

A validation study of the Caregiver Mastery Scale for partners of patients with acquired brain injury

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A validation study of the Caregiver Mastery Scale for partners of patients with acquired brain injury

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Abstract

Objective: To validate the Caregiver Mastery Scale for partners of patients with acquired brain injury.

Design: The score distributions, internal consistency and convergent validity of the Caregiver Mastery Scale were determined.

Subjects: A total of 92 partners (53% male, age 62years) of patients with acquired brain injury (91% stroke) discharged from inpatient rehabilitation (time since injury 32 months).

Main measures: *Outcome measure:* Caregiver Mastery Scale. *Reference measures:* Caregiver Strain Index, Hospital Anxiety and Depression Scale and CarerQoL.

Results: The Caregiver Mastery Scale has a normal distribution, with no floor or ceiling effects. Its internal consistency is acceptable (Cronbach's alpha: 0.75). The convergent validity analyses confirmed our hypothesis that higher scores on the Caregiver Mastery Scale correlate with less burden, lower levels of anxiety and depression and greater well-being. Furthermore, partners scoring high on the Caregiver Mastery Scale mostly scored below the clinical cut-off scores on the Caregiver Strain Index and the anxiety and depression subscales of the Hospital Anxiety and Depression Scale, whereas partners scoring low on the Caregiver Mastery Scale were more likely to score above the cut-off points.

Conclusion: The Caregiver Mastery Scale is a valid instrument to assess the caregiver mastery of partners of patients with acquired brain injury.

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Caregiving, mastery, partners, acquired brain injury, validity

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Introduction

Nowadays, most people with acquired brain injury are discharged home where informal caregivers take care of them. The role of caregiving is often fulfilled by the partner, who is the most close to the patient, and may lead to negative consequences such as high levels of burden,¹⁻⁵ anxiety^{3,4} and depressive symptoms^{1-4,6} and poor well-being.^{1,4}

Several psychological resources and coping responses can protect against the negative consequences of stressors such as caregiving.⁷ Mastery is considered to be one of these psychological resources and is defined as “the belief that one is able to influence or control life events and that one is competent or effective in managing those events in order to produce desired outcomes” (see ref. 8, p. 163).

In 1978, Pearlin and Schooler⁷ constructed a 7-item scale to assess mastery. Elaborating on this global mastery scale, Christensen et al.⁸ created four specific mastery scales for women in their roles as mother, wife, employee and caregiver for their own parent. They found mastery in the caregiving role to be positively related to well-being and negatively correlated with depressive symptoms.⁸ Little is known about the psychometric properties of this Caregiver Mastery Scale. The internal consistency and responsiveness have been investigated in a group of women taking care of their parent⁸ and caregivers of glioma patients,⁹ respectively. Whether the Caregiver Mastery Scale can be used to measure mastery in caregiving for other conditions, such as patients with acquired brain injury, is unknown. The aim of this study was therefore to determine the validity of the Caregiver Mastery Scale for partners of patients with acquired brain injury.

The objectives of this study were to (1) investigate the score distributions of the Caregiver Mastery Scale, (2) examine the internal consistency of the

Caregiver Mastery Scale and (3) test the convergent validity of the Caregiver Mastery Scale for partners of patients with acquired brain injury. The corresponding hypotheses were that higher scores on the Caregiver Mastery Scale would be related to (1) less burden,⁴ (2) less anxiety,^{4,10} (3) less depression^{4,8,10,11} and (4) greater well-being.^{4,8}

Methods

Participants

Participants in this cross-sectional study were the partners of patients with acquired brain injury discharged from inpatient rehabilitation at De Hoogstraat Rehabilitation (Utrecht, the Netherlands). Partners were invited when (1) the patient had a non-progressive, non-neurodegenerative acquired brain injury; (2) the patient was admitted to the rehabilitation center between June 2013 and June 2015 and (3) the partner was at least 18 years old. Exclusion criteria were (1) the absence of Internet access and (2) insufficient command of the Dutch language.

Procedure

Letters signed by the attending physician were sent in April 2016 to inform the partners about the study and ask them to participate. Participants were invited to fill in on-line questionnaires, and the letter contained the URL and login credentials required to gain access. Reminder letters were sent after one month when partners had not responded to the first invitation. The participants consented to the use of their data for this study by logging in to the website. The medical ethics committee of The Hoogstraat approved the study and Good Clinical Practice Guidelines¹² were followed.

Measures

The demographic characteristics of the partner (e.g. age, gender, country of birth, educational level and employment), as well as the patient's diagnosis and the date of diagnosis, were self-reported by the partners.

