

# Research Progress on Psychological Dysfunction of Post-Intensive Care Syndrome-Family

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## Abstract

Psychological dysfunction in post-intensive care syndrome-family (PICS-F) severely impairs family caregivers' capacity and patients' recovery process, and has become a research hotspot in the field of critical care. This article provides a comprehensive narrative review of PICS-F psychological dysfunction, focusing on its clinical characteristics, influencing factors, early identification and screening. It also synthesizes relevant nursing intervention strategies for family members during patients' hospitalization and after discharge, with the aim of providing a reference for the psychological care of family members of critically ill patients.

## Keywords

Critical Care, Post-Intensive Care Syndrome-Family (PICS-F), Psychological Dysfunction, Interventions, Influencing Factors

## 1. Introduction

In recent years, advances in critical care medicine and medical technology have significantly improved the treatment outcomes and survival rates of patients admitted to intensive care units (ICUs) [1]. However, the severity and uncertainty of the patient's condition, inadequate information and decision-making pressure experienced by family members, high medical costs, and long-term care needs after discharge often impose heavy psychological and economic burdens on family members and may even contribute to a range of physical and psychological dys-

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functions [2]. In 2010, post-intensive care syndrome (PICS) was first introduced at a critical care medicine conference in the United States to describe new or persistent impairments in physical, cognitive, and psychological functioning that emerge during or persist after an ICU stay [3]. The psychological and physical impairments experienced by family members of critically ill patients are collectively referred to as post-intensive care syndrome-family (PICS-F) [3] [4]. Among these, psychological impairments mainly manifest as anxiety, depression, acute stress disorder (ASD), and post-traumatic stress disorder (PTSD) [5]. This not only seriously affects the mental health and quality of life of family members, but also interferes with the prognosis and rehabilitation of patients [6]. Patient- and family-centered care emphasizes that, in addition to addressing patients' physical and psychological well-being, attention should also be given to adverse psychological responses among family members to help prevent the development of PICS-F-related psychological dysfunction. At present, international research on psychological dysfunction associated with PICS-F has gradually deepened, whereas relevant domestic studies are still in the initial stage, and the understanding and clinical response to it are still insufficient. Therefore, this article focuses on reviewing the clinical characteristics, influencing factors, early identification and screening, and nursing intervention countermeasures of PICS-F psychological dysfunction, providing a reference for deepening the understanding of PICS-F psychological dysfunction, conducting targeted research, and constructing a clinical support system.

## **2. Clinical Characteristics of Psychological Dysfunction in PICS-F**

Psychological dysfunction associated with PICS-F is mainly manifested as emotional problems such as anxiety and depression, and can be accompanied by multiple psychological stress responses including acute stress disorder and PTSD. Meanwhile, substantial differences have been reported in the prevalence of symptoms across studies, which may be attributable to variations in assessment instruments, study populations, and follow-up time points.

### **2.1. Anxiety and Depression**

Anxiety and depression are the most common and earliest-onset psychological problems among ICU family members, the two conditions frequently co-occur and interact with each other. Previous studies have reported that the prevalence of anxiety among family members of ICU survivors is approximately 21% - 56%, while that of depression is approximately 8% - 42% [7]. McAdam *et al.* [8] assessed family members using the Hospital Anxiety and Depression Scale (HADS) 3 months after patients' ICU discharge or death. The study included both family members of ICU survivors and bereaved family members, who were analyzed as a single group. The results showed that the prevalence of anxiety and depressive symptoms among family members was 44% and 27%, respectively. Cameron *et al.*

[9] assessed long-term family caregivers of ICU survivors using the Center for Epidemiologic Studies Depression Scale (CES-D), with follow-up assessments conducted at 7 days and 3, 6, and 12 months after ICU discharge. The study found that the proportion of caregivers with depressive symptoms remained as high as 43% even 1 year after discharge, suggesting that depressive symptoms may persist over the long term [10].

## 2.2. Acute Stress Disorder (ASD)

ASD refers to a stress response that occurs in individuals after witnessing, experiencing, or being confronted with a traumatic event involving severe injury or a threat of death to themselves or others. It typically occurs within 3 days to 1 month following trauma exposure [11] and is mainly characterized by emotional numbness, feelings of helplessness and bewilderment, and reduced awareness of the surrounding environment. Some family members may also experience derealization, depersonalization, or selective amnesia. Studies have shown that approximately 32% - 33% of parents of critically ill neonates and children experience ASD during their children's ICU stay. The relevant studies assessed ASD using the Stanford Acute Stress Reaction Questionnaire and the Acute Stress Disorder Scale (ASDS), respectively [7]. ASD is an early stress response after a traumatic event. If not recognized and treated promptly, symptoms lasting longer than 1 month may progress to PTSD [12].

