

Effect of eCASH Nursing Model on Life Self-care Ability, Physical Function, Psychological Function and Cognitive Function of Critical Patients in EICU

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To explore and analyze the impact of Emergency Intensive Care Unit (EICU) critical care patients using eCASH nursing mode intervention on patients' cognitive function, psychological function, physical function and life self-care ability. Randomly selected 142 critically ill patients in our hospital's EICU ward from January 2018 to October 2019 as study subjects, and grouped them according to the time of admission. 71 patients in the observation group were intervened by the eCASH nursing model, and 71 patients in the control group received regular nursing intervention. Recording the cognitive, psychological, physical and other functions and self-care ability of the two groups of patients. Before nursing, the BI score of critical patients in the observation group was compared with the control group ($P > 0.05$). After the intervention of the observation group patients accepted eCASH nursing model, the BI score was obviously higher than the control group ($P < 0.05$). According to the SCL-90 table scores, there is no significant difference in the scores of each dimension between the two groups before nursing ($P > 0.05$). Compare before and after nursing and score except for obsessive compulsive disorder and psychosis ($P > 0.05$). According to the SCL-90 scale score, there is no significant difference in the scores of each dimension between the two groups before nursing ($P < 0.05$). According to the comparison of the two groups of data after nursing, somatization, anxiety, depression, fear, hostility, paranoia and SCL-90 total score in the observation group were significantly lower than that of control group ($P < 0.05$). Before nursing, the cognitive level of the two groups was compared ($P > 0.05$). After nursing, the HDS score of the observation group was higher than that of the control group ($P < 0.05$). The CM-PPT score was compared, and the data of the two groups before nursing was compared ($P > 0.05$). The score of observation group after receiving eCASH nursing was higher than that of control group ($P < 0.05$). The study confirmed that eCASH nursing model for EICU critical patients as early as possible has a significant effect on improving patients' cognitive function, mental state, physical function, etc. At the same time, it can improve patients' self-care ability in life and is worthy of promotion.

Keywords: Emergency Intensive Care Unit, Ecash Nursing Model, Critical Illness, Cognitive Function, Life Self-Care Ability
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EICU is a form of management that integrates modern nursing technology. It mainly treats various critical patients, such as sepsis, severe shock, multiple organ failure, severe trauma, and cardiopulmonary resuscitation. The patient's condition is dangerous, urgent, and potentially life-threatening at any time. With the development of clinical treatment and nursing technology, the treatment effect of EICU critical patients has been

greatly improved ¹. However, some studies have pointed out that despite the improvement of EICU nursing and treatment technology, the survival rate of patients has improved, but there are also certain health damages. Post-Intensive Care Syndrome (PICS) may occur in patients ². EICU critical patients are affected by the disease, and most patients are accompanied by varying degrees of undesirable psychology, long-term anxiety, depression, fear and

other emotions can make patients resist mentality, affecting the development of nursing and treatment work; at the same time, undesirable emotions can induce psychological stress response, increase the degree of danger and mortality³. In addition, under the influence of environmental stimulation, intensive monitoring, various invasive operations and other factors, EICU critical patients may undergo rapid cognitive state changes, resulting in cognitive impairment, inducing delirium syndrome, and causing serious adverse effects on the treatment of patients. In this regard, Kowitlawakul et al⁴ pointed out that the use of the correct care model for critical patients in EICU has a positive effect on improving prognosis, and at the same time, its research indicates that the eCASH nursing model has a certain positive role of being used to prevent delirium and reduce cognitive impairment. In view of this, this study implemented the eCASH nursing model for 71 patients admitted to the EICU ward of our hospital from January 2018 to October 2019, and explored its effect and value. The reports are as follows.

