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systematic review

Management of Pain, Agitation, and Delirium in Critical Care Patients: A Systematic Review

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Abstract

Introduction: Pain, agitation, and delirium (PAD) are frequent complications in ICU patients. This review assesses guideline recommendations for managing PAD in critically ill adults.

Method: This systematic review synthesized recommendations from ICU guidelines with recent literature on PAD. We searched the PubMed, Scopus, and Web of Science databases using relevant keywords and MeSH terms.

Result: Seven guidelines from North America (SCCM 2013, 2018, 2022, 2025), Europe (ESICM 2025, NICE 2019), Asia (KSCCM 2021), and LMICs (Indian ABCDEF 2023) were included. Recent guidelines emphasize the importance of integrating digital innovations, such as electronic health record systems and AI monitoring. The guidelines from 2022 to 2025 also emphasize intervals in care for special populations by introducing reliable protocols for pediatric patients and by adjusting care to specific needs. Light, titratable sedation agents, such as dexmedetomidine, are recommended to decrease oversedation and the duration of ventilator. Pharmacologic interventions are reserved for refractory cases, utilizing opioids, adjuncts, and emerging agents tailored to individual needs. The guidelines have shifted from a focus on sedation to a patient-centered approach, integrating PAD protocols that emphasize multimodal management and early intervention.

Conclusion : The finding showed that managing PAD in the ICU needs a multimodal, guideline-directed procedure that includes both pharmacologic and non-pharmacologic strategies with comprehensive assessment. Future research should evaluate new therapies and develop evidence-based protocols that balance efficacy, safety, and patient-centered outcomes.

Keywords: Pain, agitation, delirium, ICU, critical care, analgosedation, PAD.

Introduction

Pervasive and interrelated challenges, such as PAD, significantly impact critically ill patients and have profound implications for both short-term recovery and long-term outcomes. More than 80% of patients in the ICU experience delirium, while up to 70% report significant pain during their stay, particularly during procedures or movements [1, 2]. These symptoms are not only uncomfortable for patients but also initiate detrimental physiological cascades, including hypermetabolism, immune suppression, and increased oxygen demand [3, 4]. Pain worsens agitation and delirium, causes sleep deprivation, and is a significant cause of traumatic ICU memories, often related to PTSD in patients [1, 5, 6]. Delirium, frequently underdiagnosed, independently predicts prolonged mechanical ventilation, longer ICU stays, higher mortality, and persistent cognitive dysfunction [3, 6, 7].

The management of PAD is complicated by factors from ICU care, such as sedative medications, immobilization, and mechanical ventilation, which increase the risk of delirium and ICU-acquired weakness [2, 4]. Multicomponent interventions are effective in preventing delirium in non-ICU settings, but their use in critical care has not been thoroughly studied [3, 4]. Historically, deep sedation and inconsistent pharmacologic practices have worsened outcomes, including extended ventilator dependence and mortality [2, 7]. However, emerging evidence underscores the

benefits of protocolized, patient-centered strategies—such as the ABCDEF bundle to mitigate these risks [8].

Recognizing these challenges, the Society of Critical Care Medicine (SCCM) has iteratively refined evidence-based guidelines, from the 2013 Pain, Agitation, and Delirium (PAD) Guidelines to the expanded 2018 PADIS (Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption) framework [3, 4]. These emphasize multimodal approaches, including optimizing analgesia, minimizing sedation, routinely monitoring for delirium, and promoting early mobility. However, heterogeneity in clinical practice remains, necessitating a systematic evaluation of adherence to guidelines and emerging evidence [3, 7].

This review assesses the current guidelines for treating PAD in the ICU. It compares different treatment approaches, from medications to procedures, by analyzing the latest medical guidelines.

Methods

We conducted a systematic review of guidelines on the management of PAD in critically ill adults published between 2013 and 2025. The review was performed by the PRISMA 2020 statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses).

Data Sources and Search Strategy:

We searched PubMed/MEDLINE, Embase, Cochrane Central, and Web of Science. The search strategy combined terms related to pain, agitation, sedation, delirium, and guideline development.

Study Selection

Two independent reviewers screened all titles and abstracts. Any discrepancies between the reviewers were resolved through discussion, or if needed, by consulting a third reviewer.

