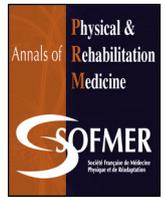




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Original article

Patients' outcome expectations and their fulfilment in multidisciplinary stroke rehabilitation



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ABSTRACT

Background: Patients' expectations of the outcomes of rehabilitation may influence the outcomes and satisfaction with treatment.

Objectives: For stroke patients in multidisciplinary rehabilitation, we aimed to explore patients' outcome expectations and their fulfilment as well as determinants.

Methods: The Stroke Cohort Outcomes of REhabilitation (SCORE) study included consecutive stroke patients admitted to an inpatient rehabilitation facility after hospitalisation. Outcome expectations were assessed at the start of rehabilitation (admission) by using the three-item Expectancy scale (sum score range 3–27) of the Credibility/Expectancy Questionnaire (CEQ). After rehabilitation, patients answered the same questions formulated in the past tense to assess fulfilment of expectations. Baseline patient characteristics were recorded and health-related quality of life (EQ-5D) was measured at baseline and after rehabilitation. The number of patients with expectations unfulfilled or fulfilled or exceeded was computed by subtracting the admission and discharge CEQ Expectancy scores. Multivariable regression analysis was used to determine the factors associated with outcome expectations and their fulfilment, estimating odds ratios (ORs) and 95% confidence intervals (CIs).

Results: We included 165 patients (96 males [58.2%], mean (SD) age 60.2 years [12.7]) who completed the CEQ Expectancy instrument at admission (median score 21.6, interquartile range [IQR] 17.0–24.0); 79 completed it both at admission (median score 20.6, IQR 16.6–24.4) and follow-up (median score 20.0, IQR 16.4–22.8). For 40 (50.6%) patients, expectations of therapy were fulfilled or exceeded. No patient characteristic at admission was associated with baseline CEQ Expectancy score. Odds of expectation fulfilment were associated with low expectations at admission (OR 0.70, 95% CI 0.60–0.83) and improved EQ-5D score (OR 1.35, 95% CI 1.04–0.75).

Conclusions: In half of the stroke patients in multidisciplinary rehabilitation, expectations were fulfilled or exceeded, most likely in patients with low expectations at admission and with improved health-related quality of life. More research into the role of health professionals regarding the measurement, shaping and management of outcome expectations is needed.

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1. Introduction

Worldwide, stroke is one of the leading causes of disability, often requiring long-term care and rehabilitation [1]. In The Netherlands, approximately 8% of all stroke patients ($n = 3200$) are admitted to an inpatient rehabilitation facility (IRF) each year [2]. In general, these are relatively younger patients with complex and multiple impairments and good recovery potential [3]. They are offered an extensive multidisciplinary rehabilitation program, ranging from 5 to 20 hr of therapy per week. Health outcomes improve, but residual impairments, limitations, and restrictions often persist.

Every stroke patient has certain expectations regarding the outcome of the rehabilitation treatment. “Outcome expectations” refer to “improvements that clients believe will be achieved” [4,5]. The concept of outcome expectations is of interest because it may be a modifiable predictor of outcome and therefore an additional target of treatment [6]. Various systematic reviews of studies of patients undergoing total knee and hip arthroplasty, [7] interventions for chronic low back pain, [8] and psychotherapy [9] showed evidence of an association between high expectations and better outcomes in terms of pain, stiffness, functioning, [7] activities, work resumption, [8] and psychological functioning [9].

Among stroke patients, only a few small-scale quantitative studies ($n < 50$) on outcome expectations of rehabilitation have been conducted. The mean (SD) expectancy score regarding motor improvement after a high-repetition upper-extremity training program was 7 (2) on a 0–10 scale [10]. A mean (SD) expectancy score of 20 (5) was found for the effectiveness of robot-assisted gait training after stroke [11] using the three-item Expectancy scale of the Credibility/Expectancy Questionnaire (CEQ; total score ranging from 3 to 27) [5]. In a qualitative study of 16 stroke patients starting outpatient rehabilitation, several patients expected that physiotherapy combined with willpower and determination could lead to improvements for years after stroke and would eventually result in (near) full recovery [12].

