



NARRATIVE REVIEW

The impact of post-traumatic stress disorder related to intensive care: a narrative review

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Findings:

The narrative review of 20 studies identified the main risk factors for PTSD among intensive care survivors, including younger age, illness severity, mechanical ventilation, delirium, prolonged sedation, and pre-existing psychiatric conditions. It also identified validated screening tools (IES-R, PCL) and effective preventive interventions, particularly ICU diaries, sensory stimulation, psychoeducation, and post-discharge follow-up, which were associated with reduced PTSD symptoms and improved psychological recovery.

ABSTRACT

BACKGROUND: Post-traumatic stress disorder (PTSD) is a common challenge for ICU survivors, with approximately 20-25% developing PTSD within a year of discharge due to factors like medical procedures, isolation, and sensory overload.

OBJECTIVE: This review investigates risk factors and interventions to address PTSD in ICU patients.

METHODS: A narrative literature review was conducted using databases such as Medline, Cinahl, Embase, PsycInfo, and grey literature, focusing on studies in English or Italian published in the last decade. A total of 20 articles examining PTSD risk factors and prevention strategies in ICU patients were included.

RESULTS: Key risk factors identified include younger age, male gender, illness severity, mechanical ventilation, delirium, pre-existing psychiatric conditions, and prolonged sedation. Screening tools like the Impact of Event Scale Revised (IES-R) and PTSD Checklist are critical for early detection. Preventive measures, such as ICU diaries, sensory stimulation, psychoeducation, and follow-up care, are effective in reducing PTSD symptoms. ICU diaries have been highlighted as particularly beneficial for helping patients process their ICU experiences.

CONCLUSIONS: ICU patients face psychological stressors that contribute to PTSD development. Recognizing modifiable and non-modifiable risk factors is essential for targeted prevention strategies. Nurses play a vital role in early identification and intervention, significantly reducing PTSD risks. Proactive care, including psychological support and ICU diaries, is vital for improving patient recovery and minimizing PTSD prevalence among ICU survivors.

KEYWORDS: ICU diaries, ICU survivors, Post-traumatic stress disorder (PTSD), Preventive measures

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REVISIONE NARRATIVA

Riduzione del disturbo post-traumatico da stress correlato al ricovero in terapia intensiva: una revisione narrativa della letteratura

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Riscontri:

La revisione narrativa di 20 studi ha identificato i principali fattori di rischio per lo sviluppo del PTSD nei sopravvissuti alla terapia intensiva, tra cui giovane età, severità della malattia, ventilazione meccanica, delirium, sedazione prolungata e pregresse condizioni psichiatriche. Sono stati inoltre individuati strumenti di screening (IES-R, PCL) e interventi preventivi efficaci, in particolare i diari di terapia intensiva, la stimolazione sensoriale, la psicoeducazione e il follow-up post-dimissione, associati a una riduzione dei sintomi di PTSD e a un migliore recupero psicologico.

ABSTRACT

INTRODUZIONE: il disturbo post-traumatico da stress (PTSD) è una condizione comune per i pazienti dimessi dalla terapia intensiva: di questi, circa il 20-25% sviluppano PTSD ad un anno dalla dimissione a causa di fattori quali procedure medico-assistenziali, isolamento e sovra-stimolazione sensoriale.

OBIETTIVO: La presente revisione mette in luce i fattori di rischio e gli interventi volti a prevenire e trattare il PTSD in terapia intensiva.

METODO: è stata condotta una revisione narrativa della letteratura. Sono stati interrogati i database Medline, Cinahl, Embase, PsycInfo e letteratura grigia. Sono stati inclusi studi in inglese ed italiano pubblicati negli ultimi 10 anni. Sono stati inclusi 20 articoli.

RISULTATI: I principali fattori di rischio sono la giovane età, il genere maschile, la severità della condizione, patologie psichiatriche pre-esistenti e sedazione prolungata. Strumenti di screening quali la Impact of Event Scale Revised (IES-R) e la PTSD Checklist sono fondamentali per riconoscere i pazienti a rischio. Interventi di prevenzione come diari di terapia intensiva, la stimolazione sensoriale, psicoeducazione e continuità assistenziale post-dimissione sono efficaci nel ridurre i sintomi di PTSD.

