Research Article
Artigo de Pesquisa
Artículo de Investigación

DOI: https://doi.org/10.12957/reuerj.2025.93984

Risk of delirium as a diagnosis proposal: an integrative review

Risco de delirium como proposta diagnóstica: revisão integrativa

Riesgo de delirio como propuesta de diagnóstico: revisión integradora

Luciana Aparecida Costa Carvalho[I]; Marisa Dibbern Lopes Correia[II]; Gabrielle Martins da Silva[II]; Ráisa Camilo Ferreira[I]; Micnéias Lacerda Botelho[IV]; Erika Christiane Marocco Duran[I]

[I]Universidade Estadual de Campinas. Campinas, SP, Brazil; [II]Universidade Federal de Viçosa, Viçosa, MG, Brazil; [III]Universidade de São Paulo, São Paulo, Brazil; [IV]Universidade Federal do Mato Grosso, Sinop, MT, Brazil

ABSTRACT

Objective: to identify risk factors for developing *delirium* and to present them as human response elements. **Method:** an integrative literature review presenting the risk factors as human response elements according to the NANDA International Diagnosis Classification taxonomy. The search strategy was applied in six databases, yielding 31 articles. **Results:** the concept of susceptibility to *delirium* as a human response was identified, as well as its 34 risk factors, classified into 12 risk factors related to independent actions by nurses, three at-risk populations and 19 associated conditions, configuring the presentation of this susceptibility as a risk Nursing diagnosis. **Conclusion:** the risk factors identified were presented as elements inherent to the patients' susceptibility to developing *delirium*, creating the "Risk of *delirium*" Nursing diagnosis proposal. This study may contribute to accuracy in nurses diagnosing such human response, collaborating to care quality.

Descriptors: Nursing; Delirium; Nursing Process; Nursing Diagnosis; Risk Factors.

RESUMO

Objetivo: identificar fatores de risco para o desenvolvimento do *delirium* e apresentá-los como elementos de uma resposta humana. **Método:** Revisão integrativa da literatura e apresentação dos fatores de risco como elementos de uma resposta humana segundo a taxonomia da Classificação de Diagnósticos NANDA Internacional. A estratégia de busca foi aplicada em seis bases de dados, incluindo 31 artigos. **Resultados:** Identificação do conceito de susceptibilidade ao *delirium* como resposta humana e seus 34 fatores de risco, classificados em 12 fatores de risco de ações independentes pelo enfermeiro, três populações em risco e 19 condições associadas, configurando a apresentação desta susceptibilidade como diagnóstico de enfermagem de risco. **Conclusão:** Os fatores de risco identificados foram apresentados como elementos da susceptibilidade do paciente ao desenvolvimento do *delirium*, sendo elaborada a proposta do diagnóstico de enfermagem "Risco de *delirium*". Este estudo poderá contribuir para a acurácia diagnóstica de tal resposta humana pelo enfermeiro, colaborando para a qualidade do cuidado.

Descritores: Enfermagem; Delírio; Processo de Enfermagem; Diagnóstico de Enfermagem; Fatores de Risco.

RESUMEN

Objetivo: identificar los factores de riesgo para el desarrollo del delirio y presentarlos como elementos de una respuesta humana. **Método:** revisión integradora de la literatura y presentación de los factores de riesgo como elementos de una respuesta humana según la taxonomía de la Clasificación Internacional de Diagnósticos de Enfermería NANDA. La estrategia de búsqueda se aplicó a seis bases de datos e incluyó 31 artículos. **Resultados:** se identificó el concepto de susceptibilidad al delirio como respuesta humana y sus 34 factores de riesgo, clasificados en 12 factores de riesgo de acciones independientes por parte del enfermero, tres poblaciones en riesgo y 19 condiciones asociadas, lo que configura la presentación de esta susceptibilidad como un diagnóstico de enfermería de riesgo. **Conclusión:** los factores de riesgo identificados se presentaron como elementos de la susceptibilidad del paciente al desarrollo del delirio*, y* se propuso el diagnóstico de enfermería "Riesgo de delirio". Este estudio puede contribuir a la precisión diagnóstica de esta respuesta humana por parte del enfermero, a la calidad de la atención.

Descriptores: Enfermería; Delírio; Proceso de Enfermería; Diagnóstico de Enfermería; Factores de Riesgo.

INTRODUCTION

Delirium (or acute brain dysfunction) results from biological attacks to the brain and is defined as an acute neurocognitive disorder. It develops in a brief period of time with alterations in attention and at the baseline consciousness level, tending to fluctuate in terms of severity throughout the day. It is characterized by mental state fluctuations and by reduced ability to direct, focus, maintain and shift the attention, including memory and language deficits, disorientation and altered visual-spatial ability or perception. It is a direct physiological consequence or one resulting from another pre-existing medical condition. Its pathophysiology probably involves multiple mechanisms associated with reduced brain oxidative metabolism[1-3].

Article extracted from the dissertation entitled: "*delirium* in patients admitted to intensive care units", presented in July 2019 at the Nursing School belonging to *Universidade Estadual de Campinas*, and having updated the integrative review via the Scientific Initiation project entitled: "Concept analysis of the 'Risk of delirium: Update to the human response proposal' Nursing diagnosis".

This study was financed in part by the Institutional Program for Scientific Initiation Grants (*Programa Institucional de Bolsas de Iniciação Científica*, PIBIC] – Brazil [BR]- [SI Edict No. 01 dated March 2024].

