

Original Article

The effect of comprehensive rehabilitation nursing on mental state recovery and neurological dysfunction in elderly stroke patients

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Abstract: Objective: To apply comprehensive rehabilitation nursing in the treatment of elderly stroke patients and to investigate its effect on their mental state recovery and neurological dysfunction. Methods: This prospective study was conducted on 130 elderly stroke patients admitted to our hospital between March 2017 and October 2019. Based on a random number table, these patients were allocated to the control group (n=65) or the experimental group (n=65). During the treatment period, the patients in both groups received drug treatment. Moreover, the patients in the control group received routine nursing, while the patients in the experimental group received comprehensive rehabilitation nursing. The two groups' mental states (such as anxiety and depression), their neurological deficit degrees, their swallowing functions, their daily life activities, and their quality of life were compared before and after the intervention. Results: The two groups' self-rating anxiety scale (SAS) scores, their self-rating depression scale (SDS) scores, and their clinical neurological deficit scale (CSS) scores at two and four weeks after the intervention were gradually reduced and were significantly lower than they were before the intervention (all $P < 0.05$). At the same time points, the scores in the experimental group were significantly lower than the scores in the control group (all $P < 0.05$). The Gugging swallowing screen (GUSS) scores in the two groups at two and four weeks after the intervention were gradually increased and were significantly higher than the scores before the intervention (all $P < 0.01$). At the same time points, the GUSS scores in the experimental group were significantly increased compared with the control group (all $P < 0.05$). The modified Barthel index (MBI) scores and the stroke-specific quality of life (SS-QOL) scores in both groups at one month and two months after the intervention were gradually increased and were significantly higher than the scores before the intervention (all $P < 0.01$). At the same time points, the MBI and SS-QOL scores in the experimental group were significantly higher than the corresponding scores in the control group (all $P < 0.001$). Compared with the control group, the total incidence of complications in the experimental group was significantly decreased ($P < 0.05$). Conclusion: The comprehensive rehabilitation nursing of elderly stroke patients helps decrease the occurrence of negative emotions, promotes improved post-recovery quality of life and nerve function, improves the swallowing function and daily life activities, and reduces the risk of complications.

Keywords: Stroke, elderly, comprehensive rehabilitation nursing, mental state, neurological function

Introduction

Stroke is a common cerebrovascular disease with high rates of disability and mortality [1]. It was reported that about 75% of stroke patients also suffer from significant autonomic symptoms: decline and even the loss of the speech function, swallowing function, nerve function, and daily life activities, significantly reduced quality of life and an increased incidence of negative emotions such as anxiety, depression, and fear. Their subsequent reha-

ilitation was also postponed [2-6]. The middle-aged and elderly populations are more prone to stroke. In people over 55 years old, the incidence of stroke doubles every ten years [7]. There are significant differences in the physiological function, development, and prognosis of the disease between young and elderly patients. Therefore, for elderly patients, nursing intervention should be carried out in various aspects and at different levels to improve the treatment effect and promote the recovery [8].

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Table 1. Baseline data ($\bar{x} \pm sd$)

Group	Experimental group (n=65)	Control group (n=65)	t	P
Gender (n)			0.502	0.479
Male	35	39		
Female	30	26		
Age (years)	70.9±4.3	71.7±5.1	0.967	0.335
BMI (kg/m ²)	23.59±3.22	23.10±4.67	0.696	0.487
Type of stroke (n)			0.694	0.707
Cerebral infarction	48	52		
Cerebral hemorrhage	13	10		
Subarachnoid hemorrhage	4	3		
Underlying disease (n)			1.178	0.555
Hypertension	25	20		
Hyperlipidemia	18	21		
Diabetes	13	9		

Note: BMI: body mass index.

