EFFECTS OF THE ECASH NURSING MODEL ON SELF-CARE ABILITY, PHYSICAL FUNCTION, PSYCHOLOGICAL FUNCTION, AND COGNITIVE FUNCTION OF CRITICALLY ILL PATIENTS IN AN EMERGENCY INTENSIVE CARE UNIT

Xiaoling Fu[1,#], Huang Zhong[1,#], Manshi Meng[2], Bo Wang[3,*]
[1]Department of Emergency, Central South University Xiangya School of Medicine Affiliated Haikou Hospital, Haikou, 570208, China - [2]Department of Nursing, Central South University Xiangya School of Medicine Affiliated Haikou Hospital, Haikou, 570208, China - [3]Department of Operating Room, Central South University Xiangya School of Medicine Affiliated Haikou Hospital, Haikou, 570208, China
[#]*These authors contributed equally to this work as co-first author*

ABSTRACT

This work aimed to explore the effects of early comfort using analgesia, minimal sedatives, and maximal human care (eCASH) nursing modes on the self-care ability, physical function, psychological function, and cognitive function of critically ill patients in emergency intensive care units (EICUs). Sixty-eight patients who received treatment in the EICU of our hospital were selected as the research subjects and were randomly divided into an experimental group receiving the conventional nursing-based eCASH nursing mode and a control group receiving routine nursing. Outcomes were evaluated based on the medical outcomes of the 36-item Short-form Health Survey (SF-36). The results showed that after the nursing intervention, the physiological function (78.4±11.1) points, physiological function (67.3±9.2) points, body pain (75.7±9.6) points, and mental health (78.5±10.8) points of the experimental group were significantly higher than those of the control group (P<0.05). The overall health score of the experimental group (81.3±9.6) was significantly higher than that of the control group (72.4±9.2) (P<0.05). eCASH nursing can effectively improve patients' physical function, physical function, physical pain, energy, social function, emotional function, and mental health, and the effect was better than that of conventional nursing, which is of clinical application and promotion value.

Keywords: *eCASH nursing, EICU patients, ICU patients, quality of life.*

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Introduction

With the continuous progress of medical conditions and the development of medical technology, intensive care units (ICUs) have been developed, mainly for the treatment of severe patients[(1)]. The emergency intensive care unit (EICU) is the main place for the treatment of acute and critically ill patients, whose conditions generally come on quickly and pose a serious threat to their lives[(2)]. Each EICU rescue unit is fully equipped with rescue equipment, complete with monitoring and life support equipment. With the continuous development of emergency departments, the emergence of the EICU is a new starting point that can treat all kinds of acute and severe patients in a timely manner. To some extent, EICU reflects the level of a hospital's ability to deal with emergency situations. The emergence of the EICU can not only guarantee the quality of medical services for critically ill patients but also timely treat patients, monitor their physical signs in real time, and provide life support to ensure the safety of critically ill patients. Therefore, it can effectively reduce the

possibility of critically ill patients losing their lives and improve their physical conditions[3]. However, when patients are admitted to the EICU, they may also have some health problems, the most common of which are psychological, cognitive, and physical injury[4], which is summarized as postintensive care syndrome (PICS)" because of its high clinical occurrence probability[5].

At present, researchers believe that the factors of PICS are related to the pressure of patients after admission, which to some extent reflects the probability of patients with urgent and severe diseases and may accompany patients for a long time after discharge, affecting their quality of life[6]. After patients are admitted to the EICU for various invasive treatments, their cognitive status can change due to environmental influences and other factors. Older patients, patients treated with benzodiazepines, and patients assisted with mechanical ventilation had higher rates. In addition, the general symptoms of PICS patients are more serious, which will affect the normal activities of patients and place considerable economic pressure on treatment[7]. With the aggravation of the disease, patients may lose self-care ability, weaken muscle strength, increase the probability of anxiety, depression, and other psychological problems, and further affect the prognosis of patients[8]. Hence, it is very important to take effective intervention measures.

