

PERSPECTIVE

Mitigating psychological morbidity in critical illness: A continuum from acute intervention to longitudinal support

Xintong Dong^{1,*}, Lingjun Chen^{2,*}, Qi Chen³

¹Department of Anesthesiology, Shenzhen People's Hospital (The First Affiliated Hospital, Southern University of Science and Technology; The Second Clinical Medical College, Jinan University), Shenzhen 518020, Guangdong, China.

²Department of Anesthesiology, The Central Hospital of Yongzhou (Yongzhou Hospital Affiliated to University of South China), Yongzhou 425000, Hunan, China.

³Department of Anesthesiology, Chongqing University Cancer Hospital, Chongqing 400030, China.

*The authors contribute equally.

Corresponding author: Qi Chen.

Address correspondence to: Qi Chen, Department of Anesthesiology, Chongqing University Cancer Hospital, No. 181 Hanyu Road, Shapingba District, Chongqing 400030, China. E-mail: mozzie0518@cqu.edu.cn.

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1 INTRODUCTION

Psychological trauma is a profound psychological and cognitive effect of extreme, particularly life-threatening, stressors, manifesting as fear, helplessness, anxiety, and flashbacks. It leads to significant emotional and cognitive impairment. In the ICU, such sequelae are more prevalent than in general hospitalized populations due to critical illness, invasive interventions, and exposure to mortality. Emerging data indicate that pediatric survivors of acute respiratory failure have particularly high levels of post-traumatic stress disorder (PTSD) symptomatology with reductions in health-related quality of life (HRQL) and neurocognitive dysfunction [1]. These findings underscore the necessity of screening for PTSD as a measure and prerequisite for optimized rehabilitation. Accordingly, early recognition and focused intervention are vital to prevent acute psychological distress, as well as to modulate the burden of psychiatric morbidity likely to unfold over time after ICU discharge; they are an integral part of the overall management of critically ill patients.

The high-stress ICU environment, combined with the severity and potential existential threat of critical illness, can lead to substantial psychological sequelae on patients. Acute stress symptoms affect approximately one-quarter of ICU survivors shortly after discharge, while clinically significant PTSD

symptoms occur in approximately one-fifth of adult ICU survivors [2]. These disorders are commonly accompanied by anxiety, depression, and sleep fragmentation; they additionally contribute to cognitive decline and impair self-efficacy. They are linked to longer hospital stays, mechanical ventilation, exposure to sedative drugs and the absence of social support. Early detection is key to mitigating symptomatology, and preventing longer-term psychopathology.

ICU patients are at high risk for psychosocial stressors, placing them at risk for psychological sequelae. Survivors may experience post-intensive care syndrome (PICS): PTSD, anxiety, and depression. An RCT (n=60; 35 post-discharge assessments completed) compared ICU diaries versus standard health education in the post-discharge period. At 4 weeks, PTSD (hyperarousal and depression scores combined) improved less in the intervention group compared to the control group, but clinically significant PTSD symptoms remained at all follow-up time points in both groups [3]. These data suggest that psychological morbidity in critically ill patients often persists from acute care through post-discharge recovery rather than being merely temporary. The findings further indicate that single-component interventions may be insufficient in isolation, underscoring the need to establish an integrated prevention and management system across the care continuum.



2 THE IMPERATIVE FOR EARLY INTERVENTION

2.1 Early clinical indicators and screening modalities

Early screening and timely diagnosis play a pivotal role in mitigating the long-term psychological sequelae commonly observed in patients surviving critical illness. Clinically, early signs of acute distress, anxiety, sleep disturbance and heightened procedural fear during the ICU stay signal risk for post-ICU psychological morbidity. The systematic use of validated tools—e.g., the ICU Stressor Scale, Hospital Anxiety and Depression Scale (HADS), Post-Traumatic Stress Syndrome 10-item Scale (PTSS-10), coupled with clinical assessment, will facilitate the identification of individuals at risk, leading to early intervention and longitudinal psychological support.