With the rapid development of rehabilitation medicine, comprehensive rehabilitation nursing has become an indispensable nursing model in neurology departments. Comprehensive rehabilitation nursing, which is combined with clinical medicine, is a comprehensive and coordinated application of medical, social, and occupational measures to train and retrain disabled people. As a result, the inconvenience induced by cause of disability is reduced, the ability to move is enhanced, and self-care in daily life and re-engagement in social activities are realized [9, 10]. At present, there are many studies on the effect of comprehensive rehabilitation nursing on neurological function in stroke patients. The incidence of negative emotions in stroke patients is high. However, the effect of nursing on negative emotions is always ignored. In this study, we explored not only the effect of comprehensive rehabilitation nursing on neurological dysfunction but also mental state in elderly stroke patients.

Materials and methods

General information

This prospective study was conducted on 130 elderly stroke patients admitted to the South District, the Second Hospital of Shandong University from March 2017 to October 2019. According to a random number table, these patients were divided into the control group and the experimental group (65 patients in

each group). The baseline data are shown in **Table 1**.

Inclusion criteria: Patients aged over 60 years old, patients were diagnosed with a stroke using CT or MRI imaging, patients with a clear consciousness, a normal cognitive function, and a normal communication ability, patients whose time from onset to admission was within 3 days, and patients whose informed consent was signed by the patients themselves or their family members.

Exclusion criteria: Patients with a severe hearing impairment, aphasia, or cognitive dysfunction; patients with mental illnesses, patients with severe heart, lung, kidney, or other important organ dysfunctions or failure, patients who were transferred to other hospitals, patients who declined to receive any treatment.

This study was approved by the Ethics Committee of the South District, the Second Hospital of Shandong University.

Methods

The patients in both groups received drug treatment, such as thrombolysis, anticoagulation therapy, correction of water-electrolyte balance, and neuroprotection. During the treatment period, the patients in the control group received routine nursing, including routine medication guidance during hospitalization and discharge guidance.

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In the experimental group, the patients received comprehensive rehabilitation nursing. Specifically, the nursing consisted of health education, psychological support, physical function training, swallowing function training, and cognitive intervention. (1) Health education: After admission, the patients were given stroke-related information, and information on relative therapy, and the importance of active cooperation, potential complications, and problems that need special attention. Thereafter, they were fully aware of their conditions and the importance and necessity of active cooperation. As a result, they spontaneously and actively cooperated with the doctors and nurses. (2) Psychological support: Effective communication was established between the nursing staff and the patients. They were encouraged to express and vent their negative emotions through language. Supportive psychological nursing was used to help the patients adjust their bad psychological states, relieve or eliminate their negative emotions such as anxiety and depression, and enhance their confidence in defeating disease. If there was significant anxiety, depression, or other negative emotions in the patients, psychotherapists would be invited to help them address their psychological problems using reasonable emotional therapy. (3) Physical function training: Maintaining good posture helped to prevent the occurrence of typical flexor spasms of the upper limbs and the lower limb extensors. In order to prevent joint contracture of the affected limb, the nursing staff were supposed to help the patients, who had received a few days' treatment but still failed to move independently, to perform passive movements. The movement was started a large joint and ended at a small joint, and this was done three times/day. In addition, the movement was performed slowly and aggressiveness was avoided. The training was not finally completed until the active and autonomous movement of the affected limb was restored. Thereafter, the patients received active systematic functional rehabilitation training: according to patients' conditions, their family members were instructed to help them perform turnover training, and they were informed of the skills of turning over on their healthy side and the affected side. For patients with spasticity, continuous anti-spasm training was performed to eliminate the abnormal muscle movement and the occurrence of continuous sp-

asms. With the assistance of the nursing staff, they performed standing balance training and stair climbing training as soon as their conditions were improved. (4) Swallowing function training: The patients with poor swallowing functions were instructed to clean their oral cavities and perform exercises like mouth opening and closing, cheeks bulging, and swallowing. These exercises helped enhance their swallowing function. For patients with mild-to-moderate dysphagia, paste-like food was their source of energy. The heads of their beds were properly raised to prevent accidental aspiration. (5) Cognitive intervention: Cognitive reconstruction was applied to help the patients determine all their bad thoughts. In addition, they were instructed to establish an active cognitive model to improve their abnormal cognition.