In view of the above situation, Vincent, former president of the European Association of Intensive Care Medicine (ESICM), proposed the early Comfort using Analgesia, minimal Sedatives, and maximal Human Care (eCASH) nursing model in 2016 to improve the treatment effect of ICU patients[9]. The eCASH nursing model is widely applied and flexibly applied, with six main objectives[10-12]. The first is early joint intervention, which emphasizes early detection and early prevention and advocates interdisciplinary team cooperation and patient-centered intervention. The second is making the patient feel comfortable. The third is focusing on pain comfort care and planning priority analgesia. Fourth, if the patient needs sedation, target minimization sedation will be adopted because a low level of sedation can help the patient maintain consciousness while awake and improve the patient's social perception.

The fifth is paying attention to the psychological condition of patients and giving timely humanistic care. The sixth is the early activity and exercise after the end of treatment to promote physical recovery. In eCASH nursing activities, nurses should let the patients themselves have a sense of participation; ideally, it can be considered to let the patient's family participate in the nursing activities.

Although there are few studies on the clinical application of the eCASH nursing model nationally and internationally, the management concept embodied by eCASH provides a new direction for the management of EICU medical teams. In this study, patients receiving treatment in the EICU were recruited as the research subjects and were treated under the eCASH nursing mode and conventional nursing mode, and the changes in the scores of various indicators of patients after nursing intervention were compared to explore the impact of the eCASH nursing mode on EICU patients' various functions, providing reference value for the application of the eCASH nursing mode in the EICU.

Materials and methods

The research object

A total of 68 patients who received treatment in the EICU of our hospital from XX to XX were randomly selected as the research subjects. All populations were randomly divided into an experimental group and a control group.

Those in the experimental group received the conventional nursing-based eCASH nursing mode, while those in the control group received routine nursing. Inclusion criteria: i) the Barthel index (BI) ≥70 when the patient was admitted to the EICU; ii) RASS score ≥-3. Exclusion criteria: i) patients with a history of visual, hearing, cognitive, or communication disorders; ii) patients with a history of drug abuse; iii) patients who could not avoid death or voluntarily gave up treatment within 48 hours after admission to the EICU. All subjects signed informed consent forms, and the test process was approved by the ethics committee of XX Hospital.

Nursing methods

Control group: routine nursing mode

• When the patient was admitted to the EEICU, the nursing staff issued a list of items that the patient's family needed to prepare for the EICU.

• Medical staff used the Critical Care Pain Observation Tool (CPOT) every four hours to evaluate the patient's pain once, and if it was over 2 points, the condition was reported to the doctor, and the medication and infusion speed were adjusted

according to the doctor's advice.

• The sedation nursing physician implemented the daytime interruption sedation strategy according to the patient's situation, and the nurse in charge evaluated the sedation depth by RASS every two hours.

• Nutritional support was provided as advised by the doctor. The patient was observed for nausea, vomiting, and other adverse reactions, and the condition was reported to the doctor for treatment.

• *Comfortable care:*

• The nurse helped the patient take a bath twice a day;

• Rubber gloves were used to support the interface between the ventilator tube and the endotracheal intubation, and the surface of the tube was pulled, resulting in discomfort for the patient;

• Nurses dipped cotton swabs in water or used watering cans to solve the problem of thirst.

• *Communication and rehabilitation:*

• For patients who could not communicate normally, nurses used EICU special communication cards or patient demand cards to help patients express their needs;

• Nurses performed an on-time nursing patrol, raised the head of bed 30°, to help patients turn over in bed, 2 h/time, and guided patients to carry out ankle pump movement.

• Environmental management: In the evening, after treatment, nurses helped patients turn off the lights so that patients could rest at ease.

Experimental group: the implementation of the eCASH nursing mode based on the routine nursing mode of the control group

• *Early joint intervention:*

• An "eCASH" team was established, including the head nurse of the EICU, the responsible nurse, the attending doctor of the EICU, and the rehabilitation physiotherapist;

• The head nurse managed the progress of intensive care, organized the team to learn eCASH nursing content in the form of PPT during the morning shift, regularly strengthened it, and evaluated the medical staff online.

