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INTERVENTIONS FOR REDUCING POST-TRAUMATIC STRESS DISORDER IN INTENSIVE CARE UNIT SURVIVORS: A SCOPING REVIEW

Dadan Ramdani*, Defa Larashati, Lurdes Acorta Freitas, Nur Azmi Lilikliswati, SuryaniSuryani
Faculty of Nursing, Universitas Padjadjaran, Jl. Raya Bandung Sumedang KM.21, Hegarmanah, Jatinangor, Sumedang, West Java 45363, Indonesia
*dadan23003@mail.unpad.ac.id

ABSTRACT

Post Traumatic Stress Disorder (PTSD) is a serious condition that patients often experience after undergoing intensive treatment in the ICU. Traumatic experiences during ICU care can cause significant and prolonged symptoms. PTSD has a major impact on patients' quality of life after discharge from the ICU. Various literatures have not comprehensively discussed PTSD in ICU survivors. Objective: To explore interventions in reducing PTSD symptoms in ICU survivors. Method: This study used the scoping review method with article searches from three databases, namely CINAHL, PubMed, and Medline. Keywords used included "ICU diaries," "interventions," "post-ICU recovery program," and "PTSD." Inclusion criteria included original research articles with quasi-experimental or RCT designs, written in English, focusing on ICU survivors and the impact of PTSD, and a publication period of the last 10 years (2014-2024). Data extraction used manual tables. Data were analyzed using qualitative descriptive methods. Results: Eight relevant articles discussing interventions to reduce PTSD in ICU survivors were found. The study results indicate that there are two types of interventions, ICU diaries and post-ICU recovery programs, which are effective in reducing PTSD, anxiety, and depression symptoms in ICU survivors. The effectiveness of these interventions is supported by active family involvement, personalization of the intervention, and support from medical staff. Influencing variables include family involvement, method of intervention implementation, and continuous support from the medical team. Conclusion: This scoping review identifies that ICU diaries and post-ICU recovery programs are effective in reducing PTSD symptoms in ICU survivors. Further research is needed to explore the long-term effectiveness of these interventions and the development of best practices in post-ICU care.

Keywords: interventions; patients; post-ICU; PTSD

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INTRODUCTION

Post-Traumatic Stress Disorder (PTSD) is a mental health disorder that can develop after an individual experiences or witnesses a traumatic event involving a threat to life or physical integrity, such as a severe accident, violence, or natural disaster (Pearson et al., 2019). In patients who have been treated in the ICU, the relevance of PTSD becomes highly significant because the ICU environment often involves intensive care and invasive medical procedures that can cause physical and emotional trauma (Cox et al., 2019). Experiences in the ICU, such as mechanical ventilation, heavy sedation, and isolation from family, can trigger PTSD symptoms in vulnerable patients. Studies show that the prevalence of PTSD among post-ICU patients is quite high, with many patients reporting symptoms such as flashbacks, nightmares, and excessive anxiety (Cox et al., 2020). This condition not only impacts the mental well-

being of patients but also hinders their physical recovery process and prolongs rehabilitation (Rashidi et al., 2024b).

The prevalence of PTSD in patients who have been treated in the ICU shows significant numbers based on various epidemiological studies. These studies indicate that about 20-25% of ICU patients develop PTSD symptoms after being discharged from the intensive care unit (Abdelbaky & Eldelpshany, 2024). Previous research found that about 22% of ICU survivors experienced PTSD symptoms within six months after hospital discharge (Zante et al., 2021). Other study show that the prevalence of PTSD could reach 35% in patients who had acute respiratory distress syndrome (ARDS) (Jackson et al., 2020). These numbers highlight the importance of long-term psychological monitoring and early intervention for post-ICU patients. The impact of PTSD on post-ICU patients includes a range of significant consequences for their quality of life, mental, and physical health. Psychologically, patients experiencing PTSD tend to have a reduced quality of life due to disturbing symptoms such as flashbacks, disruptive nightmares, and prolonged anxiety (Garza & Jovanovic, 2017). These symptoms can interfere with their ability to function normally in daily life and socially interact (B. Y. Wang et al., 2022). Additionally, this condition negatively affects patients' mental health, with a high risk of depression, anxiety, and severe sleep disturbances (Rashidi et al., 2024a). Physically, PTSD can also affect patients' recovery processes, hindering the progress of rehabilitation and recovery of the underlying physical condition (Askari Hosseini et al., 2021).

