

Life satisfaction post stroke

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Life satisfaction post stroke: The role of illness cognitions



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ABSTRACT

Objective: To describe illness cognitions two months and two years post stroke and to investigate changes in illness cognitions over time. We also examined the associations between illness cognitions and life satisfaction at two months and two years post stroke and investigated if changes in illness cognitions predicted life satisfaction two years post stroke, taking demographic and stroke-related factors and emotional symptoms into account.

Methods: Prospective cohort study in which 287 patients were assessed at two months and two years post stroke. The illness cognitions helplessness (maladaptive), acceptance (adaptive) and perceiving benefits (adaptive) were measured with the Illness Cognition Questionnaire. Life satisfaction was assessed with two life satisfaction questions. Correlational and regression analyses were performed.

Results: Patients experienced both maladaptive and adaptive illness cognitions two months and two years post stroke. Only acceptance increased significantly from two months to two years post stroke ($p \leq 0.01$). Helplessness, acceptance and perceiving benefits were significantly associated with life satisfaction at two months ($R^2 = 0.42$) and two years ($R^2 = 0.57$) post stroke. Furthermore, illness cognitions two months post stroke and changes in illness cognitions predicted life satisfaction two years post stroke ($R^2 = 0.57$).

Conclusion: Illness cognitions and changes in illness cognitions were independently associated with life satisfaction two years post stroke. It is therefore important during rehabilitation to focus on reducing maladaptive behavior and feelings to promote life satisfaction, and on promoting adaptive illness cognitions.

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Introduction

Stroke is one of the leading causes of disability in the Western world [1]. A stroke can lead to permanent physical, psychological, and psychosocial consequences, such as mobility problems [2], emotional problems like anxiety and depression [3], cognitive impairments [4], and decreased life satisfaction [5, 6]. Demographic factors, stroke characteristics and physical impairments are the most commonly investigated determinants of quality of life (QoL) post stroke [7]. These factors, however, do not completely explain why some patients with severe impairments adapt well, whereas other patients with minor impairments experience low levels of QoL [8].

It is assumed that the way patients think about and perceive their illness accounts for much of the individual differences in their QoL [9]. According to Leventhal's Common Sense Model, patients create mental representations of their illness when faced with a chronic disease [10, 11].

Through cognitive re-evaluation of uncontrollable illness experiences patients ascribe meaning to their illness and generate coping responses, which in turn affect outcome. These representations relate to thoughts about, for example, the causes of the illness, worries and fears, the ability to control the illness, and accepting the illness [12] and can be maladaptive as well as adaptive in terms of outcome [9] and some are typically more adaptive than others. These representations have been investigated using terms such as illness cognitions, illness perceptions, illness representations and appraisals. The role of illness cognitions has been recognized in the development, maintenance, and modification of psychological well-being in several chronic diseases, like rheumatoid arthritis and multiple sclerosis [9], cancer [13, 14], chronic fatigue syndrome [15], and spinal cord injury [16, submitted].

Limited research has been performed into illness cognitions of stroke patients [17–20]. Acceptance of the illness and appraisals of threat and benefit were associated with depression post stroke [17, 18]. Furthermore, female stroke patients associated their emotional state with the cause of pain [19], and maladaptive illness cognitions were associated with more severe symptoms of posttraumatic stress disorder [20]. However, associations between illness cognitions and life satisfaction, and changes in illness cognitions over time have to our knowledge never been investigated in the stroke population.

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Knowledge of associations between illness cognitions and life satisfaction in stroke patients and the susceptibility of illness cognitions to change over time is important. This knowledge may lead to the application of interventions to improve the life satisfaction of stroke patients by focusing on reducing illness cognitions which are negatively associated with life satisfaction, but also on promoting illness cognitions which are positively associated with life satisfaction. Hence, the first two aims of this study were to describe illness cognitions in stroke patients two months and two years post stroke and to investigate changes in illness cognitions over time. We expected feelings of helplessness to decrease over time and feelings of acceptance and benefits of the stroke to increase over time. The third aim was to examine the association between illness cognitions and life satisfaction at two months and two years post stroke. The fourth aim was to examine whether illness cognitions at two months are predictive of life satisfaction at two years and to examine associations between changes in illness cognitions with life satisfaction at two years post stroke.

