

# Research Progress on the Application of Cluster Nursing Mode in ECMO-Assisted Patients

Ling Liu\*, Sheilla Magbanua Trajera

University of St. La Salle Bacolod 6100, Philippines

\*Corresponding author: Ling Liu, 806739101@qq.com

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**Abstract:** Cluster care, also known as cluster therapy, cluster intervention, or bundled therapy, is a series of evidence-based supportive joint care measures developed to improve the quality of care for specific patients or nursing issues. It is highly reliable and can effectively improve patient prognosis. This article summarized the application of cluster nursing care in extracorporeal membrane oxygenation (ECMO)-assisted patients and the problems faced to provide a reference for evidence-based decision-making in clinical practice.

**Keywords:** Bundled care; ECMO; Critical and severe

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## 1. Introduction

Cluster care and extracorporeal membrane oxygenation (ECMO)-assisted care measures are currently a popular research topic. Liu *et al.* conducted a study on the implementation of cluster nursing intervention in patients undergoing ECMO combined with prone position ventilation and achieved relatively ideal results. They believed that it demonstrated great significance for patients undergoing ECMO-prone position synchronization<sup>[1]</sup>. However, there are still many challenges in practical nursing, and the exact methods on how to effectively apply cluster nursing in ECMO-assisted treatment is one of the key research contents of current studies. While strengthening the research on ECMO cluster nursing, it is necessary to strengthen the evaluation of its clinical safety, and corresponding research and evaluation from the perspective of “patient-centered” and improving nursing safety should be carried out. In particular, it is necessary to strengthen the development of nursing measures and understand the clinical effects of cluster nursing in ECMO-assisted patients to provide a basis for clinical ECMO-assisted patient care.

## 2. Overview of research on cluster nursing models at home and abroad

Cluster intervention is a measure that can enhance medical technology and improve patient prognosis<sup>[2]</sup>. The cluster nursing theory believes that strengthening communication and collaboration among multidisciplinary

teams is necessary to conduct reliable and safe nursing work. Lu *et al.* validated the reliability of this theory by implementing a multidisciplinary team collaborative nursing model in ECMO-assisted patients<sup>[3]</sup>. However, cluster nursing does not represent comprehensive care, but rather a specific nursing measure based on routine nursing to address a specific problem. These nursing measures have an evidence-based basis and have been tested in clinical practice, exhibited strong operability, and improved patient prognosis.

### **3. ECMO-assisted nursing research**

#### **3.1. Key points and challenges of ECMO-assisted nursing**

The main principle of ECMO is to introduce blood from the patient's body to the external environment through a catheter, oxygenate it with a membrane oxygenator, and then infuse the blood back into the patient's body with a pump. It serves as a medium to short-term cardiopulmonary support. ECMO nursing technology is highly complex to operate and manage, hence the challenges posed in clinical nursing are also relatively high. Wang *et al.* conducted nursing care for 10 critically ill patients receiving ECMO treatment. After various nursing measures, there were still many problems in the nursing process albeit exhibiting certain nursing effects<sup>[4]</sup>. This calls for the implementation of comprehensive nursing measures. Xu believed that standardized nursing procedures can effectively standardize nursing processes and reduce the incidence of complications in ECMO-assisted patients<sup>[5]</sup>. He *et al.* analyzed the prognostic factors affecting ECMO-assisted patients and pointed out that mechanical ventilation time, lung oxygenation index, and patient disease severity all affected prognosis<sup>[6]</sup>. From this, it can be seen that various nursing care issues need to be addressed in the ECMO-assisted patient care process. The main challenges include the standardization of the nursing process and improving its efficiency.

#### **3.2. Clinical nursing intervention study on ECMO-assisted patients**

ECMO-assisted treatment nursing has always been a key issue in clinical research. Through relevant research, it has been found that the main nursing goal of ECMO-assisted patients is to improve the patient's symptoms and reduce the incidence of complications. Sun *et al.* pointed out that ECMO-assisted who received clinical comprehensive high-quality care had more effective outcomes than routine care, but attention should be paid to the safety and effectiveness of nursing during the nursing process<sup>[7]</sup>. Li *et al.* pointed out that providing evidence-based cluster care to ECMO-assisted patients effectively improved their nutritional indicators and reduced the incidence of complications<sup>[8]</sup>. As cluster nursing is mainly based on evidence-based medicine, it can effectively address the issues in ECMO-assisted patient care and assist in improving the quality of care provided.

### **4. Research results of cluster nursing model in ECMO-assisted patients**

#### **4.1. Application of nursing measures**

The selection of nursing measures in ECMO-assisted patient care is a key factor affecting patient prognosis and nursing quality. Shen *et al.* showed that providing meticulous and comprehensive care to ECMO-assisted patients effectively prevented complications and promoted the successful weaning of patients<sup>[9]</sup>. Huang *et al.* pointed out that early bedside care for ECMO-assisted patients promoted the patient's recovery process<sup>[10]</sup>. Therefore, effective nursing measures should be applied and promoted in ECMO-assisted nursing care. However, it is important to note that clinical practice verification is required to confirm their safety and effectiveness.

## 4.2. Practical operation

The requirements for nursing care of ECMO-assisted patients are relatively high, but due to the relatively large number of clinical nursing types, proper scientific evaluation and selection are needed when carrying out nursing operations. Cluster nursing is mainly based on evidence-based medicine where each nursing operation relies on medical evidence and has strong operability. Chen *et al.* provided clinical care to patients undergoing ECMO treatment, with a focus on pipeline management, blood flow and pressure management, anticoagulation monitoring, respiratory management, and other measures during the nursing period, and achieved ideal results<sup>[11]</sup>. In the process of implementing cluster nursing measures for ECMO-assisted patients, the primary focus should be on preventing complications and paying attention to refined and specialized patient management during the nursing process. This is to improve patient treatment survival rate and prognosis.

## 4.3. Result evaluation

Zhao *et al.* provided cluster nursing care to patients with sudden cardiac death after ECMO. After the nursing intervention, it was found that the patient's ECMO assistance time, intensive care unit (ICU) hospitalization time, as well as various blood gas and respiratory indicators, were effectively improved, and the outcomes of the nursing effect were relatively ideal<sup>[12]</sup>.

## 5. Challenges in the application of cluster nursing care in ECMO-assisted patients

There is relatively little clinical research on the application of cluster nursing care in ECMO-assisted patients, hence its applicability and safety require further research and validation. The application of this nursing measure reduced the problems faced in ECMO-assisted care but places higher demands on nursing staff. For example, Ye *et al.* pointed out that the most common problems in ECMO treatment nursing are air-related alarms, flow monitoring alarms, pressure detection alarms, blood parameter indicators alarms, etc.<sup>[13]</sup>. From this, it can be seen that when implementing a cluster nursing model for ECMO-assisted treatment patients in clinical practice, it is necessary to focus on various complications, device treatment status, and various clinical indicators of the patients.

## 6. Conclusion

Through this analysis, we learned about the clinical research on cluster care in ECMO-assisted patients and analyzed its application quality and effectiveness. At the same time, we also addressed the problems of this nursing care in clinical application. Nonetheless, further research is required to provide assistance for the application of cluster nursing in ECMO-assisted patients, help improve the quality of clinical nursing, and contribute to its clinical application and promotion.

## Disclosure statement

The authors declare no conflict of interest.

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