Corresponding author: Luciana Aparecida Costa Carvalho. E-mail: luci89@unicamp.br

Editor in Chief: Cristiane Helena Gallasch; Associate Editor: Alessandra Conceição Leite Funchal Camacho

Received: Sep 4th 2025 – Accepted: Dec 7th 2025

Research Article
Artigo de Pesquisa
Artículo de Investigación

DOI: https://doi.org/10.12957/reuerj.2025.93984

The incidence of *delirium* varies from 13% to 67% in hospitalized patients, representing the most incident neurological dysfunction in Intensive Care Units (ICUs). However, under-reporting of cases can also be a reality, possibly due to not using specific and systematized instruments to screen it or targeted clinical evaluations. When present, *delirium* can result in various harmful consequences for patients and health systems alike, such as increased hospitalization times, institutionalization and mortality rates, with preventive measures standing out as essential to reduce this outcome[4,5].

Applying instruments or performing clinical evaluations to identify *delirium* allows screening it only when already installed. Such tools cannot detect the risk factors identified (RFIs) for its development. *Delirium* can be triggered by an isolated RFI; however, it is frequently considered as a multifactorial condition. For being the professionals that spend the most time at the bedside, Nursing team members hold a privileged position to early identify these RFIs, targeting preventive and systematized actions with the objective of reducing their incidence[5,6].

In this context, nurses' actions in relation to the human responses of vulnerable individuals to *delirium* should be systematized, ideally via the Nursing Process (NP), which is a method that guides professional Nursing care and documentation of the professional practice. It comprises five inter-related stages: Nursing Assessment, Nursing Diagnosis (ND), Nursing Planning, Nursing Implementation and Nursing Evaluation[7].

According to the NANDA International (NANDA-I) Standardized Nursing Terminology (SNT), the NP is defined as a clinical judgement on a human response to health conditions/life processes, or as some susceptibility to such response that is recognized in a given person, family or community. NDs include those focused on the problems, risk diagnoses and health promotion diagnoses. Accurately identifying a risk diagnosis can reduce harmful effects in the patients, as the factors that determine such susceptibility are subjected to Nursing interventions[7,8].

It is emphasized that the risk of *delirium* is determined by a patient's specific RFIs and by their individual response to each factor. Depending on that response, nurses can make a clinical decision and diagnostic inference about that susceptibility. According to the variability across the RFIs, each individual will have a different response, which requires a risk Nursing Diagnosis and targeted prevention measures[8].

Consequently, the importance of identifying the RFIs for *delirium* and their systematized presentation through some SNT is warranted and, considering that there is a gap in the literature because there is still no specific Nursing diagnosis in NANDA-I for this human response, there is a need for scientific productions that support systematizing nurses' assessments as for the risks of this outcome. The existing studies mostly concentrate on preventing *delirium*, but without contemplating the importance of structuring the process to identify the susceptibility to its development or systematically relating it to preventive Nursing interventions.

Thus, the results may contribute to developing more accurate assistance by targeting nurses' assessments given the factors that favor developing *delirium*. Such outcome can cause harms in the patients and increase the costs for health systems.

Therefore, the objective of this study was to identify the RFIs for developing *delirium* and to present them as human response elements.

METHOD

An Integrative Literature Review (ILR) study presenting the results based on the NANDA-I Nursing Diagnosis Classification taxonomy to propose the *Risk of delirium* diagnosis. The search strategy was developed with the aid of a bibliotecarian and applied in the databases from August to September 2024.

The ILR consisted in six phases: Identifying the topic or question; Sampling or search in the literature; Categorizing the studies; Evaluating the studies included; Interpreting the results; and Synthesizing the knowledge found in the articles analyzed or Presenting the ILR[9].

The ILR guiding question was as follows: Which RFIs contribute to *delirium* in hospitalized patients?". The Population, Exposure and Outcomes (PEO) acronym was used, where P refers to "Hospitalized patients", E means "Risk factors" and O stands for "*Delirium*". The inclusion criteria encompassed articles dealing with adult patients hospitalized in ICUs that used a specific screening instrument to identify *delirium*, with the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR)[1] as a reference. Studies published in English, Portuguese or Spanish from 2013 onwards were included. Choice of this time clipping is justified by the latest update made to the Delirium Management Nursing intervention (4352), described in the Nursing Interventions Classification (NIC), originally

Research Article
Artigo de Pesquisa
Artículo de Investigación

DOI: https://doi.org/10.12957/reuerj.2025.93984

included in 1992 and modified in 2013. It is considered that, despite having a correlation with other human responses, the Nursing activities associated with this intervention can be related to risk factors that contribute to the outcome and to the vulnerability human response. In addition, it is grounded in the need to gather current evidence in line with the contemporary practices in identifying *delirium*, as its concept was last updated in 2013, displacing the focus on its cause to its clinical manifestation and evolution in time[10].

The publications excluded were those in the form of editorials, letters to the editor, congress summaries and review articles, for not presenting any empirical evidence compatible with the objectives set forth in this review.

The following descriptors were used in the search strategy: *Delirio*/Delirium, *Fatores de Risco*/Risk Factors and *Hospitalização*/Hospitalization, with "AND" and "OR" Boolean operators between them and between their synonyms, respectively.

The databases selected included the following ones: Cochrane Library, Scopus®, Science Citation Indexes (Web of Science), Cumulative Index to Nursing and Allied Health Literature (CINAHL), the *Biblioteca Virtual em Saúde* (BVS) portal and the National Library of Medicine and National Institute of Health (PubMed) portals. These sources were chosen due to their relevance in the health area.

An instrument adapted from Ursi was used to extract the data from the articles selected; all the studies were chosen and evaluated by two researchers who worked independently, resorting to a third evaluator to analyze specific studies in case of disagreement. The levels of evidence were categorized based on the following references: Level I - Systematic reviews or meta-analysis; Level II - Controlled randomized studies; Level III - Controlled non-randomized studies; Level IV - Case-control or cohort studies; Level V - Systematic reviews of qualitative or descriptive studies; Level VI - Qualitative or descriptive studies; and Level VII - Opinions or consensus[11-12].