Methods

Design

The current study is part of the longitudinal Restore4Stroke Cohort study in which stroke patients are followed for two years [21]. Six general hospitals in The Netherlands participated and stroke patients were recruited between March 2011 and March 2013. The medical ethics committees of all participating hospitals approved the Restore4Stroke Cohort study and informed consent was obtained from all included patients. The present study reports data from stroke onset, two months, and two years post stroke.

Subjects

Stroke patients were eligible for this study if they had a clinically confirmed diagnosis of stroke (ischemic or intracerebral hemorrhagic lesion) and had suffered their stroke within the last seven days. All patients had to be at least 18 years old.

Patients were excluded if they (1) had a serious other condition which was expected to interfere with the study outcomes; (2) were already dependent in activities of daily living (ADL) before their stroke, as defined by a score of 17 or lower on the Barthel Index (BI) [22]; (3) had insufficient command of the Dutch language to understand and complete the questionnaires (based on clinical judgment); or (4) were already suffering from cognitive decline before their stroke, as defined by a score of 1 or higher on the Heteroanamnesis List Cognition [23].

Procedure

Demographic and stroke-related factors were assessed at inclusion. After informed consent had been given, the stroke characteristics as determined by the neurologist of the concerning hospital at four days post stroke were extracted from the medical charts. Information on demographic factors was obtained from the patients. Two months post stroke, patients were assessed by a trained research assistant at home or at the institution where they were residing at that moment. This assessment included the illness cognitions, life satisfaction and emotional symptoms. In addition, ADL were assessed and a cognitive screening was conducted. Two years post stroke, the illness cognitions, life satisfaction and emotional symptoms were assessed by postal questionnaire.

Measures

Independent variable: illness cognitions

Illness cognitions were measured with the Illness Cognition Questionnaire (ICQ) [9]. This scale consists of 18 items which are scored on a 4-point scale ranging from 1 'not at all' to 4 'completely'. The ICQ

consists of three subscales, each representing an illness cognition: helplessness, acceptance, and perceived benefits. Each subscale has 6 items and a subscale scoring range of 6–24. Helplessness includes cognitions emphasizing the aversive meaning of the stroke (e.g. 'My illness frequently makes me feel helpless'); acceptance includes cognitions diminishing the aversive meaning of the stroke (e.g. 'I can accept my illness well'); and perceiving benefits includes cognitions giving a positive meaning to the stroke (e.g. My illness has made life more precious to me) [9]. The ICQ is a reliable instrument to assess illness cognitions in patients with several chronic diseases, such as rheumatoid arthritis and multiple sclerosis [9].

Control variables

The demographic factors gender, age, and level of education were obtained from the patient. For level of education we used the Dutch classification system by Verhage [24] ranging from 1 (did not finish primary school) to 7 (university).

Stroke-related factors were stroke severity, ADL, and cognitive functioning. Stroke severity was assessed with the National Institutes of Health Stroke Scale (NIHSS) (range 0–42) and was administered 4 days post stroke [25]. The NIHSS includes items on level of consciousness, motor functioning, and communication and is a valid measure. ADL was assessed using the BI (range 0–20) two months post stroke, which includes items such as personal care and mobility [22]. The BI is a validated measure and commonly used in stroke patients [22]. Cognitive functioning was assessed using the Montreal Cognitive Assessment (MoCA) (range 0–30) two months post stroke [26]. The MoCA is a brief cognitive screening tool suitable for use in stroke patients [26].