## 2.3. Post-Traumatic Stress Disorder (PTSD)

PTSD is a mental disorder that may develop following exposure to sudden, severely threatening, or catastrophic events. Its onset may be delayed, and symptoms can persist for a prolonged period. PTSD is primarily characterized by recurrent re-experiencing of the traumatic event, avoidance of trauma-related stimuli or situations, and persistent hyperarousal. A meta-analysis by Wang *et al.* [13] reported that the prevalence of PTSD among family members of ICU patients ranged from 13.8% to 51.0%. However, this range was derived from studies involving different populations, assessment instruments, and follow-up time points, resulting in substantial heterogeneity. McAdam *et al.* [8] included both family members of ICU survivors and bereaved family members in the same analysis and assessed PTSD symptoms using the Impact of Event Scale-Revised (IES-R) 3 months after the patient's death or discharge from the ICU. The results showed that approximately 42% of family members experienced PTSD symptoms. A multicenter prospective cohort study conducted by Rai *et al.* [14] assessed PTSD symptoms among family members of ICU survivors using the Impact of Event Scale-Revised (IES-R). The results showed that the proportions of family members experiencing PTSD symptoms were 39% and 35% at 3 and 12 months after ICU discharge, respectively. During the follow-up period, this proportion decreased only slightly, suggesting that PTSD symptoms in some family members do not

decrease substantially over time.

### **3. Risk Factors for Psychological Dysfunction in PICS-F**

#### **3.1. Patient-Related Factors**

Patient death, age, duration of ICU admission, and APACHE II score are all associated with psychological dysfunction associated with PICS-F. Family members of patients who die in the ICU may have a higher risk of psychological dysfunction [15]. Compared with family members of elderly patients, relatives of younger patients are more vulnerable to severe psychological shock. In contrast, among older patients with more severe illness, their family members may experience relatively less psychological burden, possibly because they have greater psychological preparedness [16]. Nevertheless, other studies [17] have indicated that family members of older patients have a relatively higher risk of psychological dysfunction, which may be related to the caregiving burden they assume after the patient's discharge. Furthermore, the duration of patients' hospitalization is associated with the risk of anxiety and depressive symptoms among family members, with family members of patients with longer hospital stays having a relatively higher risk of experiencing anxiety and depressive symptoms [18]. The patient's APACHE II score has been reported to be associated with PICS-F-related psychological dysfunction [19]. A higher APACHE II score usually indicates that the patient's condition is more serious, and the family members may face greater care pressure and economic burden as a result. All these factors may be related to psychological symptoms such as anxiety, depression and PTSD in the family members.

#### **3.2. Family-Related Factors**

Family-related factors for psychological dysfunction associated with PICS-F include age, gender, educational level, relationship with the patient, surrogate decision-maker status, and monthly household income. Studies have shown that family members' age is associated with anxiety symptoms, with younger family members reporting relatively higher levels of anxiety. Female family members are also more likely than male family members to experience anxiety and other stress-related emotional symptoms [20] [21]. Family members' educational level is associated with the prevalence of psychological dysfunction, with a relatively higher prevalence observed among those with lower educational attainment [22]. This may be related to their limited ability to obtain information and insufficient understanding of the patient's condition, making them more likely to develop psychological dysfunction [23]. In addition, spouses and primary decision-makers are more susceptible to emotional stress such as anxiety and depression [24]. Household monthly income has also been reported to be associated with family members' psychological status [22].

#### **3.3. Healthcare System-Related Factors**

Healthcare-related factors mainly include the effectiveness of physician-patient

communication and restrictions on visitation and companionship, and other aspects. Among these, poor physician-patient communication is a high-risk factor for psychological disorders among family members [25]. Incomplete information provided by healthcare professionals is also associated with an increased risk of PTSD-related symptoms among family members. The rationality and flexibility of ICU visiting policies also have a direct impact on the psychological status of family members [17]. During the patient's ICU stay, family members are unable to accompany the patient in person and can only communicate through indirect means such as telephone calls, which not only exacerbates their concerns about the patient's condition but also hinders emotional communication, these factors are all associated with an increased risk of psychological problems, such as PTSD, among family members [26].

