Macrothink Institute™

Journal of Biology and Life Science
ISSN 2157-6076
2026, Vol. 17, No. 2

The Effect of Empathetic Nursing Combined with Family-Participatory Nursing on Psychological Stress Responses in Critically Ill Patients in the Emergency Department

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Received: February 14, 2026 Accepted: March 19, 2026 Published: March 22, 2026

doi:10.5296/jbls.v17i2.23659 URL: https://doi.org/10.5296/jbls.v17i2.23659

Abstract

To investigate the effects of empathetic nursing combined with family-participatory nursing on psychological stress responses in critically ill patients in the emergency department, 96 critically ill patients admitted to the emergency department of a tertiary A-level hospital in mainland China between April 2025 and April 2026 were enrolled. Participants were evenly divided into a control group and an observation group based on admission sequence in respective, with 48 patients in each group. The control group received traditional nursing interventions, while the observation group received empathetic nursing combined with family-participatory nursing. The effects of these two nursing interventions on patients' psychological status, post-traumatic stress disorder (PTSD), and patient satisfaction were compared. Results illustrated that in pre-intervention period, both SAS & SDS scores and IES-R scores showed no significant difference between groups ($P > 0.05$); while in post-intervention era, observation group patients exhibited significantly lower SAS & SDS scores and IES-R scores than control group counterparts ($P < 0.05$). Meanwhile, patient satisfaction survey scores were significantly higher in the observation group ($P < 0.05$). In conclusion, empathetic nursing combined with family-participatory care could offer a novel pathway for humanistic care in critically ill emergency department patients. This approach could not only effectively improve psychological status and post-traumatic stress disorder symptoms in critically ill emergency patients, but also enhance patient satisfaction, and thus warrant clinical implementation in depth on a larger scale.

Keywords: empathetic nursing, family-participatory care, emergency department nursing, critical care nursing, psychological stress

1. Introduction

Critically ill conditions refer to diseases or clinical states characterized by sudden onset, rapid progression, and the potential to directly threaten the patient's life or cause severe organ dysfunction, necessitating immediate emergency medical intervention (Meiers et al., 2024). Common disease types include acute myocardial infarction, malignant arrhythmias, aortic dissection, acute respiratory failure, tension pneumothorax, acute stroke, or acute gastrointestinal hemorrhage (Zhang & Chen, 2021). The emergency department serves as the primary triage point for critically ill patients in hospitals. Patients presenting here typically exhibit life-threatening conditions that progress rapidly, involve complex diagnostic and treatment processes, and possess high unpredictability. Confronted with imminent danger and an unfamiliar medical environment within a short timeframe, patients are highly susceptible to intense psychological stress reactions. These manifest as negative emotions such as anxiety, fear, depression, and restlessness. Some patients also exhibit physiological stress responses such as tachycardia, sudden blood pressure spikes, and sleep disturbances (Du et al., 2025; Yang et al., 2025). Psychological stress is not merely an emotional issue; it impacts patients' physiological states through neuroendocrine-immune interactions, leading to sympathetic nervous system activation and abnormal cortisol secretion. This not only affects treatment compliance but also accelerates disease progression, increases the risk of complications, and adversely affects treatment outcomes and long-term prognosis (Wu et al., 2020). Therefore, for critically ill patients admitted to the emergency department, it is essential not only to emphasize precise physiological intervention but also to promptly address psychological stress.

However, constrained by factors such as limited medical resources and an aging population in China, emergency department nursing staff have to perform numerous procedures within tight timeframes. Particularly when critically ill patients are in severe condition, the primary focus is on maintaining vital signs. Psychological care often remains limited to routine reassurance and guidance, lacking systematic and targeted interventions. This makes it difficult to effectively alleviate the severe psychological stress experienced by critically ill patient, which not only directly impacts patient prognosis but also exacerbates nurse-patient conflicts, undermining overall nursing quality (Slavin et al., 2023). Empathetic nursing is a patient-centered humanistic care model emphasizing nurses' proactive understanding and attunement to patients' emotional experiences to build trust. This fosters warmer, more personalized care services, serving as a vital nursing approach to improve patients' psychological states. Currently, this care philosophy is gaining increasing attention among emergency nursing professionals and is being applied in emergency practice settings (Pettit et al., 2019; Wang et al., 2018). Family-centered care (FCC), also known as family-participatory care, is a nursing model that views families as core partners in patient health management. It emphasizes equal collaboration between families and healthcare teams, with shared participation in decision-making (Ahmadi & Shahboulaghi, 2025). First proposed in the 1950s, FCC was initially applied in pediatric healthcare (Donney et al., 2022). This model addresses patients' emotional needs, enhances their sense of security and care, and alleviates anxiety and tension. Given this, this study combines empathetic nursing with

