Posttraumatic Stress Syndrome Associated With Stays in the Intensive Care Unit: Importance of Nurses’ Involvement

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More patients in the intensive care unit are surviving their critical illnesses because of advances in medical care. This change in survival has led to an increased awareness of the emotional consequences of being critically ill. Posttraumatic stress disorder has been identified in approximately 9% to 27% of critically ill patients compared with 7% of the general US population. Risk factors such as treatment with mechanical ventilation, sedation, delusional memories, and agitation are associated with development of posttraumatic stress disorder in patients in the intensive care unit. Individuals with posttraumatic stress disorder are more likely to experience negative physical and psychiatric health outcomes and a lower quality of life than are patients without the disorder. Early identification and treatment of patients experiencing these signs and symptoms may reduce these physical and psychological comorbid conditions. Through careful monitoring of medications, early mobilization, sleep promotion, and pain management, nurses may be able to reduce signs and symptoms of posttraumatic stress disorder. ([Critical Care Nurse. 2015;35[3]:44-54])

The Society of Critical Care Medicine has estimated that each year 5 million patients in the United States will be admitted to an intensive care unit (ICU). Treatment of critically ill patients has improved so that an increasing number are surviving to be discharged home or to a long-term care facility to make a meaningful recovery. This change in survival has led to an increased awareness of the emotional and physical consequences of lifesaving interventions and critical illness.

This article has been designated for CE credit. A closed-book, multiple-choice examination follows this article, which tests your knowledge of the following objectives:

1. Identify risk factors for the development of posttraumatic stress disorder (PTSD) among patients in the intensive care unit
2. Describe nursing interventions to reduce the development of PTSD
3. Discuss physiologic complications associated with PTSD

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Posttraumatic stress disorder (PTSD) is a severe anxiety disorder that results when a person experiences or witnesses trauma. The disorder is characterized by reexperiencing the traumatic event via flashbacks or nightmares and by arousal of the autonomic nervous system, which can be manifested as difficulty sleeping, irritability, and exaggerated startle response. Persons with PTSD also report a numbing feeling and tend to avoid places, people, and situations associated with the trauma. Diagnosis of PTSD requires that signs and symptoms cause impairment in an important area of functioning and be present for at least 30 days after the traumatic event.2

ICU patients are particularly at risk for PTSD because of their experience of a life-threatening illness or trauma and because of treatments and interventions received in the ICU.2,3 Critically ill patients in whom PTSD develops may have a more complicated recovery than do other patients because the disorder is associated with higher rates of coronary heart disease, chronic pain, gastrointestinal disorders, arthritis, and decreased quality of life.4-7 In this literature review, we examine the phenomenon of PTSD and the risk factors and complications associated with ICU-related PTSD to help nurses recognize the factors that place critically ill patients at risk. We also suggest potential nursing interventions that may mitigate these risk factors.

Prevalence of PTSD and ICU-Related PTSD

According to estimations, PTSD affects 6.4% to 8.7% of adults in the United States.2,8 The prevalence of post-ICU PTSD has been difficult to determine; estimates range from 0% to 64%. This wide variation has been attributed to research-related factors, including small sample sizes, high dropout rates of participants, and the use of a wide variety of assessment measures (eg, use of screening tools vs diagnostic tools).9 In a systematic review of these issues, Wade et al10 compared studies from 1997 through 2007 with studies from 2008 through 2012 of post-ICU PTSD in both surgical and medical patients. The reviewers10 followed a specific protocol to determine the risk of bias for each study and included only high-quality studies in the final analysis. Prevalence rates between the 2 groups of studies were similar: 8% to 27% (1997-2007) and 9% to 27% (2008-2012). These numbers suggest ICU patients are at higher risk for PTSD than are members of the general population.