CONCLUSIONI: I pazienti in terapia intensiva affrontano fattori stressogeni che contribuiscono a sviluppare PTSD. Riconoscere i fattori di rischio modificabili e non modificabili è essenziale per pianificare strategie di prevenzione. Gli infermieri hanno un ruolo di primaria importanza nell'identificazione precoce e nell'attuazione di interventi che rilevino precocemente e che minimizzino gli effetti del PTSD. Un atteggiamento proattivo che includa supporto psicologico e la scrittura di diari sembra rivestire un ruolo importante nel minimizzare la prevalenza del PTSD

KEYWORDS: ICU diaries, ICU survivors, Post-traumatic stress disorder (PTSD), Preventive measures

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BACKGROUND

Post-traumatic stress disorder (PTSD) is a mental health condition that typically arises after experiencing highly traumatic events (DSM-5), with a multifactorial aetiology [1]. It leads to the development of typical symptoms following direct or indirect exposure to one or more traumatic events. These include intrusive memories such as flashbacks or nightmares related to the trauma, persistent avoidance of memories, negative changes in mood and cognition, and significant alterations in arousal, such as irritability, hypervigilance, and sleep disturbances. Additionally, dissociative symptoms, such as depersonalisation and derealisation, may be present (DSM-5). The development of PTSD can result in severe consequences in an individual's life; individuals are at high risk of developing mental disorders such as depression and substance use disorders [1,2].

Among the risk factors for developing PTSD are so-called "peritraumatic" factors (specifically related to the traumatic event), which are overwhelming and perceived as life-threatening [3]. PTSD is considered one of the conditions that can critically affect an individual's life, especially when it is associated with precarious conditions that necessitate admission to a high-intensity care unit, such as intensive care [3]. Admission to an intensive care unit can be associated with numerous sequelae, not only of an organic nature but also, and especially, of a psychological and cognitive nature, both in the short and long term, which can lead to PTSD [3,4]. It is estimated that approximately 20% of patients admitted to and discharged from an intensive care unit develop symptoms indicative of PTSD within three months of discharge [5]. Stressors that may predispose to the onset of PTSD include not only elements directly related to the illness and the anxiety arising from it, but also factors related to the hospitalisation (e.g.,

noise from devices, isolation, artificial lighting) and healthcare procedures (e.g., endotracheal suctioning, extubation procedures, etc.) [3]. Because of these elements, proactive care is essential in terms of early identification of potentially traumatic factors and patients at high risk for the development of PTSD [5,6].

The aim of this review is to identify the main risk factors associated with the onset of PTSD and to explore evidence related to prevention and screening interventions that can be carried out by nurses.

METHODS

The PICO framework was employed to formulate the research question. A narrative literature review was conducted by consulting the databases Medline, CINAHL, Embase, and PsycInfo and grey literature. Through a preliminary review of the literature, key terms for the search strategy were identified: "*Intensive care unit*" and "*Post-traumatic stress disorder*." The complete research strategy is available in Appendix 1. The bibliographic search was carried out during April and May 2024. Inclusion criteria were articles written in English or Italian, and studies focusing on individuals aged 18 years or older. The search was limited to the last 10 years

Ethical considerations: The methodology used does not require approval from the ethics committee.

RESULTS

708 records were retrieved. A total of 331 duplicates were removed. Screening of titles, abstracts, and full texts based on inclusion and exclusion criteria resulted in the selection of 20 papers. The decision-making process was described using the Prisma Flow Diagram (Figure 1). The papers included in the review are available in Appendix 2.