• Planned priority analgesia: after entering the EICU, patients' analgesia must be assessed first, and then the attending doctor should formulate a detailed analgesia plan and target.

Then, the responsible nurse should implement medical advice (Table 1).

Item	Methods
The scoring tool	The Numeric Rating Scale (NRS) [13]: 0~3; The Critical Care Pain Observation Tool (CPOT): 0~2 points
Assessment tools	1. Patients who could self-report pain were assessed by NRS; 2. Patients who could not be described in detail were evaluated by CPOT.
Observation and monitoring	1. Based on routine nursing, the responsible nurse pumped remifentanil (0.25~4μg/(kg/min) for routine analgesia as planned; 2. The pain caused by the patient in the process of nursing operation was treated with fentanyl (50μg) analgesia according to the doctor's advice, and the dosage of drugs used by the patient, pumping time, and analgesic effect were recorded in detail; 3. If the patient's symptoms changed, the doctor should timely evaluate and change the analgesic method; 4. After the treatment, the use of analgesic drugs should be gradually reduced according to the doctor's advice to avoid the occurrence of drug withdrawal reaction.

Table 1: Table 1 Planned priority analgesic care.

• Goal-oriented minimization sedation care: doctors evaluated patients' sedation needs and determined the sedation plan that was beneficial to patients, and then nurses implemented the plan. Under the condition of following the doctor's advice and meeting the sedation goals, the nurse can adjust the infusion speed according to the patient's condition, ensure the normal operation of the drug effect at the lowest dose, and record the patient response (Table 2).

Item	Methods
The scoring tool	When the patient was quiet, comfortable, and can cooperate, they were scored, RASS: -2~0
Assessment tools	Richmond Agitation-Sedation Scale (RASS)[14]
Observation and monitoring	1. Nursing staff pumped dexmedetomidine (0.2~1.0μg/kg/h) for sedation according to the doctor's advice, except for individual patients who needed to maintain deep sedation at a fixed time; 2. If the high dose of conventional drugs still cannot achieve the sedation goal, the patients should be injected with midazolam (2~5 mg) combined with sedation as instructed by the doctor, and the patient's reaction should be closely watched and the patient's condition should be recorded in time; 3. If the patient's symptoms changed, the doctor should re-evaluate and replace the sedation method; 4. After the treatment, the use of analgesic drugs should be gradually reduced according to the doctor's advice to avoid the occurrence of drug withdrawal reaction.

Table 2: Goal-directed minimal sedation care.

• To promote patient comfort, on the premise of the above objectives, the patient's body discomfort was reduced. i) When a tracheal intubation fixator was used, the Comfeel transparent dressing was used to cover the patient's mouth to form a protective film, reduce compression, protect the patient's skin, and avoid long-term too tight fixation resulting in lip damage, pressure ulcers, etc., ii) After tracheal extubation, atomization nursing was given to help patients improve pharynx and airway discomfort. iii) The patient's family members were told to apply lip balm to the patient to keep her lips moist.

• Nurses should pay attention to the psychological status of patients, take humanistic care of patients in a timely manner, and improve EICU nurse–patient communication, including family-social support, as shown in Table 3.

Item	Methods
Communication	1. When patients entered EICU, nurses should communicate with patients' family members to learn about their living habits, self-care, cognitive ability, understanding of the disease, and important medical history, etc. 2. A communication board was placed at the head of the patient's bed, and the responsible nurse filled in the special nursing needs or patient needs of the day, etc., and the head nurse checked when the morning shift was completed every day.
Provide family and social support	1. Nurses should communicate with patients. If they cannot communicate with patients, they should communicate with their families to understand the family situation, economic situation, personality characteristics, hobbies, and needs of patients; 2. If the patient had the need to communicate with his family members, the nurse can let his family members write a message, and the nurse can help convey the message during the daily shift; 3. In special cases, nurses should let the patients be accompanied by family members and guide them to massage patients and help patients recover.
Focus on environmental management	The noise management was improved in addition to routine basic care. Nurses should be on regular shift, trying not to disturb the rest of patients, and night nurses should pay attention to the management of instrument alarm sound.

