The Impact of Systematic Stepwise Rehabilitation Nursing Intervention on the Prognosis and Disease Uncertainty of Patients with Hypertensive Intracerebral Hemorrhage

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Abstract: Objective: To explore the impact of systematic stepwise rehabilitation nursing intervention on the prognosis and disease uncertainty of patients with hypertensive intracerebral hemorrhage, and to provide feasible strategies for clinical nursing. Methods: Eighty patients with hypertensive intracerebral hemorrhage admitted to our hospital from January 2023 to June 2025 were selected and randomly divided into an observation group (n = 40, receiving systematic stepwise rehabilitation nursing) and a control group (n = 40, receiving conventional nursing). The intervention effects were analyzed by comparing changes in the National Institutes of Health Stroke Scale (NIHSS) scores for neurological recovery, Short Form 36 Health Survey (SF-36) scores for quality of life, Exercise of Self-Care Agency Scale (ESCA) scores for self-management ability, compliance, and the Mishel Uncertainty in Illness Scale (MUIS) scores between the two groups. *Results:* All scores in the observation group were significantly better than those in the control group after the intervention ($p < 0.05$). Specifically, the NIHSS scores decreased more significantly, the total SF-36 scores increased, the ESCA scores increased significantly, while the MUIS scores decreased significantly, and compliance improved markedly, indicating a reduction in disease uncertainty among patients. *Conclusion:* Systematic stepwise rehabilitation nursing intervention can significantly improve neurological recovery, quality of life, self-management ability, and compliance in patients with hypertensive intracerebral hemorrhage, while effectively reducing disease uncertainty. It is worthy of clinical promotion and application.

Keywords: Hypertensive intracerebral hemorrhage; Rehabilitation nursing; Stepwise intervention; Uncertainty in illness; Prognosis

1. Introduction

Hypertensive intracerebral hemorrhage (HICH) is a prevalent form of stroke, with its incidence rate rising annually, significantly impacting patients' lives and quality of life [1]. Particularly among the elderly, HICH exhibits a higher incidence rate and is often accompanied by multiple chronic diseases, complicating the rehabilitation

process. HICH is characterized by its acute onset, pronounced neurological deficits, and high risk of complications. Patients frequently experience long-term blood pressure fluctuations and underlying health conditions, factors that increase the complexity of rehabilitation and the difficulty of nursing care. Concurrently, patients and their families often endure substantial psychological stress due to the sudden onset of the condition, posing additional challenges to nursing management. In recent years, advancements in imaging and minimally invasive techniques have led to a decline in mortality rates during the acute phase. However, suboptimal long-term functional recovery, impaired quality of life, and increased psychological burden remain significant clinical challenges. Nursing interventions play a crucial role in patient rehabilitation, with their scientific and systematic nature directly influencing prognosis and psychological well-being. Traditional routine nursing care primarily focuses on monitoring vital signs and preventing complications, while often neglecting patients' rehabilitation awareness and psychological adaptability. This oversight results in low self-management skills and inadequate disease awareness among discharged patients, frequently leading to anxiety and uncertainty in illness [2]. Uncertainty in illness refers to the psychological state arising from patients' unclear cognition of disease progression, treatment outcomes, and rehabilitation prospects. This state often manifests as anxiety, fear, or behavioral avoidance. A high level of uncertainty can increase psychological burden and affect rehabilitation compliance and quality of life. Studies have shown that reasonable rehabilitation nursing, through phased, goal-oriented interventions, can promote the recovery of neurological function while improving disease cognition and psychological adaptability [3].

Systematic stepwise rehabilitation nursing is a novel nursing intervention model that has garnered attention in the field of stroke rehabilitation in recent years. Its core concept is to design progressive nursing plans in stages based on patients' disease progression, rehabilitation needs, and individual differences. Its content primarily includes focusing on monitoring vital signs and implementing measures to prevent complications during the acute phase; conducting functional training and providing guidance on daily living skills during the subacute phase; and emphasizing psychological support and enhancing self-management abilities during the rehabilitation phase [4]. This model emphasizes the continuity and systematic nature of the nursing process while incorporating multidisciplinary collaboration to tailor rehabilitation plans for patients. Related studies both domestically and internationally have indicated that stepwise rehabilitation nursing has a positive effect on improving neurological function and quality of life in stroke patients. However, there is still a relative lack of research on patients with cerebral hemorrhage, particularly with limited reports on interventions for uncertainty in illness. Clinical observations have shown that patients with hypertensive cerebral hemorrhage often experience a high level of uncertainty in illness after discharge due to insufficient knowledge about the disease and a lack of rehabilitation guidance, which consequently affects their quality of life and long-term rehabilitation compliance [5].

