Review

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Emergence Delirium Among Older Adults in the Post-Anesthesia Care Unit: A Rapid Review

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Abstract

Introduction: Emergence delirium (ED) has been commonly recognized as a critical event within the postoperative period. Yet, evidence on its prevalence and clinical implications among older adults remains limited in the current body of knowledge. Objective: The aim of this rapid review was to elucidate and synthesize existing literature related to the key characteristics of ED and its clinical implications among older adult patients in post-anesthesia care units. Methods: The Oxford's rapid review framework, Aveyard's thematic analysis approach, and PRISMA checklist were followed. A systematic literature search was conducted in March 2025 across four electronic databases, including Embase, MEDLINE, CINAHL, and PubMed. Covidence software was used to assess identified primary research. The American Association of Critical-Care Nurses' Levels of Evidence was employed to appraise and evaluate the clinical relevance of the included articles. Two authors independently screened the full text records and finalized the data extraction process. Results: Of 224 records initially screened, 69 full-text articles were assessed for eligibility, and five met the inclusion criteria. All included studies were mainly from China (n = 4) and Ethiopia (n = 1) and classified as Level C evidence. Characteristics of ED in older adults, including its risk factors, signs and symptoms, assessment tools, management strategies, and impact on patient outcomes were narratively reported in this review. Conclusion: Emergence delirium has been found to be an independent condition that potentially influences outcomes among older adult patients. The overlapping clinical picture of ED with emergence agitation and postoperative delirium warrants areas for future scientific investigation to establish accurate diagnostic tools and management for ED to improve overall patient care delivery and outcomes.

Keywords:
Older Adults, Frailty, Postoperative Delirium, Perioperative Nursing, Postoperative Complications, Perioperative Care

INTRODUCTION

The term emergence refers to the transition phase experiences of a patient after receiving general anesthesia (Cascella et al., 2018). During this critical process of regaining consciousness, some individuals, especially children and elderly patients, may experience a condition known as emergence delirium (Mason, 2017; Silva et al., 2021). Initially identified in the 1960s as “postoperative excitement”, emergence delirium (ED) has undergone significant conceptual evolution, transitioning from being characterized as a pseudo-psychosocial condition to a recognized neurocognitive condition during anesthetic recovery (Eckenhoff et al., 1961; Viswanath et al., 2015). Historically, nomenclature was unstandardized until 2018, often conflating ED with emergence agitation (EA); however, contemporary research differentiates ED as a common phenomenon characterized by an acute onset of temporary confusion, disorientation, and altered awareness immediately following the cessation of anesthesia or emergence, occurring within 30 to 60 minutes, which is distinct from the predominantly motoric nature of EA and the delayed onset of postoperative delirium (PoD) (He et al., 2024; Munk et al., 2016; Silva et al., 2021; Viswanath et al., 2015). It is a phenomenon that is commonly observed in the post-anesthesia care unit (PACU), where patients are closely monitored for recovery from an invasive procedure requiring anesthesia use (Mason, 2017; Munk et al., 2016).

Current evidence related to ED has been recognized in clinical practice, as its prevalence can negatively impact patient outcomes. These include increased risk of postoperative complications, longer hospital stays, delayed surgical recovery, and long-term cognitive decline (Cascella et al., 2018; Munk et al., 2016; Wang et al., 2023a). Across the lifespan, the prevalence of ED varies widely, with pediatric populations showing a global prevalence rate of 19.2% with an incidence rate of approximately 32%, posing risks of self-injury and late postoperative maladaptive behavioral disturbances (Aoyama et al., 2025; Chen et al., 2024; Mason, 2017). Although the general adult population experiences ED incidences of roughly 5% to 10%, the clinical impact is most severe among the elderly, where vulnerability can reach up to 70% depending on the surgical procedures they underwent (Assefa et al., 2022; Munk et al., 2016; Viswanath et al., 2015).

Perioperative nurses working in the postoperative phase are often the primary healthcare professionals to recognize and manage ED (Ban et al., 2024; Hudek, 2009). While adult and pediatric populations have been extensively studied, empirical research related to ED in older adults remains underrepresented and poorly understood in the literature (Aoyama et al., 2025; He et al., 2024; Wang et al., 2023a). There is limited research synthesizing existing knowledge on this phenomenon in older adult patients, especially regarding best practices for early identification and evidence-based management strategies (Faeder et al., 2023; Lee & Sung, 2020; Wang et al., 2023a). Despite the physiological aging, comorbidities, and polypharmacy as possible significant risk factors of neurocognitive disturbances like ED among older adults, the evidence specific to this population remains fragmented. Distinguishing ED from EA and PoD remains a persistent challenge due to overlapping clinical features and inconsistent terminology across studies.

The lack of studies related to ED among older adult patients in the PACU during the postoperative period warrants further investigation to explore its prevalence and impact on clinical practice, especially in perioperative nursing (Aoyama et al., 2025; He et al., 2024; Wang et al., 2023a). This notable empirical gap warrants an opportunity for a rapid literature review to examine the extent of evidence surrounding ED in older adults, providing an overview of its key characteristics, associated risk factors, management strategies, and impact on patient outcomes. Our goal for this rapid review of the literature was to explore primary research and map existing evidence related to ED among older adults during the postoperative period in the PACU.

