

## PERSISTENT PAIN IN INTENSIVE CARE SURVIVORS: A SYSTEMATIC REVIEW

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### Abstract

**Background:** Practical evaluation and management of pain are essential due to their potential impact on daily functioning. Pain can be classified into nociceptive, neuropathic, mixed, or idiopathic origins. Critically ill patients are at risk of experiencing long-term complications.

**Aim:** The goal of this study is to find about persistent pain in intensive care survivors.

**Methods:** The study uses the PRISMA 2020 recommendations, 2013–2023, and online reference sources for accuracy and relevance.

**Result:** A total of 659 articles were obtained from PubMed and 276 from SagePub. In 2013, 22 papers were retrieved from PubMed and SagePub. Six articles fulfilled the research criteria.

**Conclusion:** This study agrees with previous research on the prevalence of pain afterward becoming in the ICU.

**Keyword:** Intensive care unit; Pain; Survivors

**INTRODUCTION**

According to IASP, pain is a combination of unpleasant sensory and emotional experiences that result from tissue damage. Practical pain assessment and treatment are crucial as pain can significantly impact daily functioning. Pain can be classified as nociceptive, neuropathic, mixed, or of unknown etiology.<sup>1</sup> The first and most noticeable symptom of a disease is pain. An unpleasant sensory experience identified as pain might cause tissue damage.<sup>2</sup>

Assessing acute, mixed, and chronic pain for therapy and overall patient satisfaction is necessary for optimizing pain management.<sup>3,4</sup> A bio-psycho-social strategy is necessary for pain management, integrating neuropathic and non-neuropathic agents and considering pathophysiology and drug interaction.<sup>5</sup>

Persistent pain refers to pain that lasts more than three months and exceeds the typical healing period, resulting in losing its protective function. Pain is a prevalent domain in the context of health-related quality of life (HR-QoL); however, many studies exhibit an absence of outcome data about pain. Post-discharge, there is a minimal enhancement in pain and other health domains across all subgroups.<sup>6-8</sup>

Critically ill patients may experience prolonged effects of acute pain, which can be attributed to various factors such as pre-existing chronic pain, the severity of illness, psychological vulnerability, and the type of surgery or trauma. The prevalence of persistent pain following major surgery varies between 20% and 50%, while chronic illnesses can result in ongoing discomfort.<sup>9,10</sup>

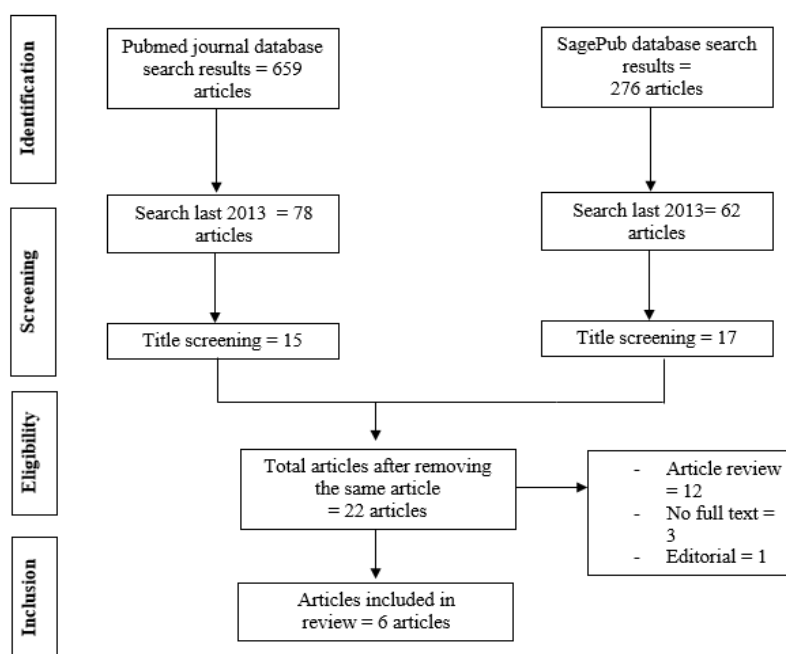
**This study aims to demonstrate the frequency of intensive care unit admissions for end-stage renal disease patients.**

**METHODS**

The study followed the PRISMA 2020 guidelines to provide current insights on ICU admissions of patients with renal failure. A critical aspect of achieving the article's objective is conducting a literature review and highlighting the discussed topics' significance.