In order to organize the RFIs and according to the NANDA-I SNT, the Level of evidence 1.3 was used, which corresponds to the diagnostic components and to their relationship with outcomes and interventions. In this study, the RFIs were categorized into risk factors (RFs), associated conditions and at-risk populations, as per the possibility for nurses' independently acting on these elements. The ND title and definition had the definition of *delirium* identified in the ILR as a reference, adding in its writing a mention to people's susceptibility as a human response, object of nurses' work[1,8].

The RFs were defined as antecedent factors that increase susceptibility to an undesirable human response in a given person, family or community. They are factors that can be modified through autonomous Nursing interventions. The at-risk population was considered as a group of people sharing sociodemographic characteristics, health/family histories, growth/developmental stages and exposure to certain events/experiences that render their members susceptible to a given human response. In turn, the associated conditions considered were as follows: medical diagnoses, diagnostic/surgical procedures, medical/surgical devices or pharmaceutical preparations, all elements not modifiable by nurses' independent performance[8].

In order to create the ND, the ISO 18.104:2023 standard was complied with, which standardizes the terminology and diagnostic structure used in the Nursing practice and the NANDA-I SNT recommendations[8].

RESULTS

The ILR yielded 5,020 search results. The procedures to select the documents are presented in the flowchart showing how the articles were selected in Figure 1, adapted from PRISMA 2020[13].

After using a reference manager (EndNote™) and excluding duplicate articles, the studies were pre-selected by evaluating their titles and abstracts, followed by two researchers reading the papers in full. The articles that did not meet the inclusion criteria were excluded. There was no disagreement among the researchers when evaluating the search results. Consequently, 31 articles were included in the final sample.

Research Article
Artigo de Pesquisa
Artículo de Investigación

DOI: https://doi.org/10.12957/reuerj.2025.93984

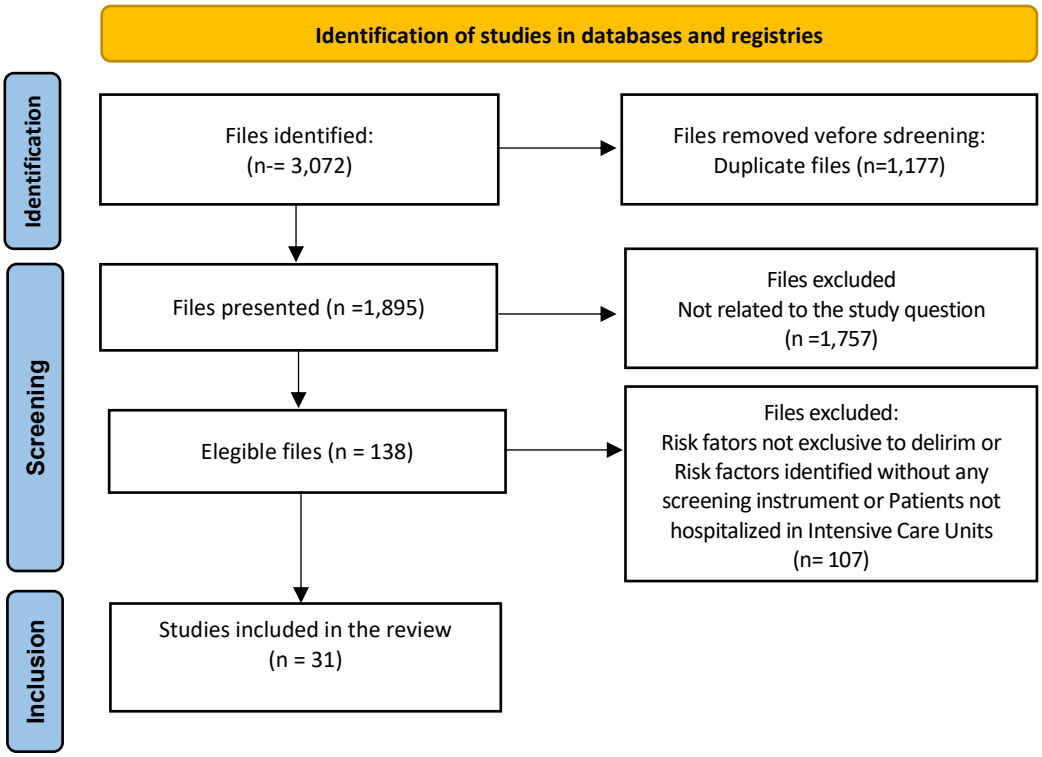

Figure 1: Flowchart corresponding to selection of the articles. Campinas, SP, Brazil, 2025.

Figures 2, 3 and 4 presents the main characteristics of the articles selected, including author, title and risk factors for *delirium*, country, publication year and level of evidence.