The relation between outcome expectations and actual rehabilitation outcomes after stroke is poorly investigated. Existing research suggests that stroke patients with high outcome expectations overestimate their functional level at discharge after inpatient rehabilitation [13] and may be disappointed after therapy because they did not reach full recovery [14].

Factors affect outcome expectations of stroke rehabilitation were investigated only qualitatively, and included “limited knowledge on likely recovery, physiotherapists’ encouragements, and actual improvements made in the first weeks” [12]. Sociodemographic and clinical characteristics associated with outcome expectations have not been investigated in stroke, unlike in other diseases. Factors predicting the fulfilment of expectations have not been identified.

A comprehensive study of stroke patients on the outcome expectations regarding multidisciplinary rehabilitation is lacking. Such a study will reveal more insight into the need for and the target group of expectation management. Both the patients’ outcome expectations and the potential effects of rehabilitation treatment are discussed by the health professional and patient at the start of rehabilitation to facilitate the formulation of individual and achievable goals. Therefore, the primary goal of this study was to assess the outcome expectations of stroke patients at the start of rehabilitation and their fulfilment after finishing rehabilitation. The secondary goal was to explore the determinants of outcome expectations and determinants of the fulfilment. Because the psychometric properties of the CEQ in stroke are unknown, its internal consistency and convergent validity were explored as well.

2. Methods

2.1. Design and setting

This study is part of the Stroke Cohort Outcomes of REhabilitation (SCORE) study, an ongoing prospective cohort study starting in March 2014 in two Dutch rehabilitation facilities (Dutch Trial Register no. 4293) [15]. For the present study on outcome expectations, data were used for patients who had completed rehabilitation by June 2016. The study protocol was approved by the ethics board of Leiden University Medical Center (LUMC) and all participating patients gave written informed consent. All study procedures were executed in accordance with the Helsinki Declaration [16].

2.2. Study population and recruitment

This study included consecutive stroke patients who had been referred for inpatient rehabilitation by the neurologist and/or rehabilitation physician, were ≥ 18 years old and had an ischaemic or haemorrhagic (including subarachnoid haemorrhage) stroke less than 6 months ago. Patients with a pre-existing psychiatric disorder or dementia were excluded, as were patients unable to provide written informed consent or complete Dutch-language questionnaires because of severe aphasia or a language barrier. Within the first week after admission, participants received an information letter from the treating rehabilitation specialist, then a research assistant visited the patient for further explanation. All patients who agreed to participate and provided informed consent were included.

2.3. Assessments

At the start of rehabilitation, sociodemographic characteristics, clinical characteristics, and health-related quality of life (HRQoL) were assessed in addition to outcome expectations by means of medical files and baseline questionnaires that were administered by the research assistant. The health professionals were unaware of the patients’ scores on the CEQ. Rehabilitation-related characteristics were derived from medical files after treatment. Within 2 weeks after the end of the rehabilitation trajectory, expectation fulfilment and HRQoL were determined. The delay of 2 weeks provided the patient time to consider and reflect on the outcomes of treatment. Follow-up questionnaires were sent by post or email by patient preference.

2.3.1. Outcome expectations and fulfilment of expectations

Outcome expectations were assessed at baseline by the CEQ, which includes an Expectancy scale (3 items) and a Credibility scale (3 items). For the current study, only the Expectancy scale was used because we were specifically interested in outcome expectations and their fulfilment. Items 1 and 3 of the CEQ Expectancy scale have a 0–100% scale, and item 2 has a 1–9 rating scale. After transforming the percentage scales, the total sum score ranged from 3 to 27. The CEQ is not disease-specific and was translated into Dutch for use in patients with chronic back pain [17]. Among patients with post-traumatic stress and generalized anxiety disorders, standardized α coefficients of 0.90 and 0.79 were found, and the test–retest reliability (r) was 0.82 [5].