family-participatory care in nursing interventions for critically ill patients in the emergency department in which explores the effects of these interventions on patients' psychological stress responses, aiming to provide practical evidence for constructing a more harmonious, humanized and scientifically grounded psychological care model in emergency settings. Furthermore, this approach seeks to further enhance the quality of care for critically ill patients and promote their coordinated physical and mental recovery.

2. Methodology

2.1 General Information

A total of 96 critically ill patients who visited the emergency department of a tertiary A-level (the highest level) hospital in mainland China between April 2025 and April 2026 were enrolled as study subjects. Inclusion Criteria: (1) Met the diagnostic criteria for critical illness outlined in the Expert Consensus on Emergency Pre-examination and Triage (2018), achieved relative stability of vital signs following emergency department intervention, and did not require ongoing cardiopulmonary resuscitation; (2) Age ≥ 18 years; (3) Demonstrated psychological stress response post-admission with a Self-Rating Anxiety Scale (SAS) (Dunstan & Scott, 2020) score ≥50 or a Self-Rating Depression Scale (SDS) (Dunstan & Scott, 2019) score ≥53; (4) Patients who are conscious or can be aroused from sedation, possess basic cognitive and communication abilities, and can cooperate with assessment scales and nursing intervention procedures; (5) Patients with a designated family member willing to participate in family-involved care, who possesses normal communication abilities and can fully cooperate with the intervention plan; (6) Voluntary participation in this study, with written informed consent provided and commitment to full cooperation throughout the intervention; (7) Expected observation period in the emergency department ≥24 hours, enabling completion of nursing interventions and related data collection; (8) No prior experience with similar psychological interventions such as empathetic nursing or family-participatory nursing. Exclusion Criteria: (1) Patients with severe mental illness, cognitive impairment, or organic brain damage who cannot communicate effectively; (2) Patients with severe post-traumatic stress disorder or recent major life events that may interfere with psychological stress response assessment; (3) Patients with language barriers, insufficient education to comprehend questionnaire content, or refusal to complete questionnaires; (4) Severe baseline data missingness compromising study integrity or statistical analysis. The 96 enrolled patients were divided into a control group and an observation group based on admission sequence, with 48 patients in each group. The control group comprised 32 males and 16 females aged 29–83 years (mean age: 46.98 ± 12.65 years). Disease types: 12 cases of acute myocardial infarction, 3 cases of malignant arrhythmia, 10 cases of acute respiratory failure, 8 cases of acute stroke, 7 cases of acute gastrointestinal hemorrhage, and 8 cases of other conditions. Educational attainment: 20 patients with junior high school education or below; 16 with high school or vocational school education; and 12 with college education or above. In the observation group (48 patients): 28 males and 20 females; Age: 32–82 years, mean age (47.56 ± 13.32) years; Disease types: 8 cases of acute myocardial infarction, 4 cases of malignant arrhythmia, 9 cases of acute respiratory failure, 12 cases of acute stroke, 9 cases of acute gastrointestinal hemorrhage, and 6 cases of other

diseases. Educational attainment: 21 patients had a junior high school education or below; 18 had a high school or technical secondary school education, and 9 had a college degree or higher. There were no significant differences in general demographic data between the two groups ($P > 0.05$).

