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*Randomized Controlled Trial*

**Optimization of nursing interventions for postoperative mental status recovery in patients with cerebral hemorrhage**

**INTRODUCTION**

Cerebral hemorrhage is a severe bleeding in the brain caused by the blood rupture vessels in the brain tissue due to sudden excitement, excessive exercise, and mental work<sup>[1]</sup>. Its clinical morbidity is very high, with the World Health Organization statistics finding that about 40.4% of patients die in the first month after a cerebral hemorrhage, and many more survivors have irreversible disabilities after successful clinical resuscitation<sup>[2]</sup>. However, in a previous review study, it was found that the common causes of cerebral hemorrhage are hypertension, cerebrovascular atherosclerosis, and cerebrovascular malformation. Hypertension is responsible for > 80% of all cerebral hemorrhages and is a priority for prevention<sup>[3]</sup>.

In modern society, with the change of the global medical model, the clinical treatment of the patient's disease is not a single requirement, but the pursuit of a full range of needs, from health care prevention-treatment-physical and mental rehabilitation - the pursuit of a better quality of life, but today's medical care model only meets the general needs of the patient, the individual needs of the care, there are still some shortcomings. Most studies have shown that patients with cerebral hemorrhage experience significant changes in their psychological state after surgery, including anxiety, depression, and decreased sleep quality, and that these psychological conditions can lead to dysfunctions in multiple systems<sup>[4,5]</sup>. Quality of life has been found to be positively correlated with the ability to care for oneself. A good nursing care model can help

patients with cerebral hemorrhage have a good prognosis and improve their satisfaction with their care<sup>[6]</sup>.

Recently, studies have demonstrated that the addition of psychological intervention in rehabilitation care has a better effect on the psychological recovery of postoperative patients, and psychological intervention care can effectively improve the psychological stress of postoperative patients due to the fear of surgery and the expectation of the recovery effect, but there are fewer studies on the joint psychological intervention care in the rehabilitation care of cerebral hemorrhage patients. Based on the background of the previous studies, we used a randomized controlled study to investigate the optimization of the role of the nursing intervention in the recovery of the mental state of postoperative patients with brain hemorrhage, and to provide a clinical reference for the rehabilitation of patients with cerebral hemorrhage in the future.

## **MATERIALS AND METHODS**

### ***Research participants***

Our study population consisted of patients with postoperative hypertensive cerebral hemorrhage (HCH) who were admitted to our surgical department. The admission period was from May 2021 to May 2023, and 120 patients were admitted. Simple random sampling was used to divide the patients into the observation and control groups, with 60 patients per group. The criteria for inclusion in the study were as follows: (1) patients with cerebral hemorrhage who met the diagnostic criteria for stroke, as evidenced by computed tomography or magnetic resonance imaging; (2) meet the diagnostic criteria for high blood pressure, which are a systolic blood pressure of  $\geq 140$  mmHg and a diastolic blood pressure of  $\geq 90$  mmHg; (3) conscious patients with a neurological deficit score of  $\geq 5$  points; (4) patients without previous serious mental illness; (5) patients without severe comorbid organ damage; and (6) patients without cognitive dysfunction or psychological disorders.

If any patient has the following conditions, the observation should be terminated and excluded: (1) the observation group cannot successfully complete the whole treatment

phase during the intervention for various reasons, and their compliance is poor that they cannot cooperate and comply with the nursing intervention on time; (2) patients in the control group did not comply with the nursing model during the study period; and (3) patients who experienced a sudden accidental life crisis during the period of receiving treatment.

The study was approved by the ethics committee of our hospital prior to the study, and all participants signed an informed consent form.

### *Research design*

This study mainly used randomized controlled trials. Subjects were randomized into observation and control groups. Rehabilitation nursing was added to the routine nursing model to care for patients with cerebral hemorrhage. The control group only used the conventional nursing model.