Risk factors for PTSD in patients who have been treated in the ICU can be divided into internal and external factors contributing to the development of the condition. Internal factors include individual characteristics that may influence their range of risk, such as a history of previous mental disorders, the severity of the illness prompting ICU treatment, patient age, and gender (Unoki et al., 2021). Research has shown that patients with a history of prior mental disorders are at higher risk for developing PTSD after ICU treatment, while the severity of the illness requiring intensive care can be a significant predictor (Elhai et al., 2013). Additionally, external factors such as the often risky and stressful ICU environment, interactions with medical personnel that may present frightening or traumatic situations, and invasive medical procedures that trigger physical and emotional stress can all increase the risk of PTSD (Godoy-González et al., 2023).

Interventions and management of PTSD in post-ICU patients involve a holistic and integrated approach, encompassing psychological, pharmacological, and social aspects. Psychologically, cognitive-behavioral therapy (CBT), exposure therapy, and counseling are common methods used to manage PTSD symptoms (Crompton et al., 2022). Cognitive-behavioral therapy aims to help patients identify and change negative thought patterns associated with traumatic experiences, while exposure therapy involves controlled exposure to trauma-related stimuli to reduce excessive anxiety responses (Torres et al., 2020). Additionally, counseling can provide patients with space to express their experiences and develop adaptive coping strategies (Sosin & Rockinson-Szapkiw, 2016). Pharmacological approaches can also be used in managing PTSD symptoms, with the use of medications such as antidepressants, anxiolytics, or mood stabilizers to help reduce symptoms of anxiety, depression, and poor sleep (Sabri et al., 2021).

Previous systematic reviews have discussed the high impact experienced by post-ICU patients and its negative effects on quality of life aspects (Davydow et al., 2008). These studies recommended discussing interventions to reduce PTSD problems in post-ICU patients. Other studies also indicated that individuals with chronic illnesses treated in hospital ICUs could

experience PTSD (Jackson et al., 2016). This underscores the importance of further discussing interventions to reduce PTSD in post-ICU patients. Thus, this study addresses the limitations of previous research by discussing more comprehensively the interventions to reduce PTSD in post-ICU patients. Nurses have a role in addressing psychological issues that arise during the ICU treatment process. This can provide practical guidance for healthcare professionals in identifying, diagnosing, and managing PTSD, and help design more effective interventions. Additionally, information on interventions to reduce PTSD in post-ICU patients can also develop better prevention and intervention strategies to reduce the mental health burden for ICU patients and improve their recovery outcomes and quality of life. The aim of this study is to explore interventions in reducing PTSD symptoms in ICU survivors.

METHOD

This study used the Scoping Review approach developed by Arksey & O'Malley (Arksey & O'Malley, 2005). Scoping reviews were used because they can address various findings relevant to the research objectives. The stages included: (1) Identifying the research objectives, (2) Screening the literature using established inclusion and exclusion criteria, (3) Exploring the literature by applying relevant keywords, (4) Evaluating the relevance of the literature to the research objectives, and (5) Compiling, summarizing, and interpreting the data found. To search for literature, three main databases were used: Scopus, PubMed, and Medline. These databases were chosen because they provide access to various health journals covering a wide range of related disciplines. The keywords used were: interventions OR programs OR ICU diaries OR interventions OR post-ICU recovery program AND PTSD OR Post-traumatic stress disorder OR Acute Post-Traumatic Stress Disorder OR intensive care unit OR ICU AND patients OR individuals AND after-ICU OR post-treatment OR post-care. Boolean operators and keyword Mesh terms were used to enhance search accuracy. The research question established was: "How do interventions reduce PTSD in patients after ICU treatment?"

This study used the PCC framework in the article search, including the population of patients who had been treated in the ICU and had a diagnosis or symptoms of PTSD after ICU care. The main concept considered was interventions to reduce PTSD in the ICU. The context was PTSD experienced by post-ICU patients. The inclusion criteria for this study were original research with a quasi-experimental or RCT design, written in English, focused on ICU patients and the impact of PTSD, and published within the last 10 years (2014-2024). The exclusion criteria were full text not accessible, grey literature, patients without a history of ICU treatment, or without PTSD symptoms. The literature search was reported using the PRISMA Flow Diagram (Figure 1).