Authors	**Title and risk factors for *delirium***	**Country/ Publication year**	**Level of Evidence**
Bulut A, et al[14].	Title: Evaluating the Risk of Delirium in Elderly Inpatients in COVID-19 Intensive Care: A Prospective and Observational Study. Risk factors: old age, ICU hospitalization time, pain and prolonged sedation.	Turkey/ 2024	IV
Kim MS, et al[15].	Title: Risk factors for postoperative delirium in patients with cardiac surgery. Risk factors: type of surgery, old age, cardiovascular comorbidities, stroke history, use of sedatives, altered renal function, postoperative sleep disorder, invasive devices, Acute Physiology and Chronic Health Evaluation II and surgery time.	United States of America/ 2024	IV
Cheng J, et al[16].	Title: Dynamic nomogram for subsyndromal delirium in adult intensive care unit: A prospective cohort study. Risk factors: age, alcohol consumption history, C-Reactive Protein (CRP), Acute Physiology and Chronic Health Evaluation II, indwelling bladder catheter, mechanical ventilation, cerebrovascular diseases, respiratory failure, restraint, dexmedetomidine and propofol.	China/ 2023	IV
Igwe EO, et al[17].	Title: Association between malnutrition and delirium in older chronic kidney disease patients admitted to intensive care units: A data linkage study. Risk factors: malnutrition, chronic kidney disease, old age and intensive treatments.	United States of America/ 2023	IV
Lee JH, et al[18].	Title: Delirium in patients with COVID-19 treated in the intensive care unit. Risk factors: old age, comorbidities, severity of the disease, mechanical ventilation and ICU hospitalization time.	United States of America/ 2023	IV
Wilson LD, et al[19].	Title: Prevalence and risk factors for intensive care unit delirium after traumatic brain injury: a retrospective cohort study. Risk factors: age, overall lesion severity, motor score and characteristics of the intraparenchymal hemorrhage.	United States of America/ 2023	IV

Figure 2: Articles published from 2023 to 2024 included according to author, title/risk factors for *delirium*, country, publication year and level of evidence. Campinas, SP, Brazil, 2025.

Research Article
Artigo de Pesquisa
Artículo de Investigación

DOI: https://doi.org/10.12957/reuerj.2025.93984

Carvalho LAC, et al[20].	Title: Accuracy of delirium risk factors in adult intensive care unit patients. Risk factors: hypoalbuminemia, American Society of Anesthesiologists score higher than 3, severity of the patient, altered tissue perfusion (previous neurological diseases), dehydration, male gender, physical restraint, infections, pharmacological agents, polypharmacy, anemia, altered renal function, invasive devices and altered sleep quality and hours.	Brazil/ 2022	IV
Pinheiro FGMS, et al[21].	Title: Prevalence and risk factors associated with delirium at a critical care unit. Risk factors: age, physical restraint, tube feeding and use of anticonvulsive drugs.	Brazil/ 2022	VI
Gholi Z, et al[22].	Title: Vitamin D deficiency is associated with increased risk of delirium and mortality among critically ill, elderly COVID-19 patients. Risk factors: Vitamin D deficiency, old age, comorbidities, mechanical ventilation and infections.	Iran/ 2022	IV
Hulde N, et al[23].	Title: Preoperative risk factors and early outcomes of delirium in valvular open-heart surgery. Risk factors: Old age, renal failure, stroke history, need for emergency surgeries and severe preoperative anemia.	Germany/ 2022	IV
Abraham MP, et al[24].	Title: Quetiapine for delirium prophylaxis in high-risk critically ill patients Risk factors: improper alcohol consumption and dementia history.	United Kingdom/ 2021	II
Matioli KBB, et al[25].	Title: *Delirium*: prevalência e fatores associados ao pós-operatório de cirurgia cardiovascular em idosos. Risk factors: age, male gender, schooling level, tobacco use and previous comorbidities.	Portuguese/ 2021	VI
Jäckel M, et al[26].	Title: Incidence and predictors of delirium on the intensive care unit in patients with acute kidney injury, insight from a retrospective registry. Risk factors: age, psychiatric diseases, alcohol abuse, mechanical ventilation, severe shock (severity of the patient) and Stage II/III acute renal failure.	Germany/ 2021	IV
Oh TK, et al[27].	Title: Factors associated with delirium among survivors of acute respiratory distress syndrome: a nationwide cohort study. Risk factors: male gender, mechanical ventilation, hospitalization time, benzodiazepines and propofol.	South Korea/ 2021	IV
Pun BT, et al[28].	Title: Prevalence and risk factors for delirium in critically ill patients with COVID-19 (COVID-D): A multicentre cohort study. Risk factors: mechanical ventilation, physical restraint, sedation, vasopressors (severity of the patient) and antipsychotic drugs.	Multicenter/ 2021	IV
Wu Z, et al[29].	Title: Association between dexamethasone and delirium in critically ill patients: a retrospective cohort study of a large clinical database. Risk factors: Dexamethasone use.	United States of America/ 2021	IV
Abdelrahman I, et al[30].	Title: Development of delirium: Association with old age, severe burns, and intensive care. Risk factors: age, hospitalization time, anesthesia use, patients that require intensive care and surgical procedures.	United Kingdom/ 2020	IV
Cai S, et al[31].	Title: Prevalence, predictors, and early outcomes of post-operative delirium in patients with type A aortic dissection during intensive care unit stay. Risk factors: altered renal function, use of sedatives (midazolam) and of opioid analgesics (morphine).	China/ 2020	IV
Yamamoto T, et al[32].	Title: Incidence, risk factors, and outcomes for sepsis-associated delirium in patients with mechanical ventilation: A sub-analysis of a multicenter randomized controlled trial. Risk factors: emergency surgeries (severity of the patient), high doses of analgesics/sedatives and mechanical ventilation.	Japan/ 2020	II
Green C, et al[33].	Title: Prediction of ICU Delirium: Validation of Current Delirium Predictive Models in Routine Clinical Practice. Risk factors: high score in the Acute Physiology and Chronic Health Evaluation III, longer hospitalization time/Intensive Care Unit stay and mechanical ventilation.	United States of America/ 2019	IV
Pan Y, et al[34].	Title: Incidence, risk factors, and cumulative risk of delirium among ICU patients: A case-control study. Risk factors: sedatives, Intensive Care Unit hospitalization time and physical restraint.	China/ 2019	IV

Figure 3: Articles published from 2019 to 2022 included according to author, title/risk factors for *delirium*, country, publication year and level of evidence. Campinas, SP, Brazil, 2025.

