

Post-traumatic stress disorder after prolonged hospitalization and intensive care: A systematic review

PTSD After Intensive Care

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ABSTRACT

Introduction: Post-traumatic stress disorder (PTSD) is increasingly recognized as a significant component of the psychological consequences following prolonged hospitalization and treatment in the intensive care unit (ICU). This systematic review aimed to describe the prevalence of PTSD among adult ICU survivors; identify the most common risk factors and associated psychological outcomes; and examine interventions relevant to clinical practice.

Methods: A systematic literature search was conducted in January 2026 in the PubMed and Scopus databases in accordance with the PRISMA 2020 guidelines. Studies published between 2021 and 2026; available in English; with access to an abstract and full-text were included. Clinical and observational studies conducted in adult populations after ICU stay were analyzed. Studies focusing on pediatric populations, family members, and caregivers (PICS-F); healthcare professionals; as well as qualitative studies; study protocols; and single case reports were excluded.

Results: A total of 175 records were identified; 149 articles were screened after duplicate removal, and 26 studies were included in the final synthesis. The prevalence of PTSD ranged from 13% to 60%, depending on population characteristics, follow-up duration, and the assessment instruments used. The factors most frequently associated with post-traumatic stress disorder symptoms included delirium, hallucinations and delusional memories, deep sedation, prolonged mechanical ventilation, and dyspnea, while lower levels of social support were associated with poorer psychological outcomes after intensive care.

Conclusion: PTSD is a common and long-term psychological consequence of intensive care. The findings highlight the need for systematic psychological screening, early identification of high-risk patients, and the integration of psychological care into standard post-ICU follow-up and rehabilitation pathways.

INTRODUCTION

Post-traumatic stress disorder (PTSD) is a serious and chronic psychiatric condition that develops as a consequence of exposure to extremely stressful or life-threatening events [1]. Traditionally, it has been associated with war-related trauma, natural disasters, and violence; however, contemporary research increasingly confirms that medical experiences, particularly those related to critical illness and intensive care, may also have strong traumatic potential [2–4]. In this context, intensive care units (ICUs) are recognized as one of the most stressful environments within the healthcare system, where patients are exposed to invasive procedures, prolonged mechanical ventilation, sedation, delirium, pain, loss of control, and a constant threat to life [5].

An ICU stay is often characterized by fragmented or distorted memories, hallucinations, and feelings of helplessness and fear, which may significantly impair patients' psychological integrity [6, 7]. Although the primary goal of intensive care medicine is the preservation of life and stabilization of vital functions, increasing evidence shows that survival of critical illness does not necessarily imply full psychological recovery [8, 9]. Over the past decade, the concept of post-intensive care syndrome (PICS) has been developed to describe a set of persistent physical, cognitive, and psychological impairments among ICU survivors, with PTSD representing a central component of the psychological outcomes.

Post-traumatic stress disorder following intensive care is characterized by intrusive memories related to the ICU stay, nightmares, avoidance behaviors, emotional numbing, hyperarousal, and persistent anxiety [9, 10]. Symptoms may persist for several months after hospital discharge, and some studies have reported persistence of symptoms beyond one year [4, 11, 20, 23, 24]. Unlike classical forms of trauma, medical trauma often remains underrecognized, and the psychological consequences of intensive care are still rarely monitored systematically in clinical practice.

With advances in intensive care medicine, the number of ICU survivors continues to increase, highlighting the growing need to recognize and manage

long-term psychological consequences in this population [11]. Despite this, psychological outcomes after intensive care remain marginalized in comparison with somatic outcomes, and standardized protocols for psychological screening and follow-up after ICU discharge have not yet been routinely implemented in most healthcare systems.

Given the growing clinical and public health importance of this issue, it is necessary to systematically examine the available scientific evidence on the prevalence of PTSD after ICU stay, identify key risk factors, understand the mechanisms underlying psychological trauma, and assess the effectiveness of existing preventive and therapeutic approaches. This systematic review aims to synthesize current knowledge on PTSD in adult patients following intensive care, with particular emphasis on long-term psychological consequences and implications for clinical practice.