Rehabilitation nursing model: The researcher formed an observation group with five nurses and one professional rehabilitation therapist who passed training in the undergraduate department; the nurses had more than five years of clinical work experience, bachelor's degree or above, and supervisor nurse or above; the rehabilitation therapist had a professional qualification certificate, postgraduate education or above, and possessed good clinical rehabilitation skills. Patients in the observation group underwent a mental nursing intervention prescription based on the control group, and the intervention prescription was set according to the characteristics of stroke disease staging, which included self-concept aspects in the onset stage; disease-related behavioral aspects and daily life behaviors in the critical stage; disease-related behavioral aspects, daily life behaviors, and self-concept in the acute stage; and disease-related behavioral aspects, daily life behaviors, and self-concept in the stable stage; daily living behavior aspects and self-concept aspects in the stable phase; and disease-related behavior aspects and daily living behavior aspects in the unstable phase.

In the process of intervention, the researcher, to help patients master knowledge of the disease and various rehabilitation techniques and self-care skills, uses the health education board structure chart to carry out individualized health education for patients. The main method is that the researcher carries the health knowledge board structure chart to the patient's bedside, and the patient chooses the boards that interest him according to his needs, carries out one-to-one guidance, and asks his family members or the patient to cooperate with the exercise, to judge whether the patient has mastered the knowledge.

To judge whether the patient has mastered it, the researcher can carry out semi-structured questioning and set up identification cards for knowledge feedback, and the health education of different disease stages follows the patient's individual wishes and needs for health guidance. The intervention was carried out from the day the patient was admitted to the hospital. During the hospital period, the intervention time was concentrated from 10:00 a.m. to 12:00 p.m. and 14:00 p.m. to 18:00 p.m. every day, each time from 30 min to 60 min. After discharge, the intervention time was for WeChat interaction every day from 18:00 p.m. to 20:00 p.m., weekly home visits, and weekly remote video on Saturdays and Sundays. According to the patient's needs, appointment of home visits and guidance was made, and if the patient had serious problems, they were asked to return to the hospital for follow-up at any time. The entire prescription intervention was conducted for eight weeks.

#### *State of consciousness rating Scale*

The Glasgow Coma Scale, developed by Teasdale and Jennett in 1974, assesses disorders of consciousness. The items included eye-opening responses (1-4 points), motor responses (1-5 points), and verbal responses (1-6 points). The scale has a maximum score of 15 and a minimum score of 3. The higher the score, the better the state of consciousness. Those with a score lower than 3 are in a deep coma, and a score of 3-6 suggests that the patient has a poor prognosis<sup>[7]</sup>.

### *Mental status score*

**Pittsburgh sleep quality index:** In 1989, Dr Buysse, a psychiatrist at the University of Pittsburgh, USA, and others developed the Pittsburgh sleep quality index (PSQI). Participants' sleep quality over the past month was assessed using the PSQI. It consists of 19 self-rating items and 5 others review projects, of which the 19<sup>th</sup> self-rating item and the 5 others review projects do not take part in the scoring process. Only 18 self-evaluation items that participated in scoring are introduced here. Eighteen items have seven components, each of which has a score on a scale of 0-3. The cumulative score for each component is the total PSQI score, with a total score range of 0-21. Each component is summed to produce a PSQI score, which ranges from 0 to 21. The higher the score, the poorer the quality of sleep<sup>[8]</sup>.

**Anxiety scale (SAS):** The Zung Anxiety Self-Rating Scale, first developed in 1971, is a self-report measure of anxiety used primarily in adults and consists of 20 items on a four-point scale ranging from one to four. These are then multiplied by 1.25 for a standard score. In relation to the national norm, the final classification of the SAS standard is as follows: Total score  $\geq 50$  has anxiety symptoms,  $< 50$  has no anxiety symptoms. Cronbach's  $\alpha$  for this scale was 0.931<sup>[9]</sup>.

**Depression scale (SDS):** Developed by Zung in 1965, the SDS is a self-report measure of the severity of depressive symptoms in adults, consisting of 20 items on a four-point Likert scale from one to four (*i.e.*, none to all of them). The total score of the SDS index is the integer portion of the scores of each of the 20 entries added together to obtain the initial score, and then multiplied by 1.25. Referring to the results of the national norm, the final SDS criteria were: a total score  $\geq 53$  as having depressive symptoms and  $< 53$  as not having depressive symptoms<sup>[10]</sup>.