Research Article
Artigo de Pesquisa
Artículo de Investigación

DOI: https://doi.org/10.12957/reuerj.2025.93984

Guo Z, et al[35].	Title: Postoperative Delirium in Severely Burned Patients Undergoing Early Escharotomy: Incidence, Risk Factors, and Outcomes Risk factors: old age, alcohol consumption history (>3 times a week), American Society of Anesthesiologists (ASA) III or IV, time elapsed between lesion and surgery, number of escharotomies/surgeries, sedation, long surgeries and intraoperative hypotension (<55 mmHg)/hypoperfusion.	2017	IV
Kumar A, et al[36].	Title: Delirium after cardiac surgery: A pilot study from a single tertiary referral center. Risk factors: comorbidities, Non-Invasive Ventilation (NIV), Intensive Care Unit hospitalization and pain.	2017	IV
Mehta S, et al[37].	Title: Prevalence, risk factors, and outcomes of delirium in mechanically ventilated adults. Risk factors: use of antipsychotic drugs, midazolam and physical restraint.	2015	IV
Pipanmekaporn T, et al[38].	Title: Incidence and risk factors of delirium in multi-center Thai surgical intensive care units: a prospective cohort study. Risk factors: anemia, male gender and dementia diagnosis.	2015	IV
Smith PJ, et al[39].	Title: Delirium affects length of hospital stay after lung transplantation. Risk factors: cognitive function.	2015	IV
Limpawattana P, et al[40].	Title: Delirium in critical care: a study of incidence, prevalence, and associated factors in the tertiary care hospital of older Thai adults. Risk factors: age, functional status, severity of the disease (Acute Physiology and Chronic Health Evaluation II), infections (pneumonia), cognitive impairments, depression, previous stroke, physical restraints, sleep deprivation, use of bladder catheters and patients on mechanical ventilation.	2015	VI
Whitlock EL, et al[41].	Title: Postoperative delirium in a substudy of cardiothoracic surgical patients in the BAG-RECALL. Risk factors: blood transfusions, high classification as per the American Society of Anesthesiologists, comorbidities and analgesics.	2014	IV
Zhang Z, et al[42].	Title: Prediction of delirium in critically ill patients with elevated C-reactive protein. Risk factors: high C-Reactive Protein (CRP) levels.	2014	IV
Guenther U, et al[43].	Title: Predisposing and precipitating factors of delirium after cardiac surgery: a prospective observational cohort study. Risk factors: old age, higher Charlson Comorbidity Index, lower score in the Mini Mental State Examination (MMSE), surgery time and systemic inflammatory response syndrome.	2013	IV
Norkiene I, et al[44].	Title: Incidence and risk factors of early delirium after cardiac surgery. Risk factors: mechanical ventilation and ICU hospitalization time.	2013	IV

Figure 4: Articles published from 2013 to 2017 included according to author, title/risk factors for *delirium*, country, publication year and level of evidence. Campinas, SP, Brazil, 2025.

Of all 31 articles selected, 87% (n=27) were classified as Level IV, 6.5% (n=2) as Level II and another 6.5% (n=2) as Level VI. Followed by China, the United States of America led in terms of number of publications, showing broad international diversity in the scientific productions. In addition, the highest volume of publications corresponded to 2021, with 16.1% (n=5) of the studies included.

Given the multifactorial nature for the development of *delirium*, the RFIs were classified as predisposing RFIs (pre-existing conditions) and as precipitating RFIs (acute conditions developed during hospitalization). Such division eases understanding the relationship between these factors and individual susceptibility to developing *delirium*[45].

The predisposing RFIs include the following ones: *Smoking*[25], *Dementia*[24,38], *Hypoalbuminemia*[20], *Altered renal function*[15,17,20,23,26,31], *Cognitive impairment*[39-40,43], *Previous neurological diseases*[15-16,19-20,23,26,40], *Functional impairment*[19,40], *American Society of Anesthesiologists (ASA) score higher than 3*[20,36,41], *Alcohol abuse*[16,22,35], *Comorbidities*[15,18,22,25,36,41,43], *Infections*[20,22,40,43], *Age at least 60 years old*[14-19,21-23,25-26,30,35,40,43], *Male gender*[20,25,27,38], *Lower schooling level*[25], *Polymedication*[20], *Vitamin D deficiency*[22] and *Previous malnutrition*[17].

In turn, the precipitating RFIs were as follows: *Pain*[14,36], *Invasive devices (catheters and tubes)*[15-16,20-21,40], *Mechanical ventilation*[16,18,22,26-28,33,36,40,44], *Surgery time and type*[15,23,30,32,35,43], *Physical restraint*[16,20,37,40], *Protective restraint*[21,28,34], *Anemia*[20,23,38], *Blood transfusions*[41], *Altered tissue perfusion*[35], *Dehydration*[20], *Malnutrition*[17], *Altered sleep quality and hours*[15,20,40], *Severity of the patient*[15-16,18-19,26,28,33,35,40], *Hospitalization days*[27,30], *ICU hospitalization*[14-15,16,-18,30,33-34,36,44], *CRP*[16,42] and *Pharmacological agents*[20]: dexamethasone[21], sedatives[14-15,28,31,34,35,37], antipsychotics and anticonvulsive drugs[21,28,37], benzodiazepines[27], anesthesics[16,27,30] and analgesics[31-32].