METHODS

A systematic literature search was conducted in January 2026 in the electronic databases PubMed and Scopus in accordance with the PRISMA 2020 guidelines. The search aimed to identify studies addressing post-traumatic stress disorder in adult patients after ICU stay, with particular emphasis on prevalence, risk factors, psychological outcomes, and long-term consequences.

The search was limited to studies published between 2021 and 2026, available in English, and accessible via abstract and full text. Original scientific articles classified as clinical trials, controlled clinical trials, randomized controlled trials, multicenter studies, and prospective and retrospective observational studies were included.

The search strategy used a combination of controlled vocabulary and free text keywords covering three main domains: post-traumatic stress disorder, intensive care, and psychological outcomes after critical illness. Inclusion and exclusion criteria were defined in advance and are presented in Table 1.

Table 1. Inclusion and Exclusion Criteria

Inclusion criteria	Exclusion criteria
Studies published between 2021 and 2026	Studies published before 2021
Original research articles available in English with full text	Articles in other languages; editorials; letters to the editor; commentaries
Clinical and observational studies (randomized controlled trials; cohort studies; multicenter studies)	Qualitative studies; study protocols; case reports
Adult patients after ICU stay	Pediatric or neonatal populations
Studies investigating the prevalence of PTSD and psychological outcomes after ICU stay	Studies focusing on psychological outcomes in family members or caregivers (PICS-F)
Studies analyzing risk factors and diagnostic instruments	Studies including healthcare professionals as the study population
Long term psychological outcomes and therapeutic approaches in ICU survivors	Ethical contexts, organ donation, or end-of-life care without reported patient clinical outcomes
Quantitative data on the prevalence and/or predictors of PTSD	Studies on COVID-19 without analysis of long-term psychological outcomes in ICU survivors

Source: Authors' own work.

A total of 175 records were identified in the initial search (PubMed n = 63, Scopus n = 112). After removal of duplicates (n = 26), 149 records were included in the screening phase. Based on the review of titles and abstracts, 87 articles were excluded due to insufficient relevance to the topic. Sixty-two articles were retained for full-text assessment, all of which were available in full-text.

In the final stage of full-text evaluation, an additional 36 studies were excluded for methodological and thematic reasons. Reasons for exclusion included psychological outcomes in family members or caregivers (PICS-F) (n = 11); pediatric or neonatal popu-

lations (n = 6); healthcare professionals as the study population (n = 4); ethical contexts, organ donation, or end-of-life care without reported patient clinical outcomes (n = 2); studies conducted in a COVID-19 context without analysis of long-term psychological outcomes in ICU survivors (n = 3); and qualitative studies, study protocols, and case reports (n = 10).

After these steps, a total of 26 studies met all inclusion criteria and were included in the final synthesis. The phases of identification, screening, eligibility, and inclusion are presented in the PRISMA flow diagram (Figure 1).

