

Original Article

Responsibility system nursing intervention for cerebral infarction complicated with hypertension can effectively control blood pressure and improve neurological function

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Abstract: Objective: This study aimed to explore the application value of responsibility system nursing intervention in patients with cerebral infarction and hypertension. Methods: Cerebral infarction patients complicated with hypertension who were admitted to our hospital were divided into groups according to different nursing methods. Altogether 131 patients who underwent responsibility system nursing intervention were included as the research group, and 112 who underwent conventional nursing intervention were regarded as the control group. Blood pressure and nerve function were observed. Results: We found that the blood pressure levels of both groups showed a fine range, and the diastolic and systolic blood pressure levels in the research group were better than those in the control group ($P < 0.05$). Self-management ability of patients before discharge from the hospital was evaluated via a self-made questionnaire, and the results showed that patients in the research group were better than those in the control group in medication compliance, emotional management and disease knowledge ($P < 0.05$). After nursing intervention, the NIHSS scores of both groups were improved compared with those before intervention ($P < 0.05$), while the scores of the observation group were dramatically lower than those of the control group ($P < 0.05$). The negative emotions of both groups were improved, while the negative emotion scores of the research group were lower than those of the control group. After different nursing intervention, the quality of life score of the observation group was higher than that of the control group ($P < 0.05$). By investigating the satisfaction of discharged patients with nursing in our hospital, we discovered that the satisfaction in the research group was higher than that of the control group ($P < 0.05$). Conclusion: Responsibility system nursing intervention for cerebral infarction complicated with hypertension can effectively control blood pressure and improve neurological function.

Keywords: Nursing, cerebral infarction, hypertension, neurological function

Introduction

Cerebral infarction is a common cerebrovascular disease with high morbidity and mortality. In China, it has become a primary factor of death and disability [1]. Moreover, patients complicated with cerebral infarction for the first time have a higher risk of relapse and death due to vascular complications in the later period [2]. Recently, with the change of people's lifestyle, the onset age of cerebral infarction is earlier

than before [3]. At present, many studies generally believe that hypertension is the main risk factor for cerebral infarction. Even for hypertension patients with stable blood pressure control, the morbidity of cerebral infarction is higher than that of normal people [4]. However, among the middle-aged and elderly population, the morbidity of hypertension has been at a relatively high level [5]. Because the predisposing factors of hypertension are related to many things, if the disease cannot be effectively con-

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trolled, the long-term rise of blood pressure will lead to endothelial dysfunction, induce cerebral apoplexy, cerebral infarction and hemiplegia [6]. Patients suffering from cerebral infarction complicated with hypertension for a long time often have negative emotions due to long treatment time, repeated illness and economic pressure, which seriously affects the recovery of the illness [7].

Responsibility system nursing is a representative nursing intervention mode that is used in clinical practice. It mainly emphasizes the specific division of labor and responsibilities of nursing staff during clinical nursing [8]. The model can effectively standardize and restrict nursing behaviors, and it plays a strong auxiliary role in patients' cooperative treatment and the improvement of prognosis [8, 9]. Studies have suggested that in the process of psychiatric inpatient treatment, when nurses adopt personal responsibility nursing mode it has good application value [10]. At present, the research of responsibility nursing mode clinically is relatively little. Therefore, this study adopts responsibility system nursing and conventional nursing intervention modes for cerebral infarction complicated with hypertension treated in our hospital, and compares the effects of the two nursing modes on the blood pressure and neurological function of patients.

Materials and methods

Patients with cerebral infarction and hypertension [6, 11] who were admitted to our hospital were divided into groups based on different nursing methods. Altogether, 131 patients who underwent responsibility system nursing intervention were included as the research group. Among them, the ratio of male to female patients was 77:54, and there were 36 cases of grade I hypertension, 48 with grade II and 47 with grade III. While 112 who underwent conventional nursing intervention were considered as the control group, and the ratio of male to female was 64:48, with 31 cases of grade I hypertension, 45 with grade II and 36 with grade III. The study was approved by the ethics committee, and the patients signed an informed consent form after being briefed about the experiment.

Inclusion criteria were as follows: those in accordance with the diagnostic criteria of cerebral infarction and hypertension; those willing

to accept and cooperate with this research; there was no cognitive impairment. Exclusion criteria were as follows: patients with depression; those unable to communicate normally; those who withdrew from the experiment midway; there were serious liver and kidney dysfunction; incomplete clinical data.