Research Article
Artigo de Pesquisa
Artículo de Investigación

DOI: https://doi.org/10.12957/reuerj.2025.93984

All the studies selected employed screening instruments based on the definition of *delirium* as a change in the consciousness and cognition levels, which develops quickly (in a matter of hour or days) and tends to fluctuate throughout the day[14-44].

Based on this definition, the RFIs classified as predisposing or precipitating were analyzed and organized into risk factors (RFs), associated conditions and at-risk populations, according to the NANDA-I Nursing Diagnosis Classification taxonomy. The RFIs lacking nurses' independent actions were categorized as associated conditions or as at-risk populations.

Therefore, it is suggested to present the following ND title: "Risk of *delirium*", defined as "Susceptibility along with changes in attention, consciousness and cognition, with acute onset (in a matter of hours or days) and varying in severity throughout the day, resulting from a physiological condition[1-2,14-44]. Figure 5 presents a description of the definition corresponding to the "Risk of *delirium*" ND and the RFIs classified as RFs, associated conditions and at-risk populations.

Risk of *delirium*: Susceptibility along with changes in attention, consciousness and cognition, with acute onset (in a matter of hours or days) and varying in severity throughout the day, resulting from a physiological condition[1-2,14-44].
Risk factors
Pain[14,36], *Invasive devices (catheters and tubes)*[15-16,20-21,40], *Mechanical ventilation*[16,18,22,26-28,33,36,40,44], *Physical restraint*[16,20,37,40], *Protective restraint*[21,28,34], *Altered tissue perfusion*[35], *Dehydration*[20], *Malnutrition*[17], *Altered sleep quality or hours*[15,20,40], *Severity of the patient*[15-16,18-19,26,28,33,35,40], *Hospitalization days*[27,30] *and ICU hospitalization*[14-15,17-18,30,33-34,36,44].
Associated conditions
Smoking[25], *Dementia*[24,38], *Hypoalbuminemia*[20], *Altered renal function*[15,17,20,23,26,31], *Cognitive impairment*[39-40,43], *Previous neurological diseases*[15-16,19-20,23,26,40], *Functional impairment*[19,40], *American Society of Anesthesiologists (ASA) score higher than 3*[20,36,41], *Alcohol abuse*[16,24,35], *Comorbidities*[15,18,22,25,36,41,43], *Infections*[20,22,40,43], *Polymedication*[20], *Vitamin D deficiency*[22], *Previous malnutrition*[17], *Surgery time and type*[15,23,30,32,35,43] *Anemia*[20,23,38], *Blood transfusion*[41], *Pharmacological agents*[20]: dexamethasone[21], sedatives[14-15,28,31,34,35,37], antipsychotics and anticonvulsive drugs[21,28,37], benzodiazepines[27], anesthesics[16,27,30] and analgesics[31-32] and *PCR*[16,42].
At-risk populations: *Age at least 60 years old*[14-19,21-23,25-26,30,35,40,43], *Male gender*[20,25,27,38], *Lower schooling level*[25].

Figure 5: Suggestions for the Nursing Diagnosis title, its risk factors, associated conditions and at-risk populations. Campinas, SP, Brazil, 2025.

DISCUSSION

There are specific criteria to identify *delirium*: the patients should present altered attention, consciousness and cognition concomitantly, with acute onset (in a matter of hours or days), with variable severity throughout the day and as a result of a physiological condition. The definition of the "Risk of *delirium*" ND was described based on a person's susceptibility to developing this outcome; the human response resulting from each individual's susceptibility is of utmost relevance for nurses to plan the care to be provided to each patient, aiming at its prevention[1,8].

A Nursing diagnosis involves a communion between the knowledge areas inherent to the Nursing discipline and to clinical reasoning applied to the evaluation data. Consequently, in order to understand the susceptibility to developing *delirium*, nurses should know the pathophysiology of this outcome and the relationship between the RFs and a person's associated conditions, interpreting the risk of developing it as a human response that is unique for each patient[8].

It is noted that the RFIs categorized as RFs should establish a correlation with *delirium* and be suitable for independent interventions by nurses. Only five of the 17 RFIs classified as precipitating present independent Nursing interventions, showing the importance of this professional category to prevent or reduce those factors that can be manifested during hospitalization[8].

Given this, among the RFs, uncontrolled *Pain* can result in an increase in the release of endogenous catecholamines that alter tissue perfusion, leading to hypoxemia and respiratory impairments, altered brain perfusion and increased risk of *delirium*. Nurses can act independently on this RF by resorting to non-pharmacological methods such as applying heat/cold, relaxation techniques, music therapy, recreation, occupational therapy, *decubitus* changes, stimulating walking, individualized care and closeness to the patients[10-46].

Invasive devices can increase the infection risk since, on the one hand, they increase the patients' hospitalization time, severity and mortality; they should be re-evaluated daily as for their indication, with nurses in charge of planning their removal. In addition, *Mechanical ventilation* also contributes to increasing the risk of infections, of administering sedatives and analgesics and of painful procedures like orotracheal aspiration. The chronic stress resulting from not removing these devices also release cytokines responsible for the increased inflammation and permeability of the hematoencephalic barrier, contributing to the development of *delirium*[3,46-47].

DOI: https://doi.org/10.12957/reuerj.2025.93984

Thus, as for nurses' performance for the *Mechanical ventilation* RF, they can implement actions aimed at improving the patients' gas exchange and pulmonary function, including assistance in weaning from the ventilator by choosing a body position that helps the patients use their respiratory muscles, optimizing diaphragm expansion, applying airway aspiration whenever necessary, early identifying respiratory fatigue, encouraging adequate rest and properly directing the patients' energy[10,46-47].

