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Original Article

The effect of self-management on the knowledge, beliefs, behavior and subjective well-being in stroke patients during the rehabilitation phase

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Abstract: Objective: To investigate the effects of self-management on the knowledge, beliefs, behavior, and subjective well-being in stroke patients during the rehabilitation phase. Methods: the data from 60 first-episode stroke patients in the rehabilitation phase who were discharged from the Department of Neurology were analyzed in this retrospective study. The patients were assigned to an observational group or a control group, with 30 patients in each group. The routine intervention mode was used in the control group, and the self-management intervention mode was used in the observation group. Subsequently, the muscle strength of the upper and lower extremities, the self-care ability scores, the ADL, NIHSS, and FMA scores, the subjective well-being levels, and the patients' complication rates were compared between two groups. Results: After the intervention, the muscle strength of the upper and lower extremities, the self-care ability scores, and the ADL, NIHSS, and FMA scores of the patients in the observational group were all better than they were in the control group, with statistically significant differences (all $P<0.05$). The subjective well-being levels of the patients in the observation group were also significantly better than they were in the control group ($P<0.05$). The incidence of complications in the observation group was lower than it was in the control group ($P<0.05$). Conclusion: Self-management intervention measures effectively improve the self-care abilities, enhance patient confidence in self-management, and help to improve the quality of life in stroke patients during the rehabilitation phase.

Keywords: Self-management intervention mode, stroke, rehabilitation phase, self-care abilities, subjective well-being

Introduction

A stroke is a neurological deficit syndrome with an acute onset and symptoms lasting for at least 24 hours. Based on the type of local cerebral blood circulation disorder, there are two main types of stroke: ischemic stroke and hemorrhagic stroke [1]. With the continuous improvement of people's living standards in China, the incidence of ischemic stroke has increased significantly and the patients now tend to be younger. There are about 2 million new stroke cases in China each year, and ischemic stroke accounts for more than 60%-70% of the cases; 70%-80% of patients lose their living ability due to various dysfunctions after their strokes. Therefore, strokes have now become one of the main diseases which threatens the life and health of humans [2]. Surgery is one of the main clinical options for the treatment of ischemic stroke. Patients with ischemic stroke are often elderly, with long-term treatment and large trauma after surgery, which lead to a high incidence of complications [3]. Therefore, promising self-management plays an important role in stroke rehabilitation.

As a secondary preventive measure, self-management has been widely verified and used in the prevention and control of chronic diseases around the world. As reported previously, effective self-management can prompt patients to correct their unhealthy lifestyles, enhance their self-monitoring of diseases, and improve their compliance with the treatment, thereby improving their quality of life [4]. Moreover, studies

have also shown that effective self-management interventions help to enhance patients' self-efficacy, ameliorate their healthy behavior, and improve their rehabilitation [5].

However, the majority of current studies have focused on the effect of single intervention measures, such as rehabilitation training, psychosocial intervention or health guidance on the subjective well-being of patients [6]. There is no published report involving the effect of self-management interventions based on the theoretical framework of knowledge, belief and behavior on the subjective well-being of stroke patients. Thus, our study retrospectively analyzed the data of 60 first-episode stroke patients in their rehabilitation phase discharged from the Department of Neurology from March 2018 to September 2020 to explore the intervention effect of self-management in them during the rehabilitation phase.

Materials and methods

General data

We retrospectively analyzed the data of 60 first-episode stroke patients in the rehabilitation phase discharged from the Department of Neurology from March 2018 to September 2020. The patients were assigned into an observational group or a control group. The routine intervention mode was used in the control group, and the self-management intervention mode was used in the observation group. One patient in the control group was re-admitted to the hospital due to a lung infection, so 59 patients in the rehabilitation phase completed the study, including 30 patients in the observation group and 29 patients in the control group. This study was approved by the hospital's ethics committee.

Inclusion criteria: Patients diagnosed with first-episode stroke according to the diagnostic guidelines specified by the National Neurological Cerebrovascular Disease Conference in 1996, with the diagnosis confirmed through clinical examinations (MRI and/or head CT) [7]. Patients who were conscious and who did not have a communication disability or mental retardation (NEVISE>24). Patients who were able to take care of their daily lives before the onset of the illness and who did not have any limb disabilities.