Emotional symptoms, in terms of depressive and anxiety symptoms, was assessed using the total score of the Hospital Anxiety and Depression Scale (HADS) (range 0–42) [27]. This measure is valid and commonly used in stroke patients [27, 28].

Outcome variable

Life satisfaction was operationalized as satisfaction with overall quality of life and was measured with two questions (2LS) [29]. The first question ('What is your quality of life at the moment?') is scored on a 6-point scale, ranging from 1 (very unsatisfying) to 6 (very satisfying). The second question ('If you compare your life now with your life before the stroke, is your quality of life at the moment worse, equal, or better than before the stroke?') is scored on a 7-point scale, ranging from 1 (much worse) to 7 (much better). The sum of these two questions (range 2–13) is a valid and responsive measure of life satisfaction. [29, 30].

Statistical analyses

Descriptive statistics were used to describe patients' characteristics and item scores on the ICQ two months and two years post stroke.

Wilcoxon Signed Rank tests were used to determine changes in illness cognitions between two months and two years post stroke. Spearman correlation coefficients were calculated to assess cross-sectional associations between life satisfaction and illness cognitions. We considered correlation coefficients to be weak if below 0.3, moderate between 0.3 and 0.5, and strong above 0.5 [31].

Two hierarchical linear regression analyses were performed to investigate the cross-sectional relationships between illness cognitions and life satisfaction, controlling for demographic factors, stroke-related factors, and emotional symptoms. Step one consisted of entering the control variables. The three illness cognitions were added in the second step.

A third hierarchical linear regression analysis was performed to investigate longitudinal associations between illness cognitions and life satisfaction at two years post stroke. In step one the same control variables were entered. But this time also life satisfaction at two months. The three illness cognitions at two months post stroke were added in

the second step. Finally, in a third step the change scores of the illness cognitions from two months to two years post stroke were added to the regression model.

Level of education was dichotomized into low (up to completed secondary education) and high (completed University of Professional Education or higher). Dependency in ADL was dichotomized into 'dependent' (BI < 18) and 'independent' (BI ≥ 18). Cognitive functioning was dichotomized into 'impaired cognitive functioning' (MoCA < 26) and 'normal cognitive functioning' (MoCA ≥ 26). The critical value of α was set at 0.05. All statistical analyses were performed using IBM SPSS version 22.0.

Results

Subjects

In total, 395 patients were enrolled in the Restore4Stroke Cohort study. Datasets of 287 patients were used in the analyses. Datasets of 108 patients could not be used: 71 did not complete the study and 37 had incomplete data. The 287 included patients had a lower age, less severe stroke, higher BI scores and were discharged home more often in comparison with the 108 patients not included in the analyses.

Patient characteristics are presented in Table 1. Mean age at the onset of stroke was 65.5 years, and 65.5% of the patients were male. Four days post stroke, the mean BI score was 17.3, and 74.6% of the patients had been discharged home from the hospital.

Illness cognitions experienced

Table 2 presents the illness cognitions scores. There were no significant changes in the helplessness and perceived benefits scores between two months and two years post stroke. The acceptance score increased significantly between two months and two years post stroke ($p \leq 0.01$). Correlations between illness cognitions scores two months and two years post stroke were moderate for acceptance and perceived benefits and strong for helplessness (Table 2).

Table 3 presents the percentages of patients scoring the two highest answer categories 'to a large extent' and 'completely' on each item of the ICQ. The largest changes were seen on the helplessness subscale (decreases) for the statements 'because of my illness, I miss the things I like to do most' and 'my illness prevents me from doing what I would really like to do', on the acceptance subscale (increases) for the statements 'I have learned to live with my illness' and 'I have learned to accept the limitations imposed by my illness', and on the perceiving benefits subscale for the statements 'my illness has helped me realize what's important in life' (decrease) and 'dealing with my illness has made me a stronger person' (increase). Appendix 1 presents the percentages of patients scoring each of the four answering categories, for each item of the ICQ two months and two years post stroke.

Table 1

Patients' characteristics (N = 287).

