Mental distress in stroke rehabilitation

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Abstract
The most common psychological consequence is depression. Post-stroke depression may hinder rehabilitation and may exercise a negative effect on the course of the disease. In this study, changes were measured in joint function, activities of daily living (Functional Independence Measure and Barthel Index) and psychological state in our own patients.

Setting: Physiotherapy Center, Ss. Cosmas and Damian Rehabilitation Institute, Visegrád, Hungary.

Methodology: 30 clients who had suffered an ischaemic stroke and showed prevalent unilateral symptoms in the upper limbs were selected at random. Rehabilitation was started 10±3 days after the acute event. The following measurements were taken before and after rehabilitation: joint function ("global joint function" [%]), the functional independence measure (FIM), the Barthel Index, the Beck Depression Inventory (BDI) and the Mini-Mental State Examination (MMSE). Changes in individual parameters due to treatments (paired t-test; p<0.05) were studied as well as correlations between joint function, activities of daily living and psychological state (correlation analysis; p<0.05).

Results: Significant changes were found due to treatments for all the parameters under investigation compared to the before-treatment state (joint function before treatment [BT]: 63.22%, after treatment [AT]: 93.41%; FIM BT: 89.83, AT: 118.4; Barthel Index BT: 61.36, AT: 88.8; BDI BT: 20.33, AT: 10.5; MMSE BT: 11.83, AT: 22.16; p<0.05). There were strong correlations (r) between changes in joint function, activities of daily living and psychological state (joint function and MMSE: 0.796; FIM and MMSE: 0.655; Barthel Index and MMSE: 0.601; joint function and BDI: -0.786; FIM and BDI: -0.685; Barthel Index and BDI: -0.623; p<0.05).

Conclusion: Based on our results, favourable changes in joint function and activities of daily living in the case of stroke rehabilitation are likely to have a positive effect on clients’ psychological state, thus improving their life changes.

Keywords: Stroke; Depression; Joint function; Activities of daily living

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Introduction

Stroke is one of the most common causes of death and a major cause of chronic disability

[1]. According to a German study, the direct cost per first-year survivor of ischaemic stroke was 18,517 euros [2]. Depression after stroke is common [3]. Effective treatments exist, but they are probably underutilized. Increased
efforts should be made to utilize these methods effectively because they would not only be likely to improve patient symptoms, but also promote functional recovery, decrease mortality and reduce post-stroke health care utilization [4]. The various examination methods suggest that 25–40% of clients suffer from post-stroke depression, with half of them experiencing severe depression and the other half facing other depressive disorders [5-8]. Post-stroke depression may increase the risk of stroke and stroke mortality [9].

Objective

The main objective of this study was to determine the extent to which an early rehabilitation program affects joint function, ADLs, and psychological state, in patients with acute stroke. A secondary objective was to determine the extent of the association between joint function, ADLs, and psychological state.

Patients and methodology

30 clients who had suffered an ischaemic stroke and showed prevalent unilateral symptoms in the upper limbs were selected at random (10 women, 20 men; average age: 62.66). Rehabilitation was started 10±3 days after the acute event. The following comorbidities were identified: high blood pressure (hypertension) (in 22 clients), hyperlipidaemia (in 20), diabetes mellitus (in 10), CHD (8) and hyperuricaemia (in 6).

In each case, the treatment consisted of 15 sessions involving physiotherapy (passive motion, guided active exercises, improving joint mobility, strength training and relearning to walk; 30 minutes), massage (brush massage and connective tissue massage; 30 minutes) and descending galvanic therapy (bipolar; 10 minutes). Clients were not given any antidepressants, and they received no psychotherapy. Several measurements were taken before and after rehabilitation. First, joint function (“global joint function” [%]) was measured. To express the functioning of the joint using a single parameter that best represents that functioning and at the same time can be used well in mathematical analysis, a so-called “global joint function” was developed. For every single joint and for all ranges of motion, the percentage of the maximum range of motion was calculated for the value currently being measured. These values were added up, the average calculated and that value obtained as a percentage. Other measures were also employed: functional independence measure (FIM),[10] the Barthel Index, [11,12] the Beck Depression Inventory (BDI) [13] and the Mini-Mental State Examination (MMSE) [14].