Risk Factors for ICU-Related PTSD

Personal Factors

Some risk factors for ICU-related PTSD are non-modifiable; however, for earlier identification of ICU patients with this disorder, nurses must understand what personal factors place patients at higher risk. Patients who have anxiety and depressive disorders before ICU admission have a higher rate of PTSD after discharge from the ICU than do patients who did not have psychological problems before admission.11 In addition, patients who are female or who are younger than 65 years are at greater risk than are males or older patients for ICU-related PTSD.12-14 The factors that predispose women to a greater risk for PTSD are not well understood. The difference between PTSD rates in men and women is not accounted for by the higher rates of depression and anxiety or sexual assault experienced by women.15

ICU Factors

Categories associated with the critical care environment for ICU-related PTSD include use of specific medications such as vasopressors and sedatives, treatment with mechanical ventilation, delusional memories of the ICU, and agitation. By understanding these risk factors, nurses who provide care for critically ill patients may be better prepared to identify and potentially mitigate some of the risk factors.

Vasopressors. Vasopressors, such as phenylephrine and norepinephrine, are often administered in the
ICU to counteract profound hypotension due to cardiac or vascular failure or systemic infections. Physiologically, these medications mimic the stress response for extended periods, acting on target organs such as the heart to increase heart rate and contractility. In addition, blood vessels constrict, bronchioles expand, and blood is diverted away from nonessential areas, such as the gastrointestinal tract and peripheral circulation, allowing higher volumes of oxygen to reach vital organs. In a prospective cohort study of 100 mixed-diagnosis ICU patients, use of vasopressors and inotropes was correlated with anxiety. Use of vasopressors for an extended time creates a chronic stress state, putting the body at risk for excessive systemic inflammation leading to immune and metabolic dysregulation, endothelial damage, cytokine imbalance, carbohydrate intolerance, dyslipidemia, and insulin resistance. Further support for the link between vasopressors and PTSD is provided by research on the relationship between β-adrenergic antagonists, such as propranolol, and the occurrence of PTSD. In theory, propranolol crosses the blood-brain barrier, inhibiting fear conditioning by blocking catecholamine receptors in the amygdala. In an observational study of 128 patients, Krauseneck et al found that female patients who received β-blockers (metoprolol) after cardiac surgery had lower levels of PTSD signs and symptoms and fewer traumatic memories 6 months after surgery than did women who did not receive the medication.

**Sedation.** In a literature review, including 26 articles from 1997 through 2012, Wade et al found that use of benzodiazepines and duration of sedation were associated with signs and symptoms of PTSD. Furthermore, benzodiazepines have an amnesic effect, and amnesia has been positively correlated with higher levels of PTSD signs and symptoms. Despite the extent of research on the role of benzodiazepines, whether these medications are a causative factor in the development of PTSD is still unknown.

Spontaneous awakening trials were developed to reduce the amount of sedatives patients receive in the ICU. The results of research on the relationship between spontaneous awakening trials and both length of hospital stay and duration of mechanical ventilation are conflicting. Furthermore, the relationship between the use of spontaneous awakening trials and a reduction in PTSD signs and symptoms has not been validated. Therefore, some researchers suggest a focus on lighter levels of sedation might be more beneficial than a focus on the more time-consuming spontaneous awakening trial.

**Mechanical Ventilation.** Various studies and systematic reviews have indicated an association between mechanical ventilation and signs and symptoms of PTSD in mixed-diagnosis ICU patients. For example, in a follow-up study of 186 patients with acute lung injury or acute respiratory distress syndrome from 13 ICUs who received mechanical ventilation, PTSD signs and symptoms were detected in 35% of the patients during a 2-year period. Also, longer duration of mechanical ventilation has been associated with increased risk for PTSD in patients who survive acute lung injury or acute respiratory distress syndrome. Although nurses have little control over a patient’s initial need for mechanical ventilation, they may have an opportunity to reduce risk for PTSD in ICU patients by advocating for interventions that promote earlier extubation, such as spontaneous breathing trials, lighter levels of sedation, and early mobilization.