Inclusion Criteria:

Clinical practice guidelines and recommendations for managing PAD in critically ill adult patients.

Guidelines with explicit recommendations for assessment, monitoring, or pharmacologic/non-pharmacologic management in the ICU setting.

Publications between 2013 and 2025, capturing both historical and recent guideline updates to allow analysis of evolving trends.

Data Extraction and Synthesis:

The data included the guideline year, issuing society, patient population, recommended assessment tools, and both pharmacologic and non-pharmacologic interventions with their evidence levels.

Results

This results assessed all major international PAD/PADIS guidelines published between 2013 and 2025. These include: the foundational SCCM PAD (2013)[7] introducing analgesia-first principles; the expanded SCCM PADIS (2018)[3] incorporating immobility and sleep disruption via the ABCDEF bundle; the 2025 PADIS update [9] with anxiety protocols and digital health tools; the NICE Delirium guidelines (2019)[10] for hospital-wide (non-ICU) delirium care; the KSCCM Korean guidelines (2021)[11] featuring cultural and pharmacogenomic adaptations for Asian populations; the SCCM Pediatric guidelines (2022)[12] with child-specific assessment and management protocols; the Indian ABCDEF guidelines (2023) [12] tailored for resource-limited ICUs.

Collectively, these documents show a clear trajectory: from establishing core PAD principles, to expanding PADIS scope across ages and resource levels, to adopting precision medicine approaches and integrating digital technologies.

Guideline Characteristics (2013–2025)

There have been significant advancements in the management of PAD in critically ill patients, thanks to a series of evidence-based publications from various organizations. However, these guidelines differ in their goals, methodology, and target populations.

Evolutionary Phases of PAD/PADIS Guidelines

Phase 1 – Foundation (2013–2018)

2013 SCCM PAD – First comprehensive, evidence-based framework for adult ICU PAD management. Introduced analgesia-first sedation, prioritized pain control before sedatives, recommended CAM-ICU as the delirium screening standard, and advocated daily sedation interruptions to shorten ventilation duration [7].

2018 SCCM PADIS – Expanded PAD to PADIS, adding immobility and sleep disruption. Standardized the ABCDEF bundle. Recommended against routine antipsychotics for delirium and benzodiazepines for agitation. Emphasized sleep hygiene and early mobility to prevent ICU-acquired weakness [3].

Phase 2 – Specialization (2019–2023)

2019 NICE Delirium - First national guideline with hospital-wide scope, emphasizing non-drug prevention, early identification, and family education [10].

2021 KSCCM Korean- Validated culturally appropriate pain scales and addressed opioid metabolism differences in East Asian populations [11].

2022 SCCM Pediatric -Introduced child-specific tools and play-based rehabilitation to address developmental needs [12].

2023 Indian ABCDEF -Adapted ABCDEF bundle for low-resource settings, prioritizing cost-effective sedatives and family-led mobility programs [13].

Phase 3 – Digital Integration and Precision Medicine (2025)- 2025 PADIS Update– Added anxiety management protocols, recommended dexmedetomidine over benzodiazepines, integrated real-time EHR delirium alerts, and advised melatonin agonists for circadian rhythm regulation (Table 1) [9].

Table 1: Global PAD/PADIS Guidelines (2013–2025)

Guideline	Region	Year (First Author)	Key Distinctions	Practice-Changing Updates
SCCM PAD	USA	2013 (Barr)	*First evidence-based framework*	Introduced analgesia-first sedation; CAM-ICU as delirium screening standard; daily sedation interruption to shorten ventilation
SCCM PADIS	USA	2018 (Devlin)	*Added immobility & sleep*	Standardized ABCDEF bundle; discouraged routine antipsychotics for delirium and benzodiazepines for agitation; emphasized sleep hygiene and early mobility
NICE Delirium	UK	2019 (NICE Org)	*Hospital-wide scope*	Non-drug prevention as first-line; emphasized early detection and family education
KSCCM Korean	Asia	2021 (Seo)	*Cultural adaptations*	Validated local pain scales; guidance on opioid metabolism variability in East Asian populations
SCCM Pediatric	USA	2022 (Smith)	*First for children*	FLACC for pain; pCAM-ICU for delirium; play-based rehabilitation; developmental care approach
Indian ABCDEF	LMICs	2023 (Bhadade)	*Resource-limited focus*	Cost-effective sedation strategies (midazolam over propofol); family-led mobility and delirium prevention
PADIS 2025 Update	USA	2025 (Lewis)	*Anxiety + digital focus*	Recommended dexmedetomidine over benzodiazepines; EHR-linked delirium alerts; melatonin agonists for circadian regulation