Expectation fulfilment was assessed by the CEQ Expectancy-Follow up survey. This version comprised the same 3 items of the Expectancy scale, phrased in the past tense, in line with the methodology used by Haanstra et al. [18]. These questions were applied after rehabilitation, without patients knowing their baseline scores.

2.3.2. Sociodemographic, clinical, and rehabilitation-related characteristics

Sex, date of birth, date of stroke, stroke type, and stroke localization were derived from patients' medical files. The level of independence in activities of daily living was assessed by the nurse at baseline by use of the 10-item Barthel Index [19] with a total score ranging from 0 (worst) to 20 (best). The presence of aphasia (yes/no) was determined by the speech therapist by use of the Token test (score < 7, no aphasia; score \geq 7, light to severe aphasia) [20], and the level of self-reported cognitive functioning was assessed by the 7-item cognition (memory and thinking) domain of the Stroke Impact Scale (total score from 0 to 100) [21]. The level of education was assessed by a 6-point scale and split into 3 categories (low, medium, high). Comorbidities were determined by the Dutch study on Life Situation Questionnaire (Permanent Onderzoek naar de Leefsituatie), comprising 16 chronic diseases, including, for example, diabetes, hypertension, arthrosis, and psoriasis [22]. The length of stay and whether the patient continued rehabilitation as an outpatient after discharge were derived from medical files. The time between stroke and baseline questionnaire completion and between the start of rehabilitation and questionnaire completion were computed.

2.3.3. HRQoL on admission and at the end of rehabilitation

As a possible predictor of outcome expectations, the HRQoL was assessed at baseline, and as a possible predictor of the fulfilment of expectations, change in HRQoL was assessed. Because patients' expectations concerned the effect of rehabilitation on their limitations in general instead of in specific health domains, general HRQoL was assessed by the Euroqol-5D (EQ-5D). The EQ-5D provides a single health index based on self-reported mobility, self-care, usual activities, pain/discomfort, and anxiety/depression [23]. The EQ-5D was found valid and reliable in several languages [24].

2.4. Statistical analyses

Data analyses involved use of IBM SPSS v22.0. Patient characteristics, CEQ Expectancy scores, and EQ-5D scores are presented as mean (SD), median (interquartile range [IQR]), and number (%), as appropriate. The data are presented for the total population as well as the subgroup that completed both the baseline and follow-up questionnaire. Differences between responders and non-responders to the follow-up questionnaire were assessed by unpaired *t*-tests, Mann–Whitney U-tests and Chi² tests, according to the type and distribution of the data.

To address the primary research objectives, first the mean (SD) and median (IQR; min–max) values for the CEQ Expectancy and the CEQ Expectancy-Follow up scores were calculated, per item and in total. The median CEQ Expectancy-Follow up scores were compared with the median CEQ Expectancy scores by Wilcoxon signed rank tests. Second, 3 “outcome fulfilment categories” were constructed: patients with an Expectancy-Follow up score lower than their Expectancy score – 1 were classified as “expectations unfulfilled”; patients with an Expectancy-Follow up score equal to their Expectancy score \pm 1 were classified as “expectations fulfilled”; and patients with an Expectancy-Follow up score higher than their Expectancy score + 1 were classified as “expectations exceeded”.