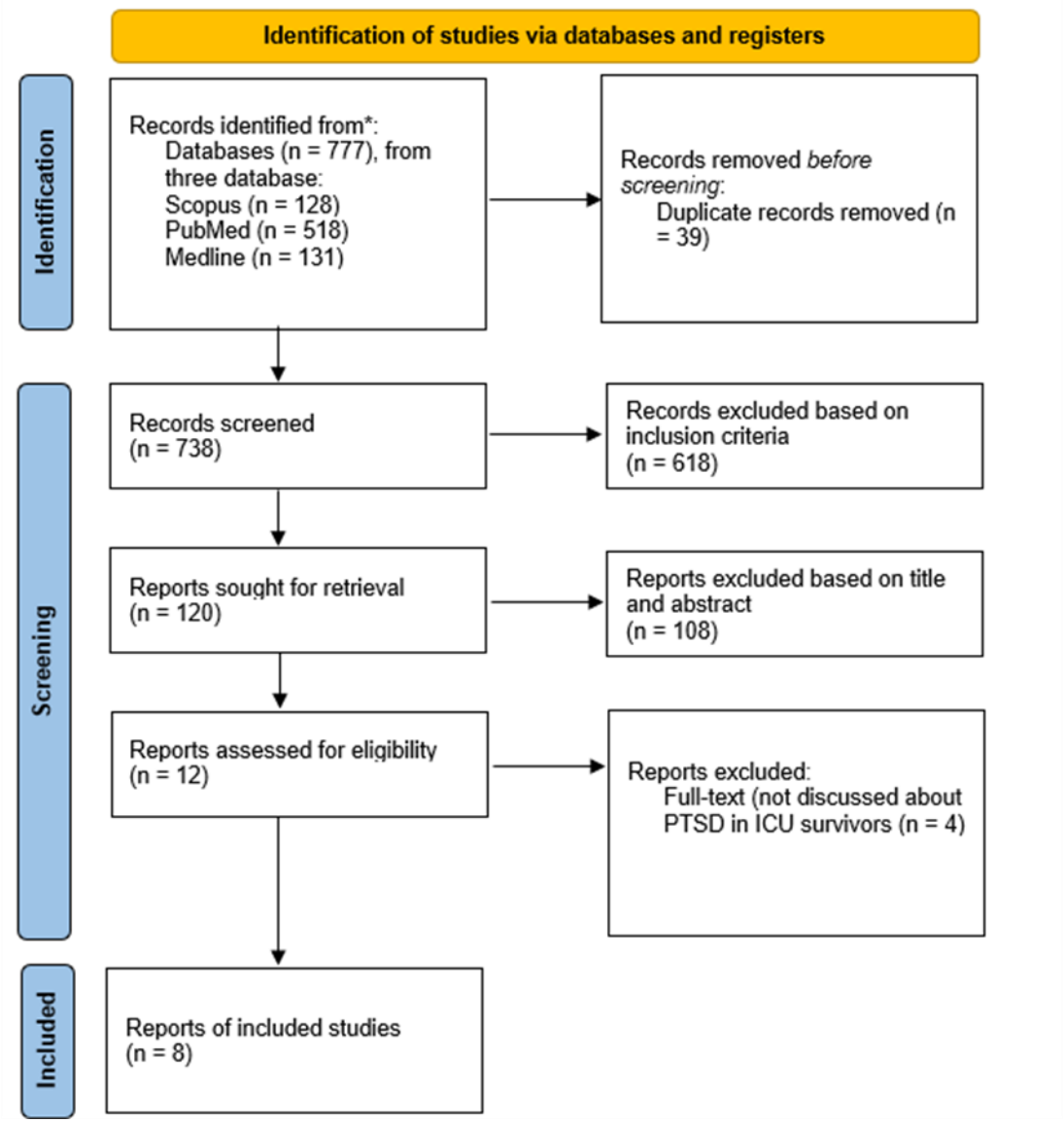

Figure 1.
PRISMA Flow Diagram

Data Extraction

Data were extracted using a manual table that included information about the authors, research objectives, study design, sample, country of origin of the study, interventions provided, and research outcomes. Data extraction was conducted independently by two researchers, and discrepancies were resolved through discussion and consensus. If disagreements could not be resolved, a third researcher was invited to perform the data extraction for the final decision.

Data Analysis

Data analysis carried out using a qualitative descriptive approach with thematic analysis. Main themes were explored based on relevant research findings concerning interventions to reduce PTSD in patients after ICU treatment. Emphasis was placed on the most consistent and significant findings from the selected literature. The results of this analysis were used to map interventions to reduce PTSD in post-ICU patients.