### 3.4. Other Related Factors

Social support and coping styles exert certain effects on psychological dysfunction in PICS-F. Family members with anxiety symptoms generally have lower social support scores than those without anxiety [27], possibly because family members with lower levels of social support tend to adopt a more limited range of coping styles when facing problems, making them more prone to adverse psychological symptoms [28]. Meanwhile, family members' coping styles are also closely associated with their psychological health status [29]. Relevant studies indicate that the degree to which family members use negative coping styles is associated with an increased risk of negative emotions such as anxiety and depression [30].

In addition, potential confounding factors should be taken into consideration. Patient condition, ICU length of stay, medical expenses, family members' educational level, household income, and coping styles may be interrelated, and the results of univariate analyses may therefore be influenced by other variables. Future studies should account for potential confounding through multivariable adjustment or path analysis to more accurately identify the independent risk factors for PICS-F-related psychological dysfunction.

## 4. Early Identification and Screening of Psychological Dysfunction in PICS-F

The assessment of psychological dysfunction in PICS-F mainly relies on symptom manifestations across different dimensions, with targeted measurement tools selected accordingly. Although existing studies have identified multiple risk factors, early and accurate identification of high-risk family members remains the most critical component in clinical practice.

### 4.1. Assessment Tools

At present, the Hospital Anxiety and Depression Scale (HADS) is commonly used in clinical settings to assess anxiety and depression among family members [30]. For ASD, the Stanford Acute Stress Reaction Questionnaire (SASRQ) is widely

used in clinical practice for measurement. The assessment of PTSD includes clinical structured interviews and self-report scales. Self-report scales are relatively easy to apply. The commonly used ones are the Impact of Event Scale (IES) and the Impact of Event Scale-Revised (IES-R) [7].

## 4.2. Screening Timing

As the onset of PICS-F psychological symptoms may vary across different stages, screening should be integrated throughout the patient's hospitalization and extended to follow-up after discharge. Anxiety and depressive symptoms occur earliest among family members and usually emerge within several days after the patient is admitted to the ICU. Therefore, the initial assessment should be performed as early as possible [11]. The related symptoms of ASD usually occur within 3 days to 1 month after trauma exposure [31]. Therefore, the ASD symptoms of family members can be monitored several days after the patient is admitted to the ICU, and screening can be conducted during hospitalization to promptly identify family members with higher psychological risks. The clinical diagnosis of PTSD requires symptoms to persist for at least 1 month [32]. Therefore, the timing of screening should take this temporal criterion into consideration. In studies involving family members of ICU patients, 3 months after patient's discharge is commonly selected as the assessment time point for PTSD [28]. Some studies have further incorporated follow-up assessments at 1, 3, and 6 months after discharge to systematically evaluate PTSD symptoms over time. [33]. In addition, some family members still exhibit obvious symptom manifestations one year after the patient's discharge [14], indicating that follow-up should not be terminated prematurely, and a long-term dynamic monitoring mechanism needs to be established.

## 4.3. Identification Strategies

Regarding the influencing factors associated with PICS-F psychological dysfunction, early identification and screening can effectively prevent its progression to more severe psychological dysfunction. Studies have found that among family members of ICU patients, those who are younger, female, with a low educational level, have a close relationship with the patient, have low monthly household income, and serve as primary decision-makers are susceptible to psychological dysfunction associated with PICS-F [20]-[24]. At the early stage of patient admission, medical staff should pay attention to the psychological changes of family members and conduct psychological status assessment as early as possible, laying a foundation for subsequent targeted interventions and effective control of the progression of psychological dysfunction associated with PICS-F.

# 5. Nursing Interventions for Psychological Dysfunction in PICS-F

## 5.1. Early ICU-Based Interventions

### 5.1.1. ICU Information Leaflet

The ICU information leaflet is an information support tool for patients and their

family members. It is usually compiled in text-and-image form, covering preparations for admission, visiting regulations, introduction of equipment and environment, nursing measures and relevant procedures. It also addresses common ICU-related questions and key concerns of family members [34]. The leaflet helps patients and family members understand the ICU environment, diagnostic and treatment procedures, and patient prognosis, facilitates their participation in decision-making, and thereby reduces their anxiety and sense of uncertainty [34] [35]. A study by Chen Xiaohong [36] found that adding an ICU information leaflet to routine verbal education significantly improved family members' knowledge and reduced their anxiety levels. Mistraletti *et al.* [37] conducted a multicenter prospective before-after study in Italy. In this study, 332 family members of ICU patients who were expected to receive mechanical ventilation for more than 96 hours were provided with ICU handbooks and guided to access popular science websites online on the basis of routine communication. The results further showed that, compared with the control group receiving only routine communication, the intervention group was more effective in improving family members' understanding of prognosis and treatment procedures, and significantly reduced the prevalence of PTSD symptoms, whereas it yielded no significant improvement in anxiety and depressive symptoms.