To address the secondary objectives, first univariate linear regression analysis was used to identify the associations between baseline outcomes expectations and several independent baseline variables expected to be related in populations with other diseases based on the literature (i.e., sex, age, time since stroke, independence in activities of daily living [Barthel index], aphasia [yes/no], level of cognitive functioning [SIS], number of comorbidities, and HRQoL [EQ-5D]). Additionally, the associations between outcome

expectations and rehabilitation facility, level of education, and time between the start of rehabilitation and completion of the baseline questionnaire were assessed. All variables related to baseline outcomes expectations ($P < 0.15$) were entered simultaneously in a multivariable linear regression model with outcome expectations as the dependent variable. Beta values and 95% confidence intervals (CIs) were calculated. Second, regarding expectation fulfilment, the characteristics of participants in all 3 outcome categories were described. The categories “expectations fulfilled” and “expectations exceeded” were combined into one category: “fulfilling or exceeding expectations”. The odds ratios (ORs) for the association between each independent variable and “expectations exceeded” was assessed in univariate logistic regression analyses. Because the independent variable “change in HRQoL” concerns a scale from 0.0 to 1.0, we multiplied it by 10 to enhance the interpretability of the OR. Finally, all variables significantly associated on univariate analyses ($P < 0.15$) were tested for an association on multivariable logistic regression analyses. $P < 0.05$ was considered statistically significant.

The internal consistency of the CEQ was calculated by the Cronbach's alpha. An indication of convergent validity was obtained by examining the association between outcome expectations and Barthel Index, aphasia, and time between rehabilitation start and questionnaire completion.

3. Results

3.1. Study population

In total, 527 patients were eligible for participation, 443 were invited, 273 provided informed consent, and 165 completed the Expectancy scale of the CEQ at admission (Fig. 1). Of those, 79 (47.9%) participants also completed the CEQ Expectancy instrument at follow-up. Overall, 96 (58.2%) patients were male, the mean (SD) age was 60.2 (12.7) years, 127 (77.0%) had an ischemic stroke, and 65 (39.9%) had a high education (Table 1). The patients who completed ($n = 79$) and did not complete ($n = 86$) the follow-up questionnaire did not differ in sociodemographic or clinical variables, except for a shorter length of centre stay (median 38.0 days, IQR 28.5–61.0 vs. 50.0 days, IQR 32.0–68.5, $P = 0.02$).

3.2. Outcome expectations and fulfilment of outcome expectations

The distribution of the total CEQ Expectancy scores at baseline is in Fig. 2, and Table 2 shows data for the items of the CEQ Expectancy scale at baseline and follow-up. The median CEQ Expectancy score at admission ($n = 165$) was 21.6 (IQR 17.0–24.0). The median CEQ Expectancy score for patients who completed both questionnaires ($n = 79$) was 20.6 (IQR 16.6–24.4; range 5.6–27.0) and the median CEQ Expectancy-Follow up score was 20.0 (IQR 16.4–22.8; range 3.0–25.4). Item and total scores did not differ between the CEQ Expectancy scale and CEQ Expectancy-Follow up scale. According to our definitions, expectations were unfulfilled in 39 patients (49.4%), fulfilled in 13 (16.5%), and exceeded in 27 (34.2%) patients.

3.3. Determinants of outcome expectations

On univariate analyses, high outcome expectations ($P < 0.15$) were associated with high education ($\beta = 0.80$, 95% CI –0.05; 1.64), short time between the start of rehabilitation and questionnaire completion ($\beta = -0.06$, 95% CI –0.12; 0.004), and being treated in a rehabilitation facility 2 ($\beta = 1.25$, 95% CI –0.22; 2.72). The presence of aphasia and level of cognitive impairment were not significantly associated with outcome expectations. On multivariable