RESULTS

Based on the initial research from the three databases, the authors found 777 reports discussing PTSD in post-ICU patients. The authors then eliminated duplicate articles, resulting in 39 duplicates. Next, the authors performed an elimination based on the inclusion criteria, identifying 120 articles that met the inclusion criteria. After reading the titles and abstracts, the authors found 12 articles relevant to the research objectives. Upon reading the full texts, 8 articles were found to discuss PTSD in post-ICU patients and met the determined criteria. This study involved eight research articles from Denmark, the United States, Canada, France, Iran, and China, with a Randomized Controlled Trial (RCT) design. The sample sizes varied, with a total of 386 adult patients in Denmark, 265 patients in the United States, 152 patients in Canada, 339 patients in France, 56 patients in Iran, and 126 patients in China.

The authors identified several themes in the results of this scoping review:

Table 1.
Data Extraction

No	Author and Year	Objective	Country	Sample	Design	Results
1.	(Jensen et al., 2016)	Examining the effectiveness of a post-ICU recovery program versus standard care during the first year after ICU discharge.	Denmark	386 adult patients (≥18 years)	RCT	Intervention: The post-ICU recovery program involves three consultations by trained nurses, with the first session in the clinic 1-3 months post-ICU and the second and third sessions by telephone at 5 and 10 months post-ICU. Results: effective for reducing symptoms of anxiety, depression, and PTSD
2.	(Sayde et al., 2020b)	Evaluating the impact of ICU diaries on the psychological consequences of ICU care.	USA	265 patients	RCT	Intervention: The ICU diary is given to the patient or family a few days before leaving the ICU, with the diary filled in by the family and ICU staff and accompanied by photos of the patient. Results: significantly reduced PTSD symptoms in patients
3.	(Kredentser et al., 2018)	Assessing the feasibility of ICU diaries and psychoeducation to prevent PTSD, depression, and anxiety after ICU care.	Canada	152 patients	RCT pilots	Intervention: ICU diaries were created using blank journals filled in by family and ICU staff, with patient photos taken by research staff and diaries kept for 30 days post-ICU. Results: ICU diaries were effective in reducing psychological morbidity and PTSD
4.	(Garrouste-Orgeas, Flahault, Vinatier, Rigaud, Thieulot-Rolin, Mercier, et al., 2019b)	Evaluating the impact of ICU diaries on psychological outcomes after hospital discharge.	France	339 adult patients	RCT	Intervention: An ICU diary was introduced before discharge, with educational meetings for clinicians, monitoring by local coordinators, and content analysis by the coordinating center. Results: significantly reduced PTSD
5.	(Nielsen et al., 2020)	Identifying the effects of diaries written by relatives for critically ill patients.	Denmark	116 relatives and 75 patients	RCT	Intervention: A personalized ICU diary with written instructions and photos of the patient during the critical phase, which is then handed over to relatives. Results: effective in reducing post-traumatic stress symptoms, with no difference in

No	Author and Year	Objective	Country	Sample	Design	Results
						depression, anxiety, or quality of life
6.	(Rashidi et al., 2024a)	Assessing the effects of nurse-initiated diaries on PTSD and memory in ICU survivors.	Iran	56 patients	RCT	Intervention: ICU diary contains simplified medical terms, photos, and information about the ICU environment, staff, patient condition, medications, and daily events, with messages of encouragement for survivors. Results: significant in reducing PTSD
7.	(Torres et al., 2020)	Analyzing the impact of nurse-initiated diaries on PTSD severity in critical illness survivors.	USA	134 participants	RCT	Intervention: Diaries are written by patients, families, visitors, and interdisciplinary team members, following guidelines for entries with clear, eighth-grade-level language. Results: effective in reducing post-critical care PTSD symptoms
8.	(S. Wang et al., 2020)	To determine the effects of ICU diary on psychiatric disorders, sleep, and quality of life in ICU survivors in China.	China	126 patients	RCT	Intervention: The standard diary format includes ward events, treatment, and visitor details, while photographs capture the patient's perspective and the equipment used. Results: significant in reducing PTSD symptoms

ICU Diary

ICU diary involves writing a diary by the patient, family, or ICU staff, which records daily experiences and events while the patient is being treated in the ICU. This intervention aims to provide emotional support and help patients and families understand and process their experiences while in the ICU (Kredentser et al., 2018; Sayde et al., 2020b). Diaries are given to patients or families several days before discharge from the ICU, allowing them to begin recording their experiences (Garrouste-Orgeas, Flahault, Vinatier, Rigaud, Thieulot-Rolin, Mercier, et al., 2019b). This diary is filled in by the family and ICU staff, accompanied by patient photos taken during treatment in the ICU, providing a visual picture of the patient's recovery journey. The diary is personalized with written instructions embedded in the diary, as well as photos of the patient during the critical phase, providing a clearer and more detailed context of the care provided. Several studies show that the use of an ICU diary can reduce PTSD symptoms and improve patients' psychological recovery (Nielsen et al., 2020; Rashidi et al., 2024a).