2.2 Methods

2.2.1 The Control Group Received Traditional Nursing Interventions:

(1) Immediate assessment and emergency intervention upon admission: Rapidly assess vital signs upon admission, evaluate consciousness level, pupil size, and light reflexes to determine criticality. Maintain airway patency, clear oral secretions and vomitus, establish effective IV access for rapid fluid resuscitation and infusion. Administer medications per orders to stabilize circulation, with continuous ECG monitoring to promptly identify arrhythmias. (2) Basic Care: Adjust patient positioning based on condition. Assist with turning and back percussion every 2 hours. Maintain skin cleanliness to prevent pressure injuries. Apply appropriate restraints for agitated patients to prevent skin abrasions. Instruct patients to urinate and defecate in bed; place urinary catheters when necessary. Closely monitor urine output, color, and volume. (3) Specialized Care: Provide continuous oxygen therapy for patients with respiratory failure, closely monitor oxygenation and respiratory function, and remain vigilant for related complications. Implement strict fluid management for patients with acute myocardial infarction or malignant arrhythmias, recording 24-hour fluid balance. Use micro-infusion pumps for steady-rate administration of vasoactive agents. Closely monitor heart rate, chest pain, blood pressure, and central venous pressure to promptly detect complications such as shock or heart failure. For stroke patients, closely monitor consciousness and pupils. Elevate the head of the bed 15-30° to prevent increased intracranial pressure. Maintain a quiet environment and administer medications such as mannitol as prescribed to reduce intracranial pressure. Restraint should be applied promptly for agitated patients. Patients with acute gastrointestinal bleeding should be instructed to strictly adhere to bed rest, take acid-suppressing and hemostatic medications as prescribed, monitor vomitus and stool color, and receive continuous fluid replacement as directed to maintain circulatory stability and prevent hypovolemic shock. (4) Condition Documentation and Transport Care: Accurately record all nursing interventions, medication administration, and patient responses to provide evidence for physicians adjusting treatment plans and facilitating subsequent department transfers. When patient transfer is required, prepare transport equipment and ensure nursing staff accompany the patient during transfer.

2.2.2 The Observation Group Implemented Empathetic Nursing Combined with Family-Participatory Nursing Interventions Based On The Control Group

2.2.2.1 Empathetic Nursing Intervention

(1) Rapid Identification and Empathetic Assessment: Upon admission, assess patients' anxiety and fear by observing facial expressions, speech patterns, and linguistic cues. Conduct rapid psychological stress evaluations using standardized scales such as the Self-Rating Anxiety

Scale (SAS) and Self-Rating Depression Scale (SDS). Guide patients to actively express their feelings and identify their current emotional pain points.

(2) Effective Communication: Employ empathetic responses such as “I understand you're feeling scared right now” or “I'd be nervous too” instead of “Don't worry” or “It'll be fine.” Validate the patient's emotions and explain current procedures in plain language to reduce anxiety from uncertainty. Simultaneously employ nonverbal communication: maintain eye contact instead of constant note-taking, lean forward to signal attentiveness, offer reassuring touches like a light pat on the shoulder or a handshake. During care delivery, lower the tone of voice, slow the speaking pace, and avoid commanding tones.

(3) Personalized Empathetic Interventions: Tailor empathetic approaches based on patient demographics, cultural backgrounds, and disease types: For elderly patients, emphasize reassurance and memory reinforcement—repeatedly introduce yourself (“I'm Nurse Wang, responsible for your care”), use nostalgic topics to redirect attention, and for those with hearing loss, speak closer to the ear at a louder but gentle volume. For trauma patients (e.g., car accidents, violent injuries), avoid probing injury details; prioritize wound care while emphasizing “You're safe now.”

(4) Environmental Empathy: Establish a relatively isolated resuscitation area to minimize onlookers. Provide temporary rest areas for family members. Conduct rapid emotional risk assessments during triage. For elderly patients living alone or those without family accompaniment, prioritize nurse companionship. Communicate test results via electronic displays or verbally to reduce family members' need for repeated trips.

2.2.2.2 Family-Involved Nursing Interventions

(1) Initial Admission Phase: Information Support and Participation Preparation

1) Admission Assessment and Informed Consent: Following triage, nurses proactively introduce family members to the emergency environment, diagnostic procedures, significance of monitoring equipment, and usage precautions to alleviate unfamiliarity and anxiety.

2) Condition Communication: Using plain language, promptly and objectively inform family members about the patient's condition, potential risks, emergency measures taken, and the next steps in the treatment plan to ensure transparency.

3) Participation Readiness Assessment: Evaluate family members' physical condition, psychological resilience, educational background, and willingness to participate in care to select appropriate nursing tasks, avoiding undue burden.

4) Basic Care Guidance: Instruct family members in fundamental nursing skills such as assisting with patient repositioning, maintaining comfortable postures, wiping the face and limbs, and providing hydration to meet basic physiological needs.

(2) Treatment Process: Collaborative Care and Condition Monitoring

1) Assisting with Daily Care: Under nursing guidance, family members participate in oral care, skin care, perineal care, etc., to prevent complications like pressure ulcers and oral infections while providing emotional support.