**Delusional Memories.** Delusional memories in the ICU context are memories of frightening perceptual experiences patients had while critically ill. ICU patients report unsettling delusional memories of their hospitalizations interwoven with real events from that time that are experienced as intrusive memories, as well as flashbacks or nightmares. The association between PTSD, delusional memories, and delirium is mixed. In a multicenter follow-up study of 238 patients who had received mechanical ventilation in the ICU, delusional memories were associated with the development of PTSD and were more likely to be retained over time than were factual memories. Unfortunately, factual memories of real events are less emotionally prominent to a person and therefore decrease over time, leaving the emotionally charged delusional memories as the primary recollections of the ICU experience. However, having no memory of the ICU is not

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beneficial either. In a large multicenter study, nearly half of the patients had no memory of their admission to the hospital or the ICU and noted a strong positive association between this amnesia for early events in their hospital course with the level of PTSD reported. Currently, no association between delirium and increased risk for PTSD has been reported. In these studies, delirium was identified by using the Confusion Assessment Method for the ICU or by nursing documentation stating the patient was "confused, disoriented, or had difficulty following commands.”

**Agitation.** In a systematic review, Davydow et al found that episodes of agitation and use of restraints were associated with PTSD. In the ICU, some patients are restrained to prevent them from removing life-sustaining devices such as endotracheal tubes or to minimize safety risks to themselves or staff if the patients are highly agitated or aggressive. Agitation is often managed first with sedative medications, but for patients in whom sedation is contraindicated, physical restraints are used as a last resort. Some research suggests that associations exist between agitation, use of restraints, and the development of PTSD in patients discharged from the ICU, thus highlighting the potential importance of managing agitation. ICU nurses must recognize agitation in patients and determine underlying causes, such as pain, delirium, and hypoxemia, before treating patients with benzodiazepines. In ICU patients who are not experiencing alcohol withdrawal, nonbenzodiazepines may be more helpful than benzodiazepines for treatment of agitation. Patients who experience stress, fear, loss of control, and an inability to express their wishes are at a higher risk for PTSD than are patients who do not experience these conditions. These emotions and frustrations may manifest themselves as agitation, emphasizing the importance of evaluating underlying causes of a patient’s agitation.

**Severity of Illness and Length of ICU Stay**

Two factors that may be major contributors to the development of PTSD in ICU patients are severity of illness and longer ICU stay, although the research is not conclusive. Length of stay and severity of illness, as measured by using the Acute Physiology and Chronic Health Evaluation II, have not been consistently associated with the development of PTSD in critically ill patients. Possibly, a patient’s perceptions of the ICU experience rather than the length of ICU stay or severity of illness contribute to the signs and symptoms of PTSD.

**Adverse Health Outcomes Associated With PTSD**

**Cardiovascular Disorders**

Mechanisms that link PTSD with poor health outcomes are multifactorial. Alterations in the hypothalamic-pituitary-adrenal axis and the sympathetic adrenal medullary axis, as well as autoimmune dysfunction, are commonly linked to the pathophysiological changes of PTSD. Cardiovascular complications due to activation of the 2 axes lead to hypertension, tachycardia, dyslipidemia, diabetes, and endothelial dysfunction. If this upregulation of the stress response is prolonged, these cardiovascular changes cause endothelial damage to vessels and eventually atherosclerosis, which is associated with myocardial infarction and embolic stroke. A meta-analytic review of 6 studies indicated that after adjustments for depression, PTSD was independently associated with an increased risk for coronary heart disease. Furthermore, these cardiovascular changes place patients at greater risk for morbidity and mortality compared with patients without clinically important stress levels.