Patients using the ICU diary reported a significant reduction in post-traumatic stress symptoms compared with the control group. The ICU diary was considered a feasible and effective intervention in the context of tertiary ICUs in Canada, indicating that it can be widely implemented in a variety of health care settings. The reduction in post-traumatic stress scores occurred not only in patients, but also in relatives involved in diary writing, confirming that ICU diaries have broad benefits in supporting psychological recovery for all parties involved (Torres et al., 2020; S. Wang et al., 2020). By integrating diary writing as part of the recovery process, patients and families can better understand and process their traumatic experiences, which in turn can speed recovery and improve quality of life after intensive treatment.

Post-ICU Recovery Program

This recovery program involves a series of consultations conducted by trained nurses to assist patients and their families in recovering after ICU care. The first consultation is carried out in the clinic with the patient and close relatives 1-3 months post-ICU, using patient photos taken during recovery in the ICU (Jensen et al., 2016). The second and third consultations were conducted by telephone at 5 and 10 months post-ICU, with patients preparing "reflection sheets" containing unfinished sentences to express issues important to them. This program aims to improve health-related quality of life (HRQOL), sense of coherence (SOC), and reduce symptoms of anxiety, depression and PTSD in the first 12 months after discharge from the ICU. The results of this program show that this consultative and reflective approach is effective in supporting patients' holistic recovery, helping them to overcome trauma and improving their and their families' psychological well-being.

DISCUSSION

The research results generally show that there are two types of interventions to reduce PTSD symptoms in post-ICU patients, namely recovery programs and ICU diaries. Patients who were mechanically ventilated or had delusional memories while in the ICU tended to have higher PTSD scores, indicating that traumatic experiences during intensive care are a major risk factor (Righy et al., 2019). In addition, poor quality of life upon discharge from the ICU was also significantly associated with symptoms of PTSD, anxiety, and depression (Wade et al., 2019). The high prevalence and symptoms of PTSD can result from the frightening and stressful environment of the ICU, coupled with invasive medical procedures such as mechanical ventilation that can leave a traumatic impression on patients (B. Y. Wang et al., 2022).

Delusional experiences caused by sedation or medical conditions also exacerbate this situation, making it difficult for patients to differentiate between reality and hallucinations (Wendlandt et al., 2019). Previous studies have shown that PTSD is a common problem in patients who have been admitted to the ICU, especially among those who were mechanically ventilated or had delusional memories during treatment (S. Wang et al., 2020). However, recent studies highlight the importance of additional factors such as post-ICU quality of life and social support, which may influence the development of PTSD and its symptoms (Garrouste-Orgeas, Flahault, Vinatier, Rigaud, Thieulot-Rolin, Mercier, et al., 2019a).

The Post-ICU Recovery Program involves a series of consultations conducted by trained nurses to assist patients and their families in recovery after ICU care. The study shows that this program is effective in reducing symptoms of PTSD, anxiety, and depression, similar to previous research findings that emphasize the importance of psychological and emotional support for post-ICU patients (Vlake et al., 2022). Regular consultations conducted by trained nurses, the program provides a platform for patients and their families to express their experiences, build illness narratives, and formulate personalized recovery strategies. In addition, a personalized approach through the use of photos and reflection sheets not only facilitates the psychological healing process, but also strengthens social support which is important in the post-ICU recovery journey (Capin et al., 2022). The results of this study are in line with previous findings showing the importance of psychological and emotional support in helping post-ICU patients overcome symptoms of PTSD, anxiety, and depression (Jensen et al., 2016).

The success of this program was supported by several factors, including the active involvement of trained nurses who provided ongoing support and personalization of the

intervention through the use of photographs and reflection sheets (Schofield et al., 2021). Family support is also an important element in the success of this intervention. However, there are several obstacles that may occur in implementing this program, such as limited trained human resources, difficulties in arranging telephone consultation schedules, and resistance from patients or families to participation in the program (Soum et al., 2022). Additionally, the existence of individual differences in response to interventions can also be a challenge, requiring tailoring of approaches to meet individual patient needs (Bastian et al., 2018).