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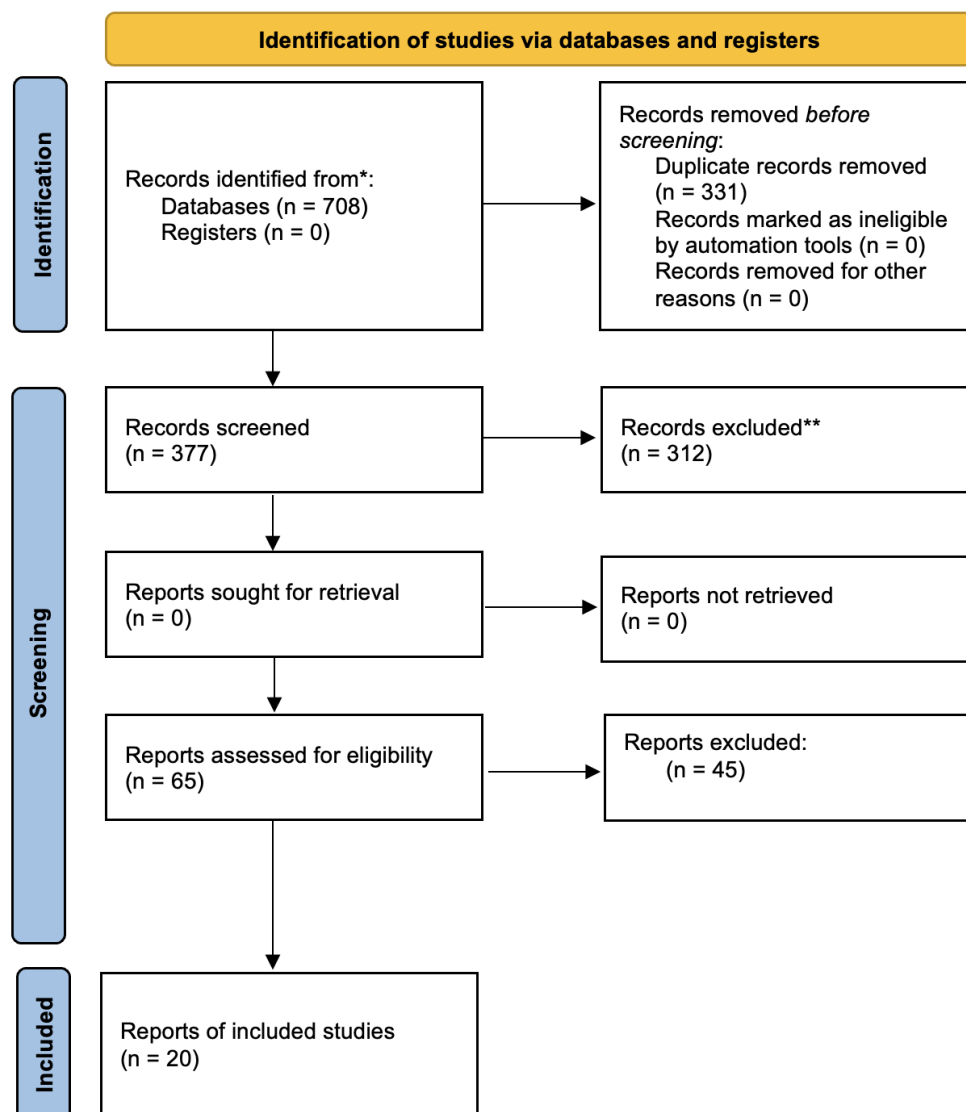


Figure 1. PRISMA Flow Diagram

Risk factors associated with the onset of PTSD

The variables are divided into two categories: major variables and minor variables. The major variables are those that were most frequently analysed in the articles, as they were considered particularly significant for the onset of PTSD. These include Gender, Age, Severity of the illness, Length of hospitalisation, Mechanical ventilation, Use of sedation/analgesia, Type of memories, Episodes of delirium, Previous psychiatric disorders, Marital

status. The minor variables are those that were less frequently analysed, but still may have an impact on the onset of PTSD. These include Education level, Type of hospitalisation, Employment status, Episodes of agitation, Pain, Pre-admission IADL score, Pre-admission IES-R score, Pre-admission HADS score, Duration of sedation. Use of benzodiazepines. Key risk factors for PTSD in patients discharged from ICUs include [4] Demographics: Younger age and male gender are associated with a higher risk of PTSD [3] Illness Severity and ICU Experience: More severe

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illness (higher SAPS II scores), mechanical ventilation, longer ICU stays, and prolonged sedation or analgesia increase the risk [5] Delirium and Agitation: Episodes of delirium and agitation during ICU admission are strong predictors of PTSD [6] Pre-existing Psychiatric Conditions: A history of depression, anxiety, or previous PTSD significantly raises the likelihood of developing PTSD [1] Sedation and Analgesia: Prolonged or excessive use of sedatives and analgesics, especially benzodiazepines, is linked to higher PTSD risk, while lighter sedation strategies are protective [7] Negative ICU Experiences: Traumatic memories, including delirium and distressing ICU experiences, are major predictors of PTSD.

PTSD screening tools

The most commonly cited tool in the studies is the *Impact of Event Scale Revised* (IES-R), a self-report instrument consisting of 22 items with a Likert scale rating from 0 to 4. It assesses symptoms of avoidance, intrusive thoughts, and hyperarousal. A test is considered positive with a total score of 33 or greater.

The *PTSD Checklist Civilian Version* (PCL-C) is an instrument consisting of 17 items based on symptoms of re-experience, avoidance, and hyperarousal, with a rating scale from 1 to 5 for each item. The test is considered positive with a score of 38 or greater.