METHODS

1. Design

To facilitate this rapid review, multiple approaches were followed. The Oxford University Center for Evidence-based Medicine rapid review framework (Plüddemann et al., 2018) guided the methodological rigor of the study process. Concurrently, Aveyard’s thematic analytic framework (2023) was adopted to support the structured narrative synthesis. The American Association of Critical-Care Nurses Level of Evidence (AACN-LOE) framework was utilized to appraise the evidence of the sourced literature (Peterson et al., 2014). The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines served as a framework for reporting the systematic search (Page et al., 2021). Collectively, these frameworks provided a coherent structure for mapping existing evidence, identifying conceptual patterns, and situating ED within the broader perioperative and geriatric nursing context.

This literature review was guided by the flexible framework for conducting a ‘restricted systematic review’ or rapid review as proposed by the Oxford University Center for Evidence-Based Medicine (Plüddemann et al., 2018). Such a framework outlined the minimum requirements and core steps for completing a rapid review that includes the following: (a) formulating the research questions; (b) searching for research evidence; (c) selecting relevant studies; (d) data extraction; (e) critically appraising the included studies and synthesizing the evidence or data. Plüddemann et al. (2018) suggested additional elements within the framework’s core steps to reduce

the risk of bias in the review. These elements may include consideration of unpublished articles without date or language restrictions, grey literature, and data extraction verification of a second author or reviewer, and use of appraisal tools.

2. Research Questions

The Oxford University Center for Evidence-Based Medicine suggested that when formulating research questions for a rapid review, one must have a clear rationale for why the research is needed (Plüddemann et al., 2018). In this rapid literature review, the following primary research question is based on the Population-Concept-Context (PCC) question format as reported by Silva et al. (2022): "Among older adult populations (Population), what is the existing evidence of emergence delirium (Concept) in the post-anesthesia care units (Context)?" This broad question was reviewed by identifying key themes and gaps in the current literature. The following sub-questions were: (1) what are the clinical manifestations of ED?; (2) what are the risk factors associated with ED?; (3) what are the existing diagnostic or assessment tools used to evaluate ED?; (4) what are the management strategies for ED?; and (5) what are the implications of ED in patient outcomes and clinical nursing practice in PACUs? To address the formulated research questions, the authors followed Aveyard's thematic analytic approach (2023), which facilitated the narrative data synthesis of the source literature.

3. Search Strategy

A comprehensive literature search was conducted in March 2025 across four electronic databases: Embase (Ovid), MEDLINE, CINAHL (EBSCOhost), and PubMed. As recommended by the Oxford University Center for Evidence-Based Medicine, the search strategy incorporated at least one central scientific database and included unpublished literature with no date restrictions to reduce publication bias (Plüddemann et al., 2018**)**. The Boolean operators such as 'AND' or 'OR' were used in combination with keywords such as 'emergence delirium', 'perioperative period', 'postoperative period', 'perioperative nursing', 'post-anesthesia care unit', 'aged', 'frail elderly', 'older adults', 'older people', 'geriatrics', and 'seniors'. We followed PRISMA guidelines to present the overview of the search strategy and selection of records in this review, as illustrated in Figure 1 (Page et al., 2021).

4. Eligibility Criteria

The inclusion criteria consisted of studies published and written in the English language, with a focus on ED among older adults aged 60 years and above in the post-anesthesia care units. Our search was not limited by any time frame or restrictions. We excluded records that involved adults younger than 59 or pediatric populations. Study protocols, editorials, letters, poster presentations, conference abstracts, or unavailable and unretrievable full-text articles were also excluded from this review.

5. Study Selection

The sourced records were imported into *Covidence digital software* to efficiently facilitate structured review of the literature (Gibbs et al., 2022; Veritas Health Innovation, 2023). After the removal of duplicated records, study selection was initially based on the screening of the identified records' titles and abstracts. During the screening process, records that included other conditions such as emergence agitation and postoperative delirium were included to enrich this review, given that such studies' primary focus was on the ED.

6. Data Extraction

For this rapid review, two authors independently and blindly screened the included full-text records. As proposed in rapid reviews, one researcher or the first author extracted data using a predefined form to consistently capture and structurally present the specific information from each included study. Extracted data from each record comprised: (a) title of the included study; (b) author and year of publication; (c) type of the study and (d) its objective/s; (e) total sample size and participants' age; (f) main findings; and (g) level of evidence. Any discrepancies or disagreements between the selection of records for the data extraction process were resolved through discussion between the first and second author.