Conventional nursing was given to the control group: the changes of physical signs of patients during their stay in hospital received great care; they were given rehabilitation training by random nurses on duty; nurses carried out knowledge dispensation of the disease and patiently explain information related to cerebral infarction complicated with hypertension to patients; they were urged to take their drugs on time and to make reasonable diet arrangements; some complications found after treatment were well protected in advance so as to be dealt in a timely and calm manner; nurses recorded and cared for patients with early symptoms of anxiety and depression, and instructed special personnel to accompany and take care of them; the ward was equipped with corresponding ventilation devices, and it was disinfected and cleaned regularly; proper temperature and humidity in the ward was maintained to create a quiet and comfortable environment.

Responsible system nursing was given to the research group: in addition to that of conventional nursing, the nursing tasks were assigned to specialized nurses to carry out the division of responsibilities. Based on the nursing staffs' ability, experience and technology, combined with the actual situation of patients, the work was divided. Before carrying out the work, we conducted skill training for relevant nurses, and worked based on the scope of each nurse's responsibility (health education, psychological care, medication guidance, diet guidance, rehabilitation training, etc.). We daily updated the contents that the nurses needed to be responsible for on the bulletin board. We shifted arrangements reasonably, reduced shift timetables and maintained strength match, which reflected the whole management process, whole service process and seamless nursing service for patients. Each nurse clearly understood their own tasks and responsibilities, and we implemented a supervision mechanism to give outstanding nurses certain material rewards to improve the enthusiasm and quality of nursing. Regular responsi-

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Table 1. Clinical data of the two groups n [%]

	Research group (n=131)	Control group (n=112)	X ² /t	P
Gender			0.066	0.797
Male	77 (58.78)	64 (57.14)		
Female	54 (41.22)	48 (42.86)		
Age			0.291	0.589
≤60 years old	50 (38.17)	39 (34.82)		
>60 years old	81 (61.83)	73 (65.18)		
Smoking history			0.158	0.691
Yes	63 (48.09)	51 (45.54)		
No	68 (51.91)	61 (54.46)		
Drinking history			0.041	0.840
Yes	59 (45.04)	49 (43.75)		
No	72 (54.96)	63 (56.25)		
Hypertension classification			0.445	0.801
Grade 1	36 (27.48)	31 (27.68)		
Grade 2	48 (36.64)	45 (40.18)		
Grade 3	47 (35.88)	36 (32.14)		

groups were observed and compared under different nursing intervention modes. 2) The neurological deficit of patients was evaluated by National Institutes of Health Stroke Scale (NIHSS) score [12]. The higher the score was, the more serious the symptoms were. 3) The depression and anxiety of both groups were evaluated by HAMD and HAMA scales [13]. The higher the score was, the more serious the negative emotion. 4) The quality of life and nursing satisfaction of both groups were evaluated by WHOQOL-100 [14]. The higher the quality of life of the patients was, the higher the score was.

ble nurses carried out rehabilitation training every day. Patients lying on their beds were massaged regularly every day, and they were supervised and encouraged to lie on their side to facilitate limb movement in bed. First, we conducted passive training under guidance, and then proceed step by step. Next, we assisted the patient to adapt to the active exercise stage. Some patients may lose cognitive ability, and relevant responsible nurses actively cooperated with their families to carry out cognitive intervention training for patients. Besides, we paid close attention to the emotional changes of patients. Responsible nurses communicated with patients patiently and gently, shared positive recovery cases, encourage patients and increased their self-healing confidence. In addition, we let patients and their families know more about disease knowledge, treatment of complications, prognosis and rehabilitation methods. At the same time, it is necessary to establish a cordial image, so that patients can trust doctors and nurses, and we urged them to develop a reasonable ratio of work and rest and maintained a healthy diet, so as to help them develop a positive and healthy lifestyle.

Outcome measures

The study lasted until the patient was discharged from hospital. 1) The blood pressure control and self-management ability of the two

Statistical methods

Data were statistically analyzed via SPSS 20.0 (IBM Corp, Armonk, NY, USA), and figures were illustrated via GraphPad Prism 7 (Graphpad Software Co., Ltd., San Diego, USA). The counting data were expressed by [n (%)], and the inter-group comparison was assessed via chi-square test. The measurement data were represented by ($\bar{x} \pm \text{sd}$), and the comparison between the two groups was assessed via t test. The difference was statistically significant when $P < 0.05$.