Exclusion criteria: Patients with liver and kidney function abnormalities. Patients with central nervous system diseases who were not able to communicate normally. Patients with heart diseases, such as bradycardia or atrioventricular block. Patients with poorly controlled hypertension or abnormal respiratory function. Patients undergoing long-term drug treatment, which might affect the experimental results. Patients with a history of alcohol or drug abuse.

Methods

Control group: In the control group, the community staff gave conventional discharge interventions, such as regularly distributing health brochures to record the patients' rehabilitation progress and providing professional guidance for the rehabilitation of the patients.

Observation group: In the observation group, additional self-management measures were further applied.

First, a home exercise plan was developed for the patients referencing rehabilitation-related books and guidelines for a total of three stages: 1-4 weeks, 4-8 weeks and 8-16 weeks after surgery [8]. The exercise plan was modified under the guidance of clinical rehabilitation experts and doctors to meet the principles of simplicity, effectiveness, and safety [9].

Second, rehabilitation exercise demonstration videos were produced. The patients were given a specific home exercise planning book and a demonstration teaching video of rehabilitation actions for guidance [10]. Easy-to-understand text of a suitable font size for the elderly was included in the videos to illustrate and to make the information easy to process for the patients [11].

Third, an official account in WeChat was registered and established for contact information exchange. Home rehabilitation exercise videos were recorded according to the home exercise plan for stroke patients in the rehabilitation phase. Reasonable diets were suggested according to the treatment and actual individual conditions of the patients to strictly control the dietary indicators. The patients maintained a good sleep quality, preferably, to go to bed early and wake up early, which is beneficial for patients to manage the related indicators and

to decrease the incidence of complications. The staff tried to help the patients avoid being depressed or having mood swings to prevent the patients from worrying too much. The patients were advised to sleep less and do more exercises in the daytime. Before going to bed at night, the patients were given sleep promoting treatment such as playing soft light music, in order to help the patients fall asleep early. We also contacted the patients via WeChat for follow-up and patient data collection. If the patient was unable to use a smartphone, a family member who lived with the patient was the contact person.

Evaluation indexes

First the general data such as age, sex and Glasgow Coma Scale (CGS). The CGS included three aspects: eye-opening responses, verbal responses, and limb movement. The sum of the scores in the three aspects is the coma index, which ranges from 3 points to 15 points. Lower scores indicated a more severe disturbance of consciousness and a worse prognosis.

Second, the modified Barthel activities of daily living (ADL) index was measured. The Chinese version of the modified Barthel ADL scale is convenient and widely used clinically, and it is highly sensitive and specific (retest reliability: 0.98, validity: 0.95). A score of 0-20 points indicated an extremely severe functional defect; 25-45 points indicated a severe functional defect; 50-70 points indicated a moderate functional defect; 75-95 points indicated a mild functional defect; 100 points indicated that the patients could take care of their ADL [12].

Third, the National Institutes of Health Stroke Scale was administered. The scale is easy to use with a high repeatability and validity and can be used many times a day [13]. The scale has a total possible score of 42 points. A higher score indicates a more serious neurological deficit.

Fourth, the Simplified Fugl-Meyer Assessment (FMA) was used for the evaluation of motor performance, with a total possible score of 100 points. There are 33 items for the evaluation of the upper limb motor performance, for a total of 66 points, and 17 items for the evaluation of lower limb motor performance, for a total of 34 points. Each item was scored in three levels: 2 points for all performed, 1 point for partially performed, and 0 points for not able to perform. A higher score indicated a better motor performance rehabilitation [12].

Fifth, the patients' self-care ability levels at discharge were recorded, including self-care skills, health knowledge, self-responsibility, and self-awareness. Higher scores indicated better self-care abilities [14].

Sixth, the patients' adverse reactions during the intervention were recorded, such as nausea, constipation and gastrointestinal discomfort. The incidence of adverse reactions = the number of cases with adverse reactions/total number of cases *100%.

Finally, the subjective well-being questionnaire was distributed to the patients before their discharge [15]. The Cronbach's α coefficient of the scale measured by our study was 0.91. Subjective well-being = the number of cases of (very happy + happy)/total number of cases *100%.