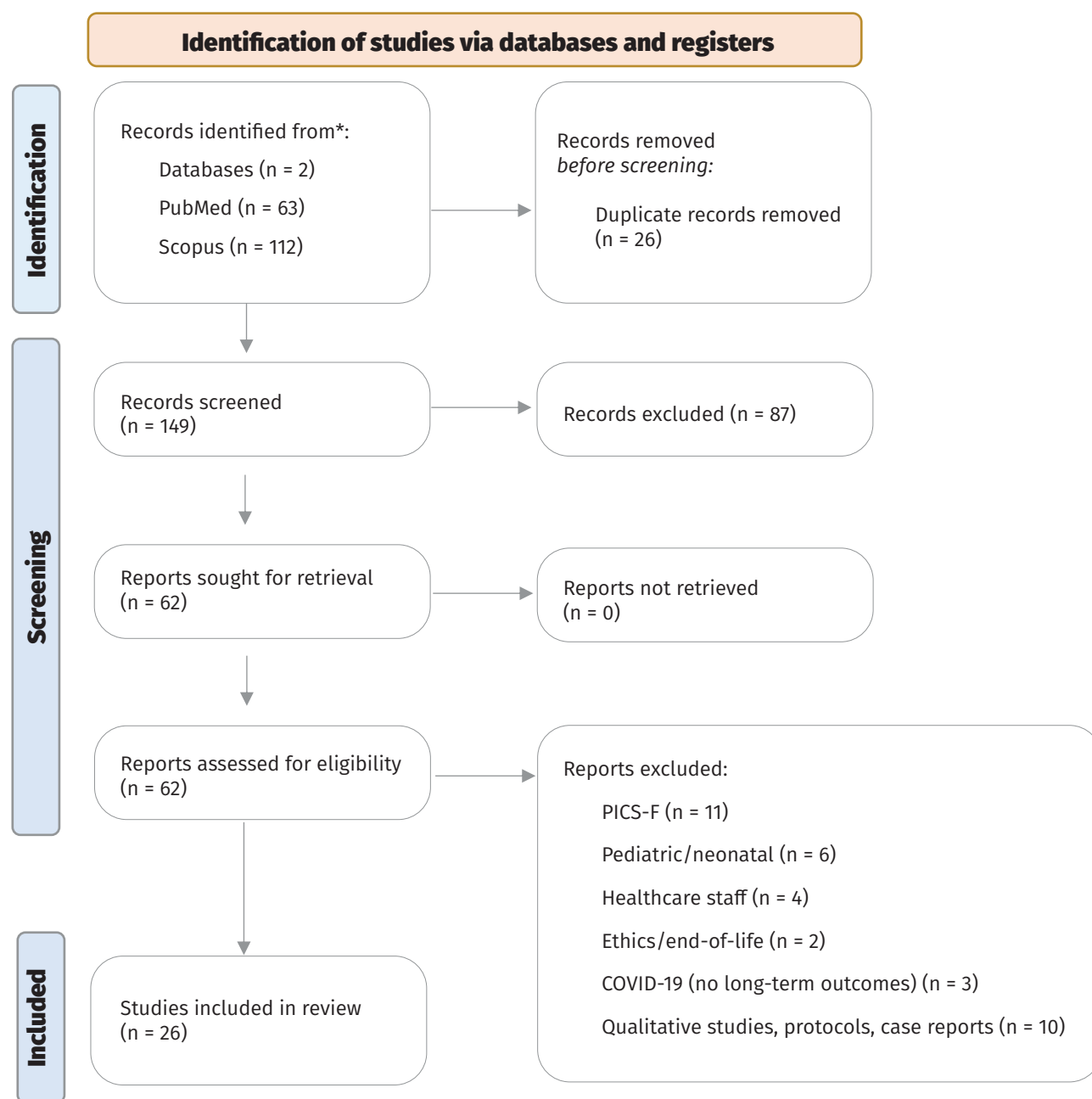


Figure 1. PRISMA 2020 flow diagram of the study selection process

Source: Adapted from PRISMA 2020, authors' modification.

The review of titles and abstracts and the assessment of full-text articles were conducted by the authors according to predefined inclusion and exclusion criteria. In cases of uncertainty, the criteria were rechecked through consultation of the full-text. Data extraction from the included studies was performed by the authors using a predefined data extraction table, and all key outcomes, measurement instruments, and basic study characteristics were double-checked to reduce the risk of error.

Data from the included studies were systematically extracted by the authors according to a predefined data extraction protocol. The accuracy and reliability of the collected information were ensured through repeated verification of all relevant variables, including population characteristics, study design, psychometric instruments used, and key outcomes.

The quality of the included studies was assessed according to criteria of methodological rigor, including study design, sample adequacy, clarity of reporting,

and relevance of outcomes to the objectives of this review. The results were synthesized narratively and presented in tabular form, without conducting a meta-analysis due to heterogeneity in study designs, populations, and measurement instruments.