Changes in individual parameters due to the treatments (paired t-test; p<0.05) were studied as well as correlations between joint function, activities of daily living and psychological state (correlation analysis; p<0.05) [15]. Permission for this study was granted by the Institute’s Research Ethics Committee.

Results

Because of the rehabilitation program:
A significant improvement was found in joint function (before treatment [BT]: 63.22%; after treatment [AT]: 93.41%) (p<0.05) (Graph 1).
The functional independence measure (FIM) indicated significant improvement (BT: 89.83; AT: 118.4) (p<0.05) (Graph 2).
The Barthel Index showed significant improvement (BT: 61.36; AT: 88.8) (p<0.05) (Graph 3).
The Beck Depression Inventory (BDI) also indicated significant improvement (BT: 11.83; AT: 22.16) (p<0.05) (Graph 4).
The Mini-Mental State Examination (MMSE) also indicated significant improvement (BT: 11.83; AT: 22.16) (p<0.05) (Graph 5).

There were strong correlations (r) between changes in joint function, activities of daily living and psychological state (p<0.05) (Table 1).
Graph 1: Change in joint function.

![Graph 1: Change in joint function.](image1)

Graph 2: Change in Functional Independence Measure (FIM).

![Graph 2: Change in Functional Independence Measure (FIM).](image2)
Graph 3: Change in Barthel Index.

Graph 4: Change in Mini-Mental State Examination (MMSE).
Graph 5: Change in Beck Depression Inventory (BDI).

Table 1: Correlations between joint function, activities of daily living and psychological state

|                                      | p<0.05 | Correlation (r) |
|--------------------------------------|--------|-----------------|
| Joint function and MMSE              | 0.007  | 0.796           |
| FIM and MMSE                         | 0.014  | 0.655           |
| Barthel and MMSE                      | 0.030  | 0.601           |
| Joint function and BDI               | 0.008  | -0.786          |
| FIM and BDI                          | 0.021  | -0.685          |
| Barthel and BDI                      | 0.037  | -0.623          |

**Discussion**

Post-stroke depression can be caused by sudden disability, severe neurological symptoms and psychological reaction to unfavourable social changes affecting clients. Cerebral damage can affect areas of the brain that are directly connected to processes that cause depression [16]. After a cerebrovascular accident (stroke), clients’ status in the family, among friends, at work and in leisure-time activities may also deteriorate [17]. Returning to work after a stroke is also considered an important policy and welfare issue [18-19]. Post-stroke depression may have a negative effect on activities of daily living (ADL) [20] as well as on rehabilitation outcomes [21]. In an article published in 2011, the authors compared various ADL tests used in stroke rehabilitation [22]. Mansur et al. found that rehabilitation interventions may reduce disability after stroke, thus possibly improving mood [23].

Our results show that there was no significant functional damage. With regard to activities of daily living, no significant loss was found either with the Barthel Index or FIM, even on examination of the initial values. Therefore, it
was easier to achieve significant improvement with the rehabilitation program from an already favourable condition. This favourable initial state and the improvement due to treatment may have been the reason further improvement was observed with both the MMSE and BDI, but it was also important to note that the initial values were not particularly poor either. This may explain why it was not necessary for patients to take antidepressants or to undergo psychotherapy in the period under examination. It seems that the significant improvement in function and activities of daily living brought about the significant improvement in psychological factors. The changes in function and activities of daily living and the corresponding changes in psychological state strongly correlated.

Conclusion

Based on our results, it is believed that favourable changes in joint function and activities of daily living are likely to have a positive effect on clients’ psychological state, reducing the risk of post-stroke depression and limiting its severity. However, post-stroke depression should not be taken lightly or considered a natural phenomenon. If clients do experience post-stroke depression, it needs to be treated with antidepressants and psychotherapy, as this improves their life chances.

List of Abbreviations

ADL - Activities of daily living  
FIM - Functional independence measure  
BDI - Beck depression inventory  
MMSE - Mini-mental state examination  
CHD - Coronary heart disease

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