The *Caregiver Mastery Scale*⁸ is a 7-item self-report scale, indicating the extent to which respondents agree (5) or disagree (1) with each item. Three items with negative statements are reverse-scored. Total scores can range from 7 to 35, with higher scores reflecting greater caregiver mastery. The Dutch version used in this study was obtained from the researchers who investigated mastery among caregivers of patients with high-grade glioma.⁹ The English and Dutch versions can be found in the Appendix.

The following measures were used to assess the convergent validity:

The *Caregiver Strain Index*^{13,14} consists of 13 items which can be scored as "yes" or "no." The total score ranges from 0 to 13, with higher scores reflecting a higher caregiver burden. A score of 7 or higher is considered to indicate a substantial burden. The Caregiver Strain Index is the most commonly used scale to assess burden among caregivers of stroke patients¹⁵ and is recommended in the Dutch stroke care guidelines.¹⁶

The *CarerQoL*^{17,18} instrument determines the care-related quality of life of informal caregivers. It consists of the CarerQoL-7D and the CarerQoL-VAS. The CarerQoL-7D uses 7 items to measure the subjective burden in various dimensions of the caregiving situation. Low scores indicate a high burden. The CarerQoL-VAS assesses the caregivers' well-being, with higher scores indicating greater well-being.

The *Hospital Anxiety and Depression Scale*¹⁹⁻²¹ consists of a 7-item anxiety and a 7-item depression subscale. Subscale total scores above 7 indicate an anxiety disorder or depression, respectively.

Statistical analyses

Data were analyzed using IBM SPSS Statistics version 22 for Windows. The score distribution of the Caregiver Mastery Scale was examined. Skewness was considered to be present if the skewness value was below -1.0 or above 1.0 . A kurtosis value between -1.0 and 1.0 was considered acceptable. Floor and ceiling effects were considered to be present if at least 15% of the participants achieved the worst or best score, respectively.²²

To determine internal consistency, Cronbach's alpha and item-total correlation were calculated. Internal consistency was considered acceptable if Cronbach's alpha was between 0.70 and 0.90.²³ A corrected item-total correlation value below 0.3 indicates that the corresponding item does not correlate very well with the scale overall and may be dropped.²³

The convergent validity of the Caregiver Mastery Scale was examined by investigating the correlations between the Caregiver Mastery Scale and the other measures. Since the Caregiver Mastery Scale is an ordinal scale, the Spearman rank-order correlation coefficient was used. Convergent validity was considered to be good if the correlation coefficient was greater than 0.6, moderate if the coefficient was between 0.3 and 0.6, and poor if the coefficient was below 0.3.¹⁵ Moderate correlations were expected, since the instruments measure concepts that are related, but not identical, to caregiver mastery. If at least 3 out of 4 hypotheses were confirmed, the Caregiver Mastery Scale was considered to have convergent validity.²²

Elaborating on the convergent validity, we investigated the relationship between Caregiver Mastery Scale scores and the burden, anxiety and depression outcomes with respect to their clinical cut-off scores. Two subgroups were created, consisting of the 25% of partners with lowest scores and the 25% with the highest scores on the Caregiver Mastery Scale. For both groups, the percentage of respondents scoring below and above the clinical cut-off scores of the Caregiver Strain Index and the anxiety and depression subscales of the Hospital Anxiety and Depression Scale were determined.

Table 1. Acquired brain injury characteristics of the patients and demographics of their partners ($n=92$).

Patient characteristics	
Diagnosis of patient, n (%)	
Ischemic stroke	62 (67.4)
Hemorrhagic stroke	22 (23.9)
Traumatic brain injury	4 (4.3)
Other	4 (4.3)
Time since diagnosis in months, median (IQR)	32 (21)
Partner characteristics	
Age (years), mean (SD)	62.4 (10.2)
Gender, n (%)	
Male	49 (53.3)
Female	43 (46.7)
Country of birth, n (%)	
The Netherlands	88 (95.7)
Other	4 (4.3)
Educational level, n (%)	
High	37 (40.2)
Medium	20 (21.7)
Low	35 (38.0)
Employed, n (%)	
Full-time (≥ 32 hours per week)	25 (27.2)
Part-time (< 32 hours per week)	22 (23.9)
Unemployed	45 (48.9)

n , number; IQR, interquartile range; SD, standard deviation.