Demographic factors	
Male gender, %	65.5
Age in years; mean (SD)	65.5 (12.3)
Marital status, living together, %	70.4
High education level*, %	26.5
Stroke-related factors	
Ischemic stroke, %	92.3
Left hemisphere, % (N = 284)	39.1
Severity of stroke 4 d post stroke (NIHSS), mean (SD)	2.4 (2.9)
No stroke symptoms (NIHSS 0), %	25.4
Minor stroke symptoms (NIHSS 1–4), %	58.9
Moderate stroke symptoms (NIHSS 5–12), %	13.9
Moderate to severe stroke symptoms (NIHSS ≥ 13), %	1.8
ADL 4 d post stroke (BI), mean (SD)	17.3 (4.4)
ADL 2 m post stroke (BI), mean (SD)	19.4 (1.9)
ADL 2 m dependent (BI < 18), %	7.3
Cognitive functioning 2 m post stroke (MoCA), mean (SD)	23.9 (3.7)
Cognitively impaired (MoCA < 26), %	65.5
Emotional symptoms 2 m post stroke (HADS), mean (SD)	9.4 (7.2)
Destination after discharge from hospital, %	
Home	74.6
Rehabilitation center	13.9
Nursing home	11.5

Abbreviations: NIHSS, National Institutes of Health Stroke Scale; ADL, Activities of Daily Living; BI, Barthel Index; MoCA, Montreal Cognitive Assessment; HADS, Hospital Anxiety and Depression Scale; 4 d, four days; 2 m, two months; 2 y, two years.

* Completed University of Professional Education or higher.

Table 2

Illness cognition scores (mean, SD) at 2 months and 2 years post stroke and Spearman correlations for illness cognitions scores between 2 months and 2 years post stroke (N = 287).

	2 m post stroke	2 y post stroke	z-value	Correlation between 2 m and 2 y post stroke
Helplessness	11.7 (4.8)	11.3 (5.0)	−1.24	0.53*
Acceptance	16.4 (4.8)	17.4 (4.9)	−3.47*	0.44*
Perceived benefits	15.1 (4.8)	15.1 (5.0)	−0.05	0.47*

z-Value: difference between mean scores at 2 months and 2 years on the different subscales of the Illness Cognition Questionnaire.

2 m: 2 months; 2 y: 2 years.

* $p < 0.01$.

Life satisfaction

Two months post stroke, patients had a mean score of 7.3 (SD 2.1) on the 2LS. Two years post stroke, their mean score was 7.7 (SD 2.3), which was a significant change ($p < 0.01$).

Correlational analyses

Helplessness and acceptance showed strong correlations at both time points (Table 4). Helplessness and perceiving benefits were not correlated two months post stroke, but showed moderate correlations two years post stroke. Acceptance and perceiving benefits were moderately and strongly correlated at two months and two years post stroke, respectively.

More helplessness was strongly related to less life satisfaction and more acceptance to greater life satisfaction at both time points (Table 4). More perceiving benefits were weakly and moderately related to greater life satisfaction two months and two years post stroke, respectively.

Regression analyses

The cross-sectional regression analysis at two months post stroke showed better emotional symptoms, less helplessness, and more acceptance to be independently associated with greater life satisfaction (Table 5). None of the demographic and stroke-related factors were associated with life satisfaction in the final model. The presence of emotional problems was the strongest predictor of life satisfaction at two months post stroke and acceptance after that. R-square of the final model was 0.42. The illness cognitions explained 7% of the variance of life satisfaction.

The second cross-sectional regression analysis showed that at two years post stroke, better emotional symptoms, less helplessness, more acceptance, and more perceived benefits were independently associated with greater life satisfaction. None of the demographic and stroke-related factors were associated with life satisfaction at two years in the final model. Helplessness at two years was the strongest predictor of life satisfaction two years

Table 3

Percentages of patients scoring 'to a large extent' and 'completely' for each item of the Illness Cognition Questionnaire two months and two years post stroke (N = 287).

