Self-Efficacy, Poststroke Depression, and Rehabilitation Outcomes: Is There a Correlation?

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Background: The sudden live changes of stroke survivors may lead to negative psychological and behavioral outcomes, including anxiety and depressive mood, which may compromise the rehabilitation process. Some personality features, such as self-efficacy, could play an important role in mediating the degree of post-stroke depression. Aim of this study is to investigate the possible correlation between specific psychological dimensions, such as poststroke depression and self-efficacy, and rehabilitation outcomes. *Materials and Methods:* Thirty-eight patients, affected by stroke, completed a four-hour-daily training lasting up to 8 weeks, including traditional and robotic-assisted physiotherapy. Patients were assessed at admission (T0) and at the end (T1) of the motor training, by means of the Montgomery-Asberg Depression Scale, the General Self-Efficacy Scale, and the Functional Independent Measure. *Results:* We observed a significant T0-T1 difference in MADRS scores in patients with a better functional recovery ($t = 5.76$; $P < .0001$) and higher self-efficacy ($t = 4.74$; $P < .001$), but no significant T0-T1 difference in individuals without functional recovery ($t = 1.21$; $P = .239$) and low self-efficacy ($t = 1.72$; $P = .103$). *Conclusions:* Our study shows that rehabilitation outcomes and self-efficacy may influence mood, but not vice versa. Thus, to potentiate self-efficacy in the rehabilitation setting may help clinicians in obtaining better functional outcomes, including depression reduction.

Key Words: Stroke—depression—functional outcomes—motor recovery—self-efficacy

Introduction

Stroke is the first cause of disability in adults in Western countries,[1] and more than one third of people who survive a stroke will live with severe motor, sensory, and cognitive limitations so to depend entirely on their family. The sudden live changes of stroke survivors may lead to negative psychological and behavioral outcomes,[2,3] including anxiety and depressive mood. Poststroke depression (PSD) affects between 12% and 72% of patients who have suffered a stroke.[4] This variation can be attributed to a number of factors including ethnicity, use of different diagnostic criteria, sample size, time interval between the stroke event and assessment, and methodological differences in case selection and use of screening tools. Certainly, such negative psychological reaction can compromise the rehabilitation process due to a lower level of participation with longer stay in the hospital and higher mortality. Several factors could interfere with PSD and with the rehabilitation process, given that younger age, impaired cognitive functioning, prestroke depression are negative predictors of poststroke depression.[5] Nonetheless, some personality features, such as self-efficacy, could play an important role in mediating the degree of PSD.

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Self-efficacy is defined as "the belief in one's capabilities to organize and execute the courses of action required to produce given attainments."[6] Among the different types, general self-efficacy (GSE) is a overall perception of their ability to deal with the adverse events and task- specific about motor and physical domains (fall self-efficacy, balance self-efficacy).[5] It is worthy to note that depression and low self-efficacy are often correlated.[7]

Aim of this study is to investigate the possible correlation between specific psychological dimensions, such as post-stroke depression and self-efficacy, and rehabilitation outcomes. It is possible, in fact, that levels of depression and self-efficacy influenced the success of rehabilitation or, conversely, that an improvement/worsening could modulate mood and self-perception.

Materials and Methods

Thirty-eight patients, mean age 58.42 ± 12.13 (55.26% female), were enrolled in this study. A more detailed sample description is given in Table 1.

Inclusion criteria were: first ever hemorrhagic or ischemic stroke; absence of important cognitive impairment (MMSE > 24); and insight of the illness. Previous depression disorders, severe medical illness, and sersory deficit potentially interfering with the physical training, represented the main exclusion criteria.

Each patient completed a four-hour-daily training lasting up to 8 weeks, including traditional and robotic-assisted physiotherapy. Neither logopedic nor neuropsychological treatment was provided during the evaluation period. Patients were assessed at admission (T0) and at the end of the motor training (T1), by means of the Montgomery-Asberg Depression Scale (MADRS) to evaluate mood state, the GSES and the Functional Independent Measure (FIM) to evaluate disability's degree. The MADR is a self-questionnaire, composed of 10 items, used to measure the severity of depressive episodes in patients with mood disorders and scored between 0 and 60. The GSES is a 10-item psychometric scale that is designed to assess optimistic self-beliefs to cope with a variety of difficult demands in life. The FIM is a scale consisting of 18 activities of daily living (5 of which are cognitive items); each task can be scored from 1 (complete dependence on others) to 7 (complete self-sufficiency).

All the patients gave their informed consent to enter the study that was conducted according to the current ethical issues.

Statistical Analysis

Data were analyzed using the R version 3.4.0, considering $P < .05$ as significance level. Since the Anderson-Darling test results showed a normal distribution of the target variables, a parametric analysis was performed. Multivariate linear regression was used to inspect relation between scales on T1-T0 differences. The Student's t test for paired samples was used to compare test scores between baseline and the end of the study. The 1-tailed Student's t tests for unpaired samples was used to assess whether high change in MADRS score corresponded to subjects with a more favorable self-efficacy picture, or a better functional recovery. Indeed, in order to investigate on the psychological changes of patients with a functional recovery versus patients without a functional recovery, we split our sample in 2 groups according to the minimal clinically important difference for the FIM instrument defined by Beinato et al.[8] Similarly, we also subdivided our sample in 2 groups according to the median value of self-efficacy at T0.

Using the car package of R, we performed two analysis of covariance, both with the MADRS score at baseline as covariate; the factor variable was 'FIM recovery' (1 = yes; 0 = no) otherwise 'SE level' (1 = high; 0 = low). We also included into the models the interaction effect "MADRS score at baseline × factor variable."

Results

No significant differences between men and women were found for FIM and MADRS, but there was a gender difference for general self-efficacy (t = 2.29; $P = .03$). A significant pre-post difference emerged for all the 3 tests: FIM (t = 6.87; $P < .0001$), MADRS (t = 4.27; $P < .001$), and SE (t = 5.01; $P < .0001$).

As shown in Table 2, the regression models built on the T1-T0 differences indicated a higher influence of FIM

Table 1. *Sample description at baseline*

	Females	*Males*	*All*
Patients	21 (55.26%)	17 (44.74%)	38 (100%)
Age ***(years)***	61.24 ± 11.95	54.94 ± 11.78	58.42 ± 12.13
MADRS ***(test score)***	34.48 ± 10.61	30.88± 8.15	32.87 ± 9.64
FIM ***(test score)***	54.86 ± 15.54	63.94 ± 25.97	58.92 ± 21.05
GSE ***(test score)***	23.33 ± 7.96	28.41 ± 5.65	25.61 ± 7.39

Abbreviations: FIM, Functional Independence Misure; MADRS, Montgomery Asberg Depression Rating Scale; SE, Self Efficacy.

Mean ± standard deviation was used to describe continuous variables; proportions (numbers and percents) were used to describe categorical variables.