2.2 Multidisciplinary synergy in early-phase intervention

To prevent psychological sequelae in patients in the ICU, an interdisciplinary approach is needed. The tailored approach includes evidence-based psychological risk assessment and multidisciplinary teams. It has been demonstrated that three structured intervention sessions of Narrative Exposure Therapy (NET), delivered after medical stabilization or during early post-discharge follow-up by general practitioners with nurses and coupled with follow-up care, were more effective than guideline-based PTSD treatment. These findings demonstrate that such brief narrative interventions are feasible and associated with sustained symptom reduction at a 12-month follow-up for PTSD, although the magnitude of improvement was modest [4]. Lastly, interprofessional synergy calls for service delivery to be timely, continuous and holistic for optimal long-term recovery from neuropsychiatric injury.

2.3 Impact of early intervention on holistic recovery

Early intervention is crucial against psychological sequelae after critical illness. Intensive care often triggers acute stress, anxiety, depression and PTSD that may become chronic morbidity without timely intervention. Evidence shows mindfulness-based interventions (MBIs), including guided meditation and symptom management, reduce distress and improve compliance [5]. These findings support a phased intervention integrating acute stabilisation (phases one and two), transitional psychotherapy (phase three), and long-term biopsychosocial rehabilitation to implement a comprehensive recovery trajectory (**Figure 1**).

The schema describes a tiered, programmatic approach that forms a continuum of care which integrates the spectrum and stages of recovery post-ICU discharge: primary prevention (intra-ICU), transitional intervention (from post-ICU transfer through early discharge from the hospital) and chronic reintegration programs (from months to years following discharge from the hospital). All stages include specific interventions in

physiology, psychology and pharmacology, providing a three-dimensional continuous treatment aiming to maximize not only biological but also psychosocial recovery.

3 THE IMPERATIVE FOR LONGITUDINAL SURVEILLANCE

3.1 Persistent psychological sequelae and multi-systemic risks

Catastrophic ICU stressors, including existential threat, nociceptive stimuli, and invasive interventions, frequently cause persistent psychological morbidity. A UK longitudinal cohort study shows that over 50% of survivors develop pathological anxiety, depression, or PTSD post-discharge. The disorders are rarely isolated, with 65% of patients exhibiting coexisting symptoms of the other two (strong comorbidity) [6]. These sequelae reduce HRQL and can increase somatic health risks independent of neuropsychiatric morbidity. Preventive programs: This constellation of risk explains the necessity for psychological monitoring in longitudinal routine recovery care. Nonetheless, the ongoing identification and mitigation of these “hidden” risks are central to optimizing long-term outcomes during critical illness recovery and rehabilitation.

3.2 Implementation and optimization of longitudinal surveillance protocols

Psychosocial care of critically ill survivors requires longitudinal monitoring. Prolonged treatment plans need to be matched with adequate evidence-based follow-up frameworks. Ideal surveillance will require specified temporal milestones and validated instruments to evaluate PTSD, mood disorders, and cognitive pathologies. Interdisciplinary synergy is essential for data integration and continuity of care across effective systems. Combining in-office visits with telemedicine and digital monitoring empowers patients, contributes to data integrity, and assists in transitioning patients from an acute interventional status to long-term psychological management.

3.3 Optimizing longitudinal surveillance for enhanced outcomes

Longitudinal surveillance optimization is pivotal for interventions targeting psychological sequelae in survivors of critical illness. The available evidence shows that adverse traumatic effects relate to and amplify intensive care measures [7]. Stage-adapted and individualized follow-ups improve neuropsychiatric outcomes in patients with mild-to-moderate post-traumatic stress. Surveillance needs to be aligned with the clinical course, injury severity and psychosocial support. Management calls for an interdisciplinary approach by psychiatrists, psychologists, rehabilitation specialists and nurses. Adherence is augmented by tele-consultation, video-conferencing and mobile health (mHealth). Regular assessment of symptoms and HRQL