Outcome measures

For the inpatients, the investigation was directly performed during their hospitalization. The discharged patients were asked to do a re-examination and fill out relevant questionnaires four weeks after the intervention.

The main outcome measures were: (1) The self-rating anxiety scale (SAS) and self-rating depression scales (SDS) were applied to assess the anxiety and depression of the patients in both groups before the intervention, and at two and four weeks after the intervention, respectively. For the SAS scores, 50 points was the cut-off value; the higher the SAS score, the more severe the anxiety was. For the SDS scores, 53 points was the cut-off value; the higher the SDS score, the more severe the depression was. (2) The clinical neurological deficit scale (CSS) was used to evaluate the degree of neurological deficit of the patients in the two groups before the intervention, and at two and four weeks after the intervention [11]. The total possible score was 45 points: 0-15 points indicated mild, 16-30 points indicated moderate, and 31-45 points indicated severe.

The secondary outcome measures were: (1) The Gugging swallowing screen (GUSS) was applied to evaluate the swallowing function of the patients in the two groups before the intervention, and at two and four weeks after the intervention [12]. The total score was 20 points; the higher the score, the better the swal-

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Table 2. SAS and SDS scores ($\bar{x} \pm sd$)

Outcome measure	Time	Experimental group (n=65)	Control group (n=65)	t	P
SAS score	Before intervention	51.43±4.58	52.21±5.15	0.912	0.363
	2 weeks after intervention	42.20±4.33**	44.57±5.20**	2.824	0.006
	4 weeks after intervention	34.48±4.08**	40.56±4.77**	7.809	<0.001
SDS score	Before intervention	49.88±4.09	50.36±4.75	0.617	0.538
	2 weeks after intervention	45.28±5.40**	47.64±4.39**	2.734	0.007
	4 weeks after intervention	40.80±4.33**	42.58±4.40**	2.325	0.022

Note: SAS: self-rating anxiety scale; SDS: self-rating depression scale. Compared with before the intervention, **P<0.01.

lowing function was. (2) The modified Barthel index (MBI) was used to assess the daily life activities of the patients in both groups before the intervention, and at one month and two months after the intervention. The total score was 100 points; the higher the score, the stronger the activity of daily living was. (3) The stroke-specific quality of life (SS-QOL) scale was applied to evaluate the quality of life of the patients in the two groups before the intervention, and at one month and two months after the intervention [13]. The scale is composed of 78 items which are allocated to 12 aspects, like physical fitness, family role, language, daily life activities, mood, personality, self-care ability, social roles, thoughts, upper limb function, vision and work ability. The total score was 390 points, with each item scored from 0-5 points. The higher the score, the better the quality of life was. (4) Complications, like joint contracture, shoulder subluxation, shoulder-hand syndrome, and foot drop were compared between the two groups.

Statistical methods

All the data were analyzed using SPSS statistical software version 20.0. The measurement data were expressed as the mean \pm standard deviation ($\bar{x} \pm sd$). Independent sample t tests were used for the inter-group comparisons, while paired t-tests were applied for the before and after comparisons within the same group. The enumeration data were expressed as number/percentage (n/%), and the comparisons were conducted using chi-square tests. A difference was statistically significant when the P value was less than 0.05.

Results

Baseline data

There were no significant differences concerning the baseline data such as gender, age, body

mass index (BMI), type of stroke, or underlying disease in the two groups (all P>0.05). See **Table 1**.

SAS and SDS scores

The SAS and SDS scores in the two groups at two and four weeks after the intervention were gradually reduced, and they were significantly lower than the corresponding scores before the intervention (all P<0.01); at the same time points, the SAS and SDS scores in the experimental group were significantly declined when compared with the control group (all P<0.05). See **Table 2**.

CSS scores

The CSS scores in both groups at two and four weeks after the intervention were gradually decreased, and they were significantly lower than they were before the intervention (all P<0.05); at the same time points, the CSS scores in the experimental group were significantly lower than they were in the control group (all P<0.05). See **Table 3**.