Results

Clinical data collection of cerebral infarction complicated with hypertension

Clinical data of patients in the two groups were collected. By comparing the gender, age, smoking, drinking and hypertension classification of both groups, we found that there was no marked difference in clinical general data ($P > 0.05$), which was comparable between groups (Table 1).

Comparison of blood pressure control between the two groups after intervention

The blood pressure level of patients in the two groups after discharge was observed. The results revealed that the blood pressure levels

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Table 2. Blood pressure of the two groups after intervention (x ± sd)

	Systolic pressure (mmHg)	Diastolic pressure (mmHg)
Research group (n=131)	135.91±4.72	79.74±3.37
Control group (n=112)	138.11±5.17	81.01±3.51
X ²	3.123	2.873
P	0.002	0.004

Table 3. Comparison of self-management in both groups n [%]

	Medication compliance	Emotional management	Knowledge of diseases
Research group (n=131)	122 (93.13)	114 (87.02)	125 (95.42)
Control group (n=112)	92 (82.14)	80 (71.43)	95 (84.82)
X ²	6.935	9.121	7.915
P	0.009	0.003	0.005

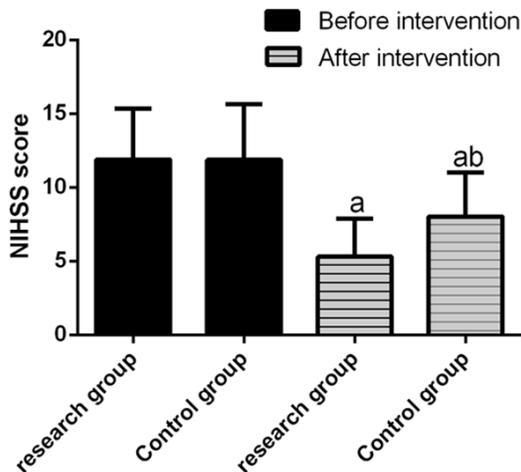


Figure 1. Comparison of nerve function. The NIHSS score scale of the observation group was significantly lower than that of the control group (P<0.05). Note: a means ^aP<0.05 compared with that before intervention; b means ^bP<0.05 compared with the research group.

of both groups showed a fine range, and the diastolic and systolic blood pressure levels of the patients in the research group were better than those in the control group (P<0.05) (Table 2).

Comparison of excellent self-management rate between both groups after intervention

Self-management ability of patients before discharge was evaluated via a self-made questionnaire. The results revealed that patients in the research group were better than those in

the control group in medication compliance, emotional management and disease knowledge (P<0.05) (Table 3).

Comparison of neurological function between both groups before and after intervention

Statistics showed that before nursing intervention, there was no difference in NIHSS scores between the two groups (P>0.05). After nursing intervention, the NIHSS score scale of both groups was improved (P<0.05), while the scale of the observation group was significantly lower than that of the control group (P<0.05) (Figure 1).

Comparison of negative emotions between both groups before and after intervention

Depression and anxiety of patients in the two groups were evaluated by HAMD and HAMA scales respectively. Hence, statistics showed that there was no marked difference in scores between both groups before nursing intervention, excluding the difference in HAMD and HAMA scores between both groups. After nursing intervention, the negative emotions of both groups were improved, while the scores of the research group were lower than those of the control group, and the difference was statistically significant (P<0.05) (Figure 2).

Comparison of quality of life between both groups before and after intervention

Quality of life of the two groups before and after intervention was evaluated via WHOQOL-100. The data revealed that there was no obvious difference in the quality of life between the two groups before nursing (P>0.05); after nursing intervention, the evaluation of WHOQOL-100 showed that the quality of life of both groups was improved, while the score of the research group was higher than that of the control group, and the difference was statistically significant (P<0.05) (Figure 3).