### *Nursing care satisfaction scores*

Newcastle Satisfaction with Nursing Scale was used in this study for nursing satisfaction measurement. Several scholars in China have systematically elaborated on the study of satisfaction with inpatient nursing services, and found that the scale is universal, with a total of 19 entries, and adopts the Likert 5-point scale, including very dissatisfied, dissatisfied, overall satisfaction, satisfaction and very satisfaction in terms of "One, two, three, four and five". The higher the score, the greater the satisfaction with care<sup>[11]</sup>.

### *Statistical analysis*

A database was set up and the data was entered using EpiData, after having double-checked. Data were entered after double checking. SPSS 26.0 software was used to analyze the data. Count data were analyzed using the chi-squared test for comparison. Measurement data were expressed as mean  $\pm$  SD. The two groups before and after the intervention were compared by repeated-measures ANOVA, the two groups were compared by two independent samples *t*-test, and the two groups within the groups were compared by the LSD procedure. Statistical significance was set at  $P < 0.05$ .

## **RESULTS**

### *Research participants*

This randomized controlled study included 120 patients admitted to our neurosurgery department for cerebral hemorrhage surgery who were randomly divided into observation and control groups. The results showed that there were no significant differences between the patients in the observation group and the control group in terms of age, sex, body mass index, years of education, or site of cerebral hemorrhage ( $P > 0.05$ ) (Table 1).

### *Consciousness scores of patients*

The patients' state of consciousness was regularly assessed after surgery and analyzed and compared between the two groups on 7, 14, 21 d postoperatively. The results

showed that the state of consciousness scores of the patients in both groups significantly increased ( $P < 0.05$ ) after surgical treatment. From the 14<sup>th</sup> day onwards, differences in the state of consciousness scores between the two groups of patients began to appear ( $P < 0.05$ ) (Figure 1).

#### *Mental status score of patients*

The patient's psychological state was assessed using indicators, including sleep quality, anxiety, and depression. The results showed that after one month of care, the sleep quality, anxiety, and depression states of patients in the observation group were significantly better than those in the control group ( $P < 0.05$ ) (Table 2).

#### *Nursing care satisfaction scores*

Comparison and analysis of the care satisfaction scores of the two groups of patients showed that the care satisfaction scores of the observation group were significantly higher than those of the control group ( $P < 0.05$ ) (Table 3).

### **DISCUSSION**

Cerebral hemorrhage caused by hypertension is usually found in the elderly population, and the latest statistics show that there are about 2 million cases of spontaneous cerebral hemorrhage in China every year, more than half of which accounts for HCH, with a mortality rate of up to 40%–70% and a disability rate of 50%–85%<sup>[12]</sup>. The results of this randomized controlled study showed that the rehabilitation nursing intervention combined with psychological care was able to significantly reduce the time it took for patients to recover from impaired consciousness in the postoperative period, and that patients in the observation group were in a better psychological state and were more satisfied with the care provided by the nursing staff compared with the control group.

HCH, as the most common chronic disease, has become a topic of global public health discussion because it is a key causative factor of functional disability, cognitive



impairment, and dementia in humans. Knowledge of the disease and prevention of patients with HCH has gradually attracted the attention of the public. Due to the large population base in China, there are more patients with cerebral hemorrhage, which places a huge burden on patients, their families, and society, and seriously affects people's standard of living; most patients suffer from neurological sequelae after treatment, cannot return to their daily life before the disease, and have a high degree of dependence, poor self-care ability, and more negative emotions<sup>[13,14]</sup>. Therefore, solving the psychological and self-care ability problems of HCH patients has become a challenge. Scientific and effective nursing care and active and accurate clinical treatment are the key to improving the prognosis and cure rate of the disease. However, the traditional nursing model has certain limitations in the clinic and cannot fully adapt to patients in different situations, which will ultimately lead to the patient's prognosis not reaching their own expectations, especially in terms of the patient's emotions. Therefore, the introduction of a new model that meets the needs of the modern chronic patient population in clinics will play a crucial role in the recovery and management of patients with chronic diseases.