GUSS scores

The GUSS scores in the two groups at two and four weeks after the intervention were gradually increased and were significantly higher than they were before the intervention (all P<0.01); at the same time points, the GUSS score in the experimental group were significantly increased when compared with the control group (all P<0.05). See **Table 4** and **Figure 1**.

MBI scores

The MBI scores in both groups at one month and two months after the intervention were gradually raised, and they were significantly higher than they were before the intervention (all P<0.01); at the same time points, the MBI

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Table 3. CSS scores ($\bar{x} \pm sd$)

Group	CSS scores		
	Before intervention	2 weeks after intervention	4 weeks after intervention
Experimental group (n=65)	24.88±3.37	21.30±3.09**	14.49±2.20**
Control group (n=65)	24.36±3.54	22.79±3.66*	17.78±2.80**
t	0.858	2.508	7.449
P	0.393	0.013	<0.001

Note: CSS: clinical neurological deficit scale. Compared with before the intervention, *P<0.05, **P<0.01.

Table 4. GUSS scores ($\bar{x} \pm sd$)

Group	GUSS scores		
	Before intervention	2 weeks after intervention	4 weeks after intervention
Experimental group (n=65)	8.87±2.19	11.44±2.64**	14.47±2.70**
Control group (n=65)	8.21±2.36	10.36±2.10**	12.08±2.54**
t	1.653	2.581	5.198
P	0.101	0.011	<0.001

Note: GUSS: Gugging swallowing screen. Compared with before the intervention, **P<0.01.

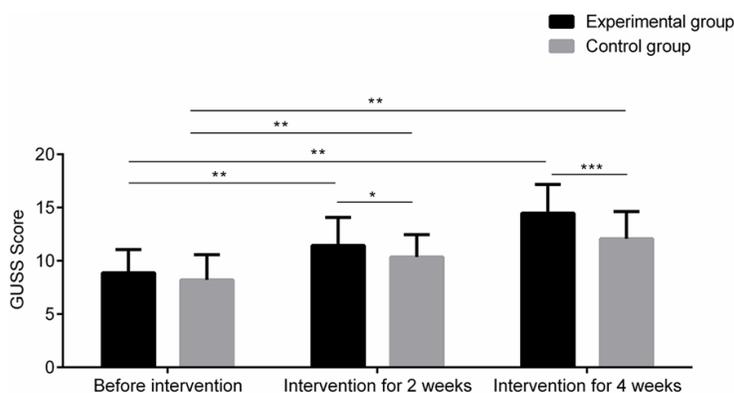


Figure 1. Comparison of the GUSS scores before and after the intervention. GUSS: Gugging swallowing screen. Compared with before the intervention, *P<0.05, **P<0.01, ***P<0.001.

scores in the experimental group were significantly higher than they were in the control group (all P<0.001). See **Table 5**.

SS-QOL scores

The SS-QOL scores in both groups at one month and two months after intervention were gradually increased, and they were significantly higher than they were before the intervention (all P<0.01); at the same time points, the SS-QOL scores in the experimental group were significantly increased when compared with the control group (all P<0.001). See **Table 6**.

Complications

The complications in the experimental group, which included joint contracture (1 case), shoulder subluxation (3 cases), shoulder-hand syndrome (1 case), and foot drop dizziness (3 cases), were significantly lower than they were in the control group (12.31% vs 26.15%, $\chi^2=4.011$, P=0.045), which consisted of joint contracture (2 cases), shoulder subluxation (6 cases), shoulder-hand syndrome (4 cases), and foot drop dizziness (5 cases).