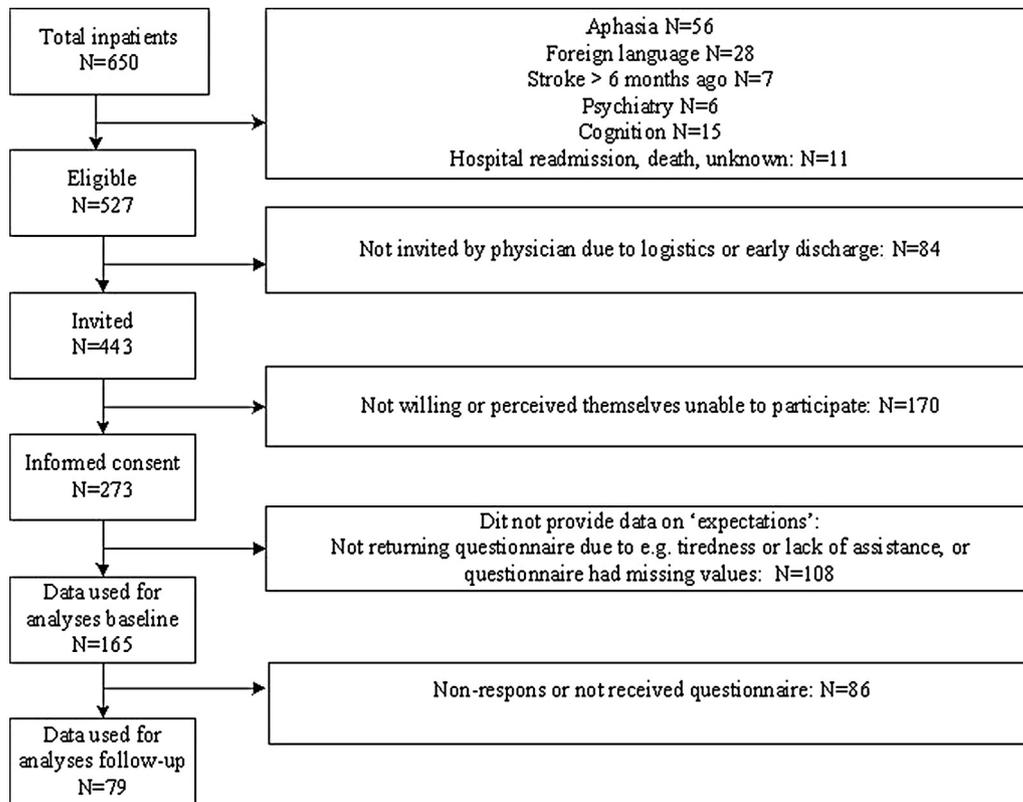


Fig. 1. Flow of patients in the study.

Table 1
Sociodemographic, clinical, and rehabilitation-related characteristics of stroke patients undergoing rehabilitation in the SCORE study.

| | Completed baseline assessment n = 165 | Completed baseline and follow-up assessment n = 79 |
|--|--|---|
| Sociodemographic characteristics | | |
| Sex (male; %) | 96 (58.2) | 47 (59.5) |
| Age (mean, SD) | 60.2 (12.7) | 62.0 (10.9) |
| Ethnicity, native Dutch (n, %) | 126 (78.3) | 64 (83.1) |
| Education, high (n, %) | 65 (39.9) | 29 (37.2) |
| Clinical characteristics | | |
| Stroke type, ischemic (n, %) | 127 (77.0) | 63 (79.7) |
| Stroke localization (n, %) | | |
| Left | 79 (47.9) | 39 (49.4) |
| Right | 74 (44.8) | 35 (44.3) |
| Stem | 5 (3.0) | 2 (2.5) |
| Posterior | 5 (3.0) | 3 (3.8) |
| Multiple sites | 2 (1.2) | 0 (0.0) |
| Barthel Index (median [IQR, min-max]) | 16.0 (11.0–19.0; 1–20) | 17.0 (11.5–20.0; 1–20) |
| Aphasia (n, %) | 37 (23.6) | 17 (22.4) |
| Stroke Impact Scale, cognition (median [IQR, min-max]) | 85.7 (71.4–100; 21.4–100) | 89.3 (74.1–100; 25.0–100) |
| Comorbidities ≥ 2 (n, %) | 108 (78.8) | 52 (78.8) |
| Comorbidities (median [IQR, min-max]) | 2.0 (1.0–2.5; 0–7) | 1.5 (1.0–2.3; 0–7) |
| EQ-5D total score (mean, SD) | 0.69 (0.24) | 0.71 (0.23) |
| Change in EQ-5D between start and end of rehabilitation (mean, SD) | 0.09 (0.20) | 0.09 (0.12) |
| Rehabilitation-related characteristics | | |
| Inpatient rehabilitation facility, n = 1 (n, %) | 100 (60.6) | 51 (64.6) |
| Time between stroke and questionnaire completion (days) (mean, SD) | 29.0 (22.0–41.0) | 28.0 (20.0–35.0) |
| Time between start of rehabilitation and questionnaire completion (days) (median, IQR) | 17.0 (10.0–24.5) | 16.0 (9.0–23.0) |
| Length of stay (days) (median, IQR) | 43.5 (30–67) | 38.0 (28.5–61.0)* |
| Continuation as an outpatient, Yes (n, %) | 106 (64.2) | 48 (60.8) |