Table 3: Humanistic nursing measures.

• Early activities and functional exercises: Twenty-four hours after admission to the EICU, EICU staff and rehabilitation physiotherapists jointly evaluated patients who could begin appropriate functional exercise, and the responsible nurse provided health education. After the consent of the patient and his/her family was obtained, the caregiver assisted the patient in developing an activity plan that included airway care and physical activity. During the exercise, the nursing staff should continuously observe the patient's breathing status and finger oxygenation. Under the guidance of the physician and rehabilitation physiotherapist, the patient gradually completed the exercise, and each exercise was subject to the patient not feeling tired. Specific measures are shown in Table 4.

Item	Methods
Airway nursing	1. Lung auscultation was performed to evaluate the patient's sputum and cough reflex; 2. The responsible nurse performed chest physical therapy on the patient: a) airway suction; b) assist the patient with sputum excretion twice a day, and each excretion should last for 10 minutes; c) lung distension was prescribed twice a day; d) administer airway drops or aerosols as directed, if necessary; 3. Real-time nursing monitoring within 48 hours of extubation in patients was implemented, and patients were guided to learn the correct method of expectoration, to remove airway secretions.
Physical activity	1. Bed physical activity: a) under the guidance of the rehabilitation physiotherapist, the patient's family assisted the patient with passive joint activities, activities twice a day, each lasting 10 or 15 minutes; b) the responsible nurse shall follow the doctor's advice and administer barometric therapy to the patient's limbs for 20 minutes twice a day; 2. Bedside physical activity: patients were guided by rehabilitation physiotherapists to clench their fists, upper limb lifting exercise, lower limb lifting exercise, ankle pump exercise, etc.; 3. Resistance exercise: a) after the patient's muscle strength was evaluated, the patient was gradually transferred from the rubber duck to the rubber grip strength circle, so that the patient could reach 30% of the maximum grip strength, 20 s/time; b) the head of the bed was gradually raised by the responsible nurse until the patient was in an upright sitting position; 4. Bed and lower limb activities: under the guidance of rehabilitation physiotherapists, supervised by responsible nurses, patients' family members assisted patients with sitting and standing exercises at the bedside.

Table 4: Early activity and functional exercise.

Methods of nursing effect evaluation

The evaluation was conducted using the Medical Outcomes Study 36-item Short-form Health Survey (SF-36)[15]. There were 36 items, including physiological function (PF), physiological function (RP), physical pain (BP), overall health (CH), vitality (VT), social function (SF), emotional function (RE), and mental health (MH). It can effectively reflect the patient's quality of life for nearly a month. The original score was converted into a standard score (percentage system) [Standard score = (original score - lowest score of the item) ×100/(highest score of the item - lowest score of the item)]. Out of 100 points, a higher score indicates a better quality of life.

Statistical methods

SPSS 22.0 statistical software was used for data analysis. The measurement data are expressed as the mean ± standard deviation ($\bar{x}\pm s$). Independent sample T tests were used for general data, and paired sample T tests were used for intergroup comparisons. $P<0.05$ was considered statistically significant.

Results

General patient information

The 68 patients were randomly divided into an experimental group and a control group. In the experimental group, there were 14 males and 20 females, aged 53±4.5 years, with a BMI of 22±4.8 kg/m^2. There were 16 males and 18 females in the control group, aged 55±3.7 years old, with a BMI of 21±7.2 kg/m^2. In the control group, there were 10 cases of respiratory diseases, 12 cases of digestive system diseases, 6 cases of cardiovascular diseases, 2 cases of multiple injuries, 1 case of endocrine system diseases, 1 case of hemorrhagic shock, and 2 cases of other diseases.