RFs such as *Physical restraint* and *Protective restraint* cause difficulties in the patients' mobility and should be the last resource to be employed in confused and agitated individuals; in addition to that, they need to be constantly re-evaluated and removed as soon as possible. Nurses should periodically evaluate the level of consciousness and content; in addition, they must stimulate the presence of family members while the patients are hospitalized, as the family provides known sensations to the patients, stimulating previously known activities, assisting in reducing physical stress and the release of neurotransmitters that can contribute to developing *delirium*, in addition to reducing the need for protective restraint[3,10,46-47].

Altered tissue perfusion can be related to *delirium* due to the likely reduction in brain perfusion. Its prevention or control can be planned by evaluating the schedules for the hypotensive drugs, the volume of infused liquids, the water balance control and the type, amount and fractionation of the diet offered, in addition to a systematized neurological evaluation. Each patient's pattern should be known, early identifying any hypoperfusion instance and avoiding the risk of *delirium*[3,10,18,46-47].

In this scenario, hydration should be included in nurses' assessments, as *Dehydration* is directly related to reduced tissue perfusion because contracted intra-vascular volumes, reduced tissue perfusion and global reduction of the brain oxidative mechanism are all related to *delirium*. In addition to this factor, proper nutrition is responsible for offering the nutrients that preserve body homeostasis, with some proteins in charge of transporting oxygen and maintaining intra-cell volumes and, consequently, perfusion. Nurses can prevent *Malnutrition* by evaluating the patients and having them accept the diet, planning the time spent for feeding, defining their best body position during meals and providing help, when necessary[3,10,46-47].

Altered sleep quality and hours can also trigger stress in the patients, alter some neurotransmitters and increase oxygen consumption, factors that are related to developing *delirium*. The actions to control this RF should be planned on a daily basis by concentrating the routine care measures, ensuring that sleep is not interrupted during the night, verifying that the lighting and noise levels are adequate, contributing to the sensations already known by the patients and reducing stress[10,46-47].

Consequently, the independent interventions for *Severity of the patient* encompass those related to other factors presented, as their co-existence can give rise to an increase in the severity of that person. Identifying severity of the patient is fundamental for the Nursing care practice, as this RF implies higher risks of death and of other negative outcomes[3,10,46-48]. This factor is directly related to the *Patients' hospitalization days and ICU admission*; consequently, nurses' performance as for all the other factors where they enjoy autonomy might exert an impact on reducing the patients' hospitalization time.

Given the above, nurses' performance and the relevance of the RFs in preventing *delirium* are understood; consequently, presenting the RFIs as elements of an ND based on using some SNT (such as the NANDA-I ND classification) is an aid for clinical reasoning and directs the way in which Nursing problems are identified, assisting in care planning[8].

Understanding the relationship between the RFs and the associated conditions in a specific at-risk population is of utmost importance to identify the patients' susceptibility to this outcome, as the relationship among them might result in a more or less intense response.

Thus, when defining the ND title, it is suggested to include it in Domain 5: Perception/Cognition, Class 4: Cognition; and the human response dimensions from Axis 1 (primary focus) "Cognitive function", Axis 2 (care subject) "Person", Axis 3 (Judgement) "Inadequate" and Axis 7 (Diagnosis category) "Potential for deterioration" are considered[8]. It is noted that, for being a change in attention, orientation, cognition and communication, the restriction on the primary focus and the Cognitive function scope class can be considered a reductionist classification of the Nursing phenomenon proposed.

The following is recommended to overcome this limitation: (1) Reassessing the taxonomic framework, considering a multidimensional approach that includes attention, orientation, cognition and communication; (2) Clinically validating the risk factors identified, as they holistically include indicators capable of recording susceptibility to *delirium*; (3) Integrating the diagnosis to evidence-based preventive Nursing interventions that act on the multiple domains affected; and (4) Encouraging future research about validity and applicability of the diagnosis in different clinical contexts, ensuring that its classification reflects the complexity of the phenomenon.

Research Article
Artigo de Pesquisa
Artículo de Investigación

DOI: https://doi.org/10.12957/reuerj.2025.93984

Consequently, it is understood that *delirium* is an unfavorable outcome for hospitalized individuals and that the relationship among the RFIs can result in a human response in the patients. Therefore, dividing these RFIs according to the NANDA-I SNT will assist in nurses' diagnostic accuracy and in devising a care plan targeted at the main RFs, where these professionals play an important role in the assistance provided.

CONCLUSION

A total of 34 RFIs were detected in the ILR; they were classified into 17 predisposing RFIs and 17 precipitating RFIs. Subsequently, these RFIs were organized into 12 RFs, 19 associated conditions and three at-risk populations, as per NANDA-I.

Therefore, it is of utmost importance to recognize the RFs to identify patients that are more susceptible to developing *delirium* and to prioritize the implementation of preventive measures. Presenting these RFIs as elements from an ND enables standardizing and directing nurses' assessments, allowing these professionals to develop more precise clinical judgements and to recognize at-risk individuals or populations with scientific rigor. Consequently, this risk ND evidences the relevance of Nursing performance to contribute to improving the diagnosis classification system. It is recommended to conduct content and clinical validation studies in the future that apply the concepts comprising the ND presented, ensuring its applicability and relevance in the clinical practice.