### 5.1.2. ICU Diaries

The ICU diary, also referred to as the patient diary, mainly documents patients' key experiences during their intensive-care-unit stay. It assists patients who have undergone sedation or experienced coma in reconstructing and retrieving their relevant memories. This intervention was first initiated by Danish nurses in 1984. It adopts a combination of written narratives and photographs to document patients' daily routines, therapeutic procedures, and nursing-care processes during their ICU stay. Unlike the personalized-recording nature of conventional diaries, the ICU diary serves as a subjective representation of unfolding clinical events and emotional experiences. In addition to ICU healthcare professionals, patients' family members and relatives may also act as its recorders. Studies have indicated that the ICU diary can effectively reduce the incidence of anxiety and depression among both patients and their family members, as well as improve their quality of life [38]. In a qualitative study conducted by Bosco *et al.* [39], thematic analysis was performed on diaries written by 16 family members of patients. The results revealed that the ICU diary assisted family members in expressing their inner emotions, maintaining emotional bonds and a sense of hope with patients. By reading healthcare providers' entries, family members gained insights into the patient's condition and nursing-care procedures, alleviating anxiety and fear stemming from information deficits and significantly improving their psychological status.

## 5.2. Communication and Decision-Making Support

### 5.2.1. Family Conference

The ICU family conference is a famil-centered structured communication inter-

vention. It brings together patients, their family members, and members of the healthcare team to jointly discuss the patient's diagnosis, prognosis, and subsequent care plans, so as to meet families' needs for information acquisition and emotional support [40]. Multiple studies have confirmed that such communication approaches not only help improve the quality of decision-making-related communication between clinicians and families, but also provide psychological care for family members, effectively alleviating their negative emotions including anxiety, depression and PTSD [41]. A randomized controlled trial by White *et al.* [42] demonstrated that compared with the control group receiving routine care, the intervention group that received family conferences delivered by a multidisciplinary healthcare team achieved significant improvements in clinician-family communication quality, with reductions in family members' symptoms associated with long-term psychological burden. Harris *et al.* [16] also noted that ICU family conferences could lower the incidence of stress-disorder-related psychological trauma in family members. Nevertheless, other studies have found that family conferences centered on palliative-care-related information failed to alleviate family members' anxiety and depressive symptoms as anticipated; on the contrary, they aggravated their PTSD symptoms [43].

### 5.2.2. VALUE Communication Framework

In 2017, the Guidelines for Family-Centered Care in the Neonatal, Pediatric, and Adult ICU published in Critical Care Medicine explicitly stated that structured communication should be established as standard clinical practice [44]. The VALUE communication model is one of the more representative structured communication strategies in ICU family conferences. Its core components comprise valuing family members' expressions, acknowledging family members' emotions, listening attentively, understanding the patient's personal background, and encouraging family members to ask questions. This model emphasises the philosophy of family-centred communication. By enhancing healthcare providers' empathic expression and two-way interaction, it assists family members in better comprehending the patient's clinical condition and engaging in treatment-related decision-making, thereby alleviating their psychological distress and optimising their communication experience. Lautrette *et al.* [45] conducted a randomised controlled trial involving 126 family members of terminally-ill patients across 22 intensive care units in France. The intervention group received standardised deathbed family conferences based on the VALUE principle, supplemented with a palliative-care booklet, and given sufficient expression time to the family members, the control group received routine communication practices. Telephone interviews were conducted with family members 90 days after the patient's death. The results showed that, compared with the control group, family members in the intervention group had significantly lower PTSD, anxiety, and depressive symptoms, markedly less bereavement distress and psychological burden, and significantly higher satisfaction with deathbed communication and trust in medical care. This study provides reliable evidence to support the clinical implementation of

psychological support interventions for family members of ICU patients.