7. Quality Appraisal and Data Synthesis

Both authors employed the AACN-LOE model. The appraisal tool guided the authors to ensure that the evidence of the included records was methodologically rigorous and appropriate for inclusion into clinical practice. Studies categorized under Levels A, B, and C are considered evidence, while Levels D, E, and M are considered recommendations drawn from articles, theories, or manufacturers' recommendations (Peterson et al., 2014). A formal risk of bias assessment appraisal tool was not undertaken in this study due to the rapid review design. However, the authors acknowledged potential sources of bias inherent in the included studies, such as selection and information biases, as well as possible confounders related to patients' sociodemographic characteristics and other perioperative factors. These limitations were instead considered narratively during the evidence synthesis and interpretation to contextualize the strength and applicability of results.

RESULTS

Among the 224 records initially screened, 69 articles were eligible for full-text assessment. A total of five records were included in the final analysis in this review (see Figure 1). These studies were conducted in China (four records) and Ethiopia (one record) and published between 2020 and 2024. An overview of the study's characteristics and quality

assessment of the evidence included in this review were presented in Table 1. Drawing from Aveyard's approach (2023), the evidence synthesized from the included records was narrated through the following thematic sections, as showcased in Table 2: 1) emergence delirium among older adults; 2) ED risk factors and diagnostic tests; 3) management and preventive strategies; as well as 4) impact on patient outcomes.

1. Emergence Delirium Among Older Adults

In all five studies, older adults aged 60 and above experienced delirium symptoms during the postoperative period in the recovery room or PACU (Cai et al., 2024; Huang et al., 2020; Tesfaye Mekonin et al., 2022; Wang et al., 2023b; Zhang et al., 2020). Clinical manifestations of ED included cognitive symptoms (e.g., confusion, disorientation, altered consciousness) and behavioral symptoms (e.g., restlessness, sleep disturbance). These acute complex manifestations typically occur during or immediately after emergence from general anesthesia and usually resolve within minutes or hours during PACU stay, but also tend to fluctuate throughout the day.

2. ED Risk Factors and Diagnostic Tests

Associated factors increasing the risk of ED among older adults include extreme age, lifestyle (chronic smoking and alcohol abuse), certain use of medications (benzodiazepines and anticholinergics), preoperative mild cognitive impairment, postoperative pain, and the type and duration of surgery, together with the type of anesthesia used (cardiac surgery and general anesthetics). One of the included studies highlighted intraoperative physiologic thermoregulation as a significant factor that increases the risk of ED in older patients (Wang et al., 2023b). Similarly, water deprivation, hemoglobin level, hematocrit level, and albumin level were found to be significant risk factors of ED (Huang et al., 2020; Tesfaye Mekonin et al., 2022; Zhang et al., 2020). As for diagnostic tests, most of the studies used either CAM-ICU or RASS to detect ED in PACU. Notably, one of the included studies opted to facilitate NU-DESC with CAM for ED assessment (Huang et al., 2020). However, some of these tests were also employed to evaluate for EA, PoD, and postoperative sedation in other studies. Notably, one of the studies highlighted the use of biomarkers to ascertain the prevalence of ED in older adult patients. These biomarkers include high plasma levels of interleukin-6 (IL-6), beta-secretase (BACE1), a neurodegeneration-associated marker, and neurofilament light chain, which is typically related to axonal injury (Cai et al., 2024).

