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Original Article

Effect of systematic nursing intervention on quality of life of ICU patients and core family members in the neurology department

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Abstract: Objective: To explore the effect of systematic nursing intervention on the quality of life of ICU patients and their core family members in the neurology department. Methods: A prospective study was conducted in 106 ICU patients in the neurology department who were randomly divided into the study group (n=53) and the control group (n=53). The control group was given routine nursing, while the study group was given systematic nursing intervention. The quality of life, mental state, and sleep disorders before and after the intervention were also compared between the two groups. The quality of life during the accompanying period of the core family members of the two groups was compared. Moreover, the incidence of pulmonary infection, pressure ulcers, lower extremity venous thrombosis, and other complications were also compared between the two groups in the ICU. Results: After the intervention, the SF-36 scores of the two groups were higher than those before the intervention, and those of the study group were higher than those of the control group (all $P<0.01$). The scores of social function, energy, emotional function, mental health, and general health status of the core family members of the study group were higher than those of the control group (all $P<0.001$). After the intervention, Hamilton Anxiety Scale and Hamilton Depression Scale scores of the two groups were decreased, and the decrease in the study group was more obvious (all $P<0.05$). After the intervention, the Pittsburgh sleep quality index scores of the two groups were lower than those before the intervention, and the score of the study group was lower than that of the control group (all $P<0.001$). In addition, the incidence of complications in the study group was lower than that in the control group ($P<0.05$). Conclusion: Systematic nursing care for patients in the ICU of the neurology department can significantly relieve their bad emotions, ameliorate their quality of life, improve their sleep disorders, and improve the quality of life of their core family members.

Keywords: Systematic nursing intervention, neurology intensive care unit, quality of life, psychological state, sleep disorders

Introduction

The disease types of ICU patients in the Neurology Department are complex and diverse, and most of them are cerebrovascular diseases, such as cerebral hemorrhage, cerebral infarction, cerebral venous thrombosis, brain abscess, and persistent epilepsy, etc. These diseases have a rapid onset, rapid progress, and high mortality. Even if patients are discharged from the hospital, some patients will also have different degrees of sequelae. Therefore, the nursing of ICU patients in the Neurology Department is particularly important [1]. The recovery of ICU patients in the neurology department is a long-term process, which requires family a lot of member's time and energy. Therefore, the family members' social activities, work efficiency, and income may all decrease. Besides, high treatment costs often cause a certain economic burden to the family. As time goes on, the quality of life of the core family members will also be affected [2]. The ICU patients and their families in the Neurology Department were affected by disease and economic pressure. The incidence of adverse psychological emotions was high and the sleep quality was decreased [3].

The traditional nursing mode in the ICU of the Neurology Department mostly monitors the vital signs of patients, while it ignores the psy-

Table 1. Comparison of general data (n, $\bar{x}$ ± sd)

	Study group (n=53)	Control group (n=53)	χ^2/t	P
Gender (n)			0.340	0.560
Male	26	29		
Female	27	24		
Age (year)	57.8±5.4	58.2±5.9	0.364	0.717
BMI (kg/m^2)	23.37±1.02	23.16±0.94	1.102	0.273
Primary disease (n)			0.438	0.275
Cerebrovascular diseases	31	28		
Status epilepticus	10	8		
Parkinson's disease	8	12		
Other	4	5		
Time from onset to admission (d)	1.8±0.8	1.9±0.7	0.685	0.495
Length of stay in ICU	18.9±2.8	19.4±3.0	0.887	0.377
Do the caregivers have general knowledge of routine nursing			0.268	0.605
Yes	10	8		
No	43	45		

Note: BMI: body mass index.

chological state and sleep quality of patients, so the improvement of patients' quality of life is limited [4]. Systematic nursing intervention refers to a nursing model that combines a variety of positive nursing measures in the process of nursing patients. It is not only limited to the monitoring of vital signs, but also emphasizes psychological counseling, sleep intervention and rehabilitation exercise guidance of patients, to improve the effectiveness of disease treatment, promote the prognosis of the disease, and ultimately improve the quality of life [5]. In recent years, it has been widely used in oncology, neurology, respiratory and other departments, and it is found that the nursing mode has a positive role in promoting the recovery and outcome of patients' health [6, 7]. The effect of systematic nursing intervention on the core family members of ICU patients in the Neurology Department has not been reported yet. Therefore, this study not only discusses the influence of the systematic nursing intervention on the psychological state and sleep disorder of patients in a neurology ICU but also analyzes its impact on the quality of life of core family members.