IQR: interquartile range; EQ-5D: Euroqol-5D.

* P < 0.05 for responders (n = 79) vs. non-responders (n = 86) at baseline.

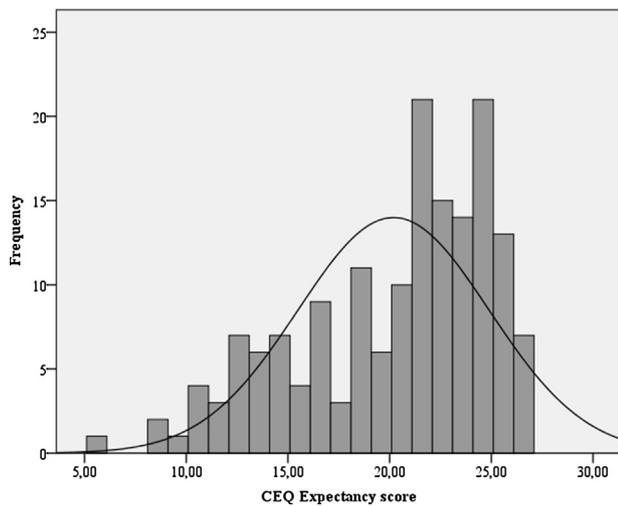


Fig. 2. Distribution of total Credibility/Expectancy Questionnaire scores at baseline.

regression analysis, none of these associations was statistically significant, with the overall explained variance of the model (R^2) being low (0.064).

3.4. Determinants of the fulfilment of outcome expectations

Table 3 presents the characteristics of the population in all 3 expectation-fulfilment categories. On unadjusted analysis, high outcome expectations at baseline were associated with low odds of

expectation fulfilment (OR = 0.73, 95% CI 0.63–0.84), whereas odds of expectation fulfilment were associated with improved HRQoL (OR = 1.35, 95% CI 1.05–1.75). In the adjusted analysis, these associations were still statistically significant (OR 0.70, 95% CI 0.60–0.83 and 1.35, 1.04–1.75, respectively).

3.5. Internal consistency and convergent validity

The internal consistency (Cronbach's alpha) was 0.74. No associations were found between outcome expectations and the Barthel Index and aphasia, but an association in the expected direction was observed with time between start of rehabilitation and questionnaire completion.

4. Discussion

This study shed light on stroke patients' outcome expectations and their actual fulfilment. We found relatively high outcome expectations, which were fulfilled in half of all patients. No determinants were identified for outcome expectations, but expectation fulfilment was associated with low baseline expectations and improved HRQoL.

