, next to an effect of sex (female vs male: $\beta = .32$; $P < .001$). The interaction term (CISS-A $\times$ TBI Self-efficacy Questionnaire total score) was nonsignificant, indicating absence of moderation (see table 3). Furthermore, CISS-A scores were not significantly related to TBI Self-efficacy Questionnaire scores ($\beta = -.06$; $P = .46$), so there was no evidence that TBI Self-efficacy Questionnaire scores mediated the relation between CISS-A and modified FAI scores.

Prediction of 1-year QOL and participation

In table 4, the final hierarchical regression models are listed for each outcome variable. An increase in self-efficacy over time as measured by the TBI Self-efficacy Questionnaire score from baseline to follow-up significantly predicted EQ-5D index scores at follow-up, accounting for 8.5% of the total explained variance (ie, 43.5%). Higher EQ VAS scores at follow-up were significantly predicted by an increase in self-efficacy over time as measured by

Fig 2 The moderating effect of self-efficacy (SEsx total score) on the relation between avoidance coping (CISS-A) and the EQ VAS. NOTE. Low represents scores -1 SD. Average represents mean scores. High represents scores $+1$ SD. Abbreviation: SEsx, Traumatic Brain Injury Self-efficacy Questionnaire.

Fig 3 The moderating effect of self-efficacy (SEsx total score) on the relation between emotion-oriented coping (CISS-E) and the EQ VAS. NOTE. Low represents scores -1 SD. Average represents mean scores. High represents scores $+1$ SD. Abbreviation: SEsx, Traumatic Brain Injury Self-efficacy Questionnaire.

the TBI Self-efficacy Questionnaire score from baseline to follow-up and by lower baseline CISS-E scores, jointly accounting for 23.1% of the total explained variance (ie, 51.5%). Increases in self-efficacy over time as measured by the TBI Self-efficacy Questionnaire score from baseline to follow-up were predictive for higher LiSat-9 scores at follow-up, jointly accounting for 16.4% of the total explained variance (ie, 58%). Higher baseline TBI Self-efficacy Questionnaire scores and higher baseline CISS-T scores significantly predicted higher modified FAI scores at follow-up, but they jointly accounted for only 5.0% of the total explained variance (ie, 48.9%).

Discussion

In this prospective cohort study of 148 patients with newly ABI, we showed that patients who became more self-efficacious in managing their brain injury-related symptoms over time showed better health-related QOL (EQ-5D index and EQ VAS scores) and general QOL (LiSat-9) after 1 year. In addition, patients with higher initial self-efficacy displayed better long-term general QOL (LiSat-9). We confirmed the association between emotion-oriented coping and poor QOL and showed that high self-efficacy protected against this negative influence of emotion-oriented coping. Initial coping and self-efficacy were far less important in predicting long-term participation.

Our results build on earlier findings. We showed that even in the subacute stage after ABI (mean time since injury = 15wk), patients who were more self-efficacious had higher QOL and better social participation. In the chronic stage after brain injury, this positive association was already known.^{6,7,9}

Furthermore, increasing self-efficacy seemed to mitigate the negative influence of emotion-oriented coping on health-related QOL, suggesting that high self-efficacy has a protective effect. This stress-buffering effect of high self-efficacy is well documented in healthy people³³ and patients with cancer.³⁴ A similar protective effect of high self-efficacy was found in patients with alcohol dependence.³⁵ As self-efficacy increased, the negative influence of coping strategies characterized by unrealistic thinking, which was associated with higher alcohol use and dependence symptoms, diminished.³⁵ However, in patients with rheumatoid arthritis, the strength of the relation between coping

Fig 4 The mediating effect of self-efficacy (SEsx total score) on the relation between emotion-oriented coping (CISS-E) and LiSat-9 scores: final model showing standardized regression coefficients for direct paths. Abbreviations: ϵ , error variance; SEsx, Traumatic Brain Injury Self-efficacy Questionnaire. $^*P < .001$.

Table 4 Prediction models based on stepwise hierarchical regressions of the association between baseline clinical and demographic variables and QOL and social participation at 1-y follow-up