Discussion

The incidence of depression in post-stroke patients is twice that of non-stroke patients [14]. In addition, about 40% of elderly post-stroke patients suffer from secondary psychological problems [15]. The reasons for psychological disorders in post-stroke patients are complicated. Patients' normal life and work have been seriously disturbed by the unexpected great life change. In addition, there are multiple function disorders in their body. As a result, they consciously feel that life is hopeless and are prone to develop depression (such as demoralization and despondence), restless-

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Table 5. MBI scores ($\bar{x} \pm sd$)

Group	MBI scores		
	Before intervention	1 month after intervention	2 months after intervention
Experimental group (n=65)	53.47±5.55	65.60±4.90**	79.68±5.50**
Control group (n=65)	54.72±5.31	60.07±5.24**	70.70±6.59**
t	1.312	6.215	8.435
P	0.192	<0.001	<0.001

Note: MBI: modified Barthel index. Compared with before the intervention, **P<0.01.

Table 6. SS-QOL scores ($\bar{x} \pm sd$)

Group	SS-QOL scores		
	Before intervention	1 month after intervention	2 months after intervention
Experimental group (n=65)	254.30±14.48	287.57±17.70**	310.88±20.87**
Control group (n=65)	257.78±16.53	270.80±15.58**	290.56±18.70**
t	1.277	5.734	5.846
P	0.204	<0.001	<0.001

Note: SS-QOL: stroke-specific quality of life. Compared with before the intervention, **P<0.01.

ness, dysphoria, and even suicidal tendencies. If patients are not able to properly deal with their pressure or promptly adjust their mental state, they will suffer from psychological disorder [16]. Therefore, it is quite important for stroke patients to receive psychological counseling. Psychological support is an important part of comprehensive rehabilitation nursing. In this model, effective communication is established between the nursing staff and the patients. Moreover, supportive psychological nursing is applied to help the patients adjust their bad psychological states. Accordingly, patients' negative emotions such as anxiety and depression are relieved or eliminated, and their psychological state is improved. In this study, the patients in the experimental group received comprehensive rehabilitation nursing. Our results showed that the SAS and SDS scores in the experimental group at two and four weeks after the intervention were significantly lower than the corresponding scores in the control group, suggesting that comprehensive rehabilitation nursing can significantly improve patients' anxiety, depression, and other negative emotions. These findings are consistent with other results reported previously [17].

In post-stroke patients, reorganization and plasticity are characteristics of the central nervous system (CNS). The plasticity of CNS can be realized through the activation of potential neu-

ral pathways, neural links, and new synapses, which are composed of collateral long buds of neuronal axons [18]. After the patients' conditions are stable, systematic functional rehabilitation training is supposed to be carried out as soon as possible to promote the recovery of patient's nervous systems [19]. In our study, physical function and swallowing function training are the keys to comprehensive rehabilitation nursing. Systematic functional rehabilitation training can promote the formation of novel neural pathways around the lesion, so that the afferent impulses are smoothly received by sensory receptors. Thereafter, neurocompensation and reorganization are promoted. In the end, patients' lost functions are restored, and their quality of life is improved [20]. Here, our results showed that GUSS scores in the experimental group at two and four weeks after intervention were significantly increased when compared with the control group, while the CSS scores were significantly declined. The MBI scores and SS-QOL scores in the experimental group at one month and two months after the intervention were significantly higher than they were in the control group, which is consistent with the results reported by Iwona et al. [21]. Compared with the control group, the total incidence of complications in the experimental group was significantly reduced. To conclude, comprehensive rehabilitation nursing is beneficial for the improvement of swallowing func-

tion, the reduction of the degree of neurological deficit, the enhancement of daily life activities, the decline of the incidence of complications, and the improvement of the quality of life.

However, there are certainly some shortcomings in this study. Due to various reasons, the number of cases was inadequate. In addition, there no long-term follow-up was done. In order to verify the effect of comprehensive rehabilitation nursing on the recovery of multiple functions in stroke patients, a subsequent follow-up study will be performed.

In summary, comprehensive rehabilitation nursing of elderly stroke patients is beneficial for decreasing the occurrence of negative emotions, for promoting the post-recovery of quality of life and nerve function, for improving swallowing function and daily life activities, and for reducing the risk of complications. It is worthy of clinical promotion.

Disclosure of conflict of interest

None.

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