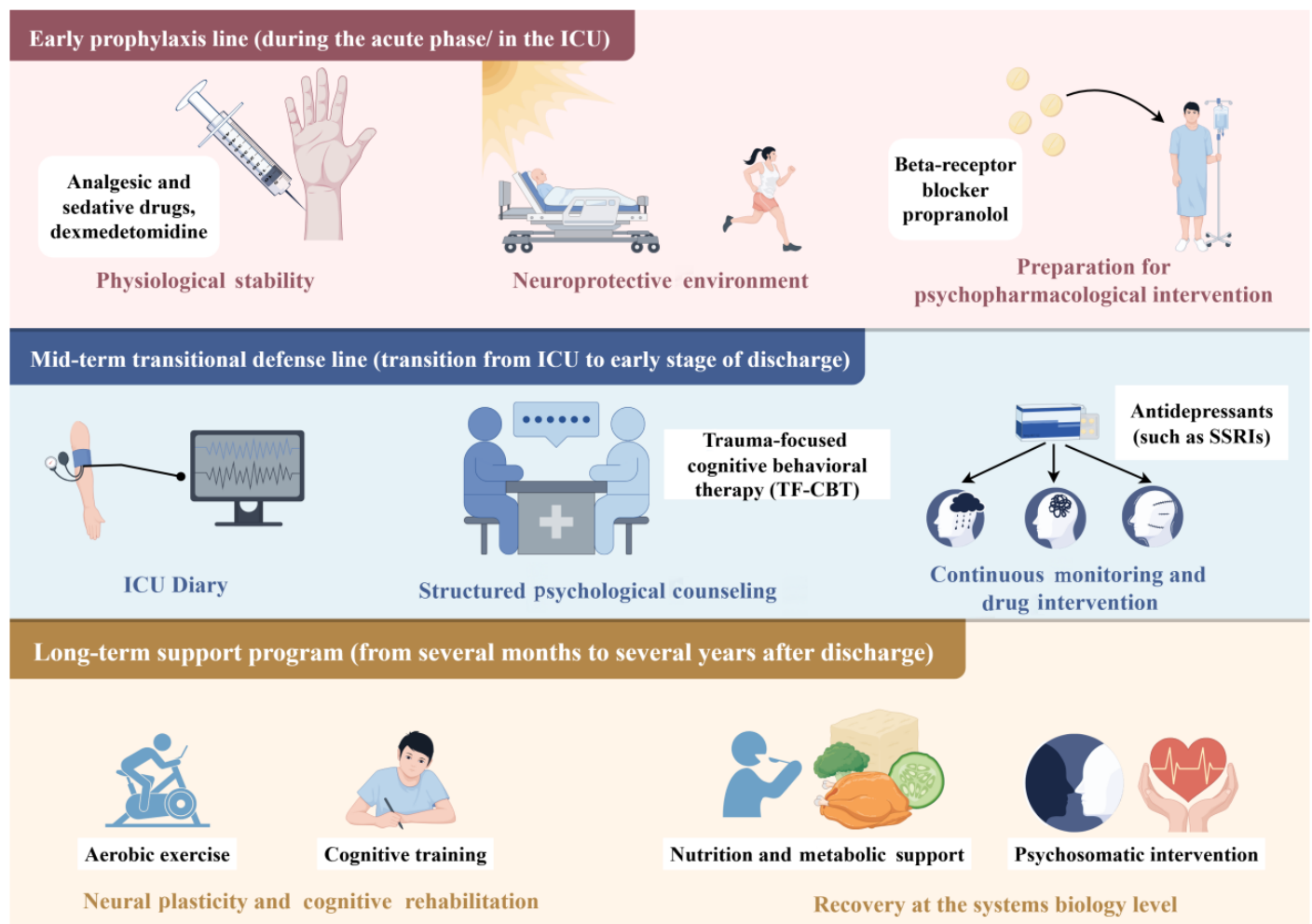


Figure 1. Conceptual model for the longitudinal care pathway in psychological sequelae of critically ill patients. The figure was created with Figdraw.

with validated instruments enables sustained, precision-guided intervention.

4 EXPLORING INNOVATIVE INTERVENTION STRATEGIES

4.1 Synergistic mechanisms of psychophysiological recovery

The latest evidence shows that early psychotherapeutic interventions mitigate anxiety, depression and post-traumatic stress while promoting systemwide recovery via the neuroendocrine-immune axis [4]. Psychological counseling also decreases sympathetic hyperactivity, catecholamine and glucocorticoid secretion, which may support autonomic stability and be associated with reduced systemic inflammatory responses. Moreover, enhanced sleep architecture and nociceptive threshold have been associated with improved adaptive coping and self-efficacy. Organ recovery includes the restoration of functional inte-

gration between mental and physical comorbidities as these psychological benefits support recovery post-critical care.