Materials and methods

General data

A prospective study was conducted, in which 106 patients in the ICU of the Neurology Department of The First Affiliated Hospital of Xi'an Jiaotong University from August 2018 to December 2019 were recruited and randomly divided into a study group (n=53) and a control group (n=53). The general data of the two groups are shown in **Table 1**. This study was approved by the Medical Ethics Committee of The First Affiliated Hospital of Xi'an Jiaotong University.

Inclusion criteria: patients aged between 35 and 75 years old; patients firstly admitted to ICU; the core family members of patients aged between 25 and 55 years old; informed consent was signed by the patients or their families.

Exclusion criteria: patients who needed surgical treatment, patients with mental illness; patients with severe cognitive impairment; patients who were in a coma or could not complete the questionnaire independently when they were admitted to the hospital; patients with severe dysfunction of important organs; those with mental diseases; and various acute and chronic diseases in core family members.

Methods

The control group received routine nursing, including strict disinfection of the ward and 24-hour monitoring of the changes of vital signs of patients. To prevent infection, only a core

family member of each patient could be allowed to enter the ICU ward and they were required to change clothes before entering.

The study group was given systematic nursing intervention. The nursing method included the following aspects:

Firstly, nursing care for the patients: (1) Psychological counseling: Responsible nurses frequently communicated with patients and gave targeted psychological counseling according to patients' psychological changes. They patiently told patients about successful cases to enhance patients' self-confidence, and to alleviate patients' bad psychological emotions. Besides, nurses patiently listened to patients' real ideas to eliminate patients' pessimism. (2) Sleep intervention: Nurses provided a good sleep environment for patients by adjusting indoor light, mattress, etc., carried out psychological counseling to relieve the ideological shackles of patients, and played soft music before going to bed to promote patients' sleep. (3) Early rehabilitation nursing: Responsible nurses helped patients turn over on time to avoid pressure sores and lift legs or joints passively to prevent venous thrombosis of lower limbs. Patients with language disorders were encouraged to speak aloud, carry out pronunciation training and communicate with nurses and core family members. (4) Diet care: Patients had food with high protein, low salt and low-fat; with more meals a day but less food at each meal. For patients with dysphagia such as weak chewing, choking and other dysphagia, they were given nasogastric feeding accordingly.

Secondly, nursing care for core family members: (1) Establishing trust and mutual assistance relationships: Nurses allowed family members to enter the ICU ward and actively introduced themselves, to establish a trusting relationship. Nurses actively asked if there was any place where they needed help and promised to provide help. (2) Establishing care and expressing wishes: For comatose patients, nurses told families about the day of patients, such as the condition, vital signs, medication, diet and excretion, so that the family members can better understand the patient's condition. Also, nurses expressed hope that the patient will recover as soon as possible [8].

Outcome measures

Primary outcome measures: (1) Patients were asked to fill in the health status questionnaire (SF-36) on the next day after hospitalization and the day of discharge, respectively, to evaluate the quality of life of patients before and after the intervention [9]. The questionnaire was collected on the spot after filling out, with a recovery rate of 100%. The SF-36 contains eight dimensions. Each dimension is calculated according to the percentage system. The higher the score, the better the quality of life. (2) On the day of discharge, the patients' core family members were asked to fill in the SF-36 independently to evaluate their quality of life during the accompanying period. The questionnaire was collected on the spot after filling out, and the recovery rate was 100%.