Results

A total of 255 partners were invited to participate, 95 of whom (37%) logged in to the on-line questionnaire. Three persons only answered a few demographic questions but quit before filling in the Caregiver Mastery Scale and were therefore excluded from the analyses. Hence, the study sample consisted of 92 partners. The age of the respondents and the patients' diagnosis in our study sample are similar to those of the invited population. Men were more likely to respond: 49 out of 92 (53%) of the study sample were male, compared with 111 out of 255 (44%) in the invited population.

Table 1 presents the acquired brain injury characteristics of the patients and the demographic characteristics of their partners.

Table 2. Descriptive statistics of the Caregiver Mastery Scale ($n=92$).

	Caregiver Mastery Scale (range: 7–35)
Minimum	13
Maximum	34
Mean (SD)	23.63 (4.29)
Median (IQR)	24 (5)
Skewness (SE)	-0.45 (0.3)
Kurtosis (SE)	0.33 (0.5)

SD, standard deviation; IQR, interquartile range; SE, standard error.

Score distributions

Table 2 presents the descriptive statistics of the Caregiver Mastery Scale for 92 partners of patients with acquired brain injury. No floor or ceiling effects were found and the skewness and kurtosis values showed a normal distribution of the Caregiver Mastery Scale.

Internal consistency

The Caregiver Mastery Scale showed acceptable internal consistency, with a Cronbach's alpha value of 0.75. The item-total correlations are presented in Table 3. Item 5 showed an unacceptable item-total correlation. Removing this item from the scale, however, would only slightly improve the internal consistency.

Convergent validity

The results of the convergent validity analyses are shown in Table 4. Higher scores on the Caregiver Mastery Scale correlate with less burden, lower levels of anxiety and depression and greater well-being. All tested relations showed a moderate correlation.

The correlations of the Caregiver Mastery Scale with the CarerQoL-7D and the subscales of the Hospital Anxiety and Depression Scale were determined for a sample of 90 partners, because two respondents had missing data on these measures. The correlation of the Caregiver Mastery Scale

Table 3. Item-total correlations of the Dutch version of the Caregiver Mastery Scale ($n=92$).

		Corrected item-total correlation	Cronbach's alpha if item deleted
Item 1	You are usually certain about what to do in caring for your partner	0.42	0.73
Item 2	No matter what you do as a caregiver, it never seems to be enough	0.45	0.73
Item 3	In general, you are able to handle most problems in the care of your partner	0.57	0.70
Item 4	You are not doing as well as you would like as a caregiver	0.42	0.73
Item 5	You feel that you have a great deal of influence over the things that happen in caregiving	0.27	0.76
Item 6	You believe you are mastering most of the challenges in caregiving	0.70	0.67
Item 7	You have lost some control of your life since your partner's illness	0.47	0.72

Table 4. Correlations between the Caregiver Mastery Scale and the other measures.

	Burden		Anxiety	Depression	Well-being
	CSI ($n=92$)	CarerQoL-7D ^a ($n=90$)	HADS-A ($n=90$)	HADS-D ($n=90$)	CarerQoL-VAS ($n=68$)
Caregiver Mastery Scale	-0.58**	0.46**	-0.45**	-0.55**	0.57**

CSI, Caregiver Strain Index; CarerQoL-7D, care-related quality of life—seven dimensions of burden; HADS-A, Hospital Anxiety and Depression Scale—Anxiety subscale; HADS-D, Hospital Anxiety and Depression Scale—Depression subscale; CarerQoL-VAS, care-related quality of life—visual analog scale for well-being.

Spearman's rank correlation coefficients.

^aLow scores indicate a high burden and reflect a poor care-related quality of life.

** $P < 0.01$ (two-tailed).

Table 5. Subgroup analyses of the Caregiver Mastery Scale relative to clinical cut-off scores.

	Burden		Anxiety		Depression	
	Below CSI < 7	Above CSI ≥ 7	Below HADS-A ≤ 7	Above HADS-A > 7	Below HADS-D ≤ 7	Above HADS-D > 7
25% lowest CMS scores	13.0%	87.0%	56.5%	43.5%	47.8%	52.2%
25% highest CMS scores	86.4%	13.6%	86.4%	13.6%	95.5%	4.5%

CMS, Caregiver Mastery Scale; CSI, Caregiver Strain Index; HADS-A, Hospital Anxiety and Depression Scale—Anxiety subscale; HADS-D, Hospital Anxiety and Depression Scale—Depression subscale.

with the CarerQoL-VAS was tested for 68 respondents, due to missing data in 24 cases.