In the experimental group, there were 9 cases of respiratory system diseases, 14 cases of digestive system diseases, 7 cases of cardiovascular diseases, 1 case of multiple injuries, 2 cases of endocrine system diseases, and 1 case of others. There was no significant difference in the general data between the two groups ($P>0.05$) (Table 5 and Figure 1).

Health status scores of patients in the two groups

The physiological function (PF) scores showed no significant difference between the two groups before nursing ($P>0.05$). After nursing intervention, the situation of patients in both groups improved, and the difference was statistically substantial ($P<0.05$), and the experimental group (78.4±11.1) was significantly higher than the control group (67.3±10.5) ($P<0.05$) (Figure 2).

Group	Male/female (cases)	Age (years old)	BMI (kg/m^2)
Experimental group (34 cases)	14/20	53±4.5	22±4.8
Control group (34 cases)	16/18	55±3.7	21±7.2

Table 5: Basic information of patients.

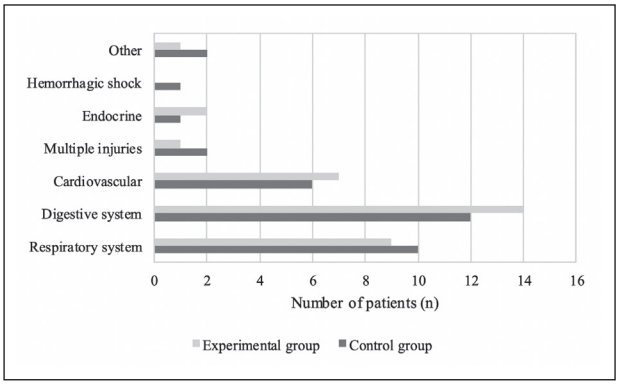

Figure 1: Diagnosis on admission.

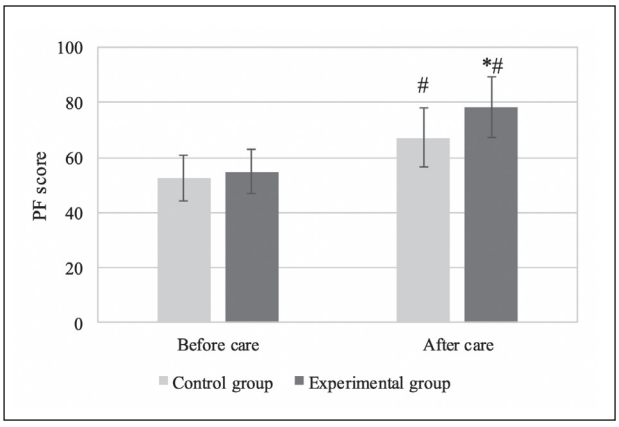

Figure 2: Physiological function scores of patients in the two groups.
*(*indicates that the difference is statistically considerable in contrast to the control group, P<0.05; #*indicates that the difference is statistically considerable in contrast to before nursing, P<0.05).*

The physiological function (RP) scores showed no significant difference between the two groups before nursing (P>0.05).

After the nursing intervention, the situation of patients in both groups improved; the experimental group (67.3±9.2) scores significantly increased compared with before nursing, and the difference was statistically substantial (P<0.05) and was significantly higher than that of the control group (58.6±9.6) (P<0.05) (Figure 3).

Body pain (BP) scores showed no significant difference between the two groups before nursing (P>0.05). After the nursing intervention, the scores of the experimental group (75.7±9.6) and control group (66.3±9.2) were significantly higher than those before nursing (P<0.05) and that in the experimental group was significantly higher than that in the control group (P<0.05) (Figure 4).

