

SYSTEMATIC REVIEW

Protocol for preventing delirium in critically ill patients in intensive care units

Protocolo para prevenir el delirium en pacientes críticos en unidades de cuidados intensivos

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ABSTRACT

Introduction: delirium is an acute neurocognitive disorder commonly seen in intensive care units (ICUs), associated with increased mortality, prolonged hospital stays, functional impairment, and long-term cognitive sequelae. Its timely identification and the implementation of preventive interventions continue to be a challenge for healthcare teams, especially nurses, given their central role in monitoring critically ill patients.

Objective: to identify and analyze evidence-based protocols for the prevention of delirium in critically ill patients in intensive care units, with the aim of synthesizing the most effective strategies and strengthening evidence-based critical care.

Method: a systematic review of the literature was conducted following the PRISMA 2020 guidelines. Studies were searched for in PubMed, Scopus, Web of Science, Cochrane Library, and SciELO. Studies published between 2020 and 2025, in English and Spanish, that addressed prevalence, risk factors, diagnostic methods, or interventions for the prevention and management of delirium in adults in the ICU were included. The selection was made through independent evaluation by two reviewers and consensus resolution. The risk of bias was assessed using validated tools (RoB2, ROBINS-I, AMSTAR-2, QUADAS-2).

Results: fifty-three studies were included, including clinical trials, cohorts, observational studies, systematic reviews, and instrument validations. The most common risk factors were advanced age, deep sedation, benzodiazepine use, prolonged mechanical ventilation, metabolic disturbances, and sleep deprivation. Non-pharmacological interventions—especially ABCDE/ABCDEF bundles, early mobilization, cognitive reorientation, sensory environment control, and family involvement—were most effective in preventing delirium. Pharmacological interventions (omega-3, minocycline, dexmedetomidine) showed promising but heterogeneous results. The CAM-ICU, ICDSC, and Nu-DESC tools were the most widely used for diagnosis.

Conclusions: delirium is a preventable syndrome that requires a comprehensive strategy based primarily on non-pharmacological interventions, continuous assessment, and active participation by the nursing team. The available evidence reaffirms the effectiveness of care bundles, early mobilization, and a multicomponent

approach. Despite advances, limitations persist regarding the use of specific drugs and the standardization of diagnostic protocols. It is recommended to strengthen evidence-based practices and promote multicenter research evaluating innovative interventions and their long-term effects.

Keywords: Delirium; Critical Care; Clinical Protocols; Disease Prevention; Critical Care Nursing.

RESUMEN

Introducción: el delirium es una alteración neurocognitiva aguda frecuente en las Unidades de Cuidados Intensivos (UCI), asociada con mayor mortalidad, estancias prolongadas, deterioro funcional y secuelas cognitivas a largo plazo. Su identificación oportuna y la aplicación de intervenciones de prevención continúan siendo un desafío para los equipos de salud, especialmente para enfermería, por su rol central en la vigilancia del paciente crítico.

Objetivo: identificar y analizar los protocolos basados en evidencia científica para la prevención del delirium en pacientes críticos en Unidades de Cuidados Intensivos, con el propósito de sintetizar las estrategias más efectivas y fortalecer el cuidado crítico basado en evidencia.

Método: se realizó una revisión sistemática de la literatura siguiendo las directrices PRISMA 2020. Se buscaron estudios en PubMed, Scopus, Web of Science, Cochrane Library y SciELO. Se incluyeron estudios publicados entre 2020 y 2025, en inglés y español, que abordaran prevalencia, factores de riesgo, métodos diagnósticos o intervenciones para la prevención y manejo del delirium en adultos en UCI. La selección se realizó mediante evaluación independiente por dos revisores y resolución por consenso. El riesgo de sesgo se evaluó con herramientas validadas (RoB2, ROBINS-I, AMSTAR-2, QUADAS-2).

Resultados: se incluyeron 53 estudios entre ensayos clínicos, cohortes, estudios observacionales, revisiones sistemáticas y validaciones de instrumentos. Los factores de riesgo más frecuentes fueron la edad avanzada, sedación profunda, uso de benzodiazepinas, ventilación mecánica prolongada, alteraciones metabólicas y privación del sueño. Las intervenciones no farmacológicas —especialmente los bundles ABCDE/ABCDEF, la movilización temprana, la reorientación cognitiva, el control del ambiente sensorial y el involucramiento familiar— mostraron mayor efectividad en la prevención del delirium. Las intervenciones farmacológicas (omega-3, minociclina, dexmedetomidina) presentaron resultados promisorios pero heterogéneos. Las herramientas CAM-ICU, ICDSC y Nu-DESC fueron las más utilizadas para el diagnóstico.

Conclusiones: el delirium es un síndrome prevenible que requiere una estrategia integral basada principalmente en intervenciones no farmacológicas, evaluación continua y participación activa del equipo de enfermería. La evidencia disponible reafirma la efectividad de los bundles de cuidado, la movilización temprana y el abordaje multicomponente. A pesar de los avances, persisten limitaciones respecto al uso de fármacos específicos y la estandarización de protocolos diagnósticos. Se recomienda fortalecer las prácticas basadas en evidencia y promover investigaciones multicéntricas que evalúen intervenciones innovadoras y sus efectos a largo plazo.

Palabras clave: Delirio; Cuidados Críticos; Protocolos Clínicos; Prevención de Enfermedades; Enfermería de Cuidados Críticos.

INTRODUCTION

Delirium is an acute, multifactorial neuropsychiatric syndrome that currently represents one of the most frequent complications in patients during their hospital stay in intensive care units (ICUs).⁽¹⁾ It is considered a public health problem because acute loss of brain function can cause permanent damage. Furthermore, its prevalence and incidence reach up to 80 %, being higher in people on mechanical ventilation (60-80 %) compared to those who do not require it 50 %.^(2,3)

This syndrome not only increases the mortality rate, but also increases the burden on healthcare personnel and healthcare costs by up to 40 %.^(2,4) Recent studies conducted in the United States revealed that 77,6 % of patients presented this complication, and those with a positive diagnosis experienced a significantly longer average hospital stay.^(5,6,7,8)

At the national level, a study on delirium in the ICU was conducted, determining that, although the prevalence of delirium in critically ill patients is not completely clear, its presence constitutes a highly relevant independent prognostic factor, associated with prolonged ventilatory support and cognitive impairment after discharge.^(6,9,10) However, in Ecuador, research on delirium in critically ill patients in ICUs is still limited. This lack of local evidence hinders the implementation of standardized protocols contextualized to the reality of the healthcare system, underscoring the urgent need to promote research to improve the quality of intensive

care and health outcomes for our patients.^(11,12,13,14)

The pathophysiological mechanisms that trigger delirium are not fully understood; however, current evidence points to a multifactorial etiology resulting from multiple interactions.^(5,15,16) Predisposing factors such as older age, history of dementia, diabetes, atrial fibrillation, chronic kidney disease, high blood pressure, and elevated biomarkers have been identified.^(7,17) There are also susceptible precipitating factors such as drug treatment, pain, dehydration, stress, sleep-wake cycle disruption, physical immobilization, and environmental factors.^(1,2,8,18)

Delirium can occur when the patient suffers from sensory, psychological, or environmental discomfort. In this regard, Kolcaba's comfort theory offers a theoretical framework for managing patients' needs in different physical, psychospiritual, sociocultural, and environmental settings. It identifies three types of comfort: first, relief is the elimination of a specific need; second, tranquility is a state of calm and security; and third, transcendence is the ability to cope with adverse situations.^(9,19)

Among its clinical manifestations as a global mental disorder with fluctuations in consciousness, patients also experience spatial-temporal disorientation and disturbances in the sleep-wake cycle, accompanied by affective and perceptual changes ranging from anxiety or depression to episodes of euphoria and hallucinations, with a pattern of frequent intensification during the night. It is classified into three subtypes: hyperactive, hypoactive, and mixed, with the hyperactive subtype being the most easily recognizable. The hypoactive subtype manifests itself with daytime sleepiness, apathy, and inappropriate responses.^(10,20)

There are different tools for diagnosis, such as the Comfort Questionnaire (CQ-ICU) developed by Kolcaba, an instrument for measuring comfort needs in various dimensions, which allows a quantitative basis to be established, thus enabling the development of a comfort-centered care plan as a preventive tool for delirium to identify factors of physical discomfort such as pain, heat, or cold, and emotional discomfort such as fear and anxiety.^(11,21)