	2 m	2 y
Helplessness		
Because of my illness, I miss the things I like to do most	40.1	30.3
My illness controls my life	25.1	24.4
My illness makes me feel useless at times	22.0	20.9
My illness prevents me from doing what I would really like to do	40.5	32.6
My illness limits me in everything that is important to me	25.4	24.1
My illness frequently makes me feel helpless	13.6	17.2
Acceptance		
I can handle the problems related to my illness	70.7	69.6
I have learned to live with my illness	59.6	71.4
I have learned to accept the limitations imposed by my illness	47.7	58.9
I can accept my illness well	53.0	63.2
I think I can handle the problems related to my illness, even if the illness gets worse	45.6	48.2
I can cope effectively with my illness	64.1	67.9
Perceived benefits		
Dealing with my illness has made me a stronger person	41.3	44.6
I have learned a great deal from my illness	44.2	46.7
My illness has made life more precious to me	57.1	53.8
Looking back, I can see that my illness has also brought about some positive changes in my life	32.4	31.1
My illness has helped me realize what's important in life	61.5	57.3
My illness has taught me to enjoy the moment more	64.8	63.8

2 m: 2 months post stroke; 2 y: 2 years post stroke.

Table 4
Cross-sectional Spearman correlation matrix between life satisfaction and illness cognitions two months and two years post stroke.

		Life satisfaction	Helplessness	Acceptance
Helplessness	2 m	−0.51*		
	2 y	−0.69*		
Acceptance	2 m	0.55*	−0.57*	
	2 y	0.60*	−0.63*	
Perceived benefits	2 m	0.22*	−0.05	0.40*
	2 y	0.46*	−0.33*	0.58*

2 m: 2 months post stroke; 2 y: 2 years post stroke.

* $p < 0.01$.

post stroke. R-square of the final model was 0.57. The illness cognitions explained 11% of the variance of life satisfaction.

The longitudinal regression analysis showed that greater life satisfaction at two years post stroke was predicted by greater life satisfaction, acceptance and perceiving benefits and less helplessness at two months post stroke. Furthermore a decrease in helplessness and increases in acceptance and perceiving benefits between two months and two years post stroke were associated with greater life satisfaction two years post stroke. R-square of the final model was 0.57. The change in illness cognitions explained 33% of the variance of life satisfaction two years post stroke.

Discussion

Feelings of helplessness, acceptance and perceiving benefits of the stroke were present in our stroke patients at two months as well as at two years post stroke. However, the patients differed in the extent to which they had these cognitions. There was an increase in the acceptance of the stroke over time between two months and two years post stroke, but there were no changes in feelings of helplessness or perceiving benefits. All three illness cognitions were associated with life satisfaction and they explained 7–13% of the variance of life satisfaction two months and two years post stroke, respectively. Furthermore, feelings of helplessness, acceptance and perceiving benefits two months post stroke and a change in these illness cognitions between two

months and two years post stroke predicted life satisfaction two years post stroke.

Association between illness cognitions and life satisfaction

Evers et al. [9] reported that illness cognitions might play similar roles in determining long-term outcome in different diagnostic groups of patients with chronic diseases. Their study in patients with rheumatoid arthritis and multiple sclerosis showed similar relationships between maladaptive cognitions and negative outcome, such as worse psychological health status, and between adaptive cognitions and positive outcome, such as better psychological health status [9]. The uniformity of these relationships across different diagnostics groups supports the idea of the generic character of illness cognitions [9, 13, 14].