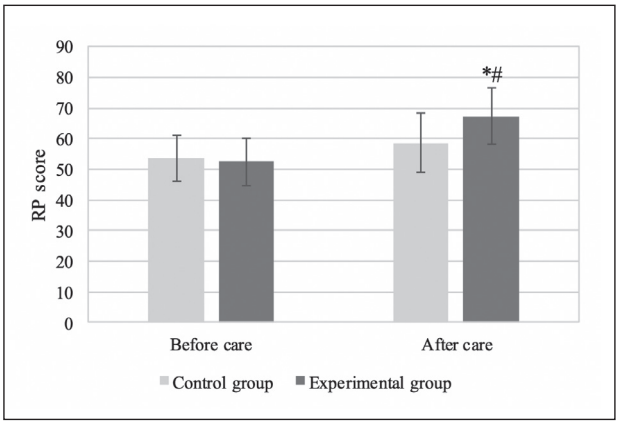

Figure 3: Comparison of physiological function scores between the two groups.
*(*indicates that the difference is statistically considerable in contrast to the control group, P<0.05; #*indicates that the difference is statistically considerable in contrast to before nursing, P<0.05).*

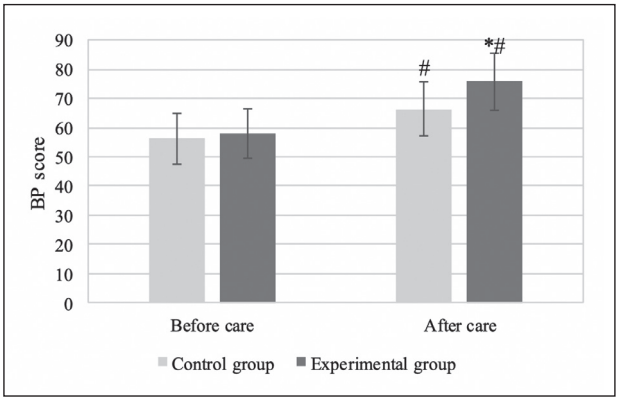

Figure 4: Comparison of somatic pain scores between the two groups.
*(*indicates that the difference is statistically considerable in contrast to the control group, P<0.05; #*indicates that the difference is statistically considerable in contrast to before nursing, P<0.05).*

Energy (VT) scores showed no significant difference between the two groups before nursing (P>0.05). After the nursing intervention, the situation of patients in both groups improved; that of the experimental group was 78.3±8.7 points and that of the control group was 72.8±8.5 points, which was significantly increased compared with before nursing (P<0.05) (Figure 5).

Social functioning (SF) scores showed no significant difference between the two groups before nursing (P>0.05). After the nursing intervention, the two groups of patients improved; that of the experimental group was 81.5±6.9 points and that of the control group was 76.4±6.4 points. Compared with before nursing, the difference was statistically

substantial (P<0.05), but there was no significant difference between groups (P>0.05) (Figure 6).

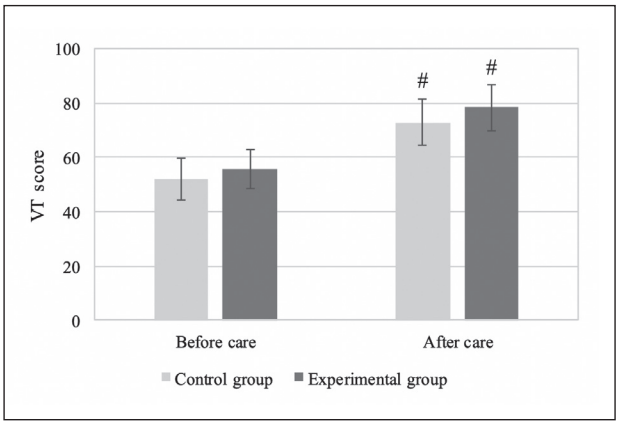

Figure 5: Comparison of energy status scores between the two groups.
*(*indicates that the difference is statistically considerable in contrast to the control group, P<0.05; #*indicates that the difference is statistically considerable in contrast to before nursing, P<0.05).*