Likewise, tools have been designed to detect alterations in the state of consciousness and the level of confusion presented by a patient, such as the Confusion Assessment Method in the Intensive Care Unit (CAM-ICU).^(12,22,23,24) This scale was designed for use in busy ICUs with the aim of facilitating and optimizing both clinical resources and the healthcare personnel caring for critically ill patients. It can even be used on intubated patients or those who are unable to speak. Among its advantages are its speed and ease of implementation, as it can be used by any member of the healthcare team, even those without extensive expertise.^(13,25,26,27)

Furthermore, although there are validated scales, such as CAM-ICU or ICDSC, if used incorrectly they can lead to late or erroneous diagnoses, limiting the possibility of timely interventions.^(14,28,29,30) However, there is no standardized protocol or manual as such, so suboptimal detection of delirium is recurrent, creating a gap in clinical care that directly affects the patient's prognosis. Recognizing evidence-based preventive protocols improves early identification and facilitates early interventions.^(15,31,32,33,34)

The Nursing Delirium Screening Scale (Nu-DESC) is a clinical instrument designed to identify suspected delirium by assessing five fundamental dimensions, which are rigorously aligned with the classification manual in terms of diagnostic criteria for mental disorders, thus providing a systematic and standardized tool for the early detection of this syndrome.^(16,35,36,37,38)

In this context, the prevention of delirium emerges as an essential need during the management of critically ill patients to improve their life expectancy and reduce long-term neurological sequelae, from validated non-pharmacological interventions implemented in a structured manner through evidence-based nursing protocols.^(10,39,40)

Therefore, the present systematic review aims to identify and analyze evidence-based protocols for the prevention of delirium in critically ill patients in intensive care units, with the purpose of synthesizing the most effective strategies and strengthening evidence-based critical care.

METHOD

This systematic review was conducted following a rigorous and transparent methodological approach, in accordance with the PRISMA 2020 Statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). This guiding framework ensures the reproducibility and scientific quality of the process, allowing the identification, evaluation, and synthesis of existing evidence on protocols for the prevention of delirium in critically ill patients in intensive care units (ICUs).⁽¹⁷⁾

Eligibility criteria

The selection of studies was defined according to the PICOS scheme, with the following components:

- Population (P): adult patients admitted to intensive care units, with or without mechanical ventilation.
- Intervention (I): protocols, strategies, or pharmacological and non-pharmacological interventions for the prevention of delirium.

- Comparator (C): standard care, absence of intervention, or application of alternative protocols.
- Outcomes (O): incidence of delirium, absolute risk reduction (ARR), odds ratio (OR), length of hospital stay, mortality, and cognitive sequelae.
- Study designs (S): randomized controlled clinical trials, quasi-experimental studies, previous systematic reviews, and meta-analyses.

Inclusion criteria

- Original studies published between January 2020 and June 2025.
- Publications in English or Spanish with access to full text.
- Research conducted in critical care hospital settings.
- Peer-reviewed studies with clearly described methodology.

Exclusion criteria

- Studies involving pediatric, psychiatric, or outpatient populations.
- Duplicate, incomplete articles, or articles without full text available.
- Publications without peer review or verifiable methodological analysis.

Sources of information and search strategy

The systematic search was conducted between June and July 2025 in ten international scientific databases: PubMed, Scopus, Web of Science, ScienceDirect, ClinicalKey, Redalyc, Dialnet, SpringerLink, Cochrane Library, and EBSCOhost.

Search strategy

Controlled descriptors (MeSH and DeCS) and free terms were used in combination with Boolean operators AND and OR, with the following equations: Delirium AND Critical Care; Delirium AND Clinical Protocols; Delirium AND Disease Prevention; Critical Care AND Clinical Protocols; and Delirium AND Critical Care Nursing. An example of the strategy applied in PubMed was: ("Delirium"[MeSH]) AND ("Critical Care"[MeSH] OR "Intensive Care Units") AND ("Clinical Protocols" OR "Disease Prevention" OR "Critical Care Nursing").^(18,41)

No geographical limits were applied. Articles published between January 2020 and June 2025, in English and Spanish, with access to full text, were included.

Study selection process

The process followed the stages of the PRISMA flowchart (identification, screening, eligibility, and inclusion). Of a total of 538 912 records identified, 52 547 duplicates were removed, and 484 657 were discarded after reading the title and abstract. Finally, 53 articles met the inclusion criteria and were analyzed in full text.

The selection was performed independently by two reviewers, and disagreements were resolved by consensus with a third evaluator. The selection process followed the four phases of the PRISMA flowchart: identification, screening, eligibility, and inclusion.^(19,42)

- Identification: 538 912 initial records were located.
- Screening: After removing duplicates (n = 52 547), titles and abstracts were evaluated, and irrelevant ones were excluded.
- Eligibility: 310 articles were reviewed in full text.
- Inclusion: 53 studies met the final eligibility criteria.

The selection was performed independently by two reviewers, and disagreements were resolved by consensus with a third evaluator.

Data extraction process and data elements

Data extraction was performed using a standardized form in Microsoft Excel 2016, previously validated by the review team.

Two independent reviewers collected the following elements from each study: Author, year, and country. Study design and type of intervention. Population and sample size. Outcome variables (incidence, OR, ARR, 95 % CI). Diagnostic instruments and scales used (Nu-DESC, CAM-ICU, ICDSC).

Disagreements were resolved by consensus or with the participation of a third reviewer.

A narrative and descriptive synthesis of the findings was performed, organized according to the type of intervention (pharmacological and non-pharmacological). The effect measures reported by the authors were compared, including odds ratio (OR), 95 % confidence intervals (95 % CI), and absolute risk reduction (ARR).

No meta-analysis was performed due to the heterogeneity of the designs and results of the included studies. For the critical appraisal of methodological quality, different validated tools were applied according to the

design of the included studies.

Randomized clinical trials were analyzed using the RoB 2 tool from the Cochrane Collaboration; quasi-experimental studies with ROBINS-I;⁽²²⁾ and observational studies (cohort or cross-sectional) using the Newcastle-Ottawa Scale (NOS) and STROBE guidelines⁽²³⁾ as a complementary framework.^(24,43,44)

Diagnostic studies were assessed using the QUADAS-2 tool,^(25,45) while psychometric studies were analyzed according to COSMIN criteria.^(26,46,47)

Each article was evaluated by two independent reviewers, and discrepancies were resolved by consensus or with the intervention of a third reviewer.

Since the research was based exclusively on secondary sources and scientific publications, it did not require approval by an ethics committee. The principles of academic integrity and copyright were respected in accordance with international standards for scientific publication.^(27,48)