The median score on the CEQ Expectancy scale was 21.6, which is higher than in a previous study of stroke patients (mean 20.0) [11] and higher than for patients undergoing treatment for chronic low back pain (mean 16.4) [17] and fatigue (mean 17.5) [25]. After rehabilitation, the CEQ Expectancy-Follow up scores were somewhat lower than the baseline CEQ Expectancy scores, although not significantly. Nevertheless, according to our definition, half of the patients had their expectations unfulfilled. In line with previous studies of stroke, high outcome expectations were related to poor

Table 2

CEQ Expectancy scores for outcome fulfilment for patients with stroke undergoing rehabilitation at baseline and follow-up.

| CEQ Expectancy items | CEQ Expectancy Baseline, all (n = 165) | CEQ Expectancy Baseline, completers (n = 79) | CEQ Expectancy-Follow up, completers (n = 79) | P-value ^a |
|--|--|--|---|----------------------|
| Item 1 "How much reduction of your impairments do you think will have occurred/has occurred at the end of the rehabilitation treatment?" | 7.4 (5.8–8.2; 1–9) | 7.4 (5.0–8.2; 1–9) | 6.6 (5.0–7.4; 1–9) | 0.07 |
| Item 2 "How much do you really feel, at this moment, the rehabilitation treatment will contribute/has contributed to decreasing your impairments?" | 8.0 (7.0–8.0; 1–9) | 8.0 (7.0–8.0; 1–9) | 7.0 (6.0–8.0; 1–9) | 0.26 |
| Item 3 "How much reduction of your impairments do you feel will have occurred/has occurred at the end of the rehabilitation treatment?" | 7.4 (5.4–8.2; 1–9) | 7.4 (5.0–8.2; 1–9) | 6.6 (5.0–7.4; 1–9) | 0.40 |
| Total | 21.6 (17.0–24.0; 5.6–27.0) | 20.6 (16.6–24.4; 5.6–27.0) | 20.0 (16.4–22.8; 3.0–25.4) | 0.24 |

Data are median (IQR, min–max). CEQ: Credibility/Expectancy Questionnaire.

^a Nonparametric comparison between baseline and follow-up.

Table 3

Univariate and multivariate analysis of fulfilment of expectations for patients with stroke undergoing rehabilitation.

| | Unfulfilled (n = 39) | Fulfilled (n = 13) | Exceeded (n = 27) | Univariate analysis OR (95% CI) ^a | Multivariable analysis OR (95% CI) ^a |
|--|----------------------|--------------------|-------------------|--|---|
| Sex, male (n, %) | 20 (51.3) | 10 (76.9) | 17 (63.0) | 1.97 (0.79–4.91) | 2.06 (0.82–5.18) |
| Age, years (mean, SD) | 62.9 (10.8) | 63.7 (7.2) | 60.0 (12.6) | 0.99 (0.95–1.03) | 0.98 (0.94–2.03) |
| Education, high (n, %) | 12 (30.8) | 4 (30.8) | 9 (34.6) | 1.29 (0.78–2.13) | 1.23 (0.73–2.05) |
| Baseline ADL independence, BI (mean, SD) | 17.0 (12.0–19.0) | 16.0 (10.0–19.5) | 17.5 (12.0–20.0) | 0.99 (0.89–1.09) | 0.95 (0.84–1.07) |
| Change in health status, EQ-5D (mean, SD) | 0.03 (0.18) | 0.14 (0.25) | 0.14 (0.21) | 1.35 (1.05–1.75) | 1.35 (1.04–1.75) [*] |
| Rehabilitation facility, n = 1 (n, %) | 14 (35.9) | 5 (38.5) | 9 (33.3) | 0.96 (0.38–2.42) | 0.92 (0.34–2.44) |
| Length of stay, days (median, IQR) | 39.0 (28.0–57.0) | 35.0 (24.0–60.5) | 38.0 (30.0–66.0) | 1.00 (0.98–1.02) | 1.00 (0.98–1.03) |
| Outpatient rehabilitation, yes (n, %) | 21 (53.8) | 6 (46.2) | 21 (77.8) | 1.78 (0.71–4.44) | 1.63 (0.64–4.18) |
| Outcome expectations, CEQ Expectancy scale total score (median, IQR) | 23.6 (20.2–24.4) | 24.4 (18.6–24.4) | 14.2 (12.6–18.4) | 0.73 (0.63–0.84) | 0.70 (0.60–0.83) [*] |

ADL: activities of daily living; BI: Barthel Index; EQ-5D: Euroqol-5D; IQR: interquartile range; CEQ: Credibility/Expectancy Questionnaire; OR: odds ratio; 95% CI: 95% confidence interval.