4.2 Leveraging technological innovations to enhance intervention efficacy

Tele-psychological interventions are used for psychological sequelae of critical illness. Recent evidence supports the feasibility, acceptability, and usability of mindfulness-based mobile apps in post-hospitalization among ICU survivors, highlighting their potential to reduce psychological morbidity and somatic symptoms similarly to face-to-face therapist-led programs [8]. Time-space constraints and limited accessibility to specialized services will be addressed through tele-consultation. These longitudinal data are fed into digital ecosystems to track affect in real time and modify protocols accordingly. They might broaden and augment psychological support, allowing a move towards a more individualized care model for long-lasting neuropsychiatric recuperation.

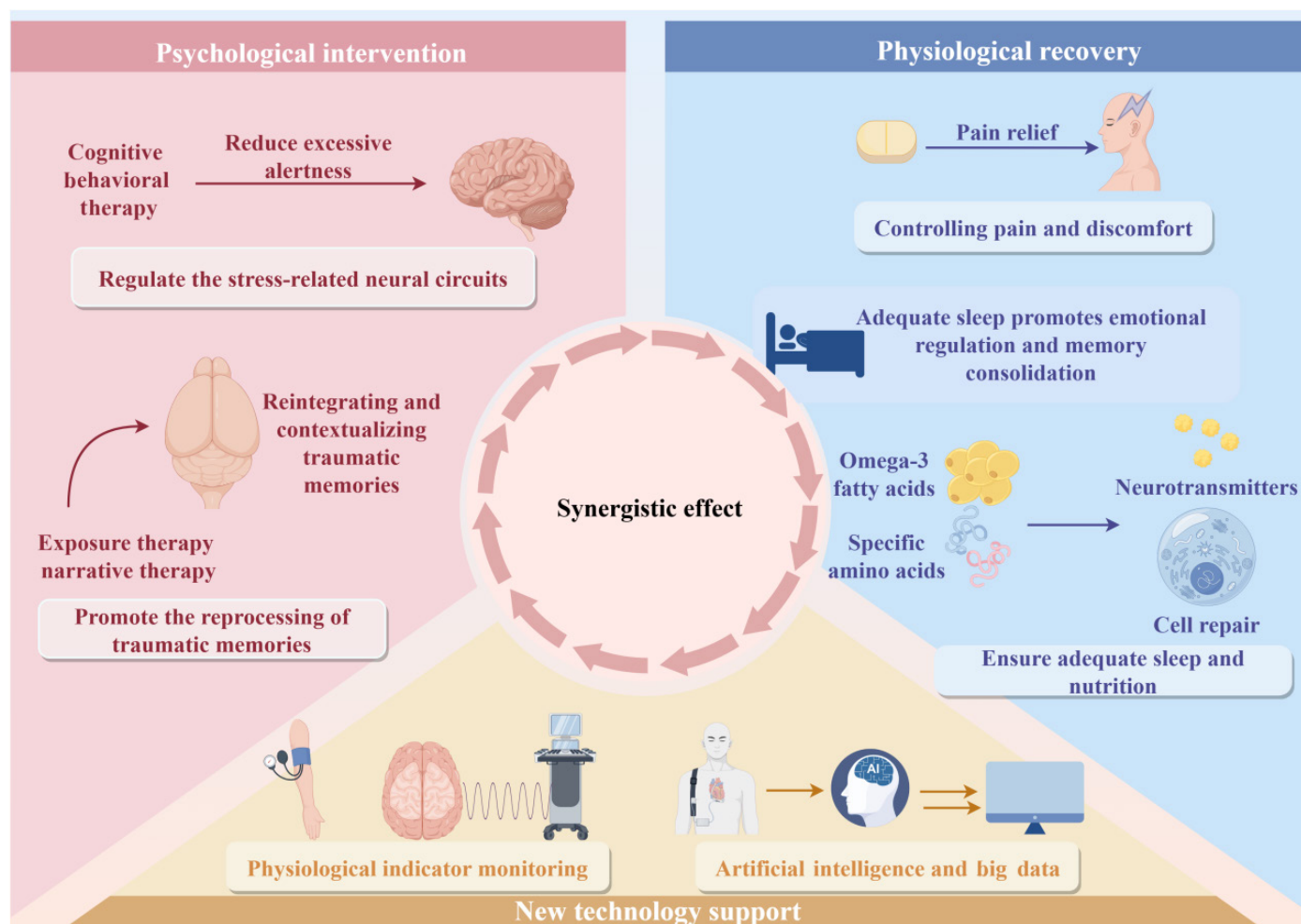


Figure 2. Role of psychotherapeutic, physiologic and technology-based interventions in adjunctive care of psychological sequelae. The figure was created with Figdraw.