The reliability of the collected data was further supported by repeated verification of all key variables by the authors, contributing to a high level of internal consistency and methodological robustness of the results.

RESULTS

A systematic literature search identified a total of 175 records (PubMed $n = 63$, Scopus $n = 112$). After removal of duplicates ($n = 26$), 149 articles were included in the screening phase. Based on the review of titles and abstracts, 87 articles were excluded due to insufficient relevance to the topic. Sixty-two articles were retained for full-text assessment, and after analysis of the full-text articles, an additional 36 studies were excluded for methodological reasons. A total of 26 scientific studies were included in the final synthesis and constitute the corpus of this systematic review.

The included studies were published between 2021 and 2026 and involved adult patients after an ICU stay. Most studies were conducted in Europe (Spain, the Netherlands, Italy, Germany, Greece, France, Belgium, and Cyprus), while the remaining studies were carried out in Asia (China, Japan, Iran, and Tunisia), the United States, Brazil, Israel, and South Africa.

According to the study design, the review included 10 cross-sectional studies, 9 prospective cohort studies, 5 cohort studies, 1 multicenter study, and 1 observational study. The total sample of the included studies comprised several thousand patients who had been treated in the ICU for various critical conditions, including acute respiratory distress syndrome, sepsis, COVID-19, surgical procedures, liver transplantation, and prolonged mechanical ventilation.

Table 2 presents the key characteristics of the included studies, including objectives, population, study design, and main findings. All analyzed studies reported a high frequency of post-traumatic stress disorder among ICU survivors, with the prevalence of PTSD ranging from 13% to 60%, depending on the population, follow-up duration, and diagnostic instruments used.

Table 2. Characteristics of the included studies on post-traumatic stress disorder after intensive care unit stay

Authors	Year	Study design	Aim	Country	Population and sample	Key findings
Dell'Oste et al. [4]	2025	Cohort study	Long-term psychiatric and physical outcomes in ICU survivors with PTSD	Italy	ICU survivors	PTSD was associated with long-term psychiatric and physical impairment
Kooiken et al. [12]	2025	Multicenter longitudinal cohort study	Role of ICU memories	Netherlands	ICU survivors	Delirium and ICU memories were associated with post-traumatic stress symptoms
Askari Hosseini et al. [13]	2021	Cross-sectional study	ICU memories and post-traumatic stress disorder	Iran	ICU survivors	Delusional memories were associated with increased PTSD symptoms

Authors	Year	Study design	Aim	Country	Population and sample	Key findings
Patel et al. [14]	2026	Observational study	Memories of ICU stay	United States	ICU survivors	Hallucinations and delusional memories were associated with psychological distress
Castillejos et al. [15]	2023	Cross-sectional study	Effect of deep sedation on psychological outcomes	Spain	ICU survivors	Deep sedation was associated with higher PTSD frequency
Pan et al. [16]	2023	Cross-sectional study	Association between analgesic use and PTSD	China	ICU survivors	An association between analgesic use and PTSD symptoms was reported
Yoshino et al. [17]	2024	Prospective study	Role of social support in psychological outcomes	Japan	ICU survivors	Higher social support was associated with fewer postdischarge mental health symptoms
Frankort et al. [18]	2024	Cohort study	Quality of life after thoracoabdominal aortic surgery	Netherlands	Surgical ICU patients	Quality of life impairment was observed in patients after ICU stay, including those with PTSD symptoms
Szymczak et al. [19]	2023	Prospective study	Long-term psychological outcomes three years after ARDS	Germany	ICU patients with ARDS	Persistent psychological disorders were observed
Godoy-González et al. [20]	2023	Cohort study	Relationship between cognitive function and PTSD	Spain	ICU patients treated for COVID-19	PTSD symptoms were associated with impaired cognitive functioning
Van der Merwe et al. [21]	2024	Prospective study	Psychological outcomes after 6 weeks and 6 months	South Africa	ICU survivors	Psychological symptoms were present in a substantial proportion of patients
Navarra-Ventura et al. [22]	2024	Longitudinal study	Persistence of depression and PTSD symptoms	Spain	ICU patients treated for COVID-19	Persistent depression and PTSD symptoms were observed
Miori et al. [23]	2023	Cohort study	Incidence of PTSD after COVID-19 ARDS	Italy	ICU patients with ARDS	PTSD symptoms persisted after ICU discharge