^a Odds ratio for expectations fulfilled or exceeded (n = 40) versus unfulfilled (n = 39).

^{*} P < 0.05

outcomes in terms of fulfilment of expectations [13,14]. This finding may be due to the enduring nature of most impairments after stroke and is an important point of attention [26].

We found no associations with age and sex, unlike in other studies. Among patients with peripheral joint problems, the expectations of physiotherapy were higher among women than men [27]. In shoulder arthroplasty patients, young age was associated with high expectations [28]. The previous finding of a short duration of the condition leading to high expectations was confirmed by our study. Also in line with a study of patients with shoulder problems, [29] we found improved HRQoL in patients with fulfilled expectations.

Of note, the factors hypothesized to be associated with outcome expectations explained only 6.4% of the variance in the multivariable regression model. Possibly unmeasured factors such as patients' limited knowledge of likely recovery and physiotherapists' encouragements may have raised their expectations. Psychological factors might have played a role, although the influence will be small because the CEQ Expectancy concerns patients' expectations regarding the treatment itself and not their active role in it.

4.1. Limitations and strengths

Several limitations should be mentioned. First, the results of our study are applicable to only a subgroup of stroke patients (i.e., 8% of all hospitalised patients are referred to a specialised medical rehabilitation facility). Most are discharged home (60–65%), whereas patients with severe impairments, requiring intensive nursing care, and/or with relatively low rehabilitation potential (25–30%) go to a skilled nursing facility. Moreover, within the subgroup of patients admitted for medical specialist rehabilitation, those with severe aphasia and severe cognitive impairments were not included because they would be unable to independently and reliably complete the questionnaires. This is an important drawback because this subsample may have had different outcome expectations. In future studies and clinical practice, outcome expectations may be assessed orally. However, for patients with cognitive and/or language-related impairments, the interpretation of the CEQ might be hampered. Second, a considerable proportion of patients (52%; 86/165) did not complete the follow-up assessment. A possible reason was that in the SCORE study, several questionnaires were sent to the study participants within a short time period, which could have limited their willingness and ability to complete them all. Although the patients with and without follow-up data did not differ in characteristics and outcome expectations, this is an issue that needs special attention in the design of future observational studies of stroke patients. Third, the use of a questionnaire not yet validated in this population can be considered a limitation. Preliminary results from our study indicated that the internal consistency was acceptable [30] and that the CEQ score was significantly correlated with the time between the start of rehabilitation and questionnaire completion. A separate and more comprehensive study of psychometric properties of the CEQ in a stroke population is recommended.

Strengths of our study include the following. We are the first to assess outcome expectations of stroke patients regarding rehabilitation and their fulfilment in a quantitative manner. As compared to other studies on expectations in stroke, our study population was much larger, thereby enhancing the robustness of our findings. Also, we are the first to explore expectations regarding rehabilitation as a whole, in a heterogeneous group with various impairments and limitations.

Altogether, our study yields valuable insights that are relevant for daily clinical practice. We do not recommend enhancing outcome expectations upon the start of treatment, as suggested in

studies of other populations. Rather, we recommend carefully managing expectations, considering the potential residual impairments after stroke, to prevent dissatisfaction.

5. Conclusion

This study showed that patients' expectations of stroke rehabilitation are relatively high and cannot be predicted by standard sociodemographic and clinical factors alone. In half of all cases, the expectations were fulfilled or exceeded, most likely in patients with reduced expectations on admission to a rehabilitation facility and those with improved HRQoL at the end of their rehabilitation. More research into the role of health professionals regarding the measurement, shaping and management of outcome expectations is needed.

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Disclosure of interest

The authors declare that they have no competing interest.

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