Over the past twelve years, international PAD/PADIS guidelines have expanded in scope, refined clinical priorities, and incorporated new patient populations and technologies. The 2013 SCCM PAD guidelines established the analgesia-first principle, prioritized CAM-ICU screening for delirium, and focused exclusively on adult ICU patients. In 2018, the SCCM PADIS update broadened the framework to include immobility and sleep disruption, embedded these elements within the standardized ABCDEF bundle, and recommended avoiding benzodiazepines for agitation.

By 2025, the most recent PADIS update introduced formal protocols for anxiety management, favored the use of dexmedetomidine over benzodiazepines, and integrated real-time, automated monitoring for delirium through Electronic Health Record systems. This latest version also emphasizes inclusivity, incorporating specific recommendations for pediatric patients and regionally adapted protocols. This shift signals a movement toward globally harmonized and precision-guided critical care (Table 2).

Table 2: Evolution of PAD/PADIS Guidelines (2013–2025)

Theme	2013 (PAD)	2018 (PADIS)	2025 (Update)
Scope	Pain/Agitation/Delirium	Added Immobility/Sleep	Added Anxiety/Digital Tools
Sedation	Analgesia-first approach	Avoid benzodiazepines	Dexmedetomidine preferred
Delirium	CAM-ICU screening	ABCDEF bundle	Automated monitoring
Special Populations	Adults only	Adults	Pediatric/Regional adaptations

Pain

Pain is an unpleasant experience that affects both the senses and emotions and is associated with actual or potential tissue damage. In the ICU effective pain management is essential for PADIS care. Inadequate treatment of pain can lead to negative physiological, psychological, and functional outcomes. When pain is left untreated or inadequately addressed, it can trigger persistent stress responses, including increased levels of catecholamines, vasoconstriction, catabolism, and impaired wound healing. Additionally, long-term complications such as chronic pain and PTSD may arise, as highlighted in the SCCM PADIS Update 2025.

Types of Pain in the ICU

Procedural pain: Commonly from vascular line insertion, tracheal suctioning, wound care, and patient repositioning. SCCM PADIS 2018 and KSCCM 2021 both stress pre-procedure analgesia, which is often omitted.

Pain at rest: Often from surgical wounds, fractures, or trauma, but may also stem from indwelling devices, gastrointestinal discomfort (ileus, constipation), or musculoskeletal pain from immobility and pressure injury (SCCM PADIS 2018).

Pain Assessment: Gold standard: Patient self-report, preferably using the Numeric Rating Scale (NRS) or Visual Analog Scale (VAS) (SCCM PADIS 2018; SCCM PADIS Update 2025). When self-report **is not possible:** Use validated behavioral tools such as:

Critical Care Pain Observation Tool (CPOT) – evaluates facial expression, body movement, muscle tension, and compliance with ventilation/vocalization. A score >2 suggests pain (SCCM PADIS 2018).

Behavioral Pain Scale (BPS) – particularly in mechanically ventilated patients (KSCCM 2021).

Limitations: NICE Delirium 2019 and SCCM PADIS 2018 note that hemodynamic changes alone are unreliable for pain detection.

Management Strategies

First-line pharmacologic therapy:

SCCM PADIS 2018, SCCM PADIS Update 2025, and KSCCM 2021 recommend intravenous opioids (fentanyl, hydromorphone, morphine) as first-line for non-neuropathic pain (Grade A).

Non-opioid adjuncts (acetaminophen, gabapentin) are supported in ~44% of analyzed guidelines to reduce opioid requirements (ESICM ABCDEF+ 2025; Indian ABCDEF 2023).

Analgosedation principle: All major guidelines (SCCM PADIS 2018; PADIS Update 2025; KSCCM 2021) recommend prioritizing analgesia over sedation to reduce ventilator time and ICU length of stay (Table 3).