Statistical analysis

The database we established was processed using SPSS 17.0 statistical software. The measurement data had a normal distribution and were expressed as the mean ± standard deviation ($\bar{x}$ ± sd) and compared using t-tests. The count data were expressed as number of cases/percentage (n/%) and compared using chi-square tests. $P<0.05$ indicated a statistically significant difference.

Results

Comparison of the baseline data of the patients in the rehabilitation phase in the two groups

The baseline data in the two groups showed no significant differences, so the two groups were comparable (all $P>0.05$; **Table 1**).

Comparison of the upper and lower extremities' performance in the two groups

Before the intervention, there were no significant differences in the upper and lower extremities' performance in the two groups (both $P>0.05$), but there were significant differences

Table 1. Comparison of the baseline data between the two groups (n, $\bar{x} \pm s$)

Items	Control group (n=29)	Observational group (n=30)	t/χ^2	P
Age (years)	60.3±7.8	60.1±7.8	0.055	0.965
GCS scale	9.15±0.75	9.10±0.72	0.213	0.834
Gender			0.141	0.708
Male	21	23		
Female	8	7		

Note: CGS: The Glasgow Coma Scale.

Table 2. Analysis of the intervention effect on the upper and lower extremities ($\bar{x} \pm s$)

Groups	Observational group (n=30)	Control group (n=29)	t	P
Upper extremities				
Before intervention	1.40±0.50	1.45±0.51	0.326	0.748
After intervention	3.40±0.50**	2.55±0.69**	4.073	0.001
Lower extremities				
Before intervention	1.95±0.60	1.90±0.55	0.271	0.789
After intervention	3.80±0.41**	2.95±0.69**	4.677	0.000

Note: Compared with before the intervention, **P<0.01.

between the performances before and after the intervention in both groups. Also, the upper and lower extremities' performance was better in the observational group than it was in the control group (all P<0.01, **Table 2**).

Comparison of the self-care abilities of the patients in terms of their rehabilitation between the two groups

Before the intervention, there was no significant difference in the self-care abilities between the two groups (all P>0.05), but the differences before and after intervention were statistically significant in both groups (all P< 0.05). After the intervention, the self-care ability scores in the observational group were significantly higher than the scores in the control group (all P<0.05; **Table 3**).

Comparison of the ADL, NIHSS, and FMA scores in the two groups

Before the intervention, there were no significant differences in the ADL, NIHSS, or FMA scores between the two groups of patients (all P>0.05), but the differences before and after the intervention were statistically significant in both groups (all P<0.05). After the intervention, the ADL, NIHSS and FMA scores of the patients in the observation group were better than the corresponding scores in the control group (all P<0.01; **Table 4**).

Comparison of the complications between the two groups

The incidences of complications in the observation group were significantly lower than they were in the control group (6.67% *vs.* 17.24%, P<0.05; **Table 5**).

Comparison of the subjective well-being between the two groups

The subjective well-being of the patients in the observation group was significantly better than it was in the control group (92.50% *vs.* 75.00%; X^2=4.891, P=0.027; **Figure 1**).

Discussion

Currently, a period of rehabilitation is necessary for stroke patients after their discharge from the hospital. Due to the limited hospitalization time and the poor rehabilitation after discharge, the efficacy of surgery and the patients' quality of life are seriously compromised [16]. Some studies have shown that effective self-management intervention can promote the rehabilitation of patients, reduce their recurrence rate, and improve their quality of life. However, with the low self-management ability of patients after discharge, a scientific and effective intervention method is still required to assist the patients to improve their self-management abilities, which is currently the main challenge to be resolved by the medical staff [17].