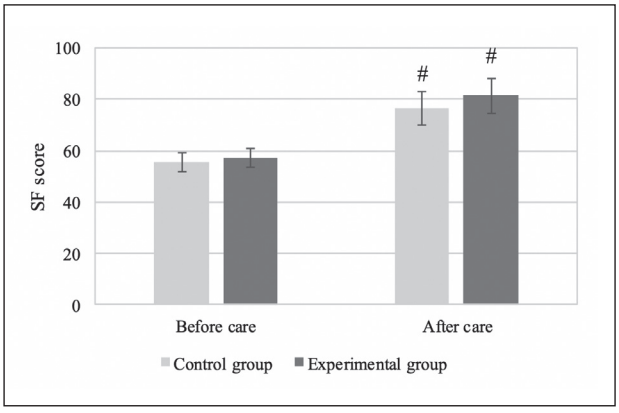

Figure 6: Comparison of social function scores between the two groups.
*(*indicates that the difference is statistically considerable in contrast to the control group, P<0.05; #*indicates that the difference is statistically considerable in contrast to before nursing, P<0.05).*

Emotional function (RE) scores showed no significant difference between the two groups before nursing (P>0.05). After the nursing intervention, the situation of the two groups of patients was improved; that of the experimental group was 81.6±10.2 points and that of the control group was 80.8±9.8 points.

Compared with before nursing, the difference was statistically substantial (P<0.05), but there was no significant difference between groups (P>0.05) (Figure 7). Mental health (MH) scores showed no significant difference between the two groups before nursing (P>0.05). After the nursing intervention, the situation of patients in both groups improved, and the score difference was statistically considerable in contrast to before nursing (P<0.05). The score of the experimental group (78.5±10.8) was significantly higher than that of the control group (69.6 ± 9.5), and the difference was statistically substantial (P<0.05) (Figure 8).

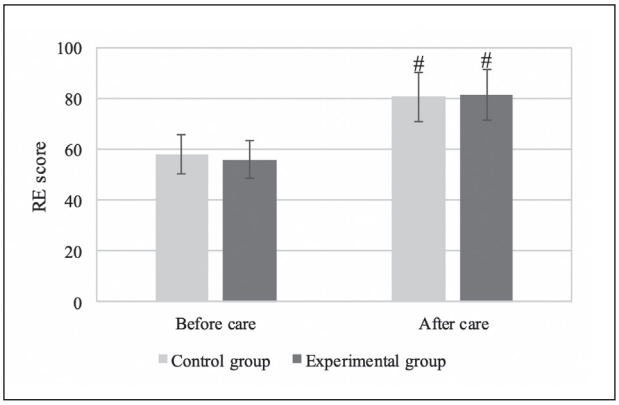

Figure 7: Comparison of emotional function scores between the two groups.
*(*indicates that the difference is statistically considerable in contrast to the control group, P<0.05; #*indicates that the difference is statistically considerable in contrast to before nursing, P<0.05).*

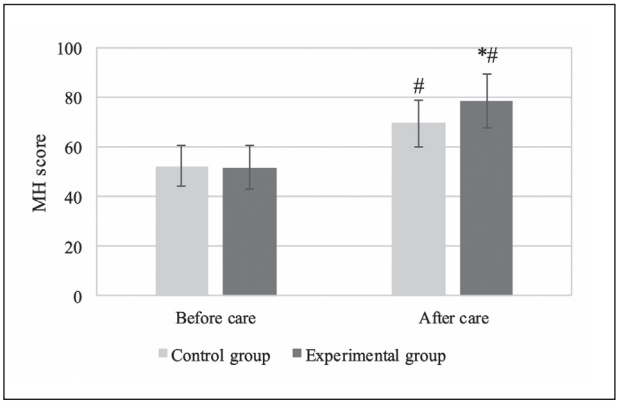

Figure 8: Comparison of mental health scores between the two groups.
*(*indicates that the difference is statistically considerable in contrast to the control group, P<0.05; #*indicates that the difference is statistically considerable in contrast to before nursing, P<0.05).*

Comparison of overall health status between the two groups

The overall health (GH) score between the two groups showed that there was no statistically substantial difference between the two groups before nursing (P>0.05).