2) Condition Monitoring Assistance: Train family members to recognize abnormal signs like altered consciousness, respiratory irregularities, limb movement difficulties, or increased pain. Promptly notify medical staff upon detection to supplement gaps in professional monitoring.

3) Treatment Cooperation: During examinations, treatments (e.g., IV administration, blood draws, monitoring), family members assist by securing the patient's limbs and calming their emotions, enhancing compliance and success rates of medical procedures.

4) Safety Management Participation: Family members assist in patient supervision to prevent accidents like falls, tube dislodgement, or extubation, particularly for patients experiencing confusion or agitation.

(3) Psychological Level: Two-Way Emotional Support

1) Patient Psychological Support: Family presence alleviates loneliness, fear, and anxiety through verbal reassurance and physical contact (e.g., hand-holding, gentle touch), enhancing the patient's sense of security and treatment confidence.

2) Family Psychological Counseling: Healthcare providers proactively monitor family members' emotional states, listen to their concerns and needs, offer psychological support and emotional guidance, and refer to mental health professionals when necessary to prevent family psychological crises.

3) Encouraging Emotional Expression: Fostering a relaxed atmosphere to encourage effective communication between family members and patients, conveying care and support to meet both parties' emotional needs.

2.3 Observation Indicators

Psychological State: The State Anxiety Scale (SAS) (Dunstan & Scott, 2020) and State Depression Scale (SDS) (Dunstan & Scott, 2019) were used to evaluate the psychological state of patients in both groups before and after intervention. The SAS was developed by Professor Zung of Duke University in 1971. Its Cronbach's α ranges between 0.733 and 0.85. The scale comprises 20 items using a 4-point rating scale, yielding a total score between 20 and 80 points. A score of 50 serves as the cutoff point: scores below 50 indicate normal range, while scores above 50 represent anxiety symptoms, with higher scores correlating positively with anxiety severity. The SDS was developed by Professor Zung in 1965. Its Cronbach's α ranges from 0.80 to 0.90. The scale comprises 20 items using a 4-point rating scale, yielding a total score between 20 and 80 points. A score of 53 serves as the cutoff point: scores below 53 indicate normal range, while scores above 53 suggest depressive symptoms, with scores positively correlated to the severity of depression.

Post-traumatic Stress Disorder: The Impact of Event Scale-Revised (IES-R) (Chang et al., 2024) assessed PTSD in both groups before and after intervention. Developed by American psychologists Daniel S. Weiss and Charles R. Marmar in 1997, this scale revises and expands the 1979 Impact of Event Scale (IES) by Horowitz et al., with Cronbach's α ranging from 0.87 to 0.92. The 22-item scale comprises three dimensions: intrusive symptoms (8 items), avoidance symptoms (8 items), and arousal symptoms (6 items). It employs a 5-point rating scale, yielding a total score ranging from 20 to 88. A score ≥33 indicates significant PTSD symptoms.

Patient Satisfaction: A department-developed patient satisfaction questionnaire was used to evaluate satisfaction levels in both groups post-intervention. The questionnaire primarily collected patient demographics and overall nursing experience in the emergency department, with a maximum score of 100 points. Scores positively correlated with patient satisfaction levels.

2.4 Statistical Methods

Data analysis was performed using SPSS 26.0 statistical software. Quantitative data, including Self-Rating Anxiety Scale (SAS) scores, Self-Rating Depression Scale (SDS) scores, International Edition of the Post-traumatic Stress Disorder Questionnaire (IES-R) scores, and patient satisfaction scores, were tested for normality. Data conforming to normal distribution were expressed as mean ± standard deviation (±SD). Pre-intervention baseline and post-intervention comparisons between groups were analyzed using independent samples t-tests. For data not meeting normality assumptions, median (interquartile range) [M (Q25, Q75)] was used for rank sum test. Count data, such as gender and disease type, were expressed as counts (percentages) [n (%)]. Intergroup comparisons were performed using chi-square tests or Fisher's exact tests (when theoretical frequency <5). The significance level was set at $\alpha=0.05$, with $P<0.05$ indicating statistically significant differences.

3. Results

3.1 Comparison of Psychological Status Before and After Intervention in Two Patient Groups

Comparison of psychological status before and after intervention showed no significant difference in SAS and SDS scores between groups in pre-intervention ($P > 0.05$). In post-intervention, observation group patients exhibited significantly lower SAS and SDS scores than control group patients ($P < 0.05$), as shown in Table 1.