Authors	Year	Study design	Aim	Country	Population and sample	Key findings
Neville et al. [24]	2022	Cohort study	Long-term psychological outcomes after severe COVID-19	United States	ICU survivors	Suspected PTSD was present in 20 percent of patients
Sun et al. [25]	2024	Cross-sectional study	Factors influencing stress disorders after liver transplantation	China	Liver transplant patients treated in the ICU	PTSD symptoms were identified after liver transplantation
Saida et al. [26]	2025	Prospective observational study	PTSD, anxiety, and depression in ICU survivors	Tunisia	ICU survivors	PTSD symptoms were present after ICU discharge
Zarour et al. [27]	2024	Cross-sectional study	PTSD within post-ICU syndrome	Israel	ICU survivors	PTSD symptoms were identified among ICU survivors
Gauchery et al. [28]	2024	Cohort study	Impact of medical evacuation on psychological stress	France	ICU patients with COVID-19-related ARDS	Medical evacuation was associated with psychological distress
Calsavara et al. [29]	2021	Prospective study	PTSD after sepsis	Brazil	ICU patients with sepsis	PTSD, anxiety, and depression symptoms were reported after ICU discharge
Gil et al. [30]	2022	Prospective study	PTSD in patients with COVID-19 and ARDS	Spain	ICU patients with ARDS	Persistent PTSD symptoms were reported after ICU discharge
Demoule et al. [31]	2022	Prospective cohort study	Clinical impact of dyspnea in mechanically ventilated ICU patients	France	Mechanically ventilated ICU patients	Dyspnea was associated with poorer psychological outcomes in mechanically ventilated ICU patients
Watanabe et al. [32]	2022	Multicenter prospective cohort study	Effect of early mobilization on psychological outcomes	Japan	ICU patients	Early mobilization was associated with improved psychological outcomes after ICU stay
Janssen et al. [33]	2026	Prospective study	Relationship between dyspnea and clinical outcomes	Netherlands	Tracheostomized ICU patients	Dyspnea was associated with psychological burden in tracheostomized ICU patients

Authors	Year	Study design	Aim	Country	Population and sample	Key findings
Li et al. [34]	2021	Cross-sectional study	Functional outcomes after mechanical ventilation	China	Mechanically ventilated ICU patients	PTSD was present in 17.7 percent of patients
Li et al. [35]	2025	Cross-sectional study	PTSD in mechanically ventilated patients	China	Mechanically ventilated ICU patients	PTSD symptoms were present in mechanically ventilated ICU survivors
Wang et al. [36]	2024	Predictive modeling study	Mental disorders within post-ICU syndrome	China	ICU patients	A predictive model for PTSD risk assessment was developed

The factors most frequently associated with post-traumatic stress disorder symptoms included delirium during the intensive care unit stay [12], hallucinations and delusional memories [13, 14], deep sedation [15], prolonged mechanical ventilation, dyspnea, the use of analgesics [16], while lower levels of social support were associated with poorer post-intensive care psychological outcomes [17]. Several studies confirmed that psychological symptoms were often associated with reduced quality of life [18, 19], impaired cognitive function [20], depression and anxiety [21–23], and difficulties in returning to everyday activities [19, 24]. Additional studies conducted among ICU survivors after sepsis, liver transplantation, and COVID-19-related ARDS also reported clinically relevant frequencies of post-traumatic stress disorder symptoms and persistent psychological burden after intensive care [25–29].