Secondary outcome measures: Patients were asked to fill out the Hamilton Anxiety Scale (HAMA) and Hamilton Depression Scale (HAMD) on the next day after hospitalization and on the day of discharge, respectively, to evaluate the anxiety and depression of patients before and after the intervention [10, 11]. The higher the score was, the more serious the anxiety and depression were. All the scales were collected on the spot after completion, with a recovery rate of 100%.

The patients were asked to fill in Pittsburgh sleep quality index (PSQI) on the next day after hospitalization and the day of discharge, respectively, to evaluate the sleep quality of patients before and after the intervention, with a total of 18 points [12]. A lower score indicates better sleep quality. The scale was collected on the spot after filling out, and the recovery rate was 100%.

The complications, such as pulmonary infection, pressure sores, lower extremity venous thrombosis, were compared between the two groups during ICU.

Statistical analysis

SPSS 20.0 was used for statistical analysis. The count data were expressed as the number of cases/percentages (n/%) and the comparison was conducted by chi-square test (χ^2). The measurement data were expressed as mean ± standard deviation ($\bar{x}$ ± sd). The paired t-test

Table 2. Comparison of general data of core family members of patients (n, $\bar{x} \pm sd$)

	Study group (n=53)	Control group (n=53)	χ^2/t	P
Gender (n)			0.673	0.412
Male	37	33		
Female	16	20		
Age (years)	36.5±5.4	35.7±5.1	0.784	0.435
BMI (kg/m^2)	23.37±1.20	23.65±1.36	1.124	0.264
Smoking habits (n)			0.268	0.605
Yes	10	8		
No	43	45		
Drinking habits (n)			0.078	0.780
Yes	7	8		
No	46	45		
Relationship with patients (n)			0.612	0.736
Parents	19	16		
Children	25	29		
Others	9	8		
Family income (rmb/month)			0.374	0.829
<5000	10	12		
5000~10000	31	28		
>10000	12	13		

was used for the comparison between the two groups before and after the intervention; the independent t-test was used for comparison between two groups. P<0.05 was considered statistically different.

Results

Comparison of general information of patients and their core family members

There were no significant differences in gender, age, body mass index (BMI), primary disease, time from onset to admission, length of stay in ICU and whether the accompanying staff had common knowledge of routine nursing and other data between the two groups (P>0.05). The groups were comparable as shown in **Table 1**. There was no significant difference in age, gender, BMI, smoking and drinking habits between the two groups (P>0.05). The groups were comparable, as shown in **Table 2**.

Comparison of SF-36 score before and after the intervention

During hospitalization, 1 patient died in the study group and 3 patients died in the control group. After excluding the dead patients, the statistical analysis showed that the SF-36 scores of the two groups after the intervention were higher than those before the intervention, and that of the study group was higher than that of the control group (all P<0.01), as shown in **Table 3**.

Comparison of SF-36 score during the period of accompanying by core family members

The scores of social function, energy, emotional function, mental health and general health status of the core family members of the study group were higher than those of the control group (all P<0.001), as shown in **Table 4**.

Comparison of HAMA and HAMD scores before and after the intervention

After excluding the dead patients, the statistical analysis showed that the scores of HAMA and HAMD of the two groups were decreased after the intervention, and the scores of the study group were lower than those of the control group (all P<0.05), as shown in **Table 5**.

Comparison of PSQI scores before and after intervention

Before the intervention, the PSQI scores of the study group and the control group were

Table 3. Comparison of SF-36 scores before and after intervention ($\bar{x} \pm sd$)

Group	Study group (n=52)		Control group (n=50)	
Time	Before the intervention	After the intervention	Before the intervention	After the intervention
Physiological function	57.78±5.40	67.70±6.69***,##	57.05±6.04	64.40±5.86***
Social function	65.69±6.50	72.10±6.30***,##	65.08±5.44	68.98±6.76**
Energy	54.09±4.08	65.50±6.05***,###	54.67±4.80	59.97±4.50***
Physiological function	62.20±4.59	70.07±5.40***,##	61.87±5.40	66.70±6.04***
Emotional function	67.79±5.40	81.10±4.30***,###	68.03±4.60	75.50±5.55***
Mental health	57.70±5.33	70.08±4.30***,###	58.11±4.98	64.40±5.40***
Physical pain	60.06±5.49	73.30±4.07***,###	60.53±5.86	66.60±5.44***
General health	58.89±5.40	67.78±5.66***,##	59.04±6.06	64.40±5.55***

Note: Compared with before the intervention, **P<0.01, ***P<0.001; compared with control group, ##P<0.01, ###P<0.001.