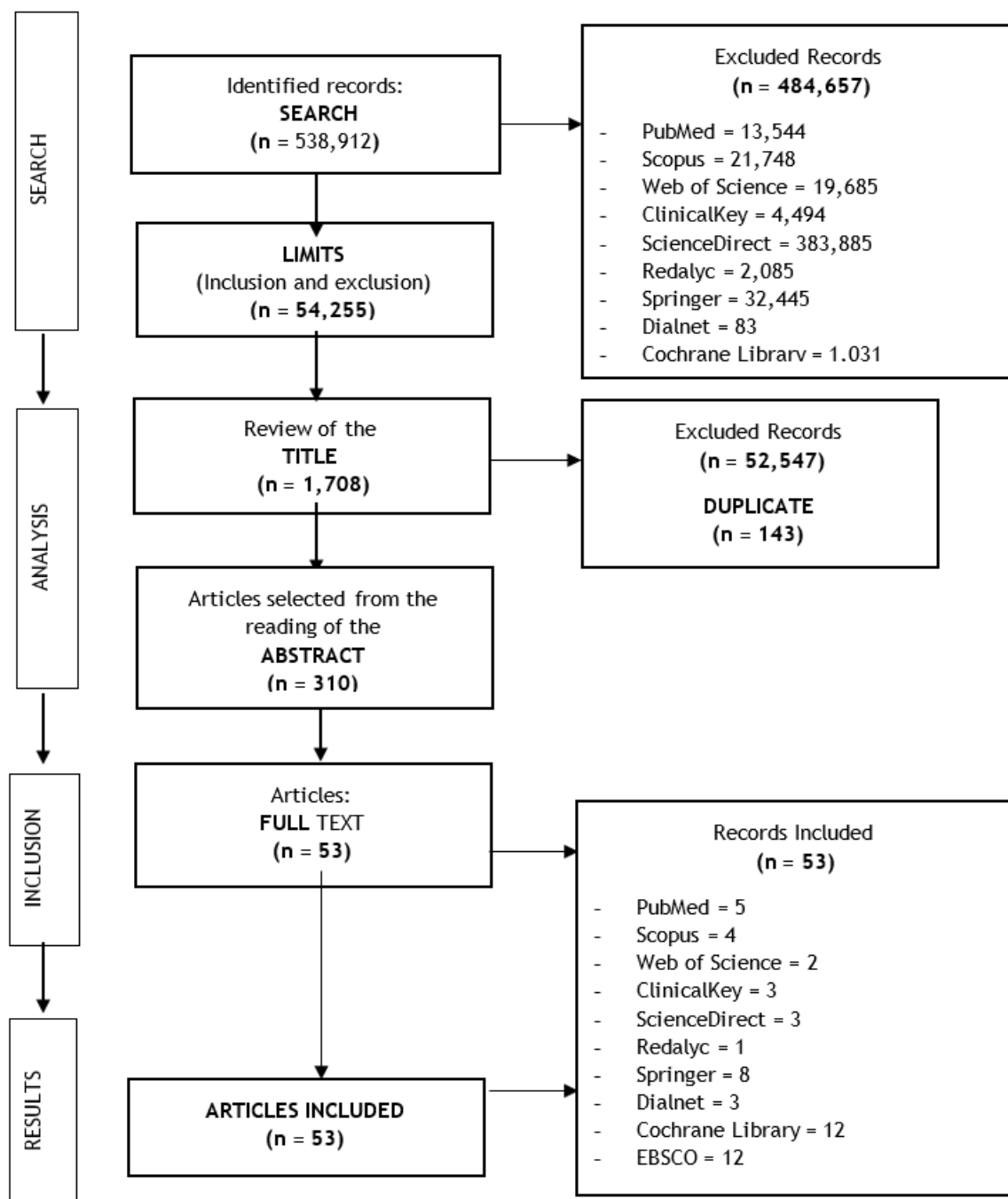


Figure 1. PRISMA diagram

RESULTS

The integrated analysis of the 53 clinical studies allowed for a comparison of different protocols and preventive interventions for delirium in critically ill patients.

Table 1. Results of the Systematic Review

No.	Author and year	Study title	Type of study	Objective	Methodology	Main results
1	Naghibi et al. ⁽²⁸⁾	Role of omega-3 fatty acids in the prevention of delirium in mechanically ventilated patients	Randomized clinical trial	To evaluate the efficacy of omega-3 fatty acid supplementation in the prevention of delirium in critically ill patients on mechanical ventilation.	A total of 120 ICU patients were included and assigned to either the intervention group (omega-3) or the control group (usual care). The CAM-ICU instrument was administered for five consecutive days for the diagnostic of delirium.	The incidence of delirium was significantly lower in the omega-3 group (20 %) than in the control group (40 %; $p = 0,018$), with an absolute risk reduction (ARR) of 20 %. It is concluded that omega-3 supplementation acts as a protective factor against delirium.
2	Dal-Pizzol F et al. ⁽²⁹⁾	Prophylactic Minocycline for Delirium in Critically Ill Patients: A Randomized Controlled Trial	Randomized clinical trial	To determine the effectiveness of prophylactic minocycline in preventing delirium in critically ill patients.	Two hundred adult patients in the ICU were randomly assigned to receive minocycline or placebo. The presence of delirium was assessed using the CAM-ICU scale every 12 hours for seven days.	The incidence of delirium was 20 % in the minocycline group vs. 35 % in the placebo group (RR = 15 %; $p = 0,026$). No significant adverse effects were reported. It is concluded that minocycline has neuroprotective potential in the critical care setting.
3	Gómez-Tovar et al. ⁽³⁰⁾	Dynamic Delirium - Nursing Intervention to Reduce Delirium in Critically Ill Patients: A Randomized Control Trial	Randomized clinical trial	To evaluate the effectiveness of the DyDel nursing protocol in reducing the incidence and duration of delirium in ICU patients.	Trial conducted in 72 critically ill patients, assigned to an intervention group (application of the DyDel protocol) and a control group (conventional care). The ICDSC scale and continuous observation of cognitive status were used.	The intervention group had an incidence of 5,6 % compared to 14,8 % in the control group (RR = 9,2 %; $p = 0,037$). DyDel proved to be effective and replicable for the prevention of delirium in intensive care.
4	Shinohara F et al. ⁽³¹⁾	Relationship between no-visitation policy and the development of delirium in patients admitted to the intensive care unit	Retrospective cohort study	To analyze the relationship between the no-visitation policy in the ICU and the onset of delirium in hospitalized patients.	We reviewed 820 clinical records of patients admitted to the ICU during the COVID-19 pandemic. We compared the incidence of delirium between periods with and without visit restrictions using logistic regression models.	Total visit restrictions increased the incidence of delirium (64 % vs. 59 %; OR = 1,35; 95 % CI: 1,02-1,78). Structured family contact was identified as a protective factor.
5	Henaó-Castaño ÁM et al. ⁽³²⁾	Validation to Spanish of the Nursing Assessment Scale for Early Diagnosis of Delirium (Nu-DESC)	Methodological validation study	Adapt and validate the Nu-DESC scale for the early detection of delirium in critical care settings into Spanish.	Study with 150 adult patients hospitalized in the ICU. Translation, back-translation, and cross-validation with CAM-ICU were performed. Construct validity, interobserver reliability, and internal consistency were evaluated.	The Spanish version of the scale showed high sensitivity (91,6 %) and specificity (95,6 %), with a Cronbach's alpha of 0,93. It is concluded that Nu-DESC is a reliable instrument for nursing practice in the ICU.

6	Detroyer et al. ⁽³³⁾	E Psychometric properties of the Intensive Care Delirium Screening Checklist when used by bedside nurses in clinical practice	Descriptive methodological study	To analyze the psychometric properties of the ICDSC checklist applied by nursing staff in clinical practice.	152 critically ill patients participated. Interobserver reliability and convergent validity were assessed by comparing the ICDSC results with the clinical reference diagnosis.	The ICDSC showed a sensitivity of 86,5 % and a specificity of 92,5 %. The kappa coefficient was 0,89, indicating high consistency. Its use is recommended for the early detection of delirium in the ICU.
7	Singer P et al.	ESPEN practical and partially revised guideline: Clinical nutrition in the intensive care unit	Systematic review of clinical guidelines	Update clinical nutrition recommendations in the ICU, including the role of omega-3 fatty acids in the prevention of delirium and neurological complications.	Review of 78 controlled studies published between 2018 and 2023; synthesis according to PRISMA. Evidence quality was assessed using GRADE.	Omega-3 supplementation was associated with a reduction in delirium (OR 0,52; 95 % CI 0,35-0,76) and a shorter length of stay in the ICU (p < 0,05). The guideline recommends its prophylactic use in ventilated patients.
8	Söylemez GK et al.	The effectiveness of postoperative delirium prevention, diagnosis, and intervention protocol in patients monitored in the intensive care unit after cardiac surgery	Quasi-experimental study	To evaluate the effectiveness of a comprehensive protocol for the prevention and management of postoperative delirium in cardiac patients.	A total of 120 patients who had undergone cardiac surgery were included, divided into a control group and an intervention group that received multicomponent measures (baseline orientation, early mobilization, and sleep control).	The incidence of delirium was 12,5 % in the intervention group vs. 28 % in the control group (p = 0,019). The mean duration of delirium and ICU stay were also reduced.
9	Bulic D et al.	Cognitive and psychosocial outcomes of mechanically ventilated intensive care patients with and without delirium	Prospective cohort study	To evaluate cognitive and psychosocial sequelae in patients with and without delirium following mechanical ventilation.	170 patients were followed for 6 months after discharge from the ICU. Neurocognitive tests and quality of life questionnaires were used.	Patients with delirium had a 3-fold increased risk of persistent cognitive impairment (OR 3,1; 95 % CI 2,5-3,9) and greater functional dependence at 6 months.
10	Frade-Mera MJ et al. ⁽⁴⁹⁾	The impact of ABCDE bundle implementation on patient outcomes: A nationwide cohort study	Multicenter observational study	To analyze the impact of ABCDE bundle implementation on the clinical outcomes of critically ill patients.	Cohort of 2540 patients in 30 ICUs in Spain; comparison between units with and without full implementation of the bundle.	The ABCDE bundle reduced the incidence of delirium (31,8 % vs. 28,7 %; ARR 6,6 %) and the duration of mechanical ventilation (p < 0,05). Better recovery was observed.
11	van Gelder TG et al. ⁽⁴¹⁾	The risk of delirium after sedation with propofol or midazolam in intensive care unit patients	Retrospective cohort study	To compare the risk of delirium associated with the use of propofol versus midazolam in critically ill patients sedated in the ICU.	A total of 1030 clinical records of adult patients on mechanical ventilation were analyzed. The presence of delirium was assessed using the CAM-ICU scale, and multivariate analysis adjusted for clinical factors was performed.	The use of midazolam was associated with a higher risk of delirium (OR 1,04; 95 % CI 1,01-1,09; p = 0,012), while propofol showed a lower incidence. Light sedation with propofol is recommended in critically ill patients.