**Other Associated Disorders and Decreased Quality of Life**

In addition to cardiovascular disease, PTSD may also be linked with metabolic syndrome, a known cluster of cardiovascular signs and symptoms that puts a person at risk for coronary artery disease, stroke, and type 2 diabetes mellitus. In a survey of more than 36,000 Canadians, PTSD was associated with chronic pain, respiratory diseases, gastrointestinal disorders, cancer, and higher rates of disability compared with people without PTSD. Arthritis is another chronic condition strongly and consistently linked to PTSD. Other autoimmune disorders, specifically psoriasis and hypothyroidism, are also correlated with PTSD signs and symptoms. Although the association between these various disease states and subsequent development of
PTSD after discharge from the hospital is not clearly understood, these clinical conditions may provide markers of patients at greater risk for PTSD.

Compared with the general population, ICU survivors are well known to have a decreased quality of life due to the limitations and obstacles the survivors face as part of their physical recovery. PTSD in a patient recovering from a critical illness or trauma increases the patient’s difficulty in functioning optimally in society and interpersonally. Some evidence suggests that patients given corticosteroids in the ICU have a better physical quality of life at 3 months after discharge than do patients who do not receive corticosteroids.

Psychological Disorders

The link between PTSD and concomitant psychological disorders has been well studied and is documented in the Diagnostic and Statistical Manual of Mental Disorders. If patients with PTSD also have depression, they are at an even higher risk for suicidal behaviors than are PTSD patients without depression. Furthermore, these disorders themselves are associated with various health risks. In patients who are already vulnerable because of their critical illness and who also have PTSD, the risk for another psychiatric disorder increases the potential for the onset of chronic physical conditions and exacerbations of existing conditions, complicating the patients’ recovery and decreasing their quality of life.

Early Detection of ICU-Related PTSD

Although it may seem intuitive that screening ICU patients would help reduce the signs and symptoms of PTSD, screening has not been adequately studied in survivors of critical illness. In addition, because of the stigma of psychiatric disorders, many patients with psychological conditions, including PTSD, often do not seek help for their illnesses. Because patients may not seek help on their own, detection of patients at risk for PTSD after ICU discharge and before fully recognizable PTSD develops is important. Nurses can facilitate early detection and treatment of patients at risk for post-ICU PTSD, potentially helping these patients avoid the physical and psychological comorbid conditions mentioned earlier.

One strategy for early identification of patients at risk for post-ICU PTSD is an automated screening procedure based on elements in a patient’s electronic medical record. A study of electronic medical records of 878 trauma survivors revealed 10 data elements that helped in the prediction of PTSD in the survivors. Most of the data elements were based on the International Classification of Diseases, 9th Revision, Clinical Modification and included psychiatric disorders, substance use disorders, and positive tests for blood alcohol on hospital admission. Other data elements that increased the risk for PTSD were female sex, nonwhite ethnicity, admission to an ICU, previous trauma, and socioeconomic factors such as insurance status. The benefits of using electronic medical records to screen patients is that the screening can be done at a convenient time after a patient’s ICU stay and by any hospital staff member who is familiar with the electronic medical record system.

Nurses can advocate for a mental health consultation before discharge from the ICU or hospital for ICU patients at risk for PTSD. In a large observational study of trauma ICU patients who received an extensive psychological intervention (education, stress management, psychological support, and coping strategies) to address anxiety, depression, fear, and hopelessness, the incidence of PTSD was 21% in the intervention group and 57% in the control group. Patients who required psychiatric medications 1 year after discharge were primarily from the control group (41%) rather than the intervention group (8%). Despite the positive outcome in this study, the intervention might not be feasible or cost-effective for hospitals without a psychology department.

Providing follow-up after discharge may be useful in early identification of patients at risk for PTSD so long as the follow-up is done within a few months after hospital discharge. In a study by Schandl et al, 61 post-ICU patients were invited to a multidisciplinary follow-up visit with a physical therapist, a nurse, and a physician to assess physical and psychological recovery. Those patients who attended the visits at 3 and 6 months after hospital discharge required little ongoing treatment 12 months after their ICU discharge. In addition, specific screening tools were helpful in detecting undiagnosed depression and PTSD in the post-ICU patients.
An example of a screening tool created specifically for ICU-related PTSD signs and symptoms is the Post-Traumatic Stress Syndrome 14-Questions Inventory. This tool is reliable at 3 times—4 to 14 days after discharge ($\alpha = 0.89$), 2 months after discharge ($\alpha = 0.86$), and 3 months after discharge ($\alpha = 0.84$)—and has good concurrent validity with the Posttraumatic Diagnostic Scale ($r = 0.86$) and the Impact of Events Scale ($r = 0.71$).