### 5.3. Post-Discharge Continuing Support

#### 5.3.1. ICU Follow-Up Clinics

The post-ICU clinic is a post-intensive-care follow-up model led by physicians or nurses with the participation of a multidisciplinary team, which provides specialized treatment and diverse continuous care for discharged patients and their family members. Drewitz *et al.* [46] conducted a randomized controlled trial enrolling patients who were hospitalized in the ICU for more than five days, had a Sequential Organ Failure Assessment (SOFA) score greater than 5 points, and were successfully discharged from hospital. The intervention group received post-ICU clinic interventions delivered by a multidisciplinary team, including pre-discharge education, comprehensive physical, psychological and cognitive assessments at 3 months post-discharge, medication review, and telephone follow-up. The control group received only routine rehabilitation and post-discharge care. The results showed that patients in the intervention group exhibited better mental-health-related indicators and activities of daily living than those in the control group, with significantly reduced risks of depression and PTSD. Meanwhile, family members demonstrated marked improvements in mental health and quality of life compared with the control group. These findings indicate that post-ICU clinic interventions exert significant positive effects on promoting patients' psychological rehabilitation and alleviating adverse psychological symptoms among family members. Furthermore, a study by Dettling *et al.* [47] confirmed that post-ICU clinics can effectively identify physical, psychological and social dysfunction in both patients and their family members, and pointed out that delivering post-ICU clinic follow-up at 3 months post-discharge confers higher clinical feasibility.

#### 5.3.2. Digital Health Intervention

With the advancement of continuity-of-care for ICU patients following hospital discharge, psychological interventions targeting ICU family members have gradually shifted from conventional face-to-face modalities to digital-based platforms. By integrating functions including informational support, emotional monitoring and remote communication, digital-health platforms offer more flexible and quantifiable means for sustained interventions among family members. Van Mol *et al.* [48] developed an eHealth-based follow-up intervention for family members of ICU survivors, comprising informational support, psychological symptom self-monitoring, and self-care guidance. The intervention aimed to alleviate PICS-F-related psychological symptoms, enhance quality of life, and reduce caregiver burden, providing a methodological reference for the development and evaluation of subsequent interventions targeting family members of ICU survivors. Petrinc *et al.* [49] conducted a randomized controlled trial involving 60 family members of ICU patients, who were randomly assigned to an intervention group or a control group. Family members in the intervention group received a smartphone-based mental health application incorporating cognitive behavioral therapy at 30 and 60

days after the patient's discharge, whereas those in the control group received usual care only at the corresponding time points. The findings indicated that the severity of anxiety, depression, and PTSD symptoms among family members in the intervention group decreased significantly over time, while the incidence of clinically significant symptoms remained substantially lower than that in the control group. Family members reported high overall satisfaction with the app, suggesting good feasibility and acceptability.

It should be noted that the effects of the above-mentioned intervention may vary due to the patient's survival status, the type of ICU population, local visiting policies, and the relationship between family members and patients. In addition, the psychological outcome indicators measured and the assessment time points in each study are different, which may all affect the interpretation of the intervention effect. Future research needs to be further verified for different subgroups of people.

## 6. Conclusion

In summary, the incidence of psychological dysfunction among family members of ICU patients is relatively high. Long-term psychological stress can not only impair their ability to provide care and make medical decisions, but also induce more severe mental illnesses, thereby indirectly affecting patient prognosis. Although extensive international studies have focused on psychological problems such as anxiety, depression and PTSD among family members of ICU patients, relevant domestic studies remain relatively insufficient in quantity and depth. In the future, medical staff should further improve their awareness and clinical attention to psychological dysfunction associated with PICS-F. Multi-center and large-sample studies should be carried out to systematically investigate the prevalence and influencing factors of PICS-F psychological dysfunction. In addition, more targeted intervention strategies should be developed to further identify the psychological characteristics and needs of different family member groups, and individualized nursing interventions should be implemented according to their potential psychological problems and risk levels, so as to improve the specificity and effectiveness of psychological nursing for family members of critically ill patients.

## Author Contributions

Conceptualization, Xueting Tian, Huanhuan Hu, and Fang Peng; methodology, Xueting Tian and Huanhuan Hu; investigation, Xueting Tian, Yaling Chen, Ziyun Wang, Wenshu Teng, and Yinxiao Huang; data curation, Xueting Tian, Yaling Chen, Ziyun Wang, Wenshu Teng, and Yinxiao Huang; writing—original draft preparation, Xueting Tian; writing—review and editing, Xueting Tian, Huanhuan Hu, Yaling Chen, and Fang Peng; supervision, Fang Peng; project administration, Fang Peng. All authors have read and agreed to the published version of the manuscript.

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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