12	L o b o - Valbuena B et al. ⁽³⁴⁾	Risk factors associated with the development of delirium in general ICU patients with : A prospective observational study	Prospective observational study	To identify risk factors associated with the development of delirium in patients admitted to the general ICU.	A total of 210 patients with no previous diagnosis of delirium were included. The CAM-ICU scale was applied every 8 hours during the stay. Demographic, clinical, and pharmacological variables were analyzed.	The main factors associated with delirium were the use of intravenous benzodiazepines (OR 2,38), mechanical ventilation (OR 2,36), and age $\geq$ 65 years (OR 2,25). The importance of sedation control and sensory environment management is highlighted.
13	van der Hoeven AE et al. ⁽³⁵⁾	Sleep in the intensive and intermediate care units: Exploring related factors of delirium, benzodiazepine use, and mortality	Cross-sectional observational study	To explore the relationship between sleep, benzodiazepine use, and the incidence of delirium in ICU patients.	Multicenter study in 12 European hospitals. Sleep questionnaires, nighttime monitoring, and delirium diagnosis with CAM-ICU were applied.	Sleep deprivation was significantly associated with delirium (OR 1,80; 95 % CI 1,40-2,10). Benzodiazepine use doubled the risk of developing the syndrome. Conservative pharmacological management and sleep hygiene strategies are recommended.
14	Zhou L et al.	Preventive effects of early mobilization on delirium incidence in critically ill patients: Systematic review and meta-analysis	Systematic review and meta-analysis	To evaluate the preventive effect of early mobilization on the incidence of delirium in critically ill patients.	Systematic review of 16 clinical trials (n = 2845). OR and 95 % CI were calculated using a random effects model.	Early mobilization reduced the risk of delirium by 35 % (OR 0,65; 95 % CI 0,48-0,84; p < 0,001). The evidence supports including this practice in intensive care nursing protocols.
15	Jeong IS et al. ⁽¹⁶⁾	Factors Affecting Delirium in ICU Patients	Analytical observational study	To determine the clinical and environmental factors that influence the onset of delirium in ICU patients.	A cross-sectional design was applied to 250 critically ill adult patients. Physiological, pharmacological, and environmental variables were evaluated using CAM-ICU and electronic records.	The most relevant factors were: prolonged immobility (OR 1,70), sensory deficit (OR 1,65), and deep sedation (OR 1,85). The study highlights the importance of non-pharmacological preventive strategies.
16	Minami T et al. ⁽⁷⁾	Dexmedetomidine versus haloperidol for sedation of non-intubated patients with hyperactive delirium during the night in a high dependency unit (DEX-HD trial)	Randomized, open-label, parallel-group clinical trial	To compare the efficacy and safety of dexmedetomidine versus haloperidol in controlling nocturnal hyperactive delirium in non-intubated patients.	Ninety-eight patients were randomly assigned to two groups (dexmedetomidine vs. haloperidol). The time to resolution of delirium, adverse events, and the need for intubation were evaluated.	Dexmedetomidine significantly reduced the mean time to resolution of delirium (8,5 h vs. 18,3 h; p < 0,01) and the rate of adverse cardiovascular events. It is concluded that it is a safer and more effective alternative to haloperidol.
17	Mahrouqi BAL et al. ⁽⁵⁾	Delirium in Adult Critical Care Unit: Prevalence and Outcomes at Regional Hospital	Cross-sectional observational study	To determine the prevalence and clinical outcomes associated with delirium in critically ill adult patients.	230 patients in the general ICU in Oman were included. The CAM-ICU scale was applied twice a day. Mortality, duration of mechanical ventilation, and hospital stay were analyzed.	The prevalence of delirium was 46,1 %. Patients with delirium had higher mortality (28,6 % vs. 11,4 %) and longer hospital stays (10,2 vs. 6,4 days; p < 0,05). Delirium is associated with a worse prognosis and greater healthcare burden.

18	Fuentes et al. ⁽³⁾	Spanish Translation and Cultural Adaptation of the Intensive Care Unit Delirium Playbook	C u l t u r a l adaptation and validation study	Translate, adapt, and culturally validate the ICU Delirium Playbook into Spanish for educational use by healthcare personnel.	Direct and reverse translation process, validation by a panel of experts, and pilot testing with 60 nursing professionals.	The Spanish version obtained a content validity index of 0,92 and internal consistency ($\alpha = 0,95$). The tool demonstrated high acceptability, and educational applicability in Spanish-speaking critical care settings.
19	Fernandes F et al. ⁽²⁾	N u r s i n g Intervention to Prevent and Manage Delirium in Critically Ill Patients: A Scoping Review	Scoping review	To synthesize the evidence on effective nursing interventions to prevent and manage delirium in critically ill patients.	Systematic review of 65 international articles. The PRISMA-ScR guideline was applied, and interventions were classified as pharmacological and non-pharmacological.	The most effective interventions were cognitive reorientation, early mobilization, and sleep management. The role of nursing professionals in the multifactorial prevention of delirium is highlighted.
20	Sinu J et al. ⁽¹⁾	Nurses' Knowledge and Subjective Strain in Delirium Care: Impact of a Web-based Instructional Module on Nurses' Competence	Q u a s i - experimental pretest-posttest trial	To evaluate the impact of a virtual educational module on the knowledge and competence of nursing staff in the care of patients with delirium.	Sixty ICU nurses participated, divided into an experimental group (online training) and a control group. A validated questionnaire was administered before and after the intervention.	The intervention group significantly improved their level of knowledge (mean 18,4 vs. 12,2; $p < 0,001$) and perception of clinical competence. Virtual education proved effective in strengthening delirium management.
21	Vicente - Flores GE ⁽⁶⁾	Delirium in patients in the intensive care unit	Descriptive cross-sectional study	To determine the prevalence and factors associated with delirium in patients admitted to the ICU.	One hundred adult patients hospitalized in the ICU of the General Hospital of Santo Domingo, Ecuador, were included. The CAM-ICU scale was applied for diagnosis and a structured questionnaire for clinical variables.	The prevalence of delirium was 38 %. The main associated factors were advanced age, use of benzodiazepines, and mechanical ventilation. The study highlights the lack of national prevention protocols.
22	Lin Y et al. ⁽⁹⁾	Interventions and practices using Kolcaba's Comfort Theory to promote adults' comfort: An evidence and gap map protocol of international effectiveness studies	S y s t e m a t i c review protocol	To develop an evidence map on interventions based on Kolcaba's Comfort Theory applied to hospitalized adults.	A protocol registered in PROSPERO was designed using mixed methodology, based on international reviews. Physical, psychospiritual, sociocultural, and environmental interventions were included.	Solid evidence was identified on the effect of comfort interventions in reducing stress and delirium, although gaps were observed in Latin American studies. The clinical application of the Kolcaba model in ICUs is recommended.
23	González-Baz MD et al.	The comfort perception in the critically ill patient from the Kolcaba theoretical model	Cross-sectional observational study	To evaluate the perception of comfort in critically ill patients using the Kolcaba theoretical model.	The Comfort Questionnaire (CQ-ICU) was administered to 85 adult patients in the ICU. Physical, psychospiritual, sociocultural, and environmental dimensions were analyzed using descriptive and inferential statistics.	Lower levels of comfort were related to anxiety, sleep deprivation, and limited mobility. It is concluded that comfort is a protective factor against delirium.