The *Posttraumatic Stress Scale-10* (PTSS) is a self-report instrument developed according to the DSM-III criteria, assessing ten common PTSD symptoms on a seven-point Likert scale ranging from 1-7 [8]. A total score above 35 indicates the presence of PTSD symptoms. *The PTSS-14* is the version developed according to the DSM-IV criteria, consisting of 14 items related to PTSD symptoms [8]. Each item is scored on a seven-point Likert scale from 1 to 7, and a total score above 45 suggests a probable PTSD diagnosis.

The *Posttraumatic Stress Disorder Checklist* for DSM-5 (PCL-5) is a 20-item self-report tool developed based on PTSD symptoms according to the DSM-5 [9]. A total score above 33 indicates a provisional diagnosis of PTSD.

Prevention Interventions for ICU-Related PTSD

Several types of interventions have been identified including pharmacological treatments, ICU diaries, psychoeducation, sensory stimulation, follow-up, and psychological or cognitive-behavioural interventions.

The main interventions for preventing PTSD in intensive care unit (ICU) patients can be classified into early interventions, which take place during hospitalization, and post-discharge interventions. Early interventions are believed to be more effective in reducing psychological stress related to hospitalization compared to post-discharge treatments.

Among the studies reviewed, 10 examined the administration of medication, one compared deep sedation versus light sedation during mechanical ventilation, five focused on psychological and cognitive-behavioral interventions, one study investigated psychological interventions carried out during ICU hospitalization, which included educational interventions, psychological support, and coping strategies, finding a reduction in PTSD symptoms. The literature highlights the effectiveness and utility of intensive care unit (ICU) diaries in preventing PTSD in patients discharged from intensive care. Several studies included in systematic reviews and meta-analyses have demonstrated that the use of diaries during ICU admission, filled out by healthcare staff or family members, significantly reduces symptoms of PTSD, anxiety, and depression. ICU diaries have proven to be an effective intervention in PTSD prevention, showing positive outcomes in reducing PTSD, anxiety, and depression symptoms, as well as aiding patients in reprocessing





and recalling their ICU experiences [3,10]. ICU diaries have proven effective in improving psychological outcomes for patients post-discharge. They significantly reduce PTSD, anxiety, and depression symptoms [3,10,11], improve memory recall of the ICU experience, and provide emotional support. Patients who received a diary reported lower PTSD rates and clearer memories of their stay, aiding in better emotional processing and recovery.

DISCUSSION

ICU patients are constantly exposed to stressors and potentially traumatic factors that can contribute to psychological disorders post-discharge, significantly impacting mental health and quality of life. The experience of critical illness and life-threatening situations can be traumatic, increasing the risk of post-traumatic stress disorder (PTSD) after discharge. Furthermore, various factors inherent to the ICU environment can elevate the risk of developing PTSD. ICU nurses play a crucial role in the early identification of signs and factors that may increase the risk of PTSD in these patients. The most effective strategy to reduce the risk of developing PTSD in patients discharged from the ICU is to identify and analyze the risk factors associated with both the hospitalization and the individual characteristics of the patients. A thorough assessment of these factors not only allows for the identification of risk factors but also enables the stratification of patients into risk categories, thereby facilitating the implementation of follow-up strategies targeted at those with greater vulnerability. Additionally, the identification of modifiable factors enables ICU nurses and healthcare staff to implement preventive interventions. Some risk factors, such as age, gender, and pre-existing psychological disorders, are non-modifiable but help identify patients at higher risk of developing PTSD post-discharge. A review of studies revealed that pre-

existing psychological conditions, such as anxiety, depression, and PTSD, are statistically associated with the onset of PTSD in ICU patients after discharge [12-16]. The study by Battle et al. showed that the presence of psychiatric disorders before hospitalization is significantly associated with an increased risk of developing PTSD post-ICU. This may be due to the fact that pre-existing mental health issues can alter the perception of hospitalization and reduce the patient's resilience and trauma processing capacity, raising the risk of PTSD symptoms even months after discharge [15,16].

Age is another significant factor, with three studies showing that younger patients are at higher risk of developing PTSD compared to older patients [13,16]. Friberg et al. found that women have a higher risk of developing PTSD after ICU admission compared to men [16], a finding also confirmed by Da Costa et al. [13].