The percentages of respondents scoring below and above the clinical cut-off scores for burden,

anxiety and depression are displayed in Table 5. Most partners scoring high on the Caregiver Mastery Scale scored below the clinical cut-off scores on the Caregiver Strain Index and the

anxiety and depression subscales of the Hospital Anxiety and Depression Scale. Partners scoring low on the Caregiver Mastery Scale were more likely to score above the cut-off points.

Discussion

The Caregiver Mastery Scale proved to be a valid instrument for partners of patients with acquired brain injury. In our study sample, the Caregiver Mastery Scale had a normal distribution, with no floor or ceiling effects. This means that the instrument can identify persons with extremely low or extremely high caregiver mastery. Our findings for partners of patients with acquired brain injury are in accordance with those in the study by Christensen et al.,⁸ who reported a similar range, mean and standard deviation among women caring for their impaired parent.

The internal consistency of the Caregiver Mastery Scale is acceptable. The Cronbach's alpha found in this study is comparable to what Christensen et al.⁸ found (0.75 vs. 0.68). In spite of the acceptable internal consistency, item 5 does not fit the scale very well. Careful analysis of this item has led to the conclusion that there may have been an incorrect translation from English to Dutch. The Dutch statement seems to concern all the care for the patient and could be interpreted to include care provided by health professionals and not merely informal caregiving. We suggest not to remove the item from the scale, as it provides useful information to indicate where the problems are experienced and enables support for the caregiver to be more targeted. Furthermore, deletion of the item hardly increases the internal consistency. Consequently, we recommend adjusting the Dutch item to make it more in accordance with the original English item. The suggested adjusted version of item 5 can be found in the Appendix.

All hypotheses regarding the correlations between the Caregiver Mastery Scale and the other concepts were confirmed, proving convergent validity. Higher scores on the Caregiver Mastery Scale are related with less burden, less anxiety, less depression and greater well-being. As expected, the relations we tested showed a moderate correlation, since the concepts are related, but not identical, to mastery. As

shown in Table 5, most partners scoring high on the Caregiver Mastery Scale scored below the clinical cut-off scores for burden, anxiety and depression, whereas the partners scoring low on the Caregiver Mastery Scale were more likely to score above the clinical cut-off scores. These findings support the clinical relevance of measuring caregiver mastery.

Our study design did not allow having missing items within a scale, as the measurements were conducted via a web-based application. However, two respondents quit before filling in all the pages, resulting in entire instruments being missed. Also, the visual analog scale (CarerQoL-VAS) was not visible for all respondents due to unforeseen technical issues, resulting in missing data. The missing data resulted in smaller but still acceptable sample sizes for the convergent validity analyses. It did not affect the analyses for score distribution and internal consistency of the Caregiver Mastery Scale.

The results of this study are limited to the partners who chose to participate and might not be applicable for the ones who did not respond. We do not know whether they score differently on caregiver mastery. The patients' diagnosis and age of the partners in the study sample are, however, comparable with the invited population, but fewer women responded.

Furthermore, we excluded partners without Internet access, as the questionnaires were delivered on-line. The results should, therefore, be interpreted with caution for partners without Internet access, who are most likely older of age, lower educated and woman.²⁴

The sample in this study was a large group of partners of patients with acquired brain injury who had been discharged from inpatient rehabilitation. Our results demonstrate that the Caregiver Mastery Scale is a valid instrument for this population. The generalizability of these findings to all caregivers may be limited. Results may differ for partners of patients with acquired brain injury who are not admitted to inpatient rehabilitation, for informal caregivers who are not the partner of the care receiver and for informal caregivers of other categories of patients. The validity of the Caregiver Mastery Scale for other informal caregivers, therefore, requires further research.

Negative caregiving consequences, such as burden and emotional problems, have been widely investigated. Positive aspects of caregiving have received less attention, although they are important since they can buffer the negative consequences.²⁵ Caregiving mastery is one of these positive aspects which may protect against the negative consequences of caregiving,⁷ and assessing caregivers' mastery could provide greater insight into the caregiving situation. Additionally, interventions aimed at improving caregiver mastery should be developed in order to achieve better psychological well-being among caregivers.²⁶ The effect of these interventions can be determined with the Caregiver Mastery Scale, which is able to measure change in caregiving mastery.⁹ Interventions are particularly relevant for partners of patients with acquired brain injury, a growing group experiencing numerous negative consequences of caregiving. Our study shows that the Caregiver Mastery Scale is a valid instrument to assess caregiver mastery in this population.

Clinical Messages

- The Caregiver Mastery Scale is a valid instrument for partners of patients with acquired brain injury.
- Higher caregiver mastery is related to less burden, less anxiety and less depression symptoms.

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