4.3 Translational evidence and implementation pathways

Post-hoc analyses by group and multicenter studies show that immediately identifying high-risk patients and then targeting them with individualized psychological support affords dramatic reductions in the severity of post-traumatic stress [6]. Working with family-focused teams, clinical evidence suggests that therapists trained in CBT contribute to building psychological resilience [9]. Longitudinal surveillance shows sustained intervention benefits and generalizability through flexibility and adaptiveness in socio-cultural spaces linked with these approaches. Integrating targeted psychological treatment, physiological recovery, and technology heralds a systems-based approach to rehabilitation. This framework consists of the refinement of rehabilitation system design and specific interventions corresponding to the domains of a biopsychosocial recovery system (**Figure 2**), encompassing transitional needs from acute care through crisis management and functional reintegration.

This schema reflects the paradigm of psychotherapeutic support, physiological stabilization and modern technology for handling psychological trauma in patients in critical condition. The therapeutic modalities include CBT and recall reconstruction for emotional trauma. Physiological restoration: Basic rehabilitative principles—pain control, sleep hygiene, and nutrition optimization. AI integration into psychological care using big data analytics and real-time monitoring carries the potential for outcome enhancement through precision-guided psychosocial and rehabilitation interventions. These pillars need to be integrated synergistically to foster biopsychosocial rehabilitation and sustain long-term well-being in patients.

5 FUTURE DIRECTIONS IN POLICY AND PRACTICE

Psychological support for critically ill patients with trauma-related distress remains insufficient to meet the complex and evolving needs of this population, and authorities are therefore calling for multi-faceted support systems. At the policy level,

standardized critical care flow sheets with extended follow-up in high-risk cohorts integrated with routine mental health screening and evidence-based interventions should also be implemented. Corrective channeling toward psychotherapeutic rehabilitation (e.g., nurse education, psychosocial interventions, and cognitive behavioral therapy) should be tried. Data from the COVID era demonstrate that nurse-led programs reduced stress, anxiety, and depression without added expense [6]. Interdisciplinary institutional networks should be set up involving intensivists, nurses, and psychologists. When integrated, they would furnish sustained individualized support through continuous management bridging acute episodes with mental health care as a prescription for a scalable adaptive recovery ecosystem.

Structured educational frameworks and targeted training programs aimed at strengthening the psychological resilience of healthcare staff are essential. This kind of training may enhance early recognition of psychological distress and contribute to improved outcomes through timely intervention. The use of multimodal digital platforms that improve psychological well-being and sleep among new ICU healthcare staff provides evidence that adaptive training approaches can facilitate stress management in high-stakes occupational environments [9]. Hybrid teaching concepts, encompassing both virtual and traditional elements of learning, should be favored for certified clinical standards and self-regulatory competencies oriented toward the healthcare staff and patients. The contribution to the methodology behind the global psychological protection model is supported by this synthesis, which integrates theory, practice, and clinical expertise.

Mental health in critical illness survivors is also much broader than clinical management. For example, a multi-phase support system involving family, community, and public health is needed to prevent psychological burden when survivors reintegrate into society. In the ICU, preventive measures must reduce delirious memories and acute stressors to prevent PTSD. Long-term psychiatric follow-up after discharge is an indispensable part of treatment, particularly since the earlier treatment occurs, the better the long-term prognosis is [10]. These measures should be regarded as core outcomes of critical care recovery for the purpose of improving HRQL and advancing systemic health equity among all survivors.

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Author contributions

Xintong Dong and Lingjun Chen contributed to the manuscript writing and figure preparation, Qi Chen designed and supervised the work. All authors have read and approved the article.

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Data availability

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study. All information is derived from publicly available articles and datasets.

Ethics approval and consent to participate

Not applicable. This manuscript does not contain any studies with human participants or animals performed by any of the authors.

Consent for publication

Not applicable. This manuscript does not include details, images, or videos relating to an individual person. And this manuscript is original and has not been published elsewhere, nor is it under consideration by any other journal.

Competing interests

The authors declare that they have no competing interests.

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