Documentation is required from researchers to demonstrate their eligibility for publication. This includes manuscripts in English that focus on persistent pain in critically ill patients, except works published after 2013. This encompasses editorials, unpublished applications, review articles, and submissions that resemble published journal papers.

Conduct a literature search on persistent pain in intensive care survivors utilizing the PubMed and SagePub databases: (*"persist"[All Fields] OR "persistence"[All Fields] OR "persistant"[All Fields] OR "persisted"[All Fields] OR "persistence"[All Fields] OR "persistences"[All Fields] OR "persistencies"[All Fields] OR "persistency"[All Fields] OR "persistent"[All Fields] OR "persistently"[All Fields] OR "persistents"[All Fields] OR "persister"[All Fields] OR "persisters"[All Fields] OR "persisting"[All Fields] OR "persists"[All Fields]*) AND (*"pain"[MeSH Terms] OR "pain"[All Fields]*) AND (*"critical care"[MeSH Terms] OR ("critical"[All Fields] AND "care"[All Fields]) OR "critical care"[All Fields] OR ("intensive"[All Fields] AND "care"[All Fields]) OR "intensive care"[All Fields]*) AND (*"survivor s"[All Fields] OR "survivors"[MeSH Terms] OR "survivors"[All Fields] OR "survivor"[All Fields]*) used in searching the literature.



**Figure 1. Article search flowchart**

The validity of the study was evaluated by investigating the abstract and title, reviewing historical records, and conducting investigations with comparable methodologies. The systematic review developed studies that met specified requirements. Nevertheless, a reduced number of outcomes were identified. The research paper presented a comprehensive list of subjects, authors, dates, places, topics, and parameters, eliminating duplications. Two reviewers analyzed the titles and abstracts of the papers.

The comprehensive analysis of articles to assess the feasibility of research and data collection related to GWAS and other medical issues. Judges utilized abstracts and titles to make recommendations and applied specific criteria to choose qualifying papers. After completing primary education, specific subjects were examined, and scholarly articles and research papers were subsequently selected.

**RESULT**

659 and 276 articles have been extracted from PubMed and SagePub, respectively. In 2013, we collected 22 papers from two databases, PubMed and SagePub, whereby six met the research criteria.

Battle, et al (2013)<sup>11</sup> reported that 44% of 196 patients experienced chronic pain, with the shoulder joint being the most commonly affected area (22%). Advanced age and severe sepsis were identified as risk factors for prolonged pain. Baumbach, et al (2017)<sup>12</sup> observed that patients with minor fiber deficiencies exhibited elevated thermal detection thresholds and abnormal values, signifying reduced small fiber function. The patients reported higher pain intensity, disability, and reduced physical quality of life.

**Table 1. The literature include in this study**

Author	Origin	Method	Sample	Result
Battle, 2013 <sup>11</sup>	United Kingdom (UK)	Retrospective cohort study	196 patients	Those who have survived a critical illness are at an increased risk for developing chronic pain, particularly in the shoulder joint; hence, additional research is required to investigate therapeutic approaches that can alleviate this ongoing issue.
Baumbach, 2017 <sup>12</sup>	United State of America (USA)	Cross sectional study	Critical illness survivors (n = 84) and controls (n = 44)	A significant number of formerly critically ill individuals exhibit small fiber deficiencies, which are believed to be linked to elevated levels of discomfort as well as a diminished quality of life as it relates to one's physical health. A screening of patients' somatosensory functions in the (post-) acute context has the potential to help identify those patients who are at risk of developing long-term deficits.
Baumbach, 2016 <sup>13</sup>	USA	Cross sectional study	Septic and nonseptic survivors of critical care (n = 207) and healthy controls (n = 46)	A significant number of people who have previously been treated in an intensive care unit go on to acquire diseases related with chronic pain. In terms of the intensity of the pain, these patients are significantly different from the control group, and they exhibit high degrees of interference with the pain. The presence of sepsis in and of itself appears to play only a minor influence in the development of chronic discomfort associated to the intensive care unit.
Jeitziner, 2015 <sup>14</sup>	Switzerland	Prospective cohort study	145 older patients (ICU group) and 146 comparison group participants	Patients who were critically ill and were older did not report a rise in pain, anxiety, or agitation 12 months after their stay in the intensive care unit.
Hayhurst, 2018 <sup>15</sup>	USA	Prospective cohort study	295 patients	Pain that doesn't go away is common after a serious illness, and it often makes it hard to go about daily life. There was no link between more opioid use in the ICU and worse pain complaints. More research is needed to find modifiable risk factors for persistent pain in critically sick people and to find out how opioids affect