Adopting a screening process to identify ICU patients at risk for the signs and symptoms of PTSD would require the creation of a defined procedure detailing how patients whose results are positive for PTSD will receive follow-up and by whom. This process most likely would involve a multidisciplinary team. Currently, no strategy has been described for implementing an early screening program for ICU-related PTSD. Furthermore, no research has been done to test the effects of an early screening process in reducing the incidence of PTSD in critical care patients after discharge from the ICU.

**Nursing Implications for Managing Risk Factors**

Unfortunately, many of the risk factors for PTSD in ICU patients, such as use of vasopressors and mechanical ventilation, cannot be eliminated because they are also the interventions used to save patients’ lives. However, by regularly assessing patients for the risk factors discussed earlier, during routine physical assessment and medication review, nurses can intervene directly or advocate for treatments to make the ICU environment less stressful and to promote recovery. The Table summarizes potential risk factors and nurse-initiated actions that may reduce ICU patients’ risk for PTSD. Reliable and valid tools are available that nurses can use to assess patients for risk factors such as sedation, agitation, and delirium. The Richmond Agitation-Sedation Scale is a valid and reliable 10-item scale with scores ranging from +4 (combative) to -5 (unarousable). ICU delirium can be closely monitored in many ICUs by using the Confusion Assessment Method for the ICU, which can reliably be administered by bedside nurses in about 5 minutes.

To address level and type of sedation, nurses can advocate for the use of either lighter target levels of sedation or the routine use of a daily-awakening protocol. For patients not experiencing alcohol or benzodiazepine withdrawal, nurses can discuss with physicians if the use of dexmedetomidine instead of benzodiazepines would be an appropriate type of sedation. Targeting lighter levels of sedation and...
considering dexmedetomidine versus benzodiazepines can reduce many of the risk factors for ICU-related PTSD, such as the number of days sedated, development of agitation, and duration of mechanical ventilation.

Early mobilization protocols can also help mitigate delirium and agitation and expedite extubation. Detailed protocols have been developed that outline the recommended frequency, duration, and type of physical activity for critically ill patients. Guidance is also provided to help organize interdisciplinary teams, which should include nurses, physicians, physical therapists, and respiratory therapists. In addition, adequately managing a patient’s pain can both encourage the patient’s participation in early mobilization protocols and reduce agitation. Other nursing interventions to promote extubation include frequent communication with physicians and respiratory therapists to decrease the fraction of inspired oxygen and positive end-expiratory pressure to facilitate spontaneous breathing trial protocols in conjunction with daily-awakening trials.

The stress of the critical illness on a patient’s body, combined with organ failure, use of sedative medications, and the lack of sleep patients experience in the ICU, may contribute to delirium. Environmental modifications such as use of earplugs and eye masks may improve sleep quality and patients’ perceptions of sleep. Clustering care procedures and reducing noise levels by closing doors and managing alarm parameters are also cost-effective ways to promote sleep and reduce agitation and delirium. A comforting bedside manner and therapeutic communication are ingrained in nurses. A patient who is unable to interact with nurses can be easily ignored, or inappropriate conversations can occur in the patient’s room. However, patients may be able to unconsciously gauge a nurse’s intentions and sense if the nurse is stressed or is compassionate. Nurses who are stressed or hurried in their manner may not be taking sufficient time to explain to unconscious patients what is happening, thus increasing anxiety or fear in patients with unrecognized cognition of their surroundings.