It was particularly emphasized that interventions such as early mobilization (26, 30), together with timely psychological screening, risk assessment, and consideration of demographic, psychosocial, and medical factors associated with post-intensive care psychological morbidity [18, 27, 28], may support early identification of patients at increased risk of post-traumatic stress disorder. Studies that followed patients over longer periods showed that in a substantial proportion of participants, symptoms per-

sisted for more than one year after discharge from the intensive care unit [19, 22, 23], confirming the long-term nature of the psychological consequences of critical illness.

The included studies were assessed descriptively according to methodological characteristics such as study design, sample adequacy, clarity of reporting, and relevance of outcomes to the objectives of this review. Cross-sectional studies were potentially subject to information and selection bias, whereas prospective cohort studies provided more methodologically robust data on the development and course of post-traumatic stress disorder. All key outcomes were clearly defined, and the data were synthesized narratively and presented in tabular form due to heterogeneity in study designs and measurement instruments.

The analyzed studies consistently confirm that post-traumatic stress disorder is a frequent and clinically significant consequence of intensive care unit stay, with long-term effects on mental health, quality of life, and functional recovery. The findings indicate the need for systematic psychological follow-up of intensive care unit survivors, early identification of high-risk patients, and integration of psychological care into standard intensive care protocols.

DISCUSSION

Prevalence of post-traumatic stress disorder after intensive care unit stay and heterogeneity of findings

The findings of this systematic review confirm that post-traumatic stress disorder is a frequent and clinically significant consequence of intensive care unit stay. The included studies reported a prevalence of post-traumatic stress disorder ranging from approximately 13% to 60%, with differences arising from heterogeneity in study populations, variation in the timing of assessment after discharge, and the use of different instruments for symptom evaluation.

In studies conducted among patients after acute respiratory distress syndrome and COVID-19, the frequency of symptoms was often higher at longer follow-up, with persistence of symptoms in a proportion of patients even after one year [19, 22, 23, 31]. This indicates that post-traumatic stress disorder is not merely a transient reaction to acute stress but a disorder that may persist throughout the recovery period and lead to long-term functional consequences.

Delirium, hallucinations, and ICU memories as key psychological mechanisms of risk

One of the most consistent findings across the included studies relates to the importance of patients' experiences during the intensive care unit stay, particularly delirium, hallucinations, and delusional memories. Delirium during intensive care treatment has been associated with subsequent traumatic symptoms [12], while hallucinations and delusional memories have been consistently associated with a higher risk of developing post-traumatic stress disorder [13, 14].

These findings suggest that the quality and content of memories related to intensive care treatment may be associated with later psychological outcomes. In this context, systematic recognition of delirium, timely documentation of changes in mental status, and reduction of factors associated with delirium

may contribute to improved long-term psychological outcomes after discharge from the intensive care unit.

Respiratory burden, dyspnea, and mechanical ventilation as clinical risk factors

Several studies have emphasized that respiratory burden during intensive care unit stay represents a strong risk context for the development of post-traumatic stress disorder. Dyspnea represents an important and distressing symptom in mechanically ventilated and weaning patients and may contribute to psychological burden during and after intensive care treatment [32, 33].

Studies conducted in populations of mechanically ventilated patients reported measurable frequencies of post-traumatic stress disorder symptoms and highlighted the importance of continued psychological follow-up after discharge from the intensive care unit [34, 35]. These findings suggest that respiratory distress and the subjective experience of breathing difficulty may be relevant contributors to psychological morbidity in ICU survivors, although the available evidence does not establish a direct causal relationship with post-traumatic stress disorder.

Sedation, analgesia, and medications associated with an increased risk of post-traumatic stress disorder symptoms

Among clinical factors, patterns of sedation and analgesia also play an important role. Deep sedation has been associated with a higher frequency of post-traumatic stress disorder in a study that analyzed survivors of critical illness, suggesting the need for caution when determining the depth of sedation and for careful monitoring of its consequences [15].

Additionally, analgesic use in one cross-sectional study was associated with post-traumatic stress disorder symptoms [16]. Although these findings do not allow causal conclusions, they consistently indicate that therapeutic interventions that alter consciousness, perception, and memory may influence later psychological outcomes, particularly in interaction with delirium and hallucinations.