MATERIALS AND METHODS

General Information

Randomly selected 142 critical patients in our hospital's EICU ward from January 2018 to October 2019, randomly divided into a control group and an observation group, each with 71 cases. Among the control group, there were 40 males and 31 females, aged between 18 to 70 years old, with an average age of (40.5 ± 7.7) years old, 10 cases of severe head injury, 27 cases of gastrointestinal bleeding, 20 cases of coronary heart disease, 10 cases of traumatic hemorrhage, and 5 cases of acute pesticide poisoning. In the observation group, there were 44 males and 27 females, aged between 20 to 68 years old, with an average age of (41.2 ± 6.3) years old, 13 cases of severe craniocerebral injury, 25 cases of gastrointestinal bleeding, 18 cases of coronary heart disease, and 9 cases of traumatic hemorrhage, 6 cases of acute pesticide poisoning. The comparison of the two groups of data ($P > 0.05$) is comparable, and this study was approved by the ethics committee.

Inclusion criteria: (1) Patients between 18 to 80 years old. (2) The patient or family members were informed about the study and agreed to participate. (3) The patient's respiratory function was stable. (4) The patient's hemodynamics was stable for more than 24 hours.

Exclusion criteria: (1) Patients undergoing cardiopulmonary resuscitation or palliative care. (2) Patients entering the EICU ward within 48 hours of life support treatment or unavoidable death. (3) Patients entering the EICU ward were diagnosed with acute deep vein thrombosis. (4) The patient has a history of drug abuse. (5) Patients with a history of diseases such as language communication impairment, hearing impairment, vision, cognitive impairment. (6) Patients who are reluctant to cooperate with the researcher.

Method

Patients who entered the EICU ward control group received routine nursing care, such as analgesia support, basic item preparation, sedation care, comfort care, nutrition support, activities and communication, and environmental management.

Use the eCASH nursing model to care for the observation group. Specific methods: (1) eCASH nursing team construction: consisting of 2 nurses and rehabilitation teachers, 3 ICU attending doctors, and EICU responsible nurses, with the head nurse as the team leader. First, the head nurse needs instructions on the implementation of intensive nursing care to the patients. During early shifts, the team members are organized to learn the eCASH nursing model. Training and assessments are regularly organized once a month. After passing the assessment, they participate in clinical nursing and improve the quality of care. (2) Analgesic care based on the eCASH model: the responsible nurse uses the Numeric Rating Scale (NRS) to assess the pain level of EICU patients and evaluate their analgesic needs. The attending physician is responsible for the patient's analgesic plan and goals, and issues doctor's order. According to the doctor's order, the responsible nurse will implement the corresponding analgesic care according to the doctor's order. If according to the plan, inject remifentanyl $0.25\text{--}4\text{ }\mu\text{g}$

/ kg.min in vein to maintain routine analgesic care. Due to the pain caused by nursing operations, intravenous injection of 50 µg / fentanyl was pumped to relieve analgesia, and detailed records pharmacology, duration, measurement, etc. According to the changes in the patient's condition in the clinic, the analgesic medication plan is adjusted. (3) In the process of analgesia care, it is necessary to target-oriented, real-time evaluation of the patient's sedation needs, as far as possible to control the dosage of medication, to achieve the best results. Such as adjusting the sedation program according to the patient's sedation-agitation score results, and using 0.2-1.04 µg /kg.hdexmedetomidine to maintain sedation support. The patient who cannot achieve the purpose of sedation by routine dosage can be combined with intravenous injection of 2-5 mg midazolam for further sedation, and at the same time observe the patient for delirium symptoms, record relevant information in detail, and timely feedback. (4) Humanistic care: There are different degrees of psychological changes in critical patients in the EICU ward. Humanistic care needs to be carried out in accordance with the psychological characteristics of patients. 1) Enhance environmental management, provide a good hospitalization environment for patients on basic nursing, optimize noise management, and avoid affecting patients' emotions. 2) Social support and family care, good family and social support for patients with EICU is conducive to providing emotional communication and improving the psychological state of the patient. At the same time, family members' better understanding of the patient's economic status, personality, family role, etc. are more conducive to channeling the patient's depression mood. In addition, it can be known that family members' assistance in massaging patients' limbs has a positive effect on preventing deep vein thrombosis and limb muscle atrophy. 3) Nursing staff comprehensively evaluate the patient's emotions, psychologically enlighten them, and eliminate the patients' bad emotions. (5) Limb activity: After the patient's condition is stable, the