Some evidence indicates that a diary of a patient’s ICU experience kept by nurses and the patient’s family members can help fill gaps in the patient’s memory of the ICU stay. A large multicenter, randomized study included use of ICU diaries in which a patient’s nurses and family members wrote daily entries and included photographs of the patient during the hospitalization. The incidence of PTSD was 5% in the group who had a diary kept for them and 13% in the group that did not receive a diary. These results suggested that giving patients this frame of reference helped the patients come to terms with their experiences and reinforced real memories rather than delusional memories. Likewise, in a smaller study in France, use of a similar diary led to a reduction in PTSD signs and symptoms 12 months after ICU discharge. Despite these encouraging findings, a literature review of 11 studies from 1950 through 2013 on the effectiveness of ICU diaries did not support incorporating diaries into routine clinical practice, citing inconsistent methods among studies and the lack of a theoretical underpinning and rationale being tested and articulated.

Conclusion

Early detection of PTSD may prevent physical and psychological comorbid conditions in critically ill patients. Currently, patients’ psychological health is not routinely being addressed during an ICU stay or after discharge from the ICU because of a lack of familiarity with the disorder in ICU patients. This review of current literature on the risk factors for and consequences of PTSD in patients during or after a stay in the ICU may increase awareness of critical care nurses of the factors that place their patients at high risk for PTSD. In addition, we provide potential strategies that may mitigate the risk. Nurses are in a unique position to help patients more effectively cope with the patients’ emotions during the hospitalization by educating patients and patients’ families about the risk for PTSD and offering anticipatory guidance. Research provides some evidence that early identification and interventions may reduce the risk of PTSD after a patient’s ICU stay. However, further research is needed to determine the most effective screening protocol for ICU-related PTSD and to examine the relationship between screening and signs and symptoms of ICU-related PTSD.

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None reported.

References


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Facts

Intensive care unit (ICU) patients are particularly at risk for posttraumatic stress disorder (PTSD) because of their experience of a life-threatening illness or trauma and because of treatments and interventions received in the ICU.

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- Two factors that may be major contributors to the development of PTSD in ICU patients are severity of illness and longer ICU stay.
- Possibly, a patient’s perceptions of the ICU experience rather than the length of ICU stay or severity of illness contribute to the signs and symptoms of PTSD.

Complications Associated With PTSD

- Cardiovascular complications due to activation of the hypothalamic-pituitary-adrenal axis and the sympathetic adrenal medullary axis lead to hypertension, tachycardia, dyslipidemia, diabetes, and endothelial dysfunction. If this upregulation of the stress response is prolonged, these cardiovascular changes cause endothelial damage to vessels and eventually atherosclerosis, which is associated with myocardial infarction and embolic stroke.
- PTSD may also be linked with metabolic syndrome, a known cluster of cardiovascular signs and symptoms that puts a person at risk for coronary artery disease, stroke, and type II diabetes mellitus.

Nursing Implications

- Because patients may not seek help on their own, detection of patients at risk for PTSD after ICU discharge and before fully recognizable PTSD develops is important.
- One strategy for early identification of patients at risk for post-ICU PTSD is an automated screening procedure based on elements in a patient’s electronic medical record.
- Nurses can advocate for a mental health consultation before discharge from the ICU or hospital for ICU patients at risk for PTSD.
- Providing follow-up after discharge may be useful in early identification of patients at risk for PTSD so long as the follow-up is done within a few months after hospital discharge.
- By regularly assessing patients for risk factors, during routine physical assessment and medication review, nurses can intervene directly or advocate for treatments to make the ICU environment less stressful and to promote recovery.
- Early mobilization protocols can also help mitigate delirium and agitation and expedite extubation.
- Adequately managing a patient’s pain can both encourage the patient’s participation in early mobilization protocols and reduce agitation.
- A diary of a patient’s ICU experience kept by nurses and the patient’s family members can help fill gaps in the patient’s memory of the ICU stay.