Social support, psychological screening, and organization of care after discharge from the intensive care unit

In addition to risk factors, the analyzed studies also identify protective factors and organizational elements of care. Higher levels of social support were associated with a lower risk of developing post-traumatic stress disorder, confirming the importance of systematic patient support in the post-intensive care period [17].

Furthermore, the development of a predictive model for risk assessment within post-intensive care syndrome indicates the need for standardized screening, especially in patients with a greater burden of risk factors [36]. In practice, this means that follow-up after discharge from the intensive care unit should include a structured assessment of psychological outcomes, with clear criteria for referral and continuation of care.

In this context, nurses play a key role in the early recognition of psychological distress, continuous monitoring of patients' behavior and emotional responses, and timely referral of patients at increased risk of post-traumatic stress disorder, both during intensive care treatment and in the post-intensive care follow-up period, which contributes to improved long-term outcomes.

Interventions that may reduce the frequency and severity of post-traumatic stress disorder symptoms

Among interventions with potentially beneficial effects, early mobilization during intensive care unit stay has been highlighted, as it was associated with a reduction in post-traumatic stress disorder symptoms in a multicenter study. In this context, such interventions are directed not only at physical recovery but also at reducing the psychological burden associated with critical illness, indicating that psychological prevention represents an integral component of comprehensive intensive care.

Long-term consequences, quality of life, and cognitive outcomes

The results of this review confirm that post-traumatic stress disorder in the post-intensive care period is often not an isolated condition, but is associated with broader consequences, including reduced quality of life, depressive and anxiety symptoms, and difficulties in everyday functioning [4, 19, 20, 22–25]. In one cohort study, post-traumatic stress disorder was associated with a decline in cognitive functioning, further emphasizing the need for long-term follow-up and rehabilitation approaches that also address cognitive domains [20]. These findings indicate that psychological outcomes after intensive care unit stay are multidimensional and require an integrated approach that extends beyond short-term post-hospital follow-up.

Limitations of the evidence and limitations of this review

A substantial proportion of cross-sectional and cohort studies was included, which allows insight into associations but limits causal inference. Cross-sectional studies may be subject to selection and information bias, while prospective cohort studies provide more robust data on the development and course of post-traumatic stress disorder symptoms over time. Furthermore, heterogeneity in populations, clinical conditions, and measurement instruments justified a narrative synthesis and tabular presentation without meta-analysis.

This review was conducted by a limited number of authors, which may increase the risk of subjectivity in study selection and interpretation. However, inclusion criteria were defined in advance, and data were repeatedly verified to ensure consistency and accuracy. The search included full-text articles, which may have limited the scope of the literature and potentially introduced selection bias. However, most recent clinical studies in this field are available in open access or through institutional repositories, and the likelihood of a substantial impact on the main findings was therefore considered low.

CONCLUSION

This systematic review demonstrates that post-traumatic stress disorder is a frequent and clinically relevant consequence of prolonged hospitalization and intensive care unit stay, with prevalence in recent studies varying widely depending on the population, duration of follow-up, and assessment instruments used. The findings of the included studies suggest that delirium, hallucinations, and delusional memories, deep sedation, prolonged mechanical ventilation, and dyspnea may be associated with post-traumatic stress disorder symptoms after intensive care, while lower levels of social support were associated with poorer psychological outcomes after intensive care. Post-traumatic stress disorder frequently co-occurs with depression and anxiety and is associated with reduced quality of life, cognitive difficulties, and impaired functional recovery.

The results indicate that outcomes may be improved through the introduction of structured psychological screening and follow-up after discharge, early mobilization, and interventions aimed at reducing traumatic memories and delirium. These results indicate the need to integrate psychological care into standard intensive care and post-intensive rehabilitation protocols, with particular emphasis on early identification of high-risk patients and continuous multidisciplinary support.

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Declaration of Conflicting Interest:

The authors declares no conflict of interest.

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