This study showed that the upper and lower extremity functions, the self-care ability scores, the ADL, NIHSS, and FMA scores in the stroke patients were significantly better in the observation group than they were in the control group, suggesting that self-management intervention can promote rehabilitation in stroke patients through the improvement of their physical functions. Researchers have shown that self-management in stroke patients ensures a continuous, effective, and scientific interven-

Table 3. Comparison of the self-care abilities between the two groups ($\bar{x} \pm s$)

Groups	Self-care skills	Health knowledge	Self-responsibility	Self-consciousness
Observational group (n=30)				
Before intervention	15.61±2.41	16.31±3.41	14.31±3.63	13.45±3.21
After intervention	33.48±5.46*	45.86±5.98*	25.34±2.34*	36.54±4.56*
Control group (n=29)				
Before intervention	15.84±2.63	16.87±3.57	14.67±3.67	13.42±3.36
After intervention	25.26±2.31*,#	38.47±3.64*,#	15.35±2.04*,#	23.56±4.12*,#

Note: Compared with before the intervention, *P<0.05; compared with the observation group, #P<0.05.

Table 4. Comparison of the ADL, NIHSS, and FMA scores between the two groups ($\bar{x} \pm s$)

	Observational group (n=30)	Control group (n=29)	t	P
ADL				
Before intervention	24.50±5.36	24.70±5.50	0.095	0.924
After intervention	71.00±3.84*,##	60.00±8.43*	4.942	0.000
NIHSS				
Before intervention	17.80±1.36	17.80±1.23	0.139	0.891
After intervention	10.10±1.17*,##	13.55±2.16*	17.131	0.000
FMA				
Before intervention	20.60±2.46	20.40±2.50	0.256	0.800
After intervention	62.80±8.64*,##	50.10±7.10*	3.842	0.001

Note: ADL: Activities of Daily Living; NIHSS: National Institutes of Health Stroke Scale; FMA: Fugl-Meyer Assessment. Compared with before the intervention, *P<0.05; compared with the observation group, ##P<0.05.

Table 5. Comparison of the incidences of complications in the two groups (n/%)

Groups	Lung infection	Urinary infection	Pressure sore	Total rate
Observational group (n=30)	2	0	0	2 (6.67%)
Control group (n=29)	3	1	1	5 (17.24%)
t				4.336
P				0.037

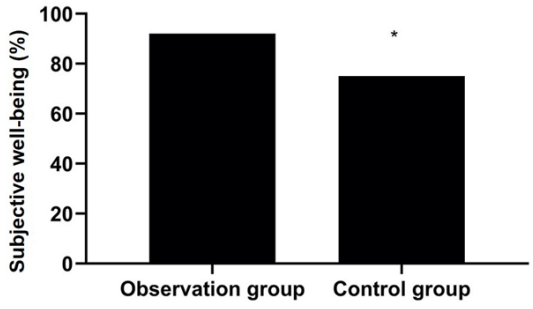

Figure 1. Comparison of the subjective well-being between the two groups in the rehabilitation phase. Compared with the observation group, *P<0.05.

tion for the patients after their discharge, helps the patients learn to swallow properly, which is beneficial to their rehabilitation [18]. Moreover, this study also showed that the subjective well-being of patients in the observational group was significantly better than it was in the control group, which indicated that self-management intervention plays a positive role in the improvement of subjective well-being in stroke patients during their rehabilitation. Patients with good self-management behaviors can take good care of themselves, perform well in disease care and enhance their self-confidence to overcome the disease; therefore, patients engaging in the effective self-management behaviors can improve their disease symptoms and improve their subjective well-being [19].

This study found that patients who applied self-management skills showed a significant elevated self-care ability when comparing with patients who received routine interventions. This result suggested that self-management intervention positively promotes the self-efficacy of stroke patients in the rehabilitation phase. It is also reported that self-management among patients with esophageal cancer showed a significant increase in self-efficacy and the other aspects [20]. The underlying mechanism might be associated with the acquisition of knowledge and skills, which is necessary for establishing effective self-management behavior, but it is not sufficient. Self-confidence is the

motivation for behavior changes. Only when patients believe "I can do it, and I have to do it" will they have enough motivation to change their behavior actively.

There are also several limitations to this study, such as its not being a long-term study and the small size of the study cohort. A large sample size study is still required in the future to avoid the negative influence resulting from the limited size of the cohort.

In summary, self-management can effectively promote the self-care abilities, enhance patient confidence in disease management, as well as improve the quality of life in stroke patients in the rehabilitation phase.

Disclosure of conflict of interest

None.

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