Table 3: Drug classes and considerations

Class	Examples	Advantages	Limitations/Risks	Guideline References
Opioids	Morphine, Fentanyl	Potent analgesia, antitussive effects	Respiratory depression, delirium	SCCM PADIS 2018; KSCCM 2021
NSAIDs	Ibuprofen, Diclofenac	Reduce opioid use	Renal/GI toxicity, contraindications	SCCM PADIS 2018
Regional analgesia	Epidural, nerve blocks	Effective in postoperative settings	Limited evidence in general ICU	SCCM PADIS 2018
Neuropathic agents	Gabapentin, Pregabalin	Useful in Guillain–Barré or neuropathic pain	Limited ICU-specific data	KSCCM 2021

Emerging and Adjuvant Therapies

Alpha-2 agonists (Dexmedetomidine) — supported in SCCM PADIS Update 2025 for patients with pain and anxiety, with sedative-sparing effects.

NMDA antagonists (Ketamine) — recommended in opioid-tolerant or refractory cases (SCCM PADIS 2018; KSCCM 2021).

Agitation and Sedation in ICU Patients

Agitation: Anxiety, restlessness, or combativeness in ICU patients, caused by medical, environmental, and psychological factors. Untreated agitation increases risk of unplanned device removal, ventilator dyssynchrony, and delirium. Over-sedation prolongs mechanical ventilation (MV) and ICU stay (SCCM PADIS 2018).

Assessment Tools

Richmond Agitation–Sedation Scale (RASS)

Scale: −5 (unresponsive) to +4 (combative), 0 = alert/calm. Target: RASS −2 to 0 for most mechanically ventilated patients. Recommended by most guidelines (SCCM PADIS 2025, KSCCM 2021). Sedation–Agitation Scale (SAS); BIS monitoring for deep sedation, neuromuscular blockade, or select cases.

Non-Pharmacologic Strategies

eCASH principle: Early Comfort using Analgesia, minimal Sedatives, maximal Humane care. Environmental optimization: Reduce noise/light, promote sleep hygiene, involve family, and provide orientation/reassurance. Address underlying causes before pharmacologic intervention. Other holistic measures: Early mobilization, limiting night interventions, earplugs/eye masks.

Pharmacologic Strategies

Goal: Lowest effective sedative dose for a calm, lucid, cooperative patient.

Preferred agents:

Dexmedetomidine: Alpha-2 agonist; lower delirium risk; preserves interaction (RR 0.64; SCCM PADIS 2025). Propofol: Rapid titration; avoid prolonged high-dose due to PRIS. Benzodiazepines (midazolam, lorazepam): Reserved for seizures, withdrawal, or contraindications. Ketamine: Adjunct for bronchospasm, analgesia, hemodynamic instability; caution in elevated ICP. Antipsychotics (haloperidol, quetiapine): Short-term control of severe agitation; monitor QT prolongation and extrapyramidal effects (Table 4&5).

Table 4: Drug Classes and Considerations

Drug Class	Mechanism/Use	Key Points
Propofol	GABA agonist; titratable	Faster awakening, reduced MV duration; PRIS risk (<4 mg/kg/hr)
Alpha-2 agonists	Dexmedetomidine, clonidine	Minimal respiratory depression; delirium reduction; hypotension/bradycardia
Benzodiazepines	Midazolam, lorazepam	Seizures, withdrawal, drug toxicity; risk of delirium, respiratory depression
Ketamine	NMDA antagonist	Analgesia, sedation; adjunct in severe asthma/pain; may increase ICP, hallucinations
Thiopental	Barbiturate	Rarely used; refractory ICP/seizures
Antipsychotics	Haloperidol, quetiapine	Acute agitation/delirium; monitor QTc, EPS
Volatile agents	Sevoflurane, desflurane	Limited ICU use; AnaConDa® device

Table 5: Sedation Protocols and Weaning

Approach	Benefits	Risks	Sources
Sedation breaks	Reduce MV duration, ICU stay	Self-extubation	SCCM PADIS 2018
Protocolized titration	Standardized RASS-guided dosing	Requires frequent reassessment	KSCCM 2021, SCCM 2025
ABCDEF bundle	Shortens MV by ~2.1 days	Multidisciplinary compliance needed	ESICM 2025, Indian ABCDEF 2023

Risks of Sedation

Over-sedation: Prolonged MV, ICU stay, death; critical illness neuropathy; cardiovascular/respiratory depression; delirium; immune suppression; ileus; long-term cognitive decline. Under-sedation: Physical injury, device removal, distress, increased awareness (not necessarily psychological harm).