Based on this, the subjects of this study are 80 patients with hypertensive intracerebral hemorrhage (HICH) admitted to our hospital, aiming to evaluate the impact of systematic stepwise rehabilitation nursing on neurological function, quality of life, self-management ability, and disease uncertainty in patients with HICH. The study seeks to provide a scientific and reliable reference for clinical medicine. Additionally, it attempts to explore the long-term effects of nursing interventions on patients' psychological adaptation, with the goal of offering practical guidance for optimizing HICH rehabilitation models.

2. Materials and methods

2.1. General information

Eighty patients with HICH admitted to our hospital from January 2023 to June 2025 were included in this study

and randomly divided into an observation group and a control group, with 40 patients in each group. There were no significant differences in general information such as gender, age, bleeding volume, and previous duration of hypertension between the two groups ($p > 0.05$), indicating comparability.

2.1.1. Inclusion criteria

(1) Aged between 18 and 80 years old and diagnosed with hypertensive intracerebral hemorrhage;
(2) Confirmed by imaging (CT or MRI) after admission;
(3) Conscious or in a mild coma, able to cooperate with nursing interventions;
(4) Signed informed consent.

2.1.2. Exclusion criteria

(1) Patients with severe cardiac, hepatic, or renal dysfunction or other systemic diseases;
(2) Previous severe stroke disability affecting functional assessment;
(3) Mental illness or cognitive impairment affecting cooperation;
(4) Life expectancy less than 6 months or at high risk of severe complications.

2.2. Methods

2.2.1. Control group

Routine nursing care was implemented, which included monitoring vital signs, providing basic nursing care, preventing complications, and offering dietary and medication guidance. Psychological intervention, disease education, and self-management training were not systematically conducted during the nursing process.

2.2.2. Observation group

On the basis of routine nursing care, a systematic stepped rehabilitation nursing intervention was implemented, with an emphasis on multidisciplinary collaboration (nursing department, rehabilitation department, and psychological department). The specific steps are as follows:

(1) Acute phase (from admission to the 7th day)

Focus on monitoring vital signs, changes in neurological function, and the risk of complications; establish nursing files and provide psychological comfort; guide family members to cooperate with nursing care, conduct education on basic disease management, and enhance the awareness of patients and their families regarding HICH and hypertension control; assess the patients' initial self-management abilities to provide a reference for formulating subsequent rehabilitation goals.

(2) Subacute phase (from the 8th day to discharge)

Carry out individualized limb function training, language rehabilitation, and life skills training; gradually cultivate patients' self-management abilities, including medication management, blood pressure monitoring, and self-care in daily life; regularly evaluate rehabilitation outcomes and adjust training plans; a joint evaluation by the multidisciplinary team should be conducted once a week to ensure the targeted and feasible nature of the intervention.

(3) Convalescence phase (follow-up at 3 months after discharge)

Follow-up was conducted via telephone calls, online video consultations, or outpatient visits to guide patients in their rehabilitation training; provide psychological support, disease education, and guidance on

rehabilitation adherence; and assess changes in quality of life and uncertainty about the disease. Family members were encouraged to participate in the follow-up guidance, forming a collaborative "physician-patient-family" rehabilitation model to enhance adherence.

2.3. Observational indicators

(1) Neurological function score

The NIHSS score was used, with lower scores indicating better neurological recovery. Assessment time points were at admission, discharge, and the 3-month follow-up.

(2) Quality of life

The SF-36 scale was used to measure quality of life, with higher total scores indicating better physiological function, social adaptability, and mental health status in patients.

(3) Self-management ability

The ESCA score was used, with higher total scores indicating stronger self-management abilities, focusing particularly on daily living abilities and adherence to rehabilitation training.

(4) Adherence indicators (newly added)

Completion rate of rehabilitation training, follow-up participation rate, and family cooperation level were used to assist in evaluating the intervention effect.