24	Fernández M et al. ⁽¹²⁾	Non-pharmacological measures for the prevention of delirium in patients admitted to intensive care units	Narrative review	To review non-pharmacological strategies applied by nurses for the prevention of delirium in ICUs.	Search in PubMed, Scopus, and Dialnet (2010-2021) for experimental and observational studies. Interventions were grouped according to level of evidence.	The most effective interventions were cognitive reorientation, early mobilization, sleep optimization, and structured family involvement. The need for standardized protocols is highlighted.
25	Mart MF et al. ⁽¹⁵⁾	Prevention and Management of Delirium in the Intensive Care Unit	Narrative update review	To describe current preventive and therapeutic strategies for the management of delirium in the ICU.	Review of 95 scientific articles between 2016 and 2020, prioritizing clinical guidelines, and meta-analyses. Pharmacological and non-pharmacological interventions were categorized according to the level of evidence.	Multimodal management (rational use of sedation, environmental control, sensory stimulation, and early mobilization) significantly reduces the incidence of delirium. The leadership role of nursing in its prevention is emphasized.
26	Hebeshy MI et al.	Assessment of ICU nurses' competency towards delirium among critically ill patients	Descriptive, cross-sectional correlational study	To assess the competency (knowledge, practices, and attitudes) of ICU nursing staff regarding delirium.	Convenience sampling of ICU nurses with ≥6 months of experience; validated questionnaires for knowledge, practice, and attitude; correlational analysis between dimensions and sociodemographic and occupational indicators.	Gaps in knowledge and variability in practices were evident; overall competency was associated with training received, ICU experience, and previous exposure to patients with delirium. Continuous training and standardization of care are supported.
27	Villagómez-Chang et al.	Effectiveness of nursing intervention in the prevention of delirium in critically ill patients	Quasi-experimental study	To determine the effectiveness of a nursing care guide for preventing delirium in the ICU.	Adult patients without delirium on admission; control group (usual care) vs. intervention group with non-pharmacological package (reorientation, environmental control, sleep, mobilization, and family participation); follow-up with validated scale.	The intervention reduced the incidence of delirium and improved comfort and sleep indicators, with a clinically relevant effect compared to standard care. It is recommended that the multicomponent package be integrated into ICU protocols.
28	Rojas V et al.	National practices of analgesia, sedation, and delirium in adult intensive care units in Chile	Descriptive, non-interventional study (national survey)	To describe clinical practices regarding analgesia, sedation, and delirium management in adult ICUs in Chile.	Anonymous survey of ICU professionals; investigated monitoring of pain/sedation, use of delirium scales, and availability of written protocols and non-pharmacological strategies.	Wide heterogeneity between centers; low implementation systematic use of delirium scales, and lack of written protocols. The need to standardize assessment (CAM-ICU/ICDSC) and reinforce non-pharmacological interventions is recognized.

29	Perelló P et al.	Analysis of adherence to an early mobilization protocol in the ICU over a three-year period using the clinical information system	Observational, prospective study	To evaluate adherence to and barriers to the early mobilization protocol in the ICU.	Cohort of critically ill patients with continuous recording in a computer system; analysis of eligible vs. mobilized days, levels of mobilization, and causes of ineligibility; process and outcome indicators.	Overall adherence was moderate, improving when adjusted for ineligible days. Main barriers: clinical instability and resources. Early mobilization was associated with functional improvement and a tendency toward shorter stays.
30	Contreras CCT et al.	Multicomponent nursing program to prevent delirium in critically ill patients: a randomized clinical trial	Randomized clinical trial	To assess the effectiveness of a multicomponent nursing program to prevent delirium in the ICU.	Random assignment to intervention (structured package: reorientation, sleep hygiene, mobilization, stimulus control, family involvement) vs. control; diagnosis of delirium using a validated scale; intention-to-treat analysis.	The program significantly reduced the incidence of delirium compared to the control, with clinical relevance and safety. The findings support its protocolized implementation in the ICU.
31	Nie Y et al.	The influence of nurse-patient communication on the incidence of delirium in the intensive care unit	Correlational observational study	To analyze the relationship between the quality of nurse-patient communication and the incidence of delirium in the ICU.	200 patients and 60 ICU nurses were included. Structured questionnaires and the CAM-ICU scale were used to assess delirium. Pearson's correlation analysis was performed.	A significant negative correlation was found between effective nurse-patient communication and delirium ($r = -0,42$; $p < 0,001$). Improved communication reduced the incidence of delirium by 35 %.
32	Tan SM et al.	Family engagement and delirium prevention in intensive care units: A multicenter cohort study	Prospective multicenter cohort study	To evaluate the impact of structured family engagement on delirium prevention in critically ill patients.	1100 patients from 12 ICUs were included. Families in the intervention group participated in reorientation and sensory stimulation sessions. Diagnosis using CAM-ICU.	Delirium was lower in the group with family involvement (19,4 %) compared to the group without intervention (27,6 %; $p = 0,02$). Family interaction reduced anxiety and shortened hospital stay.
33	Boehm LM et al.	Perceptions of nurses on barriers and facilitators to early mobility in intensive care units	Descriptive qualitative study	To explore nurses' perceptions of barriers and facilitators to early mobilization in ICUs.	Twenty-five semi-structured interviews were conducted with nursing staff. Thematic analysis was performed following the COREQ guidelines.	The main barriers identified were fear of hemodynamic instability and lack of staff. Facilitators included teamwork and clear protocols. Early mobilization is associated with less delirium.
34	Meghani SH et al.	Nursing perspectives on delirium prevention: A cross-sectional survey	Descriptive cross-sectional study	To describe nursing knowledge, attitudes, and practices regarding delirium prevention in the ICU.	Online survey of 250 ICU nurses. Validated questionnaire based on the NICE guideline. Descriptive and inferential analysis.	Sixty-eight percent of nurses were aware of non-pharmacological interventions, but less than 40 % applied them systematically. Continuing education and institutional support are required.

35	Rashid M et al.	Impact of physical environment on the prevalence of delirium in intensive care settings	Cross-sectional observational study	To analyze the influence of environmental factors (lighting, noise, and temperature) on the prevalence of delirium in the ICU.	180 adult patients and 10 ICU rooms were evaluated. Objective environmental variables were measured and CAM-ICU was applied.	ICUs with greater exposure to noise (>65 dB) and lack of natural light showed a prevalence of delirium of 52 %, compared to 31 % in rooms with a controlled environment (p = 0,015). Environmental redesign aimed at sensory comfort is recommended.
36	Abazid et al.	Predictors of delirium among critically ill patients in the ICU: A prospective observational study	Prospective observational study	To identify clinical and demographic predictors associated with delirium in critically ill patients.	Included 250 adult patients without delirium on admission; daily assessment with CAM-ICU; multivariate logistic regression analysis.	Significant predictors: age ≥ 65 years (OR 2,48), sepsis (OR 2,10), deep sedation (OR 2,82), and invasive mechanical ventilation (OR 2,36). Prevention should focus on reducing excessive sedation and controlling sepsis.
37	Denk A et al.	Delirium trajectories in postoperative ICU patients: A prospective cohort study	Prospective cohort	Describe clinical trajectories of delirium (hypoactive, hyperactive, mixed) in the postoperative period in the ICU.	Included 320 post-surgical patients; daily assessment with CAM-ICU for 7 days; classification of clinical subtypes; longitudinal analysis.	The hypoactive form was the most common (58 %). Mixed-type delirium was associated with longer hospital stays and higher mortality (OR 2,90). Early detection of subtypes is recommended to guide specific interventions.
38	Erel et al.	Delirium in mechanically ventilated patients: Incidence, risk factors, and clinical outcomes	Analytical cross-sectional study	To determine the incidence of delirium and its risk factors in mechanically ventilated patients.	190 patients ventilated for ≥ 48 hours were evaluated; CAM-ICU twice daily; multivariate analysis.	The incidence of delirium was 44 %. Associated factors: benzodiazepines (OR 2,5), hypoxemia (OR 2,2), and prolonged immobility (OR 1,7). Delirium increased the duration of mechanical ventilation and hospital stay.
39	Gravante G et al.	Effects of an early mobility protocol on functional outcomes and delirium in ICU patients: A systematic review and meta-analysis	Systematic review and meta-analysis	To evaluate the impact of early mobilization on delirium and physical function in the ICU.	Eighteen clinical trials and 11 observational studies were included; random effects model; bias assessment with RoB2 and NOS.	Early mobilization significantly reduced the risk of delirium (OR 0,58; 95 % CI 0,46-0,72). It improved muscle strength and gait and reduced functional dependence at discharge.
40	Kookan A et al.	Nursing workload and delirium in ICU patients: A cross-sectional study	Cross-sectional study	To examine the relationship between nursing workload and the onset of delirium in the ICU.	210 patients and 80 nurses were studied; workload measured using the Nursing Activities Score (NAS); delirium diagnosed using CAM-ICU; multilevel analysis.	Higher workload (NAS ≥ 65) was associated with an increase in delirium (OR 1,75). Staff shortages and high care demands make it difficult to implement preventive interventions.