ICU diaries are an innovative intervention in the context of post-ICU care, where patients, families, and ICU staff can contribute to recording the daily experiences of patients during their intensive care stay. This intervention involves using a blank journal filled with daily notes, patient photos, and written instructions provided during the ICU stay (Nielsen et al., 2020). Previous study has shown that the use of ICU diaries can significantly reduce symptoms of PTSD, anxiety, and depression in patients after they are discharged from the hospital (S. Wang et al., 2020). Other study have demonstrated the effectiveness of ICU diaries in facilitating patients' emotional processing of their traumatic ICU experiences and enhancing family understanding and support for the patient's condition (Haakma et al., 2022). ICU diaries are crucial in the post-ICU care context because they provide a means for patients and families to personally document their experiences during the intensive care period. This intervention not only facilitates the emotional processing of traumatic experiences for patients but also helps in building a profound narrative of illness, which can improve patients' understanding and adaptation to their health condition post-discharge (Tripathy et al., 2020). By involving family and care staff in the diary entries, this intervention also promotes the critical social support necessary for the patient's psychological recovery (Schofield et al., 2021). ICU diaries serve as more than just medical documentation; they are therapeutic tools that support holistic post-ICU patient care by offering space for reflection, emotional expression, and visual reminders that evoke positive memories and aid the healing process (Rajan et al., 2017).

The success factors of ICU diaries include the active involvement of family and ICU staff in journal entries and the use of photos as visual stimuli to help patients recall their ICU experiences (Rajan et al., 2017). Personalizing the journal with clear instructions also enhances its effectiveness (Garrouste-Orgeas, Flahault, Vinatier, Rigaud, Thieulot-Rolin, & Mercier, 2019). However, as noted in previous literature, some barriers may hinder the implementation of ICU diaries, such as the limited time staff have to participate in journal writing and the difficulties patients or families face in consistently maintaining the diary (Sayde et al., 2020a).Post-ICU PTSD significantly impacts patients' quality of life. Patients with PTSD symptoms report a poorer quality of life compared to those without PTSD, with significant declines in both physical and mental aspects. PTSD symptoms like intrusion, avoidance, and hyperarousal can disrupt daily functioning, including the ability to return to work, socialize, and enjoy previously enjoyed activities (B. Y. Wang et al., 2022).

Previous study shows that patients with PTSD often experience sleep problems, anxiety, and depression, all of which contribute to a decreased quality of life. Previous studies have found that post-ICU PTSD is associated with a reduced quality of life; however, recent studies emphasize that managing PTSD through interventions like iCBT and ICU diaries can help improve patients' quality of life (Tang et al., 2021). Other study indicates that effective interventions in managing PTSD symptoms not only reduce symptom severity but also enhance physical and mental well-being, highlighting the importance of a holistic approach to

post-ICU patient recovery (Rashidi et al., 2024a). The limitations of this study include the use of only three databases, which means that this scoping review could not explore various reports from other databases. Additionally, the publication year was limited to the last 10 years, preventing the study from discussing findings published outside this period. Furthermore, this study focused on interventions to reduce PTSD in post-ICU patients but did not address the factors that cause PTSD symptoms in these patients.

CONCLUSION

Based on the results of the scoping review, a total of 8 articles were found that examined various interventions to reduce PTSD symptoms in post-ICU patients. These articles covered two main types of interventions: ICU diaries and post-ICU recovery programs. ICU diaries, involving writing by patients, families, and ICU staff, were found to be effective in reducing PTSD symptoms and improving psychological recovery. Post-ICU recovery programs, which included a series of consultations with trained nurses, were able to enhance health-related quality of life and reduce symptoms of anxiety, depression, and PTSD. These findings are consistent with previous research showing the benefits of social support and educational-based interventions. The nursing implications of these findings indicate that nurses play a key role in supporting the psychological recovery of post-ICU patients. Implementing recovery programs, ICU diaries, and internet-based cognitive behavioral therapy (iCBT) can be integral parts of holistic patient care. Training nurses to provide consultations and actively engage in interventions such as diary writing is crucial for the success of these programs. Future research should explore the long-term effectiveness of the various interventions found to reduce PTSD in post-ICU patients. Additionally, further research is needed on family support for PTSD in post-ICU patients.

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