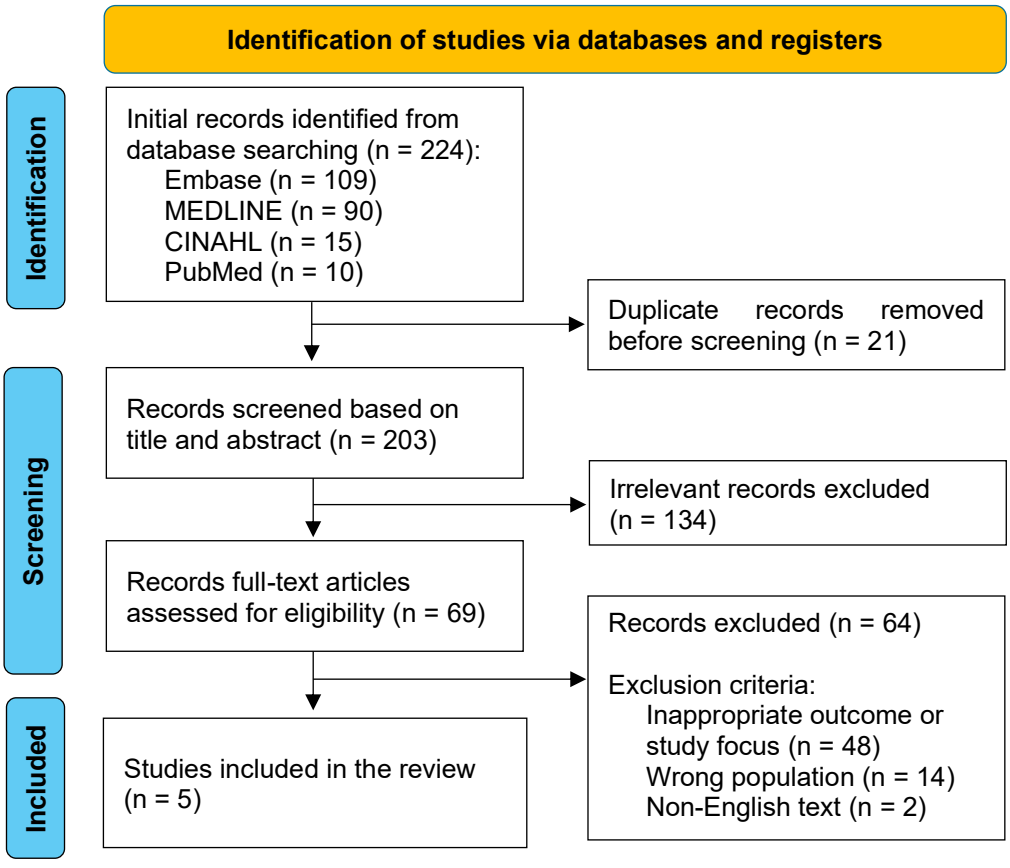

Figure 1. Flow Chart of The Search Strategy and Selection of Records

Table 1. Summary of the Sourced Literature and Characteristics

Article No.	Author and Year	Type of Study	Objective	Total Sample Size and participants' age	Main Findings	Level of Evidence
1.	Cai et al., 2024	Longitudinal prospective observational study	To examine the association between ED and worse long-term survival	Enrolled 942 patients; completed long-term follow-up for 906 patients; age 65-90 years, with mean age of 72 years	Of the 915 enrolled patients, 906 completed the long-term follow-up (mean age 72 years; 60% male; 73% underwent cancer surgery). While there were 69 deaths in 331 patients (21%) with ED compared to 114 deaths in 575 patients (20%), recurrence-free survival was 22% in patients with ED versus 21% in patients without ED. Similarly, event-free survival was 48% in patients with ED versus 47% in patients without ED. The results did not demonstrate a significant association between ED and poorer long-term survival in older patients after general anesthesia and major surgery primarily for cancer.	Level C
2.	Huang et al., 2020	Descriptive correlational study	To investigate the incidence of ED in the first hour after ET extubation under general anesthesia and determine if ED is an independent predictor of delirium occurrence at five subsequent postoperative days.	Recruited 168 patients; aged 65 years and older with mean age 72.43 ± 5.25 years	Among the 168 patients aged 58 suffered from ED (34.5%), including 79.3% for the 46 patients who experienced PoD. A significant positive correlation was observed between ED and PoD. Logistic regression analysis, which incorporated seven variables—age, preoperative Mini-Mental State Examination score, underlying diseases, American Society of Anesthesiologists (ASA) grade, surgery duration, postoperative complications, and the presence of ED—revealed that age and ED emerged as independent predictive factors of PoD.	Level C
3.	Tesfaye Mekonin et al., 2022	Multicenter prospective observational study	To determine the prevalence of ED and associated factors among older patients who underwent elective surgery in teaching hospitals of Ethiopia at the post anesthesia care unit in 2021.	Total of 384 older adults aged 60 years and over	Among the 384 older patients included in the study, the prevalence of ED was 27.6%. Preoperative low hemoglobin levels (adjusted odds ratio [AOR]: 2.0, 95% confidence interval [CI]: 1.77–3.46), opioid use (AOR: 8.0, 95% CI: 3.22–27.8), and anticholinergic premedication (AOR: 8.5, 95% CI: 6.85–17.35) were independently associated with ED. Postoperative pain (AOR: 3.10, 95% CI: 2.07–9.84) was also independently associated with ED.	Level C
4.	Wang et al., 2023b	Secondary data analysis of a prospective	To investigate the association between intraoperative body temperature (hypo/hyperthermia)	Total of 874 patients aged between 65-90 with mean age 71.8 ± 5.3 years	A total of 874 patients were analyzed with a mean age of 71.8 ± 5.3 years. The incidence of ED was 38.4% (336/874). When taking 36.0°C, 35.5°C, and 35.0°C as thresholds, the incidences of absolute hypothermia were 76.7% (670/874), 38.4% (336/874), and 17.5% (153/874),	Level C

Article No.	Author and Year	Type of Study	Objective	Total Sample Size and participants' age	Main Findings	Level of Evidence
		observational study	and ED in elderly patients undergoing non-cardiac surgery.		respectively. In multivariable logistic regression analysis, absolute hypothermia (lowest value<35.5°C) and its cumulative duration were respectively associated with an increased risk of ED after adjusting for confounders including age, education, preoperative mild cognitive impairment, ASA grade, duration of surgery, site of surgery, and pain intensity. Relative hypothermia (decrement >1.0°C from baseline) and its cumulative duration were also associated with an increased risk of ED, respectively. When taking the relative increment >0.5°C as a threshold, the incidence of relative hyperthermia was 21.7% (190/874) and it was associated with a decreased risk of ED after adjusting above confounders.	
5.	Zhang et al., 2020	Prospective observational study	To investigate the association between ED and PoD in elderly patients after general anesthesia and major surgery	Of 942 enrolled patients, 915 completed the study with aged between 65-90 years	A total of 942 patients were enrolled and 915 completed the study. ED developed in 37.0% (339/915) of patients during PACU stay; and postoperative delirium developed in 11.4% (104/915) of patients within the first 5 post-operative days. After adjusted confounding factors, the occurrence of ED is independently associated with an increased risk of PoD (OR 1.717, 95% CI 1.078–2.735, *p* = 0.023). Patients with ED stayed longer in PACU and hospital after surgery and developed more non-delirium complications within 30 days.	Level C