therapists intervene in the consultation and implements passive joint training, 2 times / d, 15 min / time. The nurses give the limb air pressure treatment according to the doctor's order, which is implemented at 9 and 15 o'clock, 20 min / time. After the patient is awake, instruct him to carry out active limb activities, such as lower leg lift, upper limb lift, ankle pump exercise, fist pump, etc. The training content is from simple to complex, gradually increasing the difficulty, and stimulating the recovery of the patient's body function.

Observation Indexes

The EICU critical patients' self-care ability was evaluated by Barthel Index (BI) ⁵. The retest reliability coefficient in each field of the scale was > 0.82, the halving coefficient was 0.86 - 0.89, and the overall internal consistency reliability was > 0.92. The scale includes 10 items, the higher the score, the lower the patient's ability to take care of themselves. The psychological function of the patients was evaluated using the Symptom Check-List90 (SCL-90) ⁶. The scale has a total of 90 items and 9 dimensions, and is evaluated using a 5-level scoring method, the lower the score, the better the mental state. The cognitive functions of the two groups were evaluated using the Hastgawa Dementia Scale (HDS) ⁷. The scale includes 2 naming recall questions, 1 calculation question, 2 common sense questions, 4 memory questions and 2 directional questions, a total of 11 questions. The higher the score, the higher the patient's cognitive level. The patient's physical function was evaluated using the Chinese version mini. Physical Physical Performance Test (CM-PPT) ⁸, a 4-level scoring method with a total score of 16 points. The higher the score, the better the physical function of the patient.

Statistics

The data was included in SPSS21.0 statistical software for analysis. The comparison of count data was by χ^2 comparison, expressed as a rate (%), the comparison of measurement data was by t test, and ($\bar{x} \pm s$). If ($P < 0.05$) then the difference is obvious and statistically significant.

RESULTS

Comparing the BI Scores of the Self-Care Ability of the Two Groups of Patients

Before nursing, the BI score of EICU critically ill patients in the observation group was not statistically significant compared with the control group ($P > 0.05$). After the intervention of the eCASH nursing model in the observation group, the BI score was obviously higher than the control group, and the difference was statistically significant ($P < 0.05$). See Table 1.

Table 1. Comparison of BI scores ($\bar{x} \pm s$)			
Group	n	Before	After
Observation group	71	44.70±4.65	47.75±4.76
Control group	71	43.99±4.92	44.40±4.79
t	-	0.883	4.180
P	-	0.378	0.000

Evaluation of the SCL-90 Scale of Mental Function in Two Groups

According to the SCL-90 scale scores, there is no significant difference in the scores of each dimension between the two groups before nursing, which is statistically meaningless ($P > 0.05$). Before and after nursing, there is no significant difference in the scores of the two dimensions except for obsessive compulsive disorder and psychotic ($P > 0.05$). The SCL-90 scores of the other dimensions were significantly lower after nursing than before nursing, and the difference was statistically significant ($P < 0.05$). Compare the data between the two groups after nursing, somatization, anxiety, depression, fear, the total scores of hostility, paranoia and SCL-90 of observation group were significantly lower than those of the control group, the difference was statistically significant ($P < 0.05$). See table 2.