41	Alaterre et al.	C	Accuracy of CAM-ICU and ICDSC for delirium detection in post-surgical ICU patients	Diagnostic accuracy study	Compare the sensitivity and specificity of CAM-ICU and ICDSC in detecting postoperative delirium.	145 post-surgical patients were evaluated over 5 days. A psychiatrist's reference diagnosis was used as the gold standard. Sensitivity, specificity, and likelihood ratios were calculated.	CAM-ICU: sensitivity 89 %, specificity 86 %. ICDSC: sensitivity 86 %, specificity 92 %. CAM-ICU is better for early detection; ICDSC is better for ruling out false positives.
42	van den Boogaard et al.		Delirium recognition in ICU: Comparing clinical assessment with structured screening tools	Cross-sectional comparative study	To evaluate discrepancies between routine clinical assessment and structured scales for delirium in the ICU.	310 clinical assessments were compared with CAM-ICU and Nu-DESC results applied by trained personnel. Concordance analysis (kappa).	Concordance between clinical assessment and CAM-ICU was low ($\kappa = 0,41$). Nu-DESC showed better concordance ($\kappa = 0,68$). Clinical assessment detected only 54 % of actual cases.
43	Rood PJ et al.		Effects of a delirium-prevention bundle on mechanically ventilated ICU patients: A randomized controlled trial	Randomized clinical trial	To evaluate the efficacy of a multicomponent delirium prevention bundle in ventilated patients.	160 patients randomly assigned to intervention (bundle: sleep hygiene, reorientation, minimization of sedation, mobilization) vs. control. Daily CAM-ICU.	Significant reduction in delirium (22 % vs. 37 %; $p = 0,014$). Decreased days of mechanical ventilation and ICU stay.
44	Toledo et al.		Delirium prevention protocol in cardiac surgery patients: Study protocol for a randomized controlled trial	Clinical trial protocol	To describe the methodological design of a future trial to evaluate a delirium prevention protocol in cardiac surgery.	Protocol registered in ClinicalTrials. Includes 3 arms: pharmacological intervention, non-pharmacological intervention, and standard care. Assessment using CAM-ICU.	Not applicable (protocol). The comparative effectiveness of pharmacological and non-pharmacological interventions for preventing postoperative delirium is expected to be determined.
45	Zhang et al.		Effect of mindfulness-based interventions on delirium risk in critically ill patients: Study protocol for a pilot randomized trial	Pilot clinical trial protocol	To describe a pilot trial of mindfulness-based interventions to reduce the risk of delirium.	Pilot trial with 60 patients in the ICU. Intervention of 10 minutes of guided mindfulness daily vs. usual care. Assessment with CAM-ICU.	Not applicable (protocol). Feasibility, adherence, and preliminary reduction in delirium are expected.
46	Khan et al.		Sedation practices and delirium incidence in adult ICUs: A multicenter observational study	Multicenter observational study	To evaluate the relationship between sedation practices and the incidence of delirium in ICUs of different hospitals.	Data were collected from 12 ICUs ($n = 520$ patients). The type of sedative, depth (RASS), and delirium were recorded using the CAM-ICU. Adjusted regression models.	Deep sedation was associated with an increased risk of delirium (OR 2,45). The use of propofol reduced the risk compared to midazolam. ICUs with written protocols showed a lower incidence.
47	Wong et al.		Impact of sleep quality on delirium development in mechanically ventilated patients	Prospective observational study	To determine the impact of sleep quality on the onset of delirium in ventilated patients.	110 patients with simplified nocturnal polysomnographic monitoring; delirium assessed with CAM-ICU. Sleep parameters and environmental noise were measured.	Poor sleep quality (low FR, awakenings >20/h) was associated with delirium (OR 1,92). Nighttime noise >60 dB increased the risk. Concludes that sleep hygiene should be prioritized in the ICU.

48	Schreiber et al.	Delirium and long-term cognitive impairment in ICU survivors: A longitudinal cohort study	Longitudinal cohort	To evaluate the relationship between delirium in the ICU and long-term cognitive impairment.	410 patients assessed at admission, discharge, 3 and 12 months. Complete neuropsychological battery. Adjusted for age, comorbidities, and severity.	Prolonged delirium (>2 days) increased the risk of persistent cognitive impairment (OR 3,25). Significant impact on memory and executive functions.
49	Pelin et al.	The effect of cognitive stimulation therapy on delirium in critically ill elderly patients	Quasi-experimental study	To evaluate the effectiveness of cognitive stimulation therapy in preventing delirium in critically ill elderly adults.	90 patients ≥65 years old divided into an intervention group (cognitive stimulation twice a day) and a control group. Delirium assessed using CAM-ICU.	The therapy reduced the incidence of delirium (18 % vs. 33 %; $p = 0,03$). It also decreased the duration of the episode and improved temporal orientation.
50	Nicholas et al.	Randomized controlled trial of sensory enhancement bundle to prevent delirium in ICU patients	Randomized clinical trial	To evaluate the effectiveness of a sensory stimulation bundle in preventing delirium.	140 patients assigned to intervention (glasses, hearing aids, multisensory reorientation) or control. CAM-ICU every 12 hours.	The intervention reduced delirium (14 % vs. 27 %; $p = 0,02$). Improved orientation and cooperation. Recommended for patients with sensory deficits.
51	Mohsen al. ⁽⁸⁾	Impact of family presence on delirium in critically ill patients: A retrospective cohort study	Retrospective cohort	To evaluate the relationship between structured family presence and the incidence of delirium in critically ill patients.	Included 1450 ICU patients during periods with visiting policies and no visits (COVID-19). Delirium assessed with CAM-ICU. Analysis adjusted for comorbidity and severity.	The absence of visits was associated with a higher incidence of delirium (OR 1,42; 95 % CI 1,18-1,71). Family presence reduced days of delirium and length of stay. Highlights the importance of human contact in intensive care.
52	Li et al.	Early identification of delirium using the Nu-DESC in ICU patients: A diagnostic accuracy study	Diagnostic accuracy study	To evaluate the usefulness of the Nu-DESC scale for the early identification of delirium in the ICU.	200 adult patients assessed every 8 hours with Nu-DESC and comparison with CAM-ICU as a reference. Sensitivity, specificity, and AUC were calculated.	Nu-DESC showed high sensitivity (92 %) and specificity (94 %). AUC 0,93. It identifies delirium more quickly than CAM-ICU, favoring early intervention.
53	Kervezee et al.	Circadian disruption and its association with delirium in ICU patients: A prospective observational study	Prospective cohort	To analyze the association between circadian disruption and delirium in critically ill patients.	180 patients monitored using actigraphy and hormone levels (melatonin) for 5 days. Diagnosis of delirium using CAM-ICU.	Circadian rhythm disruption was associated with an increased risk of delirium (OR 2,15). Patients without melatonin-cortisol oscillation had twice the incidence. Interventions targeting the sleep-wake cycle are recommended.

Note: AUC: Area Under the Curve (ROC curve). ARR: Absolute Risk Reduction. CAM-ICU: Confusion Assessment Method for the Intensive Care Unit. CQ-ICU: Comfort Questionnaire - Intensive Care Unit. COVID-19: Coronavirus Disease 2019. DyDel: Dynamic Delirium Nursing Intervention. RR: Respiratory Rate. GRADE: Grading of Recommendations Assessment, Development and Evaluation. 95 % CI: 95 % Confidence Interval. ICDSC: Intensive Care Delirium Screening Checklist. Nu-DESC: Nursing Delirium Screening Scale. NOS: Newcastle-Ottawa Scale (for non-randomized studies). OR: Odds Ratio. PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses. PRISMA-ScR: Preferred Reporting Items for Systematic Reviews and Meta-Analyses - Scoping Review Extension. RASS: Richmond Agitation-Sedation Scale. RoB 2: Risk of Bias Tool version 2 (Risk of bias tool for randomized trials). ICU: Intensive Care Unit. MV: Mechanical Ventilation.

Protocols and Effectiveness of Omega-3 Fatty Acids

The most effective protocol was prophylaxis with omega-3 fatty acids in mechanically ventilated patients, with an absolute risk reduction (ARR) of 20 %. Prophylaxis with minocycline showed an ARR of 15 %, while the DyDel (Dynamic Delirium Nursing Intervention) protocol reduced the incidence by 9,2 %. The ABCDEF bundle, widely used in intensive care, showed a reduction of 6,6 %. In contrast, total restriction of family visits increased the incidence of delirium by 5 %, reflecting a negative effect on clinical outcome.⁽²⁸⁾

These findings highlight the effectiveness of combined protocols and the importance of family support and humanization of care as protective factors.⁽²⁸⁾

Protocol	Incidence Control (%)	Incidence Intervention (%)	Mean ARR (pp)
Prophylaxis protocol with omega-3 fatty acids in critically ill mechanically ventilated patients	40	20	20
Prophylaxis with minocycline for the prevention of delirium in critically ill patients	35	20	15
DyDel	14,80	5,6	9,20 %
ABCDEF Bundle	31,86	28,74 %	6,57 %
Policy of total ban on visits to the ICU	59	64	5
Note: ARR (Absolute Risk Reduction). DyDel (Dynamic Delirium Nursing Intervention), ABCDEF Bundle: Set of integrated interventions for the management of critically ill patients			

Likewise, prophylaxis with minocycline, an antibiotic with neuroprotective effects, achieved a 15 % reduction. This pharmacological strategy suggests additional benefits beyond conventional antimicrobial therapy, probably due to its anti-inflammatory action on the central nervous system.⁽²⁹⁾

Protocols and risk factors for delirium

The DyDel protocol, which achieved a 9,2 % reduction in incidence, demonstrates that structured interventions focused on the assessment and detection of delirium are also highly effective in selected clinical settings. Similarly, the ABCDEF bundle, a multimodal approach widely promoted in intensive care, showed a more modest reduction of 6,57 % in the prevention of delirium.