Table 2. Overview of Emergence Delirium Based on Source Literature

	Sourced Literature				
Emergence Delirium	Article 1 Cai et al., 2024	Article 2 Huang et al., 2020	Article 3 Tesfaye Mekonin et al., 2022	Article 4 Wang et al., 2023b	Article 5 Zhang et al., 2020
Definition based on onset, duration, signs and symptoms	Occurrence of acute cognitive issues, such as inattention, disorientation, and lack of awareness that develop over a short period of time or immediately after emergence from general anesthesia, in the operating	Manifestations include declining memory, attention deficit, and reduced or lack of consciousness during PACU stay at 30, and 60 minutes after extubating.	Defined as a state of acute restlessness, confusion, and/ or altered level of consciousness, typically occurs in the operating room during or immediately following emergence from anesthesia; or post admission	Lucid interval occurrence of acute brain dysfunction (e.g., inattention, altered awareness, cognitive impairment, and sleep disturbance) from an anesthesia emergence, which typically occurs at	Acute onset of mental status changes that occurs during or immediately after emergence from general anesthesia; or at 10 to 30 minutes after PACU admission or before PACU discharge.

	Sourced Literature				
Emergence Delirium	Article 1 Cai et al., 2024	Article 2 Huang et al., 2020	Article 3 Tesfaye Mekonin et al., 2022	Article 4 Wang et al., 2023b	Article 5 Zhang et al., 2020
	room or PACU. ED usually resolves within minutes or hours but also tends to fluctuate throughout the day.		in PACU within the first one hour or at any time.	the first 10 minutes in PACU.	
Risk factors	Older age; ASA grade of 4 or more; coronary heart disease; Preoperative cognitive impairment; Lower hematocrit/ albumin levels; Certain medications (e.g., anticholinergic, benzodiazepine); Major surgery; Severe postoperative pain	Old age; Type of anesthesia; Blood loss; Surgery duration and type; Postoperative pain; Water deprivation; Underlying conditions such as diabetes; Use of anticholinergic drugs	Critically ill or medical-surgical (comorbidities) older patients (age) received general anesthesia (type); Chronic smoking; Alcohol abuse; Certain medications; Premedication with opioid, anticholinergic; Preoperative hemoglobin level (low); postoperative pain and sedation.	Intraoperative absolute hypothermia (<35.5°C) or relative hypothermia (>1.0°C decrements); Tympanic body temperature in PACU; Age; preoperative mild cognitive impairment (MCI); and pain intensity. Relative hyperthermia (>0.5°C increments) decreases risk of ED	Advance age; hypothermia at PACU admission; severe pain; Comorbidities (poor baseline cognitive function; coronary heart disease; previous surgery; higher ASA grade; low hematocrit and albumin levels); male sex
Diagnostic or assessment tools	RASS and CAM-ICU Higher plasma levels of Interleukin-6 (IL-6); Neurodegeneration-associated marker beta-secretase 1 (BACE1); Neurofilament light chain	NU-DESC and CAM; MMSE for cognitive function	CAM-ICU for ED; RAAS for postoperative sedation or agitation; NRS for pain	In PACU, RASS for hyperactive (from +1 to +4), hypoactive (from 0 to -3), and mixed. CAM-ICU for ICU patients; CAM for PoD	RASS >+1 for EA CAM/ CAM-ICU for ED/ PoD, if positive - RASS for hyperactive (from +1 to +4), hypoactive (from 0 to -3), and mixed.
Management Strategies	Not explicitly detailed, but mentions general anesthesia practice and pain management post-surgery (use of opioids, NSAIDs, and patient-controlled analgesia)	Adequate pain and frequent delirium assessments; Low dose haloperidol or atypical neuroleptics; Behavioral restriction or physical restraints should be limited to PACU	Nonpharmacologic management (e.g., hydration, mobility, sleep hygiene); Pharmacologic management (e.g., conscious sedation, benzodiazepines like midazolam) Optimization for patients with low preoperative hemoglobin is also recommended.	Medical heat conserving devices (e.g., forced-air warming, warm air blankets); Opioid or non-steroidal anti-inflammatory drugs (NSAIDs).	Maintaining normothermia; agitation prevention and management; optimal analgesia regimen