(5) Uncertainty about the disease

The MUIS scale was used, with higher total scores indicating stronger feelings of uncertainty. Changes in patients' perceptions of the disease and rehabilitation expectations were also recorded.

2.4. Statistical methods

This study utilized SPSS 26.0 statistical analysis software. Continuous data were presented as mean ± standard deviation ($\overline{x} \pm s$), with independent sample t-tests used for comparisons between groups and paired t-tests for comparisons within groups. Categorical data were presented as case numbers and percentages, with χ^2 tests used for comparisons between groups. A p-value < 0.05 was considered statistically significant.

3. Results

3.1. Comparison of neurological function recovery (NIHSS scores)

There was no statistically significant difference in NIHSS scores between the two groups before intervention ($p > 0.05$). After intervention, the scores in the observation group were significantly lower than those in the control group ($p < 0.05$), suggesting that systematic stepwise rehabilitation nursing intervention can significantly promote neurological function recovery, as shown in **Table 1**.

Table 1. Comparison of neurological function recovery (NIHSS scores) between the two groups ($\overline{x} \pm s$)

Group	Before intervention	After intervention
Control group (n = 40)	14.24 ± 3.53	10.86 ± 3.22
Observation group (n = 40)	14.20 ± 3.35	7.25 ± 2.87
t-value	0.321	4.873
p-value	0.757	< 0.001

3.2. Comparison of quality of life (total SF-36 scores)

There was no significant difference in quality-of-life scores between the two groups before intervention ($p > 0.05$). After intervention, the total SF-36 score in the observation group was significantly higher than that in the control group ($p < 0.05$), indicating that stepwise nursing intervention has a significant effect on improving quality of life, as shown in **Table 2**.

Table 2. Comparison of quality of life (total SF-36 scores) between the two groups ($\bar{x} \pm s$)

Group	Before intervention	After intervention
Control group (n = 40)	56.31 ± 8.55	64.79 ± 9.20
Observation group (n = 40)	55.79 ± 8.23	75.46 ± 8.77
t-value	0.232	5.312
p-value	0.830	< 0.001

3.3. Comparison of self-management ability (ESCA scores) and compliance

Before intervention, there was no significant difference in self-management ability and compliance between the two groups ($p > 0.05$). After intervention, the observation group significantly outperformed the control group, with a greater improvement ($p < 0.05$). The results indicate that systematic stepwise rehabilitation nursing can effectively encourage patients to actively participate in rehabilitation and daily management, as shown in **Table 3**.

Table 3. Comparison of self-management ability (ESCA scores) and compliance between the two groups ($\bar{x} \pm s$)

Group	Self-management ability		Compliance rate	
	Pre-intervention	Post-intervention	Pre-intervention	Post-intervention
Control group (n = 40)	62.52 ± 7.85	69.52 ± 8.19	74.01 ± 4.91	80.51 ± 5.34
Observation group (n = 40)	63.04 ± 7.57	79.54 ± 7.96	73.61 ± 4.51	87.53 ± 6.81
t-value	0.334	6.231	0.618	7.791
p-value	0.742	< 0.001	0.518	< 0.001

3.4. Comparison of illness uncertainty (measured by MUIS)

There was no significant difference in MUIS scores between the two groups before the intervention ($p > 0.05$). After the intervention, the score in the observation group was significantly lower than that in the control group ($p < 0.05$), suggesting that stepped care intervention can effectively reduce patients' uncertainty in illness, as shown in **Table 4**.

Table 4. Comparison of illness uncertainty (MUIS scores) between the two patient groups ($\bar{x} \pm s$)

Group	Before intervention	After intervention
Control group (n = 40)	84.63 ± 9.31	76.35 ± 8.76
Observation group (n = 40)	85.40 ± 9.04	62.80 ± 7.85
t-value	0.182	7.932
p-value	0.862	< 0.001