Table 4. Comparison of SF-36 scores during the accompanying period of core family members

Dimension	Study group (n=53)	Control group (n=53)
Physiological function	85.07±5.50	84.49±6.59
Social function	84.40±4.88###	80.05±5.40
Energy	76.60±5.55###	70.06±4.86
Physiological function	80.06±4.97	79.98±4.50
Emotional function	88.70±5.08###	81.07±4.89
Mental health	79.80±6.06###	75.05±5.90
Physical pain	80.60±5.55	79.80±6.49
General health	79.90±4.30###	74.40±5.50

Note: Compared with the control group, ###P<0.001.

(13.85±2.83) and (13.37±2.54) respectively, and after the intervention, the PSQI scores of the two groups were (7.78±2.35) and (10.95±2.08) respectively. After excluding the dead patients, the PSQI scores of the two groups were lower than those before the intervention, and the PSQI scores in the research group were lower than those in the control group (all P<0.001). See **Figure 1**.

Comparison of complications

In the control group, there were 7 cases of pulmonary infection, 3 cases of pressure sores and 3 cases of lower extremity venous thrombosis in ICU, with the complication rate of 24.53%, among which 3 patients died of pulmonary infection. In the study group 3 patients had pulmonary infection and 1 patients had venous thrombosis of lower extremity, the incidence of complications was 7.55%, and 1 patient died of pulmonary infection. The incidence of complications in the study group was lower than that in the control group (P<0.05). See **Table 6**.

Discussion

ICU patients need long-term care from their family members. Whether it is time, energy or economic pressure, the quality of life of the core family members will be affected to varying degrees [13]. As an important part of the ICU support system, the core family members of patients have a direct impact on patient mental health and disease outcome [14]. Therefore, improving the quality of life of core family members of patients in the ICU is an important practice of nursing work. The systematic nursing intervention model is more comprehensive and specific for patients' care. It can carry out nursing intervention from multiple avenues and aspects, such as psychological counseling, sleep intervention, early rehabilitation nursing and diet nursing, which is conducive to the improvement of patients' quality of life. Besides, the systematic nursing intervention mode intervenes with the core family members of patients through the concept of humanistic care. It encourages trust-building, mutual assistance, care, and final wishes expression, etc., and it reaches a resonance with the core family members, which is also crucial to improve the quality of life of core family members [15]. This study also confirmed this point. After the intervention, the quality of life of patients and their core family members in the study group was better than that in the control group, suggesting that systematic nursing intervention can not only improve the quality of life of ICU patients in the Neurology Department, but also significantly

Table 5. Comparison of HAMA and HAMD scores between the two groups before and after intervention ($\bar{x} \pm sd$)

Group	Time	HAMA score	HAMD score
Study group (n=52)	Before the intervention	12.49±2.88	6.50±2.11
	After the intervention	7.70±2.03$^{***,\#\#\#}$	4.29±1.02$^{***,\#\#\#}$
Control group (n=50)	Before the intervention	12.20±3.20	6.32±1.97
	After the intervention	10.89±2.87*	5.29±1.28**

Note: Compared with before intervention, *P<0.05, **P<0.01, ***P<0.001; compared with the control group, $^{\#\#\#}$P<0.001.