Identifying modifiable factors, such as sedation, is key to reducing PTSD risk in ICU patients. Prolonged deep sedation is linked to a higher PTSD risk, while lighter sedation and daily sedation interruptions lower this risk [12,17]. High doses of benzodiazepines, causing delirium and hallucinations, are also associated with increased PTSD risk [12].

The literature highlights various factors influencing PTSD risk in ICU patients. Key interventions include sensory stimulation to reduce stress and improve orientation [18], and the use of ICU diaries, which help patients reconstruct their experiences and reduce fragmented memories, thereby lowering PTSD risk [3,10,11]. Delirium and agitation, both modifiable factors, are significantly associated with increased PTSD risk [14,16], and preventive actions such as pain management, early mobilization, and environmental adjustments are essential. Furthermore, follow-up care is crucial, with psychological support and regular screenings reducing





PTSD incidence [19]. Protocols like the ABCDEF bundle for managing pain, delirium, and agitation can significantly improve patient outcomes [20]. Overall, early identification, preventive measures, and continuous support post-discharge are vital in minimizing PTSD risks.

This study has potential limitations that should be acknowledged: (1) Language Bias Limiting the review to English and Italian studies may exclude relevant research published in other languages; (2) Database Limitation: Using only Medline, Cinahl, Embase, and PsycInfo may overlook studies from other databases; (3) Exclusion of Study Types: Excluding qualitative studies may limit understanding of ICU patients' experiences of PTSD. These limitations do not necessarily undermine the validity of the study but should be recognized when interpreting the findings and considered in future research.

Future research should focus on expanding language and database coverage, including qualitative studies to explore ICU patients' experiences. Long-term PTSD outcomes and modifiable factors like sedation, pain management, and delirium should be studied to identify effective prevention strategies. The effectiveness of interventions such as ICU diaries and sensory stimulation should be explored across diverse populations. Additionally, follow-up care and interdisciplinary team roles in PTSD management require further investigation. Research in high-risk contexts, like pandemics, is also needed to understand their unique impact on PTSD development.

CONCLUSION

The literature highlights that intensive care unit (ICU) admission can be highly traumatic, with 20-25% of critically ill patients developing PTSD within one year post-discharge, a figure that exceeds 40% in high-risk contexts such as the COVID-19 pandemic. Factors

such as deep sedation, delirium, agitation, and separation from family are strongly associated with an increased risk of PTSD [14, 16]. Interventions like environmental management, clear communication, family involvement, and delirium prevention are crucial in reducing this risk [20]. The use of ICU diaries and sensory stimulation has been linked to improved psychological well-being and a lower incidence of PTSD [3,10,11]. Prevention strategies and targeted follow-up enhance patients' quality of life, supporting a holistic and multidisciplinary recovery [20].

Conflict of interest statement and funding

The authors declare no conflict of interest. No funding was allocated for conducting this study. For the drafting of this manuscript, the authors utilised AI support, specifically ChatGPT, to ensure accurate translation into the English language.

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APPENDICES:

Appendix 1. Research strategy

Medline	((exp *Stress Disorders, Post-Traumatic/ not exp Occupational Diseases/) AND (*intensive care units/ or *burn units/ or *coronary care units/ or *recovery room/ or *respiratory care units/)) OR (((post-traumatic or posttraumatic or PTSD or (trauma* adj3 stress*)).m_titl.) AND ((icu or icus or intensive-care* or intensive-therap* or critical-care).m_titl.)) NOT ((pediatr* or paediatr* or neonat* or newborn* or new*-born* or child* or infan* or nicu* or picu*).m_titl.)
Embase	('posttraumatic stress disorder'/mj AND ('intensive care unit'/mj OR ('burn unit'/mj OR 'coronary care unit'/exp/mj OR 'medical intensive care unit'/exp/mj OR 'neurological intensive care unit'/exp/mj OR 'psychiatric intensive care unit'/exp/mj OR 'stroke unit'/exp/mj OR 'surgical intensive care unit'/exp/mj))) OR (((icu:ti OR icus:ti OR 'intensive care*':ti OR 'intensive therap*':ti OR 'critical care':ti) AND ('post traumatic':ti 13 OR posttraumatic:ti OR ptsd:ti OR ((trauma* NEAR/3 stress*):ti))) NOT (pediatr*:ti OR paediatr*:ti OR neonat*:ti OR newborn*:ti OR 'new* born*':ti OR child*:ti OR infan*:ti OR nicu*:ti OR picu*:ti))
Cinahl	((((Mm "Stress Disorders, Post-Traumatic") not ((MH "Stress, Occupational+") OR (MH "Occupational Diseases+")))) OR (TI (post-traumatic OR posttraumatic OR PTSD OR (trauma* n3 stress*)))) AND (((Mm "Intensive Care Units") OR (Mm "Coronary Care Units") OR (Mm "Respiratory Care Units") OR (Mm "Post Anesthesia Care Units") OR (Mm "Stroke Units")) OR (TI (icu or icus or intensive-care* or intensivetherap* or critical-care)))) NOT (TI (pediatr* or paediatr* or neonat* or newborn* or new*-born* or child* or infan* or nicu* or picu*))