Variable	B	β	95% CI for B	P	R^2 (%)
EQ-5D index follow-up					43.5
Age	-0.0009	-.07	-0.003 to 0.001	.33	
Sex	-0.002	-.004	-0.054 to 0.050	.95	
Education medium	-0.035	-.09	-0.097 to 0.026	.26	
Education high	0.021	.05	-0.042 to 0.085	.61	
EQ-5D index baseline	0.60	.66	0.47 to 0.72	<.001	33.3
Δ SEsx	0.0028	.30	0.0016 to 0.0041	<.001	8.5
EQ VAS follow-up					51.5
Age	0.077	.06	-0.092 to 0.25	.37	
Sex	0.63	.02	-3.68 to 4.93	.77	
Education medium	-1.90	-.06	-6.87 to 3.06	.45	
Education high	-1.15	-.03	-6.55 to 4.24	.67	
EQ VAS baseline	0.53	.56	0.40 to 0.66	<.001	26.9
CISS-E baseline	-0.28	-.23	-0.45 to -0.10	.002	2.1
Δ SEsx	0.39	.48	0.29 to 0.49	<.001	21.1
LiSat-9 follow-up					58.0
Age	-0.0009	-.01	-0.009 to 0.007	.82	
Sex	0.27	.15	0.056 to 0.47	.01	
Education medium	-0.28	-.16	-0.52 to -0.036	.02	
Education high	-0.15	-.08	-0.41 to 0.099	.23	
LiSat-9 baseline	0.63	.55	0.47 to 0.79	<.001	40.7
SEsx baseline	0.015	.40	0.009 to 0.021	<.001	1.8
Δ SEsx	0.019	.44	0.013 to 0.024	<.001	14.6
Modified FAI follow-up					48.9
Age	-0.048	-.08	-0.12 to 0.028	.22	
Sex	2.16	.15	0.11 to 4.21	.04	
Education medium	1.64	.12	-0.60 to 3.87	.15	
Education high	3.63	.24	1.28 to 5.98	.003	
Modified FAI baseline	0.50	.49	0.36 to 0.63	<.001	26.5
CISS-T baseline	0.093	.14	0.011 to 0.18	.027	2.0
SEsx baseline	0.058	.19	0.017 to 0.099	.006	3.0

Abbreviations: B, unstandardized regression coefficient; β , standardized regression coefficient; CI, confidence interval; R^2 , coefficient of determination; SEsx, Traumatic Brain Injury Self-efficacy Questionnaire; Δ SEsx, Traumatic Brain Injury Self-efficacy Questionnaire score at follow-up – Traumatic Brain Injury Self-efficacy Questionnaire score at baseline.

and anxiety and depression did not vary in magnitude depending on the level of self-efficacy.³⁶

Patients using more emotion-oriented coping had lower general QOL (LiSat-9). Testing effect mediation showed that this was because these patients had lower self-efficacy. In patients with osteoarthritis, a slightly resembling pathway was described. Self-efficacy for dealing with pain and arthritis symptoms together with well-being mediated the relation between emotion-focused coping and health care use.³⁷

Increased use of avoidance coping in the subacute stage was associated with higher health status (EQ VAS) in case of low self-efficacy and with higher social participation. Our findings might seem to contradict previous studies showing a negative association between passive, avoidant coping and outcome.^{17,38,39} Yet, avoidance measured with the CISS refers to actively seeking social support and distraction, whereas in most other coping questionnaires avoidance is associated with a nonproductive, passive, internalizing attitude.⁴⁰

Our study offers important new insights with regard to the predictive quality of self-efficacy in ABI. We showed that patients who became more self-efficacious in managing their brain injury—related symptoms over the course of 1 year showed better QOL. Higher initial self-efficacy also influenced better long-term general QOL (LiSat-9). Furthermore, we found that patients with high initial emotion-oriented coping showed worse long-term health status (EQ VAS). This negative predictive influence of emotion-oriented coping on QOL is well known.^{17,41}

Clinical implications

Early monitoring of self-efficacy for managing brain injury—related symptoms might identify patients at risk of worse outcome. Furthermore, our findings suggest that promoting self-efficacy in the early stage after ABI might give rise to better long-term QOL and social participation. According to Bandura,² self-efficacy is not a trait but a generative capability in which mastery of skills is essential next to a strong belief in what can be achieved using these skills. Hence, skills training, referential comparison with others, verbal feedback, and learning control over stress and fatigue could be used to create strong domain-specific efficacy beliefs.² In ABI, cognitive-behavioral therapy, mindfulness-based training, or individualized self-management workbooks have been successful in increasing domain-specific self-efficacy.⁴²⁻⁴⁴

Study limitations

We did not investigate the influence of type of injury, injury severity, or lesion location. Our choice not to limit inclusion criteria for this study to a specific diagnosis was to increase generalizability and validity and recognizes that severity, localization, and type of brain injury do not seem to influence coping.^{15,45-47} Regarding self-efficacy, we assumed independence of injury characteristics. Our results cannot be extrapolated to the whole ABI population because we did not include people who required long-term residential care but we think our study sample is representative of the ABI population that is discharged home. Furthermore, our predictive model is a first exploration and needs confirmation in a second sample.

Conclusions

We showed in patients with ABI that increasing levels of self-efficacy for managing brain injury—specific symptoms over time

might give rise to better long-term psychosocial outcome and that high self-efficacy protected against the negative effect of emotion-oriented coping on QOL. For clinical practice, we suggest monitoring and promotion of self-efficacy in an early stage.

Supplier

a. Stata version 12.1; StataCorp, 4905 Lakeway Dr, College Station, TX 77845.

Keywords

Brain injuries; Coping; Quality of life; Rehabilitation; Self-efficacy; Social participation

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