Consciousness assessment is of great significance in the postoperative rehabilitation and prognosis of patients with cerebral hemorrhage. Rehabilitation nursing care requires the nursing staff to pay constant attention to the patient's state of consciousness and communicate with the attending physician in a timely manner. Moreover, patients with postoperative cerebral hemorrhage often suffer from pressure injuries, and in the state of coma, nursing staff are required to turn the patient over and massage him/her regularly to avoid pressure injuries and to promote the recovery of consciousness<sup>[15,16]</sup>. In our study, we showed that the rehabilitative care provided to the patients resulted in a difference in the state of consciousness scores of the observation group compared to the control group on day 14, and that the state of consciousness scores of the observation group were significantly higher than those of the control group on day 21 ( $P < 0.05$ ). Psychological support is of great importance to the postoperative rehabilitation of patients with cerebral hemorrhage, and early psychological support for

patients cerebral hemorrhage to prevent postoperative depressive disorders has shown good results<sup>[17]</sup>. In the traditional nursing model, the psychological state of patients and their families is often poorly perceived, but in fact, most postoperative patients with cerebral hemorrhage are anxious and depressed due to the fear of the effect of postoperative treatment and the need for bed rest, which leads to a strong stress reaction after surgery<sup>[18]</sup>. It is important to implement personalized psychological care for patients at this stage. A British study showed that postoperative psychological care for patients with cerebral hemorrhage effectively improved their recovery and reduced the incidence of adverse complications<sup>[19]</sup>. Similarly, our study showed that postoperative psychological care improved patients' sleep quality and that good sleep quality greatly reduced the development of adverse emotions, and the relationship between sleep quality and anxiety and depression has been demonstrated in a number of previous studies<sup>[20]</sup>. Furthermore, by assessing anxiety and depression status after treatment, the psychological status of patients in the observation group was found to be significantly better than that of the control group. Although our study used a randomized controlled study to systematically demonstrate the role of nursing interventions in optimizing the mental status of patients with cerebral hemorrhage, our study lacked comprehensiveness, had a short observation period, and did not follow up the patients for a long period of time. In the future, extensive research is needed to demonstrate this.

## **CONCLUSION**

Our study showed that quality nursing interventions have an optimizing effect on the psychological state of patients with cerebral hemorrhage, which can significantly improve the psychological state of patients, promote the recovery of their consciousness, and increase nursing satisfaction and improve the doctor-patient relationship, however, extensive evidence needs to be further researched.

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**Figure 1 Consciousness scores of patients.** <sup>a</sup> $P < 0.05$ , <sup>b</sup> $P < 0.01$ , observation group *vs* control group. GCS: Glasgow Coma Scale.

**Table 1 Baseline characteristics of the study patients**

Factors	Observation group (n = 60)	Control group (n = 60)	P value
Age (yr)	67.23 ± 0.23	68.11 ± 0.36	0.590
Sex (Male/Female)	45/15	47/13	0.975
Body mass index (kg/m <sup>2</sup> )	22.14 ± 0.25	22.03 ± 0.20	0.057
Year of education (yr)	8.0 ± 0.50	7.5 ± 0.50	0.078
Cerebral hemorrhage site			0.612
Lobes of the brain	16	16	
Ventricles	13	12	
Thalamus	25	27	
Brainstem	6	5	

**Table 2 Mental status score of patients**

Index	Observation group	Control group	P value
SDS	45.72 ± 0.92	55.13 ± 2.21	< 0.001
SAS	44.11 ± 1.02	60.92 ± 2.90	< 0.001
PSQI	3.90 ± 0.67	19.02 ± 0.82	< 0.001

SDS: Self-rating depression scale; SAS: Self-rating anxiety scale; PSQI: Pittsburgh sleep quality index.

**Table 3 Nursing care satisfaction scores**

Group	Satisfaction scores
Observation group	95.20 ± 3.5
Control group	89.90 ± 2.5
t value	11.421
P value	< 0.001

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