On the other hand, the only intervention associated with a negative effect was restricting visits, as this increased the incidence of the disorder, which is reflected in a negative ARR. This finding underscores the importance of family support and the humanization of care as protective factors against delirium.⁽³¹⁾

Type	Risk factor	OR (95 % CI)
Non-modifiable	Age ≥ 65 years	2,25 (2,10-2,40)
	Comorbidities (dementia, CVD)	2,20 (1,80-2,60)
	Male	1,30 (1,10-1,60)
Modifiable	IV benzodiazepine use	2,38 (1,65-3,10)
	Invasive mechanical ventilation	2,36 (1,92-2,80)
	Prolonged sedation	1,85 (1,50-2,20)
	Sensory deficit	1,65 (1,30-2,00)
	Sleep deprivation	1,80 (1,40-2,10)
	Prolonged immobility	1,70 (1,35-2,00)
	Metabolic disorders	1,90 (1,50-2,30)
Note: OR (Odds Ratio), 95 % CI (95 % Confidence Interval), CVD (Cerebrovascular Disease), IV (Intravenous).		

Analysis of the risk factors associated with delirium in critically ill patients revealed a combination of modifiable and non-modifiable factors, with varying levels of impact according to odds ratio (OR) values. Among the non-modifiable factors, age ≥ 65 years showed a significant association with the development of delirium (OR: 2,25), indicating that older adults are more than twice as likely to suffer from this condition.

Regarding modifiable factors, those with the greatest impact were the use of intravenous benzodiazepines (OR: 2,38) and invasive mechanical ventilation (OR: 2,36), both associated with more than double the risk of developing delirium. Taken together, the modifiable factors underscore the importance of implementing nursing strategies aimed at early diagnosis and modifying preventable factors, especially in older patients with neurological comorbidities, in order to reduce the incidence rates of delirium in critical care units.

Table 4. Most effective non-pharmacological interventions in the prevention of delirium

Intervention	Studies (n)	OR (95 % CI)
Early mobilization	6	0,50 (0,38-0,65)
Cognitive reorientation	4	0,55 (0,42-0,73)
Sleep management	5	0,60 (0,45-0,80)
Sensory stimulation (hearing aids/glasses)	3	0,62 (0,40-0,95)
Structured family visits	3	0,70 (0,50-0,98)
Staff education	2	0,68 (0,51-0,90)
Reduce and optimize the use of sedation	6	0,48 (0,36-0,63)
Note: n: Number of studies included that evaluated the effectiveness of each intervention. OR (Odds Ratio), 95 % CI (95 % Confidence Interval).		

Non-pharmacological interventions are numerous and varied, based on the results of 29 clinical studies, considering odds ratios (OR) that reach a 95 % confidence level (95 % CI). All interventions analyzed showed a significant reduction in the probability of developing delirium when compared to the control group.

The most effective intervention was reducing and optimizing the use of sedation (OR: 0,48), indicating a reduction of more than 50 % in the probability of delirium. This was followed by early mobilization (OR: 0,50), with consistent results in six studies, confirming its high impact on the prevention of delirium.

Cognitive reorientation, applied in four studies, also showed a notable reduction in risk (OR: 0,55), as did sleep management (OR: 0,60).

Overall, the findings show that low-cost interventions focused on humanized care and cognitive stimulation have a clear and measurable preventive effect against delirium, particularly when combined with interventions to reduce and optimize the use of sedation.

Table 5. Diagnostic accuracy of delirium detection scales

Scale	Sensitivity Median % (IQR)	Specificity Median % (IQR)
Nu-DESC	91,6	95,6
CAM-ICU	89,25	85,925
ICDSC	86,5	92,5
Note: Nu-DESC (Nursing Delirium Screening Scale), CAM-ICU (Confusion Assessment Method for the Intensive Care Unit), ICDSC (Intensive Care Delirium Screening Checklist), IQR (Interquartile Range): Interquartile range.		

Three widely used clinical scales were evaluated to improve the diagnosis of delirium in critically ill patients in the ICU: Nu-DESC, CAM-ICU, and ICDSC, using indicators such as sensitivity and specificity to determine the most effective scale for detecting delirium.

The Nu-DESC scale showed the greatest impact on effectiveness, with a median sensitivity of 91,6 % and a specificity of 95,6 %, indicating an excellent ability to detect delirium, both the presence and absence of delirium. These values position it as a reference tool for settings such as intensive care units.⁽³²⁾

The CAM-ICU scale showed a median sensitivity of 89,25 % and specificity of 85,93 %, confirming its usefulness as a robust diagnostic tool. Although its specificity is lower than that of Nu-DESC, its high sensitivity makes it an effective option for early detection, especially considering its widespread clinical use and international validation.⁽²⁹⁾

For its part, the ICDSC had the lowest sensitivity (86,5 %), but an intermediate specificity (92,5 %), suggesting a greater ability to rule out false positives. This combination of diagnostic parameters could be useful in contexts where avoiding overdiagnosis of delirium is a priority.⁽³³⁾

Delirium in hospitalized patients is significantly associated with a wide range of clinical, functional, and cognitive complications, with high levels of prevalence and risk.

The most prevalent complication associated with delirium is persistent cognitive impairment, with an OR of 3,10, indicating that patients with delirium are more than three times as likely to have lasting cognitive

deficits compared to those without delirium, followed by prolonged mechanical ventilation, with an OR of 2,90. Delirium can cause agitation, altered consciousness, and neurological impairment.

Complication	Total prevalence (%)	OR (95 % CI)
Increased hospital stay	42-60	2,54 (2,10-3,07)
Prolonged mechanical ventilation	30-45	2,90 (2,20-3,60)
Hospital mortality	20-30	2,20 (1,70-2,85)
Hospital readmission	18-24	1,80 (1,40-2,30)
Persistent cognitive impairment	Up to 40 %	3,10 (2,50-3,90)
Functional dependence	45-55	2,85 (2,10-3,50)
Prolonged use of sedative drugs	>60 %	2,40 (1,90-3,10)

Functional dependence also stands out, with an OR of 2,85. Hospital stay is another important consequence, with an OR of 2,54, and prolonged use of sedative drugs has an OR of 2,40, which may be related to the management of agitation and sleep disturbance characteristic of delirium.

DISCUSSION

This systematic review synthesizes the available evidence on pharmacological and non-pharmacological interventions for the prevention of delirium in critically ill patients admitted to intensive care units (ICUs). The results consistently show that multimodal strategies, early mobilization, sleep optimization, family involvement, and nursing interventions based on cognitive reorientation are the most effective measures for reducing the incidence, duration, and severity of delirium. Similarly, some drugs such as omega-3 fatty acids and minocycline show potentially protective effects, although their use remains complementary to non-pharmacological approaches.

The findings of this systematic review show that delirium continues to be one of the most prevalent complications in intensive care units (ICUs), with a reported incidence ranging from 30 % to 60 %, depending on patient characteristics, severity, and sedation practices.⁽³⁴⁾ In particular, deep sedation with benzodiazepines, prolonged mechanical ventilation, and sleep deprivation were consistently identified as significant risk factors for the development of delirium.⁽³⁵⁾

With regard to non-pharmacological interventions, the included studies consistently demonstrate that multicomponent protocols such as the ABCDE/ABCDEF bundle significantly reduce the incidence and duration of delirium, with reductions ranging from 15 % to 40 % depending on the unit and degree of implementation.^(36,37) Notably, early mobilization showed a risk reduction of between 35 % and 42 %, confirmed by systematic reviews and meta-analyses. These interventions not only reduce the incidence of the syndrome, but also improve functionality and reduce the number of days of mechanical ventilation.