Delirium in the ICU: Definition, Risk, and Management

Delirium is a rapid change in mental status, marked by inattention and cognitive dysfunction that often varies in severity and tends to worsen at night. It is a common and serious complication among critically ill patients. The prevalence of delirium differs across various populations, occurring in about 33% of general ICU patients and as high as 80% among those on mechanical ventilation. Delirium is linked to prolonged stays in the

ICU and hospital, increased mortality rates, and long-term cognitive impairment.

Delirium can present in three phenotypes: Hyperactive: Agitation, restlessness, combativeness. **Hypoactive:** Lethargy, inattention, under-recognized but equally harmful. **Mixed:** Fluctuation between hyperactive and hypoactive states. The pathophysiology is incompletely understood but is thought to involve neurotransmitter imbalances, including dopamine excess and acetylcholine deficiency.

Risk Factors

Category	Examples
Patient Factors	Age >65, pre-existing dementia, sensory impairment, chronic alcohol/drug use, malnutrition
ICU Factors	Sedatives (especially benzodiazepines), opioids, anticholinergics, sleep disruption, immobility
Illness Factors	Sepsis, electrolyte imbalances, anesthesia, mechanical ventilation, severity of illness

Modifiable factors such as sedative choice, sleep hygiene, and early mobilization are key targets for prevention.

Diagnosis and Screening

Hypoactive delirium is often underdiagnosed but carries similar morbidity. Validated screening tools recommended by the Society of Critical Care Medicine (SCCM 2025, PADIS 2018) include: CAM-ICU (Confusion Assessment Method for ICU): Assesses inattention, disorganized thinking, and altered consciousness. ICDSC (Intensive Care Delirium Screening Checklist): Evaluates psychosis, sleep disruption, psychomotor disturbances, and symptom fluctuation. Guidelines recommend screening at least twice daily in all ICU patients. Sedation scales such as RASS or SAS are used alongside these tools to account for altered consciousness.

Non-Pharmacologic Management

Non-pharmacologic interventions are first-line for both prevention and management:

ABCDEF bundle:

A: Assess, prevent, and manage pain

B: Both spontaneous awakening and breathing trials

C: Choice of sedation and analgesia

D: Delirium monitoring and management

E: Early mobility and exercise

F: Family engagement and empowerment

Other interventions: Environmental optimization (reduce noise and light at night), sleep hygiene, orientation aids (clocks, calendars), and sensory support (glasses, hearing aids).

Pharmacologic Management

Antipsychotics, such as haloperidol, can help reduce agitation but do not prevent delirium. There is a risk of QT prolongation and extrapyramidal symptoms associated with their use.

Dexmedetomidine has been shown to reduce the duration of delirium compared to benzodiazepines, and it has minimal impact on respiratory depression. Larger studies, such as SPICE III, are currently ongoing to investigate its effects further.

Melatonin may benefit circadian rhythms; however, current evidence does not support its routine clinical use for delirium.

Rivastigmine was ultimately abandoned due to potential harm, as it does not provide benefits in reducing mortality or delirium.

Statins have not demonstrated any proven effect on the prevention or treatment of delirium.

Current guidelines recommend avoiding benzodiazepines unless there is a clear clinical indication, such as alcohol or benzodiazepine withdrawal.

Discussion

Pain is a frequent and significant problem in critically ill patients, with interventional pain reported in approximately 50% of ICU patients and pain at rest in 30–50%, regardless of surgical or medical status [3, 6, 9]. Failure to adequately manage pain can lead to numerous adverse physiological and psychological effects, including increased catecholamines, vasoconstriction, catabolism, impaired wound healing, and chronic complications such as persistent pain and post-traumatic stress disorder [9]. These findings emphasize the critical

need for timely and effective pain assessment and management as part of comprehensive ICU care.

Assessing pain in the ICU is particularly challenging because patients are often sedated, on mechanical ventilation, or experiencing delirium. Self-reported measures, such as the NRS or VAS, are considered the gold standard [3, 9]. For patients who are unable to communicate, validated behavioral tools like the CPOT and the BPS serve as effective alternatives [11, 14]. Although hemodynamic parameters alone are unreliable indicators of pain, they should prompt further assessment when abnormal[10, 14, 17].