	Sourced Literature				
Emergence Delirium	Article 1 Cai et al., 2024	Article 2 Huang et al., 2020	Article 3 Tesfaye Mekonin et al., 2022	Article 4 Wang et al., 2023b	Article 5 Zhang et al., 2020
Impact on Patient Outcomes	No significant association with worse long-term survivals; Have clinical meaningful decline in cognitive function and quality of life in psychological domain within 3 years after surgery (non-cardiac)	Independent risk factor for PoD; Prolonged recovery period/ length of hospital stay; Increased medical cost, workload of medical staff, and economic burden; Intensify the baseline degeneration of cognitive functions	Postoperative-related injuries (e.g., violent behavior, increased pain, hemorrhage, and self-removal of medical devices) and mortality; Decreased functional capacity; prolonged hospital stay; Increased health care expenditures.	Physiological thermoregulation may be a potential significant factor in ED prevalence. ED is highly correlated with poor clinical outcomes, such as increased risk of pulmonary complication, postoperative delirium, and hospital readmission.	Significant independent factor that increases risk for PoD. Worse perioperative outcomes such as longer PACU or hospital stay; non-delirium complications (e.g., pulmonary conditions) within 30 days; cognitive functions and quality of life at 30 days did not significantly differ.

Notes. EA – emergence agitation; RASS - Richmond Agitation Sedation Scale; CAM - Confusion Assessment Method; CAM-ICU - Confusion Assessment Method for the Intensive Care Unit; NU-DESC - Nursing Delirium Screening Scale; MMSE – mini-mental state examination; NRS – Numeric Rating Score

3. Management and Preventive Strategies

To prevent incidences of ED among older adult populations in PACU, adequate pain and sedation management, hydration, thermoregulation, and frequent delirium assessment are highly recommended. One of the included studies demonstrated that absolute hypothermia (less than 35.5 degrees Celsius) and relative hypothermia (decrements of more than 1.0 degrees Celsius on older adults' baseline body temperature) significantly increased the risk of older adults in ED (Wang et al., 2023b). The same study also reported that relative hyperthermia (increments of more than 0.5 degrees Celsius on older adults' baseline body temperature) decreases this risk (Wang et al., 2023b). Use of medical heat-conserving devices, such as forced-air warming and warm air blankets, is also considered nonpharmacologic management for ED (Wang et al., 2023b; Zhang et al., 2020). Adequate hydration, early mobilization, and proper sleep hygiene are also emphasized as adjunct interventions to decrease the risk of ED in older adult patients (Tesfaye Mekonin et al., 2022). For pharmacologic management, administration of opioids and nonsteroidal anti-inflammatory drugs (NSAIDs) is vital for optimal analgesia regimens in older adults (Wang et al., 2023b; Zhang et al., 2020). Use of benzodiazepines like midazolam for conscious sedation may also help manage their ED symptoms (Tesfaye Mekonin et al., 2022). Administration of low doses of haloperidol or atypical neuroleptics was seen to be effective in managing ED behavioral-related symptoms such as thrashing (Huang et al., 2020). Nonpharmacologic strategies, including behavioral restriction or physical restraints, may also be considered to prevent self-harm or self-injury related to ED (Huang et al., 2020).

4. Impact on Patient Outcomes

While most of the included studies have consistently demonstrated a strong correlation between ED and poor clinical outcomes, such as increased risk of pulmonary complications, longer PACU or hospital stay, prolonged recovery period, and hospital readmission (Huang et al., 2020; Tesfaye Mekonin et al., 2022; Wang et al., 2023b; Zhang et al., 2020). Cai et al. (2024) reported a non-significant association of ED episodes with worse long-term survival of older adult patients. These outcomes significantly increase the mortality risk of older adult patients. In addition, the prevalence of ED in this vulnerable population contributes to increased medical costs and healthcare expenditures, adding to the economic burden (Huang et al., 2020; Tesfaye Mekonin et al., 2022). Emergence delirium is found to be a significant independent factor that increases the risk for postoperative delirium. While one study reported that ED worsens the cognitive function of older adults with baseline cognition issues (Huang et al., 2020), another study found non-significant associations with worse long-term survival of older adults (Cai et al., 2024).

DISCUSSION

This rapid literature review comprehensively evaluated the current evidence on the vital characteristics of emergence delirium in older adults during the postoperative phase. Based on our analysis of the included records, it is evident that the incidence of ED among older adults in PACU remains underexplored, with the majority of the studies conducted mainly in China and Ethiopia. Although there is confusion between EA, ED, and PoD due to overlapping clinical presentations, our analysis suggested that ED is an acute, transient cognitive-related phenomenon distinct from EA, which is more predominantly behavioral-related in nature (Chen et al., 2024; Mason, 2017; Wang et al., 2023a). Emergence delirium normally manifests within the initial 30 minutes of recovery time and typically resolves within an hour of onset, compared to PoD, which typically occurs days after invasive or noninvasive procedures. This temporal variation in onset was emphasized by existing literature suggesting that ED also serves as an independent significant risk factor for PoD (Huang et al., 2020; Zhang et al., 2020). Furthermore, ED in older adults appears more closely associated with cognitive impairment, comorbidities, and postoperative complications compared with adult and pediatric populations, where ED has been more extensively studied and is often marked by hyperactive behavioral manifestations (Chen et al., 2024; Munk et al., 2016; Silva et al., 2021; Viswanath et al., 2015).