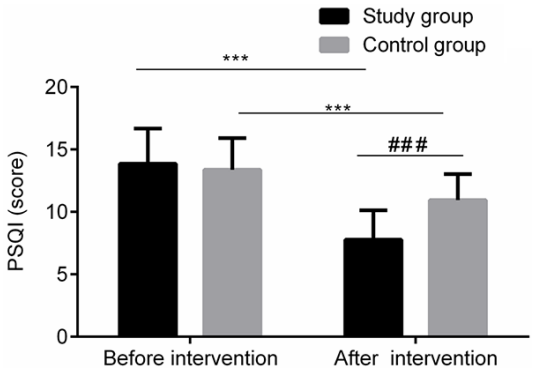

Figure 1. Comparison of PSQI scores before and after intervention. Compared with the pre-intervention, ***P<0.001; compared with the control group, $^{\#\#\#}$P<0.001. PSQI: Pittsburgh sleep quality index.

improve the quality of life of core family members of patients.

After the intervention, HAMA and HAMD scores of the study group were lower than those of the control group, suggesting that systematic nursing intervention can more effectively improve the adverse psychological state of ICU patients in the Neurology Department. The visiting system of the ICU is very strict. Patients are not accompanied by their family members and lack of sense of security. Besides, they are afraid of disease and worry about the economy and prognosis. Emotional excitement, anxiety, fear, etc., are not conducive to the prognosis of patients [16, 17]. Crayton et al. found that adverse psychology of patients can reduce medication compliance [18]. Systematic nursing intervention focuses on the psychological counseling of patients. Through communication with patients, it can transfer positive energy to patients, enhance patients' self-confidence, and then alleviate their bad psychological emotions. Studies pointed out that improving the negative emotions of patients is conducive to treatment. It is also very helpful to the prognosis of patients [19, 20]. Rose et al. also found that the effect of psychological intervention is extremely important for patients entering the ICU [21]. Systematic nursing intervention is psychological intervention under the guidance of professionals, to help patients resist negative emotions faster and help them recover from illness.

The results showed that the PSQI score of the study group was lower than that of the control group after the intervention, suggesting that systematic nursing intervention can effectively improve the sleep quality of ICU patients in the Neurology Department. Sleep disorders are a common phenomenon in ICU patients. Various rescue and nursing work in the ICU can directly affect the sleep of patients, especially rescue at night will damage the sleep of patients [22]. The survey shows that the noise in ICU is higher than 40dB almost all the time, which is extremely disruptive to the sleep of patients [23]. Besides, the use of drugs in ICU is complex and some drugs can also affect the sleep quality of patients. Poor sleep will further aggravate patients' anxiety and other adverse emotions [24]. The systematic nursing intervention mode emphasizes the intervention of patients' sleep. On the one hand, it creates a good sleep environment for patients. On the other hand, through psychological counseling for patients, it relieves their ideological shackles, and thus contributes to the improvement of sleep quality [25].

The results showed that the incidence of complications in the study group was lower than that in the control group after the intervention, suggesting that systematic nursing intervention can significantly reduce the incidence of complications in ICU patients in Neurology Department. ICU patients in the Department of Neurology have complicated diseases, long hospitalization time and significantly decreased activity, so they are prone to the risk of pressure sores or venous thrombosis of lower limbs.

Table 6. Comparison of complications between the two groups (n (%))

Group	Pulmonary infection	Pressure sore	Venous thrombosis of lower extremity	Total incidence
Study group (n=53)	3 (5.66)	0 (0.00)	1 (1.89)	4 (7.55)#
Control group (n=53)	7 (13.21)	3 (5.66)	3 (5.66)	13 (24.53)

Note: Compared with the control group, #P<0.05.

Besides, some patients need ventilator assisted breathing, and need nurses to carry out repeated sputum suction operations, so the incidence of pulmonary infection is also high. Han et al. also found that systematic nursing intervention can reduce the risk of ICU related infection and reduce the incidence of adverse reactions after catheterization [26].

In conclusion, systematic nursing care for patients in the ICU of the Neurology Department can significantly alleviate their bad emotions, improve their quality of life, and is conducive to the improvement of sleep disorders and the quality of life of their core family members, which is worthy of clinical application.

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Disclosure of conflict of interest

None.

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