The effects of implementation of neurological intensive care sub-specialized module on doctors satisfaction, nurses' competency and patient's outcome

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Abstract

Objective: This study aimed to evaluate the effects of implementation of a neurological sub-specialized nursing module in critically ill neurological patients. *Methods:* We selected 22 neurological nurses from our hospital in Nanchang, China as study subjects. The outcome of 100 neurological patients were documented and evaluated. The period from December 2017 to March 2018 was the pre-implementation period, in which the conventional nursing was implemented in 50 patients. The time from April 2018 to July 2018 was the post-implementation period, in which the sub-specialized nursing module was implemented with another 50 patients. We conducted assessment and evaluation consisting of doctor satisfaction, nursing complications (aspiration, diarrhea, pressure sores, and ventilator-associated pneumonia), and the comprehensive ability of nurses in the pre- and post-implementation periods. *Results:* The total comprehensive ability score of the nurses after implementing the nursing module was higher than that before the implementation ($P < 0.05$). The satisfaction rate of doctors after implementation (95.45%) was also higher (68.18%) ($P < 0.05$), and the incidences of nursing complications (aspiration, diarrhea, pressure sores, and ventilator-associated pneumonia) among patients were lower after implementing the nursing module ($P < 0.05$).
Conclusion: The implementation of a sub-specialized nursing module in the care of patients with critically ill neurological diseases can improve the comprehensive ability of nurses and the satisfaction rate of doctors as well as reducing the incidence of nursing-related complications.

Keywords: Sub-specialized nursing module; severe neurological disease; doctor satisfaction; nursing quality indicators

INTRODUCTION

Severe neurological diseases are characterized by critically ill condition, often of rapid onset, that seriously threaten the lives of patients.[1] In addition, many of these patients were in coma that requires mechanical ventilation, which can lead to its associated complications.[2-4] These patients may also be paralyzed, the conditions fluctuating, with prolonged periods of being bedridden, with its associated complications such as pressure sores[6], skin infection[7], and ventilator-associated pneumonia (VAP)[8], with serious impact on their physical and mental health.[9] Previous studies have shown that enhancing the professional skills and competency of nurses is beneficial for improving the success rate of nursing and reducing the incidence of nursing-related complications.[10,11]

Conventional nursing care emphasize the proficiency of nurses' skills but ignore interpersonal communication, professional development and leadership, thus imposing limitation on the achievement of the nursing program and its quality.[12,13] The sub-specialized nursing approach categorizes the professional tasks based on the traditional professional classification of first, second, and third levels, to develop new skills and training of more holistic competency.[14] In the sub-specialized nursing mode, experienced senior nurses serve as team leaders, with junior nurses as team members, learning through continuous study. The aims were to upgrade the skills, promote excellence, improve the motivation, fulfil the potential, and generally promote a well-rounded ability.[15]

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To promote clinical professional skills, sub-specialization is currently the preferred strategy. The aim is also to facilitate the development of multi-tasking capabilities among nurses.[5] This study aimed to investigate the role of the sub-specialized nursing mode in the care of patients with critical neurological diseases.

METHODS

Twenty-two neurological nurses working in the Second Affiliated Hospital of the Nanchang University, Nanchang, China from December 2017 to July 2018 were selected as the study subjects. December 2017 to March 2018 was the pre-implementation period, in which the conventional nursing mode was practiced, while April 2018 to July 2018 was the post-implementation period, in which the sub-specialized nursing mode was adopted. All the selected nurses were female, and their ages ranged from 21–39, with an average age of 29.34 ± 4.15 years. In terms of education level, 13 (59.1%) of the nurses were junior college graduates, while 9 (40.9%) were regular college graduates. Two (9.1%) of the subjects were co-chief superintendent nurses, 4 (18.2%) were supervisory nurses, 7 (31.8%) were senior nurses, and 9 (40.9%) were nurses. Their records of service were as follows: <1 year for 4 nurses (18.2%), 1–10 years for 13 nurses (59.1%), and >10 years for 5 nurses (22.7%).

From December 2017 to July 2018, a total of 100 critically ill neurological patients were selected for assessment. . The sample comprised 58 male patients and 42 female patients with an age range of 56–85 and an average age of 71.2 ± 1.4 years. Of these patients, 28 had an APACHE-II score <10, 22 had a score of ≥10 and <15, 17 had a score of ≥15 and <20, 25 had a score of ≥20 and <25, and 8 had a score of >25.

The present study met the ethical requirements of the Declaration of Helsinki. All patients signed a written informed consent form.

Pre-implementation

From December 2017 to March 2018, conventional nursing was rendered to 50 patients, which included health education, dietary guidance, psychological intervention, medication according to doctor's advice, and simple measures for symptomatic relief.