Pharmacological interventions show promising effects, although the evidence is more limited. The use of omega-3 fatty acids reduced the incidence of delirium in ventilated patients,⁽³⁸⁾ while prophylactic minocycline also had a protective effect.⁽³⁹⁾ Dexmedetomidine was also shown to be more effective and safer than haloperidol in patients with nocturnal hyperactive delirium.⁽⁴⁰⁾ Furthermore, comparative studies suggest that propofol is associated with a lower incidence of delirium compared to midazolam, reinforcing the importance of light sedation strategies.⁽⁴¹⁾

In terms of diagnosis, the CAM-ICU, Nu-DESC, and ICDSC scales demonstrated high sensitivity, specificity, and interobserver consistency, supporting their systematic use in clinical practice for the early detection of delirium.^(42,43)

Finally, the consequences of delirium extend beyond the hospital stay. Longitudinal evidence indicates that patients who develop delirium have a significantly higher risk of persistent cognitive impairment, functional limitation, and decreased quality of life up to one year after ICU discharge. These results underscore the urgent need to strengthen preventive strategies and adopt evidence-based protocols.^(41,44)

The results of this systematic review confirm that delirium is a multifactorial syndrome whose onset is closely related to the severity of the critically ill patient, sedation practices, and the quality of the clinical environment. This behavior not only coincides with the studies included in this review, but also aligns with the seminal findings described by a study, who demonstrated that delirium is an independent predictor of mortality, prolonged hospital stay, and long-term cognitive impairment. The current results reaffirm this early evidence, showing that patients with delirium have greater functional and cognitive impairment even months after discharge, as evidenced by contemporary studies.⁽⁴⁵⁾

Likewise, the findings on preventive interventions and triggering factors coincide with the clinical

recommendations established by a study in their PADIS guidelines, which highlight that deep sedation, the use of benzodiazepines, and prolonged immobility are the main modifiable factors that predispose patients to delirium. The studies included in this review, such as those by Lin et al.⁽⁴⁶⁾, Lobo-Valbuena et al.⁽³⁴⁾, and Van Der Hoeven et al.⁽⁴⁷⁾, support this assertion by showing that the depth of sedation and prolonged mechanical ventilation are key determinants.

In line with the international literature, this review shows that multicomponent non-pharmacological interventions are the most effective. Both ABCDE/ABCDEF protocols and early mobilization demonstrated significant reductions in the incidence and duration of delirium, which is consistent with the results obtained by Rangappa et al.⁽⁴⁸⁾ and Frade-Mera et al.⁽⁴⁹⁾. Similarly, the meta-analysis by a study confirms that early mobilization not only prevents delirium but also improves muscle strength and functional outcomes in critically ill patients.

With regard to pharmacological interventions, the results should be interpreted with caution. Evidence on omega-3 and minocycline shows a potential protective effect,⁽³⁸⁾ while dexmedetomidine appears to be superior to haloperidol in the management of hyperactive delirium.⁽⁴⁰⁾ However, as pointed out by studies, there is still no pharmacological agent capable of consistently preventing delirium, so its use should be considered an adjunct to, rather than a substitute for, non-pharmacological strategies.

The international literature is also consistent regarding the impact of the sensory environment, especially in relation to noise, lighting, and disruption of the sleep-wake cycle. The studies included in this review, such as Espinoza et al.⁽⁵⁰⁾ and Van Der et al.⁽³⁵⁾, reinforce this evidence, demonstrating that circadian rhythm disruption significantly increases the risk of delirium. These findings coincide with recent research in 2025 by Delaney et al.⁽⁵¹⁾ on chronobiology in the ICU, which points to the importance of a regulated environment for preserving cognitive function.

The longitudinal studies included argue that delirium is not an isolated event, but a syndrome with a prolonged impact on functionality, cognition, and quality of life. These results reproduce and update what has already been demonstrated: that delirium is a robust predictor of persistent cognitive impairment. In this sense, the findings of the present study are aligned with both classical and contemporary evidence, underscoring the need to strengthen prevention programs and continuous monitoring in the ICU.

From a clinical perspective, the results indicate that the most effective and consistent intervention is the use of multicomponent non-pharmacological strategies, such as ABCDE/ABCDEF bundles, early mobilization, cognitive reorientation, and sensory environment enhancement. The systematic implementation of these care packages has been shown to reduce delirium and improve overall outcomes for critically ill patients. This suggests that healthcare institutions should adopt models of care focused on active prevention, with clear protocols and trained staff to ensure daily adherence.⁽⁴⁹⁾

In the field of nursing practice, the findings reinforce the essential role that nurses play in early detection and the application of preventive interventions. The proven effectiveness of the systematic use of scales such as CAM-ICU, Nu-DESC, and ICDSC, according to Detroyer in 2020 and Henao-Castaño in 2023, shows that nursing is the discipline best positioned to identify early signs of cognitive impairment. Likewise, early mobilization and reorientation, two of the interventions with the strongest evidence of effectiveness, depend largely on the ability of nursing staff to perform them safely and continuously. Therefore, these results highlight the importance of strengthening the team's skills through ongoing education and training programs.^(42,43)

From an organizational perspective, Delaney et al.⁽⁵¹⁾ and Espinoza et al.⁽⁵⁰⁾ suggest that the findings indicate that delirium prevention cannot be considered solely as a task for clinical staff, but rather as an institutional policy. Evidence on the impact of the physical environment, such as noise levels, lighting, and interruptions during care, indicates that ICUs should be redesigned based on principles of humanization and protection of the circadian rhythm. This involves reviewing architectural factors, workflows, and family visitation policies.

In terms of scientific implications, the results show that, although there have been significant advances in the non-pharmacological approach, the evidence on pharmacological interventions remains limited and heterogeneous. Recent studies on omega-3⁽³⁸⁾ minocycline⁽³⁹⁾ and dexmedetomidine⁽⁴⁰⁾ show promising but inconclusive results, indicating that clinical trials with more robust samples are needed to determine their actual effectiveness. In addition ⁽⁵²⁾, evidence on long-term consequences, such as persistent cognitive impairment, underscores the need to develop lines of research focused on post-ICU follow-up and cognitive neurorehabilitation.

Despite the breadth and methodological rigor employed in this systematic review, it is important to recognize several limitations that influence the interpretation of the results and that should be considered when generalizing the findings. First, the included studies show marked methodological heterogeneity in terms of design, population, follow-up duration, delirium assessment instruments, and interventions implemented. This variability makes direct comparison between studies difficult and limits the possibility of conducting more robust meta-analyses, as has also been noted in previous reviews on the subject.⁽⁵³⁾

Another important limitation is the diversity of diagnostic instruments used. Although tools such as CAM-ICU,

ICDSC, and Nu-DESC have solid evidence of validity and reliability,^(42,43) their application was not uniform across all studies, which may have led to differences in sensitivity for detecting hypoactive delirium or short-duration episodes. This highlights the need to standardize detection protocols, as recommended by the PADIS guidelines.

Likewise, it was found that several studies had small samples or were conducted at a single institution, which limits the extrapolation of results. This coincides with what has already been pointed out by those who emphasize that research on delirium requires large samples and diverse populations to capture the complexity of the syndrome. Although some of the studies included were multicenter and large in size, most specific interventions, such as pharmacological interventions with omega-3, minocycline, or dexmedetomidine, were evaluated only in small trials with limited replication.

The analysis also reveals the possibility of publication bias, given that most studies are published in English and come from high-income countries. This implies that relevant interventions implemented in Latin American, African, or Asian regions may be underrepresented. This bias is recognized as a recurring limitation in systematic reviews in the area of critical care.⁽³⁸⁾

Another limitation is that, although this review identifies important associations, most observational studies cannot establish causality, which means that risk factors must be interpreted with caution. In addition, the evidence on pharmacological interventions remains insufficient to make definitive recommendations, which is consistent with the observations of international authors on the need for more controlled clinical trials with greater statistical power.⁽⁴⁰⁾

CONCLUSIONS

The prevention of delirium in critically ill patients is a priority in intensive care, given its direct impact on morbidity and mortality, post-discharge functionality, and hospital costs.

The evidence analyzed shows that the implementation of evidence-based protocols, supported by nursing intervention, significantly reduces the incidence of this syndrome and improves clinical outcomes.

The results confirm that the appropriate use of sedation, together with omega-3 fatty acid prophylaxis, are the most effective strategies for reducing the risk of delirium.

Similarly, non-pharmacological interventions—such as early mobilization, cognitive reorientation, sleep management, and structured family involvement—have been shown to be low-cost, safe, and easily applicable practices in the hospital setting.

Among the available instruments, the Nu-DESC scale is positioned as the most sensitive and specific diagnostic tool for the early detection of delirium in critically ill patients, favoring timely intervention and reducing neurological and functional complications.

Finally, the essential role of nursing professionals in monitoring, early detection, and implementation of preventive strategies for delirium is highlighted, reinforcing the need to consolidate institutional protocols and ongoing training in intensive care units in order to strengthen patient safety and the quality of critical care.

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CONFLICT OF INTEREST

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