Investigation on nursing satisfaction after intervention in both groups

By investigating the satisfaction of discharged patients with the hospital's nursing, we found

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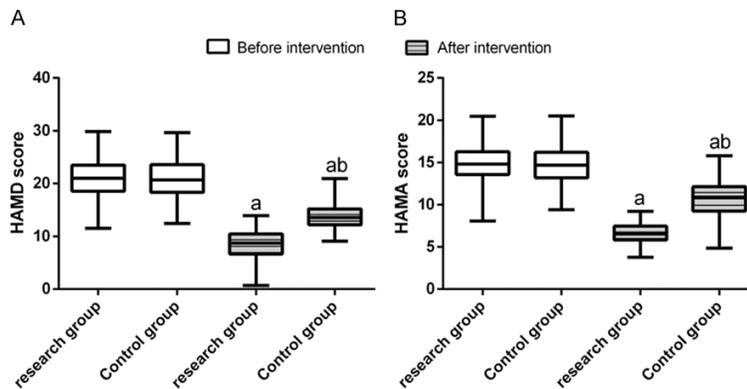


Figure 2. Comparison of negative emotions. A: The HAMD score of the research group was lower than that of the control group ($P < 0.05$). B: The HAMA scores of the research group were lower than those of the control group ($P < 0.05$). Note: a means $^aP < 0.05$ compared with that before intervention; b means $^bP < 0.05$ compared with the research group.

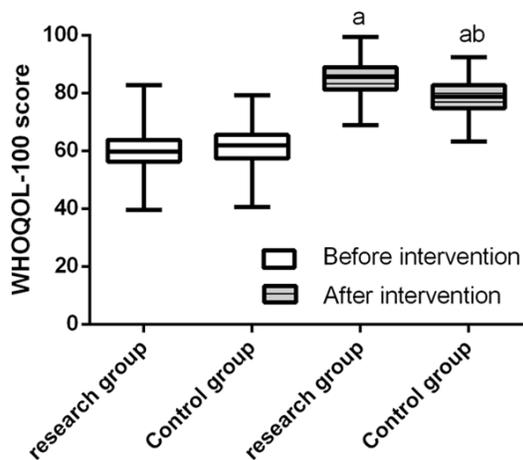


Figure 3. Comparison of quality of life. The WHOQOL-100 score of the research group was higher than that of the control group ($P < 0.05$). Note: a means $^aP < 0.05$ compared with that before intervention; b means $^bP < 0.05$ compared with the research group.

that 79 people in the research group were very satisfied, 46 were satisfied, 6 were dissatisfied, and the overall satisfaction of nursing was 95.42%. In the control group, 41 people were very satisfied, 54 were satisfied, 17 were dissatisfied, and the nursing satisfaction rate was 84.82%. Through statistical analysis, we concluded that the satisfaction degree of the research group was higher than that of the control group, and there was a difference ($P < 0.05$) (Table 4).

Discussion

Cerebral infarction complicated with hypertension is a kind of chronic comprehensive dis-

ease. Currently, there is no specific treatment plan and it is difficult to heal. Therefore, patients need to take medicine for a long time [15, 16]. In acute cerebral infarction patients complicated with hypertension, the blood perfusion in brain tissue will increase due to the early increase of blood pressure, while in the case of decreasing too fast and too much, the blood perfusion in the vascular lumen will decrease, eventually leading to the enlargement of the cerebral infarction area [17, 18].

It is generally believed that cerebral infarction patients complicated with hypertension should be given necessary nursing intervention while being treated with drugs, which can significantly improve the treatment effect, so as to facilitate their quick recovery [19]. However, the current nursing needs and functions are also expanding with the continuous development of society. Conventional nursing interventions are mainly aimed at basic clinical services, so that clinical diagnosis, treatment and nursing activities can run normally [20, 21]. Responsibility system nursing carries out the responsibility to the people, to conduct reasonable task allocation in the light of the patients' personality and illness, and to cooperate with multiple specialties at different levels to jointly lay a good foundation for improving their rehabilitation and quality of life. The occurrence of hypertension easily leads to organ damage [22]. Thus, in order to better treat cerebral infarction, it is vital to control the fluctuation of blood pressure. Through monitoring the blood pressure of patients after discharge, we observed that the blood pressure levels of the two groups showed a fine range, and the diastolic and systolic blood pressure levels of those in the research group were better than those in the control group. The main reason was that responsibility system nursing provided patients with whole-process management, whole-process service and seamless nursing service. What's more, diet guidance was given to patients during the medication period in the hospital, which avoided foods with high calories, fat, cholesterol and irritating foods, prohibited unhealthy habits such as alcoholism and