Implementation of the sub-specialized nursing module

From April 2018 to July 2018, the sub-specialized nursing module was implemented. The contents of the module were as follows:

(1) Formation of teams: The 22 selected nurses were divided into four groups according to their nursing function; i.e., a nutrition support group, a rehabilitation nursing group, an airway management group, and a skin care group. Each group consisted of 4–5 nurses and was led by a team leader, who was assessed to be suitably experienced. Supervision of the work of each nursing group was carried out by the head nurse, and the chief neurosurgeon and specialists in rehabilitation (respiratory, nutrition, and endotracheal tube) nursing were employed as consultants to provide relevant professional knowledge.

(2) Training: The nurses were comprehensively trained in theoretical knowledge, technical operation, nurse etiquette, communication skills, health education, and interpersonal communication. The training included academic discussion, clinical demonstrations and practices, literature reading, participation in the public health education activities.

(3) Clinical implementation: (A) Airway nursing group: Attention was given to changes in vital signs (pulse, blood pressure, mind status, and body temperature) and various body fluid and physiological measurements (sputum volume, respiratory volume, and urine volume). The ward was kept clean and tidy, air circulation and suitable temperature (22°C–24°C) and humidity (60%–70%) levels were maintained in the wards. The patients were guided in carrying out ultraviolet disinfection according to schedule, twice a day. To ensure softening and expectoration of sputum, prevent hardening of phlegm and ensure smooth breathing. Fluid drainage operations were carried out daily at 1,000 ml/day. According to the severities of the patients' conditions, oxygen-driven nebulization inhalation drug treatment was given for 15 minutes every 4–6 h; and negative pressure (10.7–20.0 kPa) was controlled during sputum suctioning – to avoid damage to the inner wall of the trachea induced by excessive pressure, a closed sputum suction method was adopted, and the sputum suction duration was ≤15 min to reduce airway mucosal damage. (B) Skin care group: To avoid pressure sores for patients who could not turn by themselves due to coma or paralysis, these patients were assisted to turn over every 1–2 h, and patients with paralysis underwent regular exercises. The patients were

scrubbed with warm water once or twice daily, the sweat was cleaned with a dry towel, clothes and bedsheets were replaced in good time, and patients were instructed not to apply talcum powder. Safflower alcohol (50%) was given to patients to massage the bone protuberances; and patients with skin flushing were coated with a tincture of iodine (2%). (C) Rehabilitation nursing group: Patients in the acute stage were placed in the supine position, the upper limbs raised, and they underwent passive exercises such as flexion and extension of the elbows and fingers for 10 min, once every two days. Those in the transitional stage were given flexion and extension exercises of various joints (knee, finger, and ankle joints). Patients in the stable stage were encouraged to perform active exercises (abduction, adduction, and forward flexion) 10–20 times a day. (D) Nutrition support group: The nurses would encourage the patients to eat less, drink more water, and to eat high-calorie foods. The nurses would perform circular massages on patients' abdomens to promote gastrointestinal peristalsis.

Observation indexes of post-implementation period

(1) A questionnaire designed by our hospital was adopted to assess the pre- and post-implementation satisfaction levels of doctors in three aspects: nurses' professional abilities, attitudes, and cooperation. The results were expressed as scores ranging from 0 to 100 points, with five grades: satisfactory (>95 points); relatively satisfactory (85–95 points); basically satisfactory (75–84 points); neutral (61–74 points); and unsatisfactory (≤60 points). The grades of basically satisfactory, relatively satisfactory, and satisfactory were included in the calculation of the doctors' satisfaction level.

(2) The core ability scale of registered nurses (7 dimensions comprising 58 items) was adopted to assess the comprehensive ability of nurses pre- and post-implementation. The result for each item was expressed as a score in the range 0–4 points, with 0 points representing incompetence and 4 points representing high competence.

The dimensions of the scale are as follows: critical thinking, interpersonal communication, professional development, quality of nursing, legal - ethics, counseling skills, and leadership.

(3) The pre- and post-implementation incidence rates of nursing complications (aspiration, diarrhea, pressure sores, and VAP) were assessed.

Statistical analysis

The data were analyzed using statistical software SPSS 24.0. Measurement data (nurse comprehensive ability) were expressed as mean ± standard deviation (x ± SD) and evaluated using the *t*-test. Data (satisfaction rate of doctors, incidence of nursing-related complications) were expressed as $n\%$ and evaluated using the X^2-test. A *P*-value of <0.05 was considered statistically significant.

RESULTS

Comprehensive ability of nurses

The total score for the comprehensive ability of nurses in the post-implementation period was higher than that in the pre-implementation period (188.67 ± 32.17 vs. 157.38 ± 34.00, $P < 0.05$) (Table 1). The results for most of the dimensions were significantly improved after implementation, including critical thinking (29.87 ± 5.49 from 21.93 ± 6.31), interpersonal communication (25.08 ± 4.62 from 22.07 ± 4.09), professional development (18.87 ± 3.58 from 15.37 ± 2.92), quality of nursing (28.35 ± 5.14 from 23.84 ± 5.41), counseling skills (21.92 ± 4.18 from 18.31 ± 4.85) and leadership (37.72 ± 5.01 from 31.21 ± 5.81) (all $P < 0.05$). The dimension of legal-ethics was not significantly improved after implementation, although the score did increase (26.86 ± 4.51 from 24.65 ± 4.61; P > 0.05).