					people with and without chronic pain in the ICU.
Bourdiol, 2023 <sup>16</sup>	France	Prospective cohort study	Eight hundred fourteen patients		Survivors of critical illnesses were more likely to experience persistent pain symptoms, although they were less likely to receive specialized management. In order to lessen the negative effects of pain, novel strategies will need to be devised in the intensive care unit.

Baumbach, et al (2016)<sup>13</sup> examined patients' pain intensity and interference ratings six months post-ICU discharge. No significant differences were observed between patients with sepsis and those without sepsis. One-third of patients reported chronic pain, of which 16% was related to their stay in the ICU. Most patients reported significant pain levels that hindered their daily activities.

Jeitziner, et al (2015)<sup>14</sup> conducted a comparative study of 291 patients, which consisted of 145 older patients in the ICU and 146 in the control groups. The post-ICU group presented higher pain levels one week after discharge, although the overall pain levels were minimal. Anxiety levels were significantly higher in the ICU group one week post-discharge compared to the non-ICU group, despite both groups reporting low anxiety levels. Both groups exhibited similar levels of anxiety.

Hayhurst, et al (2018)<sup>15</sup> reported a median pain intensity score of 3, with 77% and 74% of patients experiencing persistent pain at 3 and 12 months, respectively. Daily life pain interference was experienced by 59% and 62% of the participants at 3 and 12 months, respectively. There was no significant impact on pain severity or daily life pain interference at the given time points due to opioid exposure in the ICU.

Bourdiol, et al (2023)<sup>16</sup> reported that 47.7% of patients suffered from significant pain at 3 months, and 8.7% experienced neuropathic pain symptoms. Persistent pain risk factors were female gender, prior antidepressant consumption, prone positioning, and pain symptoms upon discharge from the ICU. Trauma patients indicated a greater prevalence of prolonged pain compared to sepsis patients.

**DISCUSSION**

According to IASP, pain combines sensory and emotional discomfort associated with tissue damage.<sup>17</sup> Precise identification and management of chronic pain are essential due to its impact on daily functioning and classification into nociceptive, neuropathic, mixed, or idiopathic types.<sup>18</sup>

Pain can be classified into various categories, namely nociceptive, neuropathic, mixed, and of indeterminate origin. Mixed pain is a simultaneous occurrence of nociceptive and neuropathic pain originating from both somatic and visceral sources.<sup>4,19</sup> Neuropathic pain is frequently underdiagnosed and undertreated, contributing to the chronic pain experienced by 7.8 million individuals in the UK.<sup>20</sup>

Chronic pain is a severe concern for critical illness survivors. Pain arises from neurophysiological events in the central and peripheral nervous systems, wherein peripheral nociceptors transduce noxious inputs and afferents activate channels.<sup>21</sup>

Studies indicate a significant percentage of patients (49-77%) of pain three months following their ICU discharge, with up to 38% reporting persistent pain after one year. Prolonged pain levels endure during and post-ICU, indicating that several surviving patients will encounter pain after their hospitalization.<sup>11,22</sup>

The study indicates that prolonged mechanical ventilation exceeding 12 days and elevated SAPS II with SOFA scores during severe critical illness may serve as predictors for the probability of chronic pain occurrence one year after discharge from the ICU. This finding conflicts with the independent risk factors for chronic pain during hospitalization that Battle et al. (2013) identified.<sup>11</sup>

The review identified risk factors for persistent pain in patients, admissions, and ICUs. The studies presented variations in sites, patient types, definitions, and response rates. One individual investigated the relationship between opioids administered during ICU stays and chronic pain severity.<sup>15</sup>

Pain severity significantly impacts the clinical presentation of persistent pain in patients. Moderate discomfort can lead to functional and mental impairments and increased healthcare costs and demands on social support systems.<sup>23</sup>

**CONCLUSION**

The current study lends credence to data from earlier investigations concerning the frequency of discomfort following a stay in the intensive care unit.

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