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PsycINFO	(((exp *posttraumatic stress disorder/) AND ((exp *hospitalized patients/) OR (exp *intensive care/ or exp *hospital environment/ or exp *hospitals/))) OR (((posttraumatic or posttraumatic or PTSD or (trauma* adj3 stress*).m_titl.) AND ((icu or icus or intensive-care* or intensive-therap* or critical-care).m_titl.))) NOT ((pediatr* or paediatr* or neonat* or newborn* or new*-born* or child* or infan* or nicu* or picu*).m_titl.)
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Appendix 2. Papers included in the review

The effect of nurse-initiated diary intervention on posttraumatic stress disorder and recall of memories in ICU survivors: a randomized controlled trial	Rashidi et al., 2024	Randomized controlled trial
Patient characteristics associated with posttraumatic stress symptoms in intensive care unit survivors during a one-year follow-up: A multicenter study	Friberg, Hofso, et al., 2024	Longitudinal cohort study
Prevalence of and predictive factors associated with high levels of post-traumatic stress symptoms 3 months after intensive care unit admission: A prospective study	Friberg, Hofso, et al., 2024	Prospective observational study
Prevalence and correlation analysis between post-traumatic stress disorder and analgesic use in survivors of ICU in China	Pan et al., 2023	Retrospective cohort study
The effects of a sensory stimulation intervention on psychosocial and clinical outcomes of critically ill patients and their families: A randomised controlled trial	Liang et al., 2023	Randomized controlled trial
The Effect of Intensive Care Unit Diaries on Posttraumatic Stress Disorder, Anxiety, and Depression: A Systematic Review and Meta-analysis of Randomized Controlled Trials	Gazzato et al., 2022	Systematic review and meta-analysis
Effect of intensive care unit diary on incidence of posttraumatic stress disorder, anxiety, and depression of adult intensive care unit survivors: A systematic review and meta-analysis	Sun et al., 2021	Systematic review and meta-analysis
Post-traumatic stress disorder in critical illness survivors and its relation to memories of ICU	Askari Hosseini et al., 2021	Descriptive correlational study
Early Detection of Patients at Risk of Developing a Post-Traumatic Stress Disorder After an ICU Stay	Wawer et al., 2020	Prospective study
Risk factors for post-intensive care syndrome: A systematic review	Lee et	Systematic review and

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and meta-analysis	al., 2020	meta-analysis
Psychological disorders in post-icu survivors and impairment in quality of life	Da Costa et al., 2019	Retrospective cohort study
Prevalence of post-traumatic stress disorder symptoms in adult critical care survivors: a systematic review and meta-analysis	Righy et al., 2019	Systematic review and meta-analysis
Comparative validation of three screening instruments for posttraumatic stress disorder after intensive care	Rosendahl et al., 2019	Cohort study
Effects of post-ICU follow-up on subject outcomes: A systematic review and meta-analysis	Rosa et al., 2019	Systematic review and meta-analysis
Preventing Posttraumatic Stress in ICU Survivors: A Single-Center Pilot Randomized Controlled Trial of ICU Diaries and Psychoeducation	Kredentser et al., 2018b	Randomized controlled trial
Early interventions for the prevention of posttraumatic stress symptoms in survivors of critical illness: A qualitative systematic review	Roberts et al., 2018	Qualitative systematic review
Predictors of post-traumatic stress disorder following critical illness: A mixed methods study	Battle et al., 2017	Mixed Methods study
Intensive Care Unit Delirium and Intensive Care Unit-Related Posttraumatic Stress Disorder	Marra et al., 2017	Narrative review
Posttraumatic Stress Disorder in Critical Illness Survivors: A Metaanalysis	Parker et al., 2015	Systematic review and meta-analysis
Protocolized sedation effect on post-ICU posttraumatic stress disorder prevalence: A systematic review and network meta-analysis	Nassar et al., 2015	Systematic review and meta-analysis

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