Doctor satisfaction rate

The satisfaction rate of doctors after implementation (95.45%) was higher than that

Table 1: Comprehensive ability of nurses (x̄±s)

	n	Critical thinking	Interpersonal communication	Professional development	Quality of nursing	Legal ethics	Counseling skill	Leadership	Total
After implementation	22	29.87±5.49	25.08±4.62	18.87±3.58	28.35±5.14	26.86±4.51	21.92±4.18	37.72±5.01	188.67±32.17
Before implementation	22	21.93±6.31	22.07±4.09	15.37±2.92	23.84±5.41	24.65±4.61	18.31±4.85	31.21±5.81	157.38±34.00
t		4.453	2.288	3.554	2.835	1.607	2.645	3.980	3.156
P		0.000	0.027	0.001	0.007	0.116	0.012	0.000	0.003

Table 2: Satisfaction rate of doctors [n (%)]

	n	Unsatisfactory	General	Basically satisfied	Relatively satisfied	Satisfied	Satisfaction rate
After implementation	22	0 (0.00)	1 (4.55)	3 (13.64)	8 (36.36)	10 (45.45)	21 (95.45)*
Before implementation	22	4 (18.18)	3 (13.64)	4 (18.18)	6 (27.27)	5 (22.73)	15 (68.18)

Notes: *P=0.021

before implementation (68.18%; $P < 0.05$) (Table 2). Before implementation, the doctors were unsatisfied with four (18.18%) of the nurses, but after implementation, this was reduced to 0. Generally, the satisfaction level increased after implementation.

Incidence of nursing-related complications

The incidence rates of nursing-related complications such as aspiration, diarrhea, pressure sores and VAP were lower in the post-implementation period than in the pre-implementation group ($P < 0.05$) (Table 3). The incidence of diarrhea was reduced from 18% to 2%, pressure sores from 14% to 0%, aspiration from 22% to 0%, and VAP from 24% to 0%.

DISCUSSION

The results of the present study reveals that the total score for the comprehensive ability of the nurses studied after implementation of the neurological intensive care sub-subspecialized module was higher than that before implementation ($P < 0.05$). This findings suggests that the implementation of the sub-specialized nursing mode for neurological nurses can improve their comprehensive ability and promote their specialization development. Some investigator have previously reported that the "enhancement of doctors' and nurses' cooperation" is helpful in promoting the

development of sub-specialized nursing.[16] In the sub-specialized nursing approach, nurses report patients' conditions to doctors in good time and discuss the treatment plan. This can be helpful in cultivating the critical thinking of nurses and improving their leadership skills, which is reflected by our findings regarding the comprehensive ability of our study nurses. The enhancement of doctor and nurse communication is also helpful for the nurses to collect clinical data and write research report.[17]

Our results also shows that the satisfaction levels of doctors after implementation was higher than before implementation. The higher satisfaction of the doctors were probably due to the higher comprehensive competency of the nurses, with improvement in the critical thinking ability of nurses, greater communication between nurses and doctors, and the improvement of the quality of nursing care.

Our results shows that the incidence rates of nursing-related complications such as aspiration, diarrhea, pressure sores, and VAP after implementation were lower than the pre-implementation rates. The division of the nurses into four groups: a nutrition support group, a rehabilitation nursing group, an airway management group, and a skin care group probably play an important role to improve the nursing care of patients. This suggests that the application of the sub-specialized nursing mode for critically ill

Table 3: Incidence of nursing-related complications [n (%)]

	Severe neurological patients (n=50)			
	Diarrhea	Pressure sore	Aspiration	VAP
After implementation	1 (2.00)	0 (0.00)	0 (0.00)	1 (2.00)
Before implementation	9 (18.00)	7 (14.00)	11 (22.00)	12 (24.00)
χ^2	7.111	5.530	12.360	10.699
P	0.008	0.019	0.000	0.001

Notes: VAP: ventilator-associated pneumonia.

neurological patients can reduce complications and help promote patients' recovery.[14]

The small sample size is the main limitation of this study. We hope to include more nurses in the future studies to confirm our findings. The small sample size precluded the use of optimal setting and sampling methods. The present study also do not have a control group.

In conclusion, the application of a sub-specialized nursing in the care of patients with critically ill neurological patients can effectively improve the comprehensive ability of nurses and the satisfaction rate of doctors, as well as reducing the incidence of nursing-related complications.

DISCLOSURE

Conflicts of interest: None

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