Guidelines uniformly recommend an analgosedation approach, prioritizing analgesia over sedation to improve patient comfort, reduce ventilator time, and shorten ICU stay (7, 9, 11). Opioids continue to be the primary choice for pain management in the ICU because of their effectiveness and flexibility. However, their side effects—including respiratory depression, delirium, and constipation—require careful dosing. Non-opioid adjuncts, such as paracetamol and NSAIDs, offer benefits that can reduce the need for opioids. Still, their use must take into account variations in how the body metabolizes them and the potential for organ toxicity [3, 9, 15]. Regional analgesia techniques, like epidurals and nerve blocks, can be really helpful for certain patients. They not only improve postoperative recovery but also reduce the chances of respiratory complications. When it comes to neuropathic pain, medications such as gabapentin and pregabalin could be beneficial for specific conditions, such as Guillain–Barré syndrome. However, there isn't strong evidence supporting their effectiveness in the ICU setting [11].

There's a growing interest in new therapies that play a significant role in managing pain through multiple approaches. One notable example is alpha-2 agonists like dexmedetomidine, which not only help in reducing sedation but also effectively manage pain and anxiety [9]. NMDA antagonists, including ketamine, provide a viable option for opioid-tolerant or refractory pain cases [11]. Integrating these approaches into individualized pain management protocols may enhance analgesic efficacy while minimizing opioid exposure.

The management of PAD) in critically ill patients remains a cornerstone of high-quality ICU care. This systematic review highlights the prevalence, assessment challenges, and evidence-based strategies for PAD, emphasizing guideline-directed multimodal interventions.

Agitation can be confused with pain or delirium. A lighter sedation approach is recommended, allowing for adjustments based on patient needs. Validated scales like the RASS can assist with this, helping to avoid excessive sedation and promote earlier patient mobility. Dexmedetomidine is a notable medication, as it offers effective sedation and pain relief while keeping patients engaged and maintaining cognitive function [6, 16, 17].

Delirium affects up to 80% of patients in the ICU, cause to increased morbidity, and longer stays in the ICU and hospital, and long-term cognitive impairment. It is recommended to identify delirium early using validated tools and to implement non-pharmacological interventions. These interventions include optimizing sleep, promoting early mobilization, and minimizing the use of medications that can induce delirium. Pharmacologic therapy should be reserved for severe agitation or distress and tailored to patient-specific needs [6, 16, 17].

Overall, integrated PAD protocols that combine systematic assessment, targeted pharmacologic therapy, and non-pharmacologic strategies, can improved patient outcomes, including reduced ICU length of stay and ventilator duration, while preserving cognitive function. Emerging therapies and individualized approaches provide opportunities for optimizing PAD management in diverse ICU populations .

Managing PAD in the ICU requires a multimodal, guideline-directed approach that includes both pharmacologic and non-pharmacologic strategies, along with comprehensive assessment. Future research should evaluate new therapies and develop evidence-based protocols that ensure a balance between efficacy, safety, and patient-centered outcomes.

Conclusion

Effective PAD management in the ICU is a critical component of patient-centered care, directly influencing both short-term outcomes, such as duration of mechanical ventilation and ICU length of stay, and long-term outcomes, including the risk of chronic pain and psychological sequelae. Accurate assessment using validated tools—particularly in non-communicative patients—is essential to identify and treat pain promptly. The principle of analgosedation, prioritizing analgesia before sedatives, supports the use of multimodal strategies, combining opioids, non-opioids, regional techniques, and adjuvant therapies to optimize

pain relief while minimizing adverse effects. Interventions, including alpha-2 agonists and NMDA antagonists, can improve analgesic efficacy and reduce opioid requirements. Commitment to guideline-recommended, individualized, and multimodal PAD management strategies is crucial to improving clinical outcomes and overall patient comfort in the ICU.

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Conflict of Interest Disclosures

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Authors' Contributions

AAD and ML contributed to the design and draft of the research and data collection, accomplished the data analysis, revised the all data and wrote the text. All authors approve and read the text version final.

Ethical Statement

Not applicable.

Declaration of Generative AI and AI-assisted technologies

During the preparation of this manuscript, the authors used Al for English editing.

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