The associations between illness cognitions and life satisfaction were stronger in the chronic phase than in the subacute phase post stroke. In the acute and subacute phases post stroke, most patients are very actively engaged in rehabilitation programs to regain physical functioning and reduce the consequences of the stroke. According to Leventhal's Common Sense Model, illness representations generate coping responses [10]. A frequently used classification system divides coping into problem-focused (e.g. actively addressing the problem) and emotion-focused (e.g. accepting situations more easily) coping styles [7]. Studies have found that problem-focused and emotion-focused coping also become more closely related to health-related quality of life (HRQoL) as more time elapses after a stroke, as the relationship with HRQoL was stronger at one year than at two months post stroke [32]. This is in accordance with what was found in the present study. Physical factors may play a more prominent role in life satisfaction in the acute and subacute phases post stroke, whereas psychological factors such as illness cognitions may become more important in the chronic phase [7].

Helplessness, acceptance, and perceiving benefits are illness cognitions which are related to emotion-focused coping styles. Each type of coping is considered to be adaptive under different circumstances [33]. Problem-focused coping is more adaptive to psychological well-

Table 5
Hierarchical linear regression analyses of the effects of illness cognitions on life satisfaction ($n = 287$).

	Model 1: cross-sectional analysis 2 m post stroke		Model 2: cross-sectional analysis 2 y post stroke		Model 3: longitudinal analysis		
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 3
<i>Demographic factors^a</i>							
Gender (female)	0.03 ^e	0.03	0.07	0.07	0.04	0.03	0.06
Age	0.05	0.06	−0.07	−0.02	−0.12*	−0.10	−0.01
Education (high)	−0.07	−0.05	−0.06	−0.01	−0.01	0.00	0.02
<i>Stroke-related factors^b</i>							
Severity of stroke	−0.14*	−0.08	−0.08	−0.02	−0.08	−0.05	0.01
ADL (independent)	0.06	−0.01	0.07	0.04	0.10	0.05	0.05
Cognitive functioning (normal)	0.09	0.06	−0.00	−0.01	0.03	0.02	−0.00
Emotional symptoms ^c	−0.55**	−0.34**	−0.65**	−0.25**	−0.17*	−0.09	0.08
Life satisfaction ^d					0.28**	0.22*	0.19..
<i>Illness cognitions</i>							
Helplessness ^c		−0.18*		−0.35**		−0.23*	−0.37**
Acceptance ^c		0.21*		0.14*		−0.03	0.22*
Perceived benefits ^c		0.05		0.15*		0.09	0.16*
Helplessness 2 y–2 m							−0.39**
Acceptance 2 y–2 m							0.28**
Perceived benefits 2 y–2 m							0.19*
Explained variance	0.35	0.42	0.46	0.57	0.21	0.24	0.57

2 m: 2 months; 2 y: 2 years.

^a Factors were measured at inclusion.

^b Severity of stroke was assessed at baseline, ADL and cognitive functioning 2 months post stroke.

^c Emotional symptoms and the illness cognitions in models 1 and 3 were assessed at two months post stroke. In model 2 emotional symptoms and the illness cognitions were assessed at two years post stroke.

^d Life satisfaction was assessed at two months post stroke, only used in model 3.

^e β , standardized regression coefficient.

* $p < 0.05$.

** $p < 0.001$.

being when the stressor is seen as modifiable, and emotion-focused coping is more adaptive when the stressor is perceived as un-modifiable [34]. This could explain why the illness cognitions are more important in the chronic phase than in the subacute phase post stroke, as the consequences of the stroke can be considered largely un-modifiable two years post stroke.

Change in illness cognitions

We found an increase in the acceptance of the stroke between two months and two years post stroke. Feelings of helplessness and perceiving benefits did not change between the subacute phase and the chronic phase, although it seems that there was a decrease in feelings of helplessness regarding some of the items (Table 3). This decrease seems most prevalent for items asking about feelings of helplessness regarding activities, rather than about feelings of helplessness in general, for example 'Because of my illness, I miss the things I like to do most' as opposed to 'My illness makes me feel useless at times'. There was no increase in the items of perceiving benefits, which we had hypothesized. The percentages of patients scoring the two highest answering categories even decreased for four out of six items on this scale. Items that increased related more to perceiving benefits as a person, such as 'dealing with my illness has made me a stronger person', whereas items that decreased related more to perceiving benefits of the stroke in life, such as 'my illness has helped me realize what's important in life'.