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Table 4. Investigation on nursing satisfaction of both groups n [%]

	Very satisfied	Satisfied	Dissatisfied	Satisfaction
Research group (n=131)	79 (60.31)	46 (35.11)	6 (4.58)	125 (95.42)
Control group (n=112)	41 (36.61)	54 (48.21)	17 (15.18)	95 (84.82)
X ²				7.915
P				0.005

the like during the hospital period, arranged work and rest time well, created a quiet and comfortable environment for patients, and selected appropriate activities based on their unique characteristics, thus effectively stabilizing blood pressure. Many cerebral infarction patients complicated with hypertension often miss or take fewer drugs without permission. Therefore, it is particularly important to do a good job in health education of cerebral infarction complicated with hypertension and improve the self-management ability of patients [23]. Previous studies [24] put forward health education for patients with heart failure led by nurses, which can significantly improve their self-management ability and reduce early hospitalization. Our study evaluated the self-management ability of patients with self-made questionnaires before they were discharged from hospital. It was observed that patients in the research group were better than those in the control group in medication compliance, emotional management and disease knowledge. Because the responsibility system nursing intervention carries out the division of labor and the cooperation is based on patients' different situations, it ensures that correct guidance is given to them. In the process of nursing, patients will receive gentle explained of the cause of the disease, disease treatment, precautions and medication guidance, so that they can correctly understand the disease and seek effective treatment in a timely manner. Therefore, responsibility system nursing can improve the self-management ability of patients dramatically.

Some data show that after rescue treatment, most people with cerebral infarction will have different degrees of disability, with a high disability rate. Moreover, cerebral ischemia and hypoxia can easily lead to neurological dysfunction, leaving a variety of sequela, seriously affecting the prognosis of patients [25, 26]. It is particularly important to cooperate with clinical nursing to reduce disease damage [26, 27].

Relevant studies show that evidence-based nursing intervention can effectively improve NIHSS score of neurological function in cerebral infarction patients [28]. In our study, we observed that after nursing intervention, the NIHSS score scale of the two groups was improved compared with that before intervention, while the scale of the observation group being dramatically lower than that of the control group. This might be due to the specialized rehabilitation training for the hospitalized patients by responsibility system nursing and the cognitive ability training for those in active cooperation with their families, which could effectively protect the neurological function of patients and repair the defects of their nervous system. As cerebral infarction patients complicated with hypertension need long-term medication and the disease is difficult to heal, a series of negative emotions are often generated [15, 29]. Negative emotions will delay the recovery of the disease and even aggravate it [30]. Hence, in this study, depression and anxiety of patients in the two groups were evaluated by HAMD and HAMA scales respectively. It was found that the negative emotions of both groups were improved after psychological intervention, while the scores of the research group were lower than those of the control group. This may be due to the fact that responsibility system nursing deepened the "patient-centered" concepts, divided the work reasonably, adopted reward and punishment systems, and mobilized the enthusiasm of nursing staff. According to patients' personality, we conducted different psychological interventions, and psychologists were combined when necessary, thus promoting their trust in nursing staff, enabling better communication and improving negative emotions. At the moment, relevant studies have reported that adopting personalized medical service mode is helpful to maintain the mental health and quality of life of patients with chronic diseases [31]. So, we evaluated the quality of life of the two groups before and after intervention by

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WHOQOL-100 and found that the quality of life of both groups improved, while the WHOQOL-100 score of the research group was higher than that of the control group. After intervention, patients in the research group showed higher nursing satisfaction. The results showed that the responsibility system nursing intervention improved the self-management ability of patients while improving their daily life and rest, and their quality of life was also continuously rising. In addition, responsibility system nursing has established trust between responsible nurses and patients, effectively improved the doctor-patient relationship, reduced nursing errors and disputes, and brought better medical experience to patients. It revealed that patients accepted this nursing mode and provided a strong basis for future promotion of responsibility system nursing.

To summarize, responsibility system nursing can significantly improve the blood pressure of patients with cerebral infarction and hypertension, and perfect their neurological function and quality of life. However, this study does not use statistics on the blood pressure fluctuation of patients at multiple time points during hospitalization, and there are many factors affecting their blood pressure, so there are certain limitations. We may add further research to better demonstrate the value of the responsibility system nursing.

Disclosure of conflict of interest

None.

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