4. Discussion

Hypertensive intracerebral hemorrhage is an acute cerebrovascular disease characterized by sudden onset, significant damage, and a prolonged recovery period. This condition not only leads to neurological deficits but also severely impacts patients' quality of life, imposing substantial psychological stress [6]. Particularly among elderly patients and those with comorbid chronic conditions, rehabilitation is more challenging, often resulting in anxiety, depression, and uncertainty about the illness, thereby increasing the complexity of nursing management. While acute-phase treatment and routine nursing care can stabilize the condition and prevent complications, interventions for long-term rehabilitation, recovery of daily living skills, and psychological adaptation remain limited. Therefore, exploring a scientific and practical nursing model holds significant value for optimizing patient outcomes. Systemic nursing interventions not only improve physiological function but also enhance overall adaptability through behavioral interventions, cognitive education, and psychological support. The results of this study indicate that systemic stepped rehabilitation nursing intervention can significantly enhance neurological recovery, improve quality of life and self-management abilities, and effectively alleviate uncertainty about the illness [7]. After intervention, the NIHSS scores of patients in the observation group were significantly lower than those in the control group, indicating a more rapid and stable recovery of neurological function in the observation group. The underlying mechanisms may include the following aspects:

(1) Physiological mechanisms

Phased rehabilitation training promotes brain plasticity and neural reorganization, accelerating the recovery of motor function; stabilizing the condition during the acute phase to reduce secondary brain injury and create conditions for neural repair;

(2) Psychological mechanisms

Psychological counseling, health education, and family involvement reduce anxiety, fear, and behavioral avoidance, enhancing patient motivation and self-efficacy;

(3) Behavioral mechanisms

Individualized training and self-management guidance help patients establish regular rehabilitation behaviors, improve adherence, and reduce the risk of recurrence and complications.

In terms of quality of life, the SF-36 scores of patients in the observation group were significantly higher than those in the control group, indicating that nursing intervention not only aids physiological recovery but also has a positive impact on psychological well-being and social functioning [8]. Particularly in the social functioning dimension, the introduction of family and social support enhances patients' confidence in participating in social activities, contributing to the long-term maintenance of rehabilitation outcomes. The improvement in ESCA scores suggests enhanced self-management abilities among patients, facilitating adherence to rehabilitation training, medication adherence, and blood pressure control in daily life, thereby reducing the risk of recurrence. Disease-related uncertainty is a key factor exacerbating psychological stress in patients with hypertensive intracerebral hemorrhage. During the acute phase and rehabilitation process, patients often experience uncertainty due to a lack of clear understanding of their condition and prognosis. The study results show that patients in the observation group had significantly lower MUIS scores, indicating that stepped nursing intervention has a notable effect in alleviating uncertainty. This effect may stem from the following factors:

(1) Systematic health education enhances patients' understanding of their disease and the rehabilitation process;

(2) Psychological interventions combined with family involvement establish a robust support system and

strengthen patients' coping strategies;

(3) Remote follow-up and multidisciplinary collaboration maintain the continuity of interventions, reducing anxiety caused by insufficient information [9].

Related research findings both domestically and internationally indicate that phased rehabilitation training aids in accelerating the recovery of motor functions, enhancing self-care abilities, and alleviating negative emotions such as anxiety and depression, thereby strengthening psychological adaptability. Additionally, integrating a stepped-care nursing model with telemedicine and intelligent monitoring tools allows for real-time assessment of patients' rehabilitation progress, dynamic adjustment of intervention plans, and improved long-term adherence and rehabilitation outcomes.

It is noteworthy that the implementation of stepped-care nursing requires multidisciplinary collaboration, involving neurology nursing, rehabilitation therapy, and psychological guidance, and necessitates dynamic adjustments based on changes in patients' conditions, family resources, and social support to achieve individualized and sustainable rehabilitation management [10]. However, this study is limited by a small sample size, single-center design, and short-term follow-up, making it impossible to evaluate the long-term effects and adherence of the interventions. It is recommended that future research conduct large-sample, multicenter, and long-term follow-up studies to further assess the effectiveness of the stepped-care nursing model.

5. Conclusion

In summary, stepped rehabilitation nursing, through phased, systematic, and individualized interventions, not only improves neurological function, quality of life, and self-management abilities but also effectively reduces disease uncertainty. It promotes overall rehabilitation through multiple mechanisms involving physiology, psychology, and behavior, providing a sustainable and comprehensive rehabilitation plan for patients with hypertensive intracerebral hemorrhage. This approach holds high clinical application value and is worthy of promotion.

Disclosure statement

The author declares no conflict of interest.

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