Built on prior studies (Cai et al., 2024; Faeder et al., 2023; Huang et al., 2020; Tesfaye Mekonin et al., 2022), we found that in the older adult population, ED can be more pronounced due to age-related physiologic changes, polypharmacy, cognitive impairment, and other comorbidities that affect the nervous system. Most existing studies do not account for pre-existing conditions like mild cognitive impairment and Alzheimer's disease and related dementia (ADRD), which may influence the incidence and presentation of delirium in this demographic population (He et al., 2024; Faeder et al., 2023; Zhang et al., 2020). Distinct from younger populations, ED among older adults is uniquely precipitated by intraoperative hypothermia, which demands targeted temperature management through medical-heat conserving devices, absolute normothermia, and nurse-led environmental control to minimize sensory stimuli (Hudek, 2009; Ban et al., 2024; Faeder et al., 2023; Wang et al., 2023b). We recommend considering these variables when doing comprehensive preoperative assessments, as they are critical for the prevention and early recognition of ED in older adult patients.

While most of the included records demonstrate the ability to recognize ED using validated clinical assessment tools, such as CAM and RASS, Cai et al. (2024) identified certain biomarkers (e.g., BACE1, plasma IL-6 levels) as potential diagnostic indicators for ED prevalence and

incidence. Also, RASS and CAM assessment tools were typically used among adult patients (Assefa et al., 2022; He et al., 2024). In pediatric populations, assessment is primarily facilitated through validated instruments such as the Pediatric Anesthesia Emergence Delirium (PAED) Scale (Aoyama et al., 2025; Mason, 2017). There is no available validated ED assessment tool for older adults. While this evidence offers promising significance, it requires further exploration of biomarkers in the management and prevention of ED in older adult patients during the postoperative phase.

For pharmacologic management of ED, NSAIDs and benzodiazepines are found to be effective treatments for both children and older adult populations (Faeder et al., 2023; Wang et al., 2023a; Wang et al., 2023b; Zhang et al., 2020). Interestingly, some adjunct medications, such as ketamine, dexmedetomidine, propofol, and gabapentin, have been identified as adjunct medications that exhibit efficacy in preventing ED, particularly in children (Aoyama et al., 2025; Mason, 2017; Wang et al., 2023a). Yet, this evidence remains underexamined in older adult populations. Improving understanding of optimal pain and sedation management strategies can enable nurses to tailor pharmacologic regimens to reduce the risk and symptoms of ED in older adults. Further research is imperative to develop age-specific assessment tools, preventive strategies, and nursing interventions that specifically address the unique needs of older adults experiencing ED in the PACU.

In clinical nursing practice, emergence delirium requires increased vigilance and prompt interventions. Existing evidence suggests that ED prevalence and clinical impact may vary by age subgroup, type of surgery, anesthesia modality, delirium assessment tool, and geographic context (Aoyama et al., 2025; Assefa et al., 2022; Chen et al., 2024; Viswanath et al., 2015). For instance, reported prevalence differed between studies conducted in China and Ethiopia, which may reflect variations in healthcare systems, perioperative practices, or patient characteristics (Huang et al., 2020; Tesfaye Mekonin et al., 2022; Wang et al., 2023b; Zhang et al., 2020). These differences warrant further exploration in future research.

Nurses in PACU are often the first healthcare providers to recognize signs of confusion or disorientation, initiate safety measures, and notify anesthesia providers. The findings presented in our rapid review can enhance PACU nurses' knowledge related to the provision of preventive and symptomatic care management to older adults at risk and suffering from ED. This facilitates timely interventions that can mitigate the severity and duration of ED episodes. Implementation of calming techniques such as dimming the lights, promoting quiet PACU environments, and observing soothing touch or voice when managing older adult patients could serve as first-line measures prior to pharmacological sedations. Evidence supports that nurse-led environmental control (e.g., reducing sensory stimuli) significantly reduces the severity and duration of ED (Hudek, 2009; Ban et al., 2024; Faeder et al., 2023). Rapid-response nursing protocols must also be tailored specifically to preoperative education, early pain management, and less-stimulus PACU environments to reduce the incidences and severity of ED. Staff nurses should be trained in de-escalation techniques that may include real-time explanations, emotional reassurance, and post-ED debriefing. Additionally, prior evidence supports that nurse-led family education before surgery about ED reduces panic during recovery and enhances satisfaction with care (Hudek, 2009; Ban et al., 2024; Faeder et al., 2023). Management in this demographic prioritizes the integration of family education and early mobilization to address the heightened risks of prolonged hospitalization, permanent cognitive decline, and the significant economic burden associated with the geriatric transition from ED to EA or PoD (Assefa et al., 2022; Faeder et al., 2023; Huang et al., 2020; Lee & Sung, 2020).