Table 2. Comparison of psychological function by SCL-90 score ($\bar{x} \pm s$)				
Item	Observation Group		Control Group	
	Before	After	Before	After
Somatization	2.53±0.22	1.64±0.70@*	2.49±0.61	2.12±0.45@
Interpersonal	2.12±0.36	1.60±0.56@	2.20±0.37	1.72±0.41@
anxiety	2.55±0.25	1.51±0.33@*	2.36±0.52	2.22±0.40@
Depression	2.44±0.67	1.61±0.55@*	2.38±0.57	2.36±0.41@
Obsessivecompulsivedisorder	1.69±0.42	1.65±0.55	1.70±0.51	1.66±0.43

fear	2.07±0.63	1.22±0.40@*	2.11±0.57	1.74±0.46@
Hostility	1.92±0.45	1.33±0.52@*	2.01±0.62	1.83±0.43@
Paranoid	1.83±0.40	1.36±0.52@*	1.87±0.38	1.70±0.54@
Psychotic	1.32±0.37	1.27±0.40	1.31±0.41	1.28±0.36
Total score	174.24±45	127.12±38.6	175.31±46	154.45±40.
	.33	5@*	.28	11@

Note: Compared with the observation group, * $P < 0.05$. Before and after nursing, @ $P < 0.05$.

Comparing the HDS Scores of the Cognitive Levels of the Two Groups

Before nursing, there was no significant difference in the cognitive level of the two groups of patients ($P > 0.05$). After nursing, the HDS score of the cognitive level of the observation group was higher than that of the control group, and the difference was statistically significant ($P < 0.05$).

Table 3. Comparing the HDS scores of cognitive levels between two groups ($\bar{x} \pm s$)			
Group	n	Before	After
Observation Group	71	20.24±4.72	33.07±3.95
Control Group	71	21.10±3.69	26.77±3.82
t	-	1.209	9.660
P	-	0.228	0.000

Statistical Body Function Indicators

The comparison of CM-PPT score results, the data comparison between the two groups before nursing, there was no statistical significance ($P > 0.05$); the observation group after receiving eCASH nursing score results were higher than the control group, the difference was significant ($P < 0.05$). See table 4.

Table 4. Comparing the scores of two groups of CM-PPT before and after nursing			
Group	n	Before	After
Observation Group	71	10.95±2.92	13.26±1.92
Control Group	71	10.17±2.24	10.25±2.29
t	-	1.785	8.487
P	-	0.076	0.000

DISCUSSION

EICU patients are in critical condition, and difficult clinical treatment and nursing. They are affected by factors such as dying fear and uncertain prognostic results. Patients may have PICS, leading to worsening of the condition⁹. Meanwhile, the EICU ward treatment may cause the loss of the

patient's self-awareness, which may also induce PICS, affect the recovery of the patient's physical function, and adversely affect the prognosis. The PICS response is the risk of acquired disease in EICU patients, which is currently related with the new admission pressure source and acute admission. It can involve the patient's cognition, psychology and body, causing damage in various fields, and some patients even last for several years, which can cause serious impacts on patients' life and family. The physical damage of EICU critical patients is related to long-term braking or bed rest, deep veins, pain, etc. Most of them have muscle weakness and decreased muscle strength, which affect the patients' daily life. At the same time, most patients with EICU are hospitalized for a long time, and various invasive operations, isolation from family members may cause psychological abnormalities of varying degrees, and even induce psychological stress reactions for most patients, resulting in emotional disorders. According to relevant literature, after EICU critical patients are discharged from hospital, there may be sequelae of cognitive function, psychological function, physiological ability and other aspects, which will have a serious impact on the patient's quality of life and family happiness index ¹⁰.

The eCASH nursing model is a highly flexible and applicable nursing model. It was proposed by Vincent, the former chairman of the European Society of Intensive Care Medicine. It includes early functional exercise, humanistic care, minimal goal sedation, joint intervention, and priority analgesia. In several aspects, and the main purpose is to optimize current nursing and treatment ¹¹. At present, there are few studies on eCASH nursing mode in China, but some studies have pointed out ¹² that it reflects the overall management concept and is consistent with Maslow's needs theory and domestic critical illness guidelines, and provides support for the care of EICU patients. The operation of patients undergoing eCASH nursing model for elderly patients can help them reduce the incidence of complications and, at the same time, have a certain effect on preventing delirium ¹³.