After the nursing intervention, the score of the experimental group (81.3±9.6) was significantly higher than that before nursing, and the difference was statistically substantial (P<0.05).

The score of the control group (72.4±9.2) was significantly higher than that before nursing, and the difference was statistically substantial (P<0.05).

The expression in the experimental group was significantly higher than that in the control group (Figure 9).

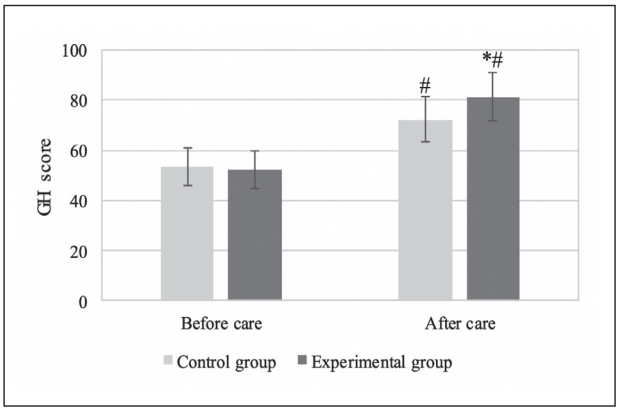

Figure 9: Comparison of overall health scores between the two groups.
*(*indicates that the difference is statistically considerable in contrast to the control group, P<0.05; #*indicates that the difference is statistically considerable in contrast to before nursing, P<0.05).*

Discussion

With the continuous deepening of clinical studies, it has been found that most patients admitted to intensive care units suffer from ICU syndrome to varying degrees, and the probability of disease is high. Therefore, an increasing number of medical professionals are paying attention to the etiology of ICU syndrome.

At present, many scholars have carried out in-depth and extensive studies on the pathogenic factors of ICU syndrome. However, most of the studies were carried out in the ICU or CCU, and there are few studies on EICU patients[16, 17]. ICU syndrome will lead to an increase in the length of stay of patients, resulting in increased economic pressure on patients and their families and posing poor long-term efficacy, while active nursing intervention plays an important role in the rehabilitation of patients[18]. In this study, the eCASH nursing model was applied to EICU patients to explore its application effect. The results showed that before the nursing intervention, there was no statistically substantial difference in patients' scores (P>0.05).

After the nursing intervention, the two groups of patients showed different degrees of improvement in physical function, physical function, physical pain, energy, social function, emotional function, and mental health. The scores of physiological function (78.4±11.1), physiological function (67.3±9.2), physical pain (75.7±9.6), and mental health (78.5±10.8) in the experimental group were significantly higher than those in the control group, with statistically substantial differences (P<0.05). Studies have shown that nursing intervention for patients in the ICU can significantly improve their ability to think and act[19].

Zale et al. (2018) also confirmed that nursing can effectively improve the physical and mental health status of patients in intensive care[20]. This is consistent with the results of this study. The overall health (GH) score of the two groups showed that the experimental group (81.3±9.6) score was significantly higher than the control group (72.4±9.2) score. This suggests that the eCASH model of care is more effective than conventional care.

Conclusion

In this study, the eCASH nursing model was used for nursing intervention in patients in the EICU and compared with conventional nursing. The results showed that eCASH nursing can effectively improve patients' physical function, physical function, physical pain, energy, social function, emotional function, and mental health, and the effect was better than that of conventional nursing, which has clinical application and promotion value.

Currently, there are few applications of the eCASH nursing model in the EICU, and this study can provide a strong reference value. However, due to limited conditions, the sample size included in this study was small, no significant difference was observed in individual indicators, and the study time was short, so it was impossible to judge the long-term effect, and further research is needed.

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Corresponding Author:
Bo Wang
Email: yuanci18877139@163.com
(China)