Despite these strategies, challenges persist due to the unpredictable onset and variability of ED symptoms in older adults. Nurse leaders and clinicians must prioritize the risk stratification of ED into preoperative assessments to effectively identify vulnerable older adult patients and implement proactive measures. Furthermore, insights from this review can guide targeted education and training initiatives to address knowledge gaps and build confidence among nurses in handling ED in this vulnerable population. These evidence-based improvements can support better overall outcomes for older adult patients.

Implications for Practice and Future Research

The evidence in this review underscores critical implications for perioperative nursing practice and research.

Practical Implications

Clinicians must recognize that ED is an independent neurocognitive condition that requires heightened vigilance in the post-anesthesia phase. Nurses working in the PACU must prioritize risk stratification during preoperative assessments among older adults, considering the findings from this rapid review, which includes age-related physiological changes, polypharmacy, and pre-existing cognitive impairments. Given that intraoperative hypothermia is a unique precipitant for ED in older adults, targeted temperature management through medical heat-conserving devices is essential to maintain hypothermia for this patient population.

Policy Implications

Healthcare administrators and nursing leaders should promote practice protocols that center on nurse-led environmental controls, such as dimming the lights, maintaining a quiet environment, and utilizing soothing touch or vocal cues to minimize sensory stimuli. Regulations related to the

implementation of tailored de-escalation training and providing preoperative family education about the risks of ED in older adults are vital, as these could potentially reduce clinical staff workload and family anxiety while enhancing overall care satisfaction.

Recommendations for Future Research

There is an urgent need for studies that employ longitudinal designs to move beyond observational findings and establish direct causal evidence for ED risk factors and targeted nursing management. Currently, there is no validated ED-specific assessment tool for older adults. Future investigations should focus on developing and validating age-specific ED assessment checklists and diagnostic instruments, and further exploring the use of biomarkers, such as IL-6 and neurofilament light chain, as objective diagnostic indicators for ED in older adult patients. Moreover, while pharmacological adjuncts like dexmedetomidine and gabapentin have demonstrated promising efficacy in the pediatric population, their impact on preventing ED in the geriatric population remains underexamined and warrants rigorous randomized clinical trials. Finally, research efforts must expand to include geographically diverse populations to ensure generalizability and applicability of this rapid review's findings across the global healthcare systems and international perioperative practices.

Limitations

Although this review provides the current evidence regarding ED among older patients in PACU, certain limitations necessitate acknowledgement. First, this rapid review did not have a registered protocol. Given the review design and its focus on informing clinically relevant synthesis within a constrained timeframe, protocol registration was not deemed feasible. We acknowledged that the absence of a protocol may increase the risk of selective methodological behavior or reporting. However, this limitation was mitigated through explicit documentation of review methods and adherence to established rapid review frameworks and reporting standards. Second, the findings of this review are unable to establish any direct or indirect causal evidence on ED risk factors due to the observational or cross-sectional study designs of the included records. Further studies that employ longitudinal designs are necessary to elucidate specific causative factors of ED. Additionally, the included studies were conducted in two countries only, China and Ethiopia. This restriction limits the generalizability of the synthesized findings. No subgroup analyses were conducted in this review due to the study's design, the limited number of included studies, and variations in included study outcome measures. While subgroup analysis is considered valuable for tailored and actionable evidence, using it in expedited methods such as rapid reviews increases the risk of type II errors or false positive interpretations. Also, the absence of a formal risk of bias assessment may limit the ability to fully evaluate the internal validity of included studies and may affect confidence in the synthesized findings; however, this limitation is acknowledged and interpreted in light of the rapid review's purpose and scope. While the onset of ED is clearly defined and distinct, its clinical manifestations sometimes overlap with EA and PoD. A specific diagnostic or assessment tool is warranted to clearly differentiate the incidence of ED compared to EA or PoD across older adult populations. Future studies are needed to better understand the prevalence, prevention, and management of ED among this vulnerable population.

CONCLUSION

The findings of our rapid review reiterate that emergence delirium is an independent, significant concern in older adults, impacting short-term recovery and long-term cognitive function. This review also provides valuable insights into the prevalence, risk factors, and management of ED in older adults. While multiple assessment tools were employed to evaluate ED incidences, variations in these tools underscore the need for further research to refine diagnostic protocols and create specific assessment tools for enhanced early recognition, prevention, and management of ED in older adults. This will improve healthcare providers' competencies, particularly nurses, to provide the optimal treatment options and ensure improved care outcomes for this vulnerable population.

Author Contributions

Conceptualization: Simon Paul P. Navarro; Methodology: Simon Paul P. Navarro; Data Collection: Simon Paul P. Navarro; Analysis: Simon Paul P. Navarro; Azenith S. Ramos; Writing – Original Draft: Simon Paul P. Navarro; Azenith S. Ramos; Writing – Review & Editing: Simon Paul P. Navarro; Azenith S. Ramos.

Data Availability Statement

All data generated or analyzed during this study are included in this published article.

Conflict of Interest

The authors declare no conflicts of interest.

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