This is the first study in stroke patients to investigate changes in illness cognitions over time. There has been some research into this among patients with other chronic diseases, but the results have been inconclusive. A study of patients with SCI found that feelings of helplessness, acceptance, and perceiving benefits were stable from the start of rehabilitation to six months after discharge from rehabilitation [35]. However, another study of patients with SCI found that they experienced less helplessness, more acceptance, and more benefits at discharge than at the start of inpatient rehabilitation [20, submitted]. A study among hemodialysis patients examined changes in illness cognitions over a six-year follow-up period and found changes in several illness cognitions [36]. At the end of follow-up, these patients experienced a less intense emotional response and considered that their illness had less serious consequences for their life. Unfortunately, the illness cognitions assessed in this study are not directly comparable with the illness cognitions measured in the present study.

Results of the longitudinal analysis suggest that changing illness cognitions in a more adaptive direction may increase life satisfaction post stroke. Modifying illness cognitions is a significant part of what a rehabilitation team (especially psychologist) tries to achieve during rehabilitation. However, no studies have investigated whether illness cognitions of stroke patients can be changed by means of therapy. In patients with inflammatory rheumatic diseases, some positive changes in maladaptive illness cognitions were observed after multidisciplinary rehabilitation treatment [37], and in patients with rheumatoid arthritis after cognitive behavioral therapy [38], although in both studies the interventions were not focused on changing illness cognitions. In conclusion, it seems possible to change illness cognitions through interventions in patients with other chronic diseases, although it remains to be investigated if this is also possible in stroke patients.

Strengths and limitations

There are several strengths and limitations with regard to this study. One of the strengths is that it included a large group of stroke patients. Another is that this is the first study to investigate the association between illness cognitions and life satisfaction in stroke patients. Furthermore, we investigated various factors, i.e. demographic factors, stroke characteristics, emotional symptoms, and illness cognitions in a multivariate analysis to assess their association with life satisfaction, and estimated the amount of variance explained by illness cognitions after

taking these other factors into account. Finally, we investigated the influence of illness cognitions on life satisfaction in the subacute as well as the chronic phase post stroke.

However, our study results must be interpreted while taking account of the following limitations. First, patients with an ischemic stroke were overrepresented in our study population. Ninety-four percent of our patients had suffered an ischemic stroke, in comparison to 75% in the total stroke population in the Netherlands [39]. A possible explanation for this is that hemorrhagic strokes are generally more severe [40], which may have resulted in patients having been excluded because of greater difficulty understanding the instructions for the study and not being able to provide informed consent within one week after the event. This overrepresentation of patients with an ischemic stroke may have led to fewer severe stroke patients in the study, which could have led to a bias regarding life satisfaction and the use of illness cognitions. Furthermore, the included patients in the present study were of lower age, had a less severe stroke, had a higher score on ADL and were discharged directly home from hospital more often than the patients that were not included in the analyses, which could have led to a bias regarding life satisfaction as well. Another limitation was that illness cognitions were assessed with the Illness Cognition Questionnaire, which has not yet been validated for stroke patients. However, mean scores in our study are similar to those in patients with other chronic diseases for which the questionnaire has been validated, and it is assumed that illness cognitions play a similar role in determining long-term in different diagnostic groups [9]. Finally, life satisfaction was assessed with the 2LS, a measure which assesses life satisfaction with two items only. However, the psychometric properties of the 2LS were satisfactory [29].

Conclusion

In the subacute phase as well as in the chronic phase post stroke, illness cognitions play a pivotal role in determining life satisfaction. It is therefore important during rehabilitation to focus not only on reducing maladaptive behavior and feelings in order to promote life satisfaction, but also on promoting illness cognitions which have a positive influence on life satisfaction.

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