The

most common victory dysfunction in critical patients in EICU is ICU acquired weakness, which is manifested by decreased muscle strength, decreased limb reflexes, and offline distress. Some patients may have symptoms such as muscle atrophy ¹⁴. It is mainly related to the patient's long-term braking, mechanical ventilation over 24h, long-term bed rest, etc. ¹⁵. The patient is at rest for a long time, which results in the influence of myofibrillar synthesis, inhibits muscle contraction ability, and causes muscle degradation. In addition, the patient's condition is dangerous and critical, the body's condition is in a state of high stress and high consumption, insufficient physiological function processing, accelerated muscle fiber protein hydrolysis, resulting in the recovery and maintenance of muscle protein balance are affected, muscles are consumed in large amounts, and ultimately lead to ICU acquired weakness. As the patient's muscle tissue endurance decreases, the patient's ability to move decreases, which affects the patient's ability to walk, resulting in a reduction in functional independence and a decline in life self-care ability ¹⁶. In view of this, this study used the eCASH nursing model to intervene in the observation group. The results showed that after the intervention, the BI score of the observation group was obviously higher than that of the control group ($P < 0.05$), suggesting that the eCASH nursing model can prevent ICU acquired weakness in the care of critical patients, strengthen patients' muscle strength, and improve their ability to take care of themselves in daily life. The self-care ability of patients is their most basic physiological need. In this study, through eCASH analgesia nursing care, according to the patient's pain assessment results, adequate analgesia support was taken to quickly relieve patients' pain and prevent cardiovascular burden and high metabolism caused by high-intensity pain to ensure the smooth development of the patient's later nursing work and improve the nursing results. In the care of critically ill patients in EICU, sedation care conforms to the basic principles of humanized care, but there is insufficient throwing. If the sedation level deviates, it may cause functional damage and adversely affect the patient's mobility ¹⁷.

Therefore, in this study, in the eCASH nursing model, the patient's sedation needs are evaluated at all times, and according to the evaluation results, strengthen sedation management. Through the rational use of analgesic drugs, sedation measurement, etc., to achieve a non-irritating situation, ensure that the patient's consciousness remains naturally sober, minimize the negative effects of sedative drugs, and prevent the limitation of muscle tension caused by sedation analgesia, and ensures that the patient's body can participate in activities normally.

EICU's psychological injury in critical patients is a relatively common phenomenon in clinic, and it is related to patients' disease, long-term hospitalization, and pain. According to relevant investigations, some EICU critical patients still have symptoms of post-traumatic stress disorder for 1 year after discharge. Due to the symptoms of post-traumatic stress disorder, the patient may have symptoms such as inattention, excessive excitement, sleep disturbances, and even accompanied by cognitive dysfunction, which ultimately leads to the patient being in a state of depression and anxiety for a long time, whose health have been seriously affected¹⁸. Therefore, how to clinically effectively reduce critical psychological injury is a hot point in clinical research. This study shows that the SCL-90 scale score offers the comparison before and after nursing, except for the obsessively compulsive disorder and psychotic scores ($P > 0.05$). The residual dimensions of the SCL-90 score after nursing are significantly lower than before nursing ($P < 0.05$). It is suggested that the EICU critical patients are less affected by psychiatric and obsessively compulsive disorder, but the patients generally have anxiety, depression, fear and other emotions. After analysis, the patient is subjected to tracheal intubation, puncture, and other invasive operations. Being in a state of high stress, the patient's uncertainty about the outcome, and the fear of dying are the main factors that cause the patient's psychological damage. The comparison of the data between the two groups after nursing showed that the total scores of somatizations, anxiety, depression, fear, hostility, paranoia and SCL-90 in the

observation group were significantly lower than those in the control group ($P < 0.05$). Afterwards, all kinds of negative emotions have been significantly improved. eCASH nursing model aims to sedation and strengthen the level of analgesia management, and to meet the needs of sedation, reduce the use of analgesic drugs, so that the patient's physiological reflex is retained, which is conducive to improving patients' participation in nursing, avoid excessive release of hormones by the body, control neurohumoral response, relieve psychological stress, and improve the psychological state of patients.