Table 1. Comparison of Psychological Status Before and After Intervention in Two Patient Groups ($\bar{x} \pm s$) : Points

Group	Sample Size	Pre-intervention		Post-intervention	
		SAS Scale Score	SAS Scale Score	SAS Scale Score	SAS Scale Score
Control Group	48	58.41±3.18	57.68±2.76	55.46±3.26	53.51±2.73
Observation Group	48	57.89±3.17	57.35±3.21	44.99±2.87	43.66±3.10
t		0.802	0.540	16.701	16.521
P		0.424	0.590	0.000	0.000

3.2 Comparison of Post-Traumatic Stress Disorder Status Between Two Patient Groups Before and After Intervention

There was no significant difference in IES-R scores between the two groups before intervention ($P > 0.05$). After intervention, the IES-R scores of patients in the observation group were significantly lower than those in the control group ($P < 0.05$), as shown in Table 2.

Table 2. Comparison of Post-Traumatic Stress Disorder Status Between Two Patient Groups Before and After Intervention ($\bar{x} \pm s$): Points

Group	Sample Size	IES-R Score Before Intervention	IES-R Score After Intervention
Control Group	48	38.67±2.53	32.64±1.79
Observation Group	48	39.02±2.04	28.36±1.62
t		0.746	12.282
P		0.458	0.000

3.3 Comparison of Patient Satisfaction Questionnaire Scores Between the Two Groups

Comparison of patient satisfaction questionnaire scores between the two groups after intervention showed that the scores for the observation group were significantly higher than those for the control group ($P < 0.05$), as shown in Table 3.

Table 3. Comparison of Patient Satisfaction Questionnaire Scores Between the Two Groups ($\bar{x} \pm s$): Points

Group	Sample Size	Patient Satisfaction Survey Score
Control Group	48	86.78±3.39
Observation Group	48	93.26±2.47
t		10.703
P		0.000

4. Discussion

4.1 Empathetic Nursing Combined with Family-Participatory Care Could Effectively Improve the Psychological State of Critically Ill Emergency Patients

Due to the sudden onset and rapid progression of critical illnesses, the abrupt transition from health to life-threatening conditions directly breaches patients' psychological defenses, leading to feelings of helplessness and impending doom (Yan et al.). Furthermore, physical discomfort amplifies patients' distress symptoms. The noisy environment and time pressure in the emergency department during treatment can trigger psychological responses such as agitation and fear (Kiyak & Taskin, 2025). Additionally, the temporary absence of social support systems, forcing patients to confront unfamiliar medical staff alone, further exacerbates feelings of loneliness and helplessness (Cayenne et al., 2021), thereby affecting the psychological state of critically ill patients in the emergency department.

Recent studies (Marks et al., 2025; Østervang et al., 2021) indicate that implementing empathetic nursing for critically ill emergency patients significantly improves their psychological state, while family-participatory nursing provides emotional support and alleviates psychological distress.

This study confirms that implementing empathetic care combined with family-participatory care could effectively improve the psychological state of critically ill patients in the emergency department. The primary reason lies in the empathetic care provided by nursing staff, which involves understanding, accepting, and responding to patients' emotions through perspective-taking, thereby effectively alleviating negative emotions. Family-participatory care, meanwhile, helped patients build social support networks, increased their sense of security, and prevented the loneliness and helplessness arising from family absence. This effectively alleviated patients' psychological stress, resulting in significantly better psychological states among patients in the observation group compared to the control group.

4.2 Empathetic Care Combined with Family-Participatory Care Could Effectively Improve Post-Traumatic Stress Disorder in Emergency Department Patients with Critical Illnesses

Post-traumatic stress disorder is the most common psychological condition among critically ill patients in emergency departments. This primarily stems from patients experiencing traumatic events that directly threaten their lives or physical integrity. When confronted with such events, patients' psychological coping abilities are overwhelmed, laying the groundwork for the development of PTSD in critically ill emergency patients. Additionally, the unique environment of the emergency department and the uncertainty surrounding prognosis can trigger secondary psychological distress, increasing susceptibility to PTSD (Moss et al., 2019).

A qualitative intervention study (Blood, 2020) explicitly demonstrated that healthcare providers in emergency departments who adopt an empathetic approach toward patients can effectively reduce the risk of PTSD occurrence. The nursing intervention in this study effectively corroborates this finding. Recently, a systematic review on family-participatory care as a psychological intervention for critically ill patients (Li et al., 2025) indicated that critically ill patients receiving family-participatory care exhibited significantly lower anxiety

and depression symptoms compared to control groups. The primary mechanisms include: empathetic care reducing acute stress responses, restoring patients' sense of control, lowering emotional arousal, interrupting intrusive cycles of traumatic memories, and enhancing patients' sense of agency. While family-participatory care provided patients with familiar emotional anchors, heightened their sense of security, improved family functioning, and reduced the inter-generational transmission of trauma. Consequently, it is understandable that the incidence of post-traumatic stress disorder among patients in the observation group was significantly lower than that in the control group.

4.3 Empathetic Nursing Combined with Family-Participatory Care Could Effectively Improve Patient Satisfaction Among Emergency and Critical Care Patients

Patient satisfaction serves as a core indicator for measuring healthcare service quality. It not only directly reflects patients' experience with medical services but also influences departmental reputation, resource allocation, team motivation, and sustainable development through multiple pathways. Therefore, enhancing patient satisfaction is crucial for clinical nursing management. Compared to general departments, patient satisfaction in emergency departments tends to be relatively low. This is primarily attributed to factors such as insufficient doctor-patient communication and the inability of family members to provide direct care (Liao Y & Chen Y, 2019). In this study, implementing empathic nursing combined with family-participatory nursing effectively improved satisfaction among critically ill emergency patients. This outcome stems from empathic nursing treating patients as individuals with emotions rather than mere medical cases, demonstrating full respect and consideration for their circumstances. Family-participatory nursing extends patients' sense of belonging through social support, adequately addressing their emotional needs. Consequently, it is tenable that satisfaction levels in the observation group significantly exceeded those in the control group.

5. Limitations and Future Directions

Although this study preliminarily validated the positive impact of empathetic nursing combined with family-participatory nursing on critically ill emergency patients, certain unavoidable limitations still exist as following. First, limitations in study design and sample size arose from constraints inherent to critically ill emergency patients, including urgent conditions and high patient turnover. Besides, the sample was concentrated in a single tertiary hospital emergency department, regional and healthcare resource disparities may limit the generalizability of these findings, and the applicability to primary care hospitals or institutions of different tiers requires further validation. Moreover, challenges exist regarding the homogeneity and sustainability of the intervention measures where the implementation of empathetic nursing and family-participatory nursing relies on the communication skills of nursing staff, the willingness of family members to cooperate, and the availability of time within the high-intensity work environment of the emergency department. However, in practice, nursing staff may express empathy in a perfunctory manner due to excessive workloads, while family members may struggle to engage deeply due to anxiety or cognitive biases, leading to significant individual variations in intervention outcomes. Meanwhile,

limitations also exist in the outcome measures like this study primarily employed subjective indicators such as anxiety-depression scores, post-traumatic stress disorder-related scores, and family satisfaction, lacking concurrent monitoring of objective biological markers of physiological stress responses (e.g., cortisol levels, immune function changes). Last but not least, the study did not deeply analyze the intervention's impact on long-term patient outcomes like quality of life or readmission rates, making it difficult to comprehensively assess its clinical value.

To address these visible limitations, first and foremost, future research should conduct multi-center, large-sample randomized controlled trials incorporating data from emergency departments across different regions and hospital tiers to clarify the applicability of intervention protocols in diverse healthcare settings. Second, refine and standardize intervention protocols like developing phased, personalized intervention manuals tailored to emergency department workflows, introducing structured training tools to enhance caregivers' empathy skills and improve family members' health literacy. Leverage digital tools like mobile nursing platforms and family education apps to extend intervention reach beyond time and space constraints. Finally, expand the multi-dimensional outcome evaluation system. Beyond short-term psychological improvements, incorporate physiological indicators like inflammatory markers and heart rate variability, alongside tracking family functioning, healthcare costs, and long-term prognosis to comprehensively reflect the intervention's value.

In summary, empathy-based nursing combined with family-participatory care offers a novel pathway for humanistic care in critically ill emergency department patients. This approach could effectively improve psychological well-being and post-traumatic stress disorder symptoms among emergency patients, enhance patient satisfaction, and warrants clinical implementation.

Acknowledgments

Not applicable.

Author contributions

Not applicable.

Funding

Not applicable.

Competing interests

Not applicable.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Macrothink Institute.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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