Cognitive impairment is a relatively common neuropsychological function defect in clinical. During the treatment of critical patients in EICU, due to various factors, acute cognitive dysfunction such as delirium is prone to occur, and patients with severe conditions may even experience sudden fluctuations in unstable mental states. In addition, this kind of mental state change is difficult to identify in the clinic, and it is more harmful. Some studies have pointed out that after delirium occurs in critical patients in EICU, as the duration of the disease prolongs, the risk of mortality of the patient gradually increases, and some patients even have persistent cognitive impairment¹⁹. Therefore, it is very important to strengthen the prevention and care of cognitive impairment in the clinic. This study showed that the cognitive levels of the two groups of patients were compared ($P > 0.05$). After nursing, the HDS score of the observation group was higher than that of the control group ($P < 0.05$), indicating that the eCASH nursing model is conducive to improving the cognition of critical patients in EICU to prevent delirium. Delirium is a multiple syndrome of critical patients in EICU. It is an acute organ dysfunction disease, and its occurrence and development are related to the patient's pain level and psychological state. This study uses the eCASH nursing model to implement pain care for patients, uses the NRS scale to evaluate patients' pain level in real time, comprehensively analyzes the patient's sedation needs, and implements real-time scientific analgesic intervention according to the doctor's order to relieve the patient's physical discomfort and prevent the patient from appearing the damage in

cognitive level. In addition, through humanistic care, this paper helps real-time psychological intervention in terms of strengthening environmental management, family care, social support, psychological care and other aspects to help patients adjust their psychological status so that they can sense the family care and social support, reduce psychological pressure, and improve the hospitalization environment, reduces the irritation of patients caused by the outside world and reduces the occurrence of delirium.

Compared with the CM-PPT score results, the observation group received eCASH nursing scores higher than the control group ($P < 0.05$), indicating that the eCASH nursing model can improve the body function of EICU critical patients and promote their recovery. After analysis, the EICU critical patients stayed in bed for a long time, and the use of analgesic drugs will gradually decline the patient's physical function. Through the eCASH nursing model, a team is formed to discuss the patient's condition and nursing points. The team members learn the eCASH nursing model, improve their nursing professional abilities, and the analgesic nursing. Under the guidance of ICU doctors, they can improve the rationality and scientificity, reduce the negative effects caused by narcotic drugs. At the same time, in the eCASH nursing model, the patient's psychological state and nursing participation initiative have been significantly improved, laying a foundation for the smooth implementation of later rehabilitation training. After the patient's condition is stable, the therapist will carry out passive limb training to avoid muscle degradation and ensure the maintenance of body function. Meanwhile, after the patient is awake, he will be instructed to carry out active exercise, of which the difficulty of training gradually increase, so that the patient's physical function can gradually returns to normal. In addition, family members implement supportive activities under the guidance of responsible nurses, such as massage to patients, which is conducive to the prevention of muscle atrophy²⁰.

In conclusion, due to the influence of their own disease

factors, most EICU critical patients have affected body organs and functions, poor metabolic function, and low immunity. In addition, patients may receive mechanical ventilation and venipuncture during EICU ward etc., which increase the suffering of the patient, causing the patient's physical and psychological aspects to be affected, and even causing obstacles to cognitive function, psychological state, life self-care ability, physical function, etc. It not only affects the patient's prognosis and quality of life, but also added the patient's family burden and social burden. Intervene through the eCASH nursing model takes the patient as the center, combining with the patient's analgesia needs assessment results, implement analgesia and sedation treatment under the guidance of the attending physician, ensure the reasonable use of sedation drugs, always put the patient first, and take humane treatment for nursing, making full use of the patient's family, social and other materials to improve the patient's unhealthy mental state, mobilizing the enthusiasm of the nursing staff, and optimizing the content of nursing. In addition, it combines the patient's clinical situation, carries out early physical activities to prevent the muscle atrophy of the patient's limbs, stimulates the recovery of the body's function, and improves the patient's ability to take care of themselves in life. It is worthy of clinical promotion.

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