REFERENCES

1. American Psychiatric Association. Diagnostic and statistical manual of mental dispordes: DSM-5-TR. 5th ed. text rev. Washington (DC): American Psychiatric Association; 2022.
2. Dalgalarrondo P. Psicopatologia e semiologia dos transtornos mentais. 3rd ed. Porto Alegre: Artmed; 2018. 520 p.
3. Smith CJ, Hodge D, Harrison FE, Williams Roberson S. The pathophysiology and biomarkers of delirium. Semin Neurol. 2024 [cited 2025 Aug 19]; 44(6):720-31. DOI: https://doi.org/10.1055/s-0044-1791666.
4. Igwe EO, Nealon J, O'Shaughnessy P, Bowden A, Chang HR, Ho MH, et al. Incidence of postoperative delirium in older adults undergoing surgical procedures: a systematic literature review and meta-analysis. Worldviews Evid Based Nurs. 2023 [cited 2025 Aug 19]; 20(3):220-37. DOI: https://doi.org/10.1111/wvn.12649.
5. Williams EC, Estime S, Kuza CM. Delirium in trauma ICUs: a review of incidence, risk factors, outcomes, and management. Curr Opin Anaesthesiol. 2023 [cited 2025 Aug 19]; 36(2):137-46. DOI: https://doi.org/10.1097/ACO.0000000000001233.
6. Contreras CCT, Páez-Esteban AN, Rincon-Romero MK, Carvajal RR, Herrera MM, Castillo AHDD. Nursing intervention to prevent delirium in critically ill adults. Rev Esc Enferm USP. 2021 [cited 2025 Aug 19]; 55:e03685. DOI: https://doi.org/10.1590/S1980-220X2019035003685.
7. Conselho Federal de Enfermagem. Resolução COFEN n. 736, de 17 de janeiro de 2024. Dispõe sobre a implementação do processo de enfermagem em todo contexto socioambiental onde ocorre o cuidado de enfermagem. Brasília (DF): COFEN; 2024 [cited 2025 Aug 19]. Available from: https://www.cofen.gov.br/resolucao-cofen-no-736-de-17-de-janeiro-de-2024.
8. Herdman HT, et al. NANDA International, Inc. Nursing diagnoses: definitions and classification 2024-2026. 13th ed. Harrisburg: NANDA International; 2024.
9. Pompeo DA, Rossi LA, Galvão CM. Integrative literature review: the initial step in the validation process of nursing diagnoses. Acta Paul Enferm. 2009 [cited 2025 Aug 19]; 22(4):434-38. DOI: https://doi.org/10.1590/S0103-21002009000400014.
10. Bulechek GM, Butcher HK, Dochterman J, Wagner CM. Classificação das intervenções de enfermagem - NIC. 7th ed. Rio de Janeiro: GEN Guanabara Koogan; 2020. 440 p.
11. Ursi ES, Galvão CM. Prevenção de lesões de pele no perioperatório: revisão integrativa da literatura. Rev Lat Am Enfermagem. 2006 [cited 2025 Aug 19]; 14(1):124-31. DOI: https://doi.org/10.1590/S0104-11692006000100017.
12. Stillwell SB, Overholt EF, Melnyk BM, Williamson KM. Evidence-based practice, step by step: searching for the evidence. Am J Nurs. 2010 [cited 2025 Aug 19]; 110(5):41-47. DOI: https://doi.org/10.1097/01.NAJ.0000372071.24134.7e.
13. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021 [cited 2025 Aug 19]; 372:n71. DOI: https://doi.org/10.1186/s13643-021-01626-4.
14. Bulut A, Yilmaz BE, Yurksel A. evaluating the risk of delirium in elderly inpatients in COVID-19 intensive care: a prospective and observational study. Turk J Geriatr. 2024 [cited 2025 Nov 1]; 27(1):68-78. DOI: https://doi.org/10.29400/tjgeri.2024.380.
15. Kim MS, Kim SH. Risk factors for postoperative delirium in patients with cardiac surgery. Sci Prog. 2024 [cited 2025 Nov 1]; 107(3):368504241266362. DOI: https://doi.org/10.1177/00368504241266362.
16. Cheng J, Lao Y, Chen X, Qiao X, Sui W, Gong X, et al Dynamic nomogram for subsyndromal delirium in adult intensive care unit: a prospective cohort study. Neuropsychiatr Dis Treat. 2023 Nov 22; 19:2535-48. DOI: https://doi.org/10.2147/ndt.s432776. Erratum in: Neuropsychiatr Dis Treat. 2023 [cited 2025 Nov 1]; 19:2755-2756. DOI: https://doi.org/10.2147/NDT.S453349.
17. Igwe EO, Ding P, Charlton KE, Nealon J, Traynor V. Association between Malnutrition and delirium in older chronic kidney disease patients admitted to intensive care units: a data linkage study. J Nutr Health Aging. 2023 [cited 2025 Nov 1]; 27(7):571-7. DOI: https://doi.org/10.1007/s12603-023-1938-5 .
18. Lee JH, Han WH, Chun JY, Choi YJ, Han MR, Kim JH. Delirium in patients with COVID-19 treated in the intensive care unit. PLoS One. 2023 [cited 2025 Nov 1]; 18(11):e0289662. DOI: https://doi.org/10.1371/journal.pone.0289662.

Research Article
Artigo de Pesquisa
Artículo de Investigación

DOI: https://doi.org/10.12957/reuerj.2025.93984

19. Wilson LD, Maiga AW, Lombardo S, Nordness MF, Haddad DN, Rakhit S, Smith LF, et al. Prevalence and Risk Factors for Intensive Care Unit Delirium After Traumatic Brain Injury: A Retrospective Cohort Study. Neurocrit Care. 2023 [cited 2025 Nov 1]; 38(3):752-60. DOI: https://doi.org/10.1007/s12028-022-01666-1.
20. Carvalho LAC, Correia MDL, Ferreira RC, Botelho ML, Ribeiro E, Duran ECM. Accuracy of delirium risk factors in adult intensive care unit patients. Rev Esc Enferm USP. 2022 [cited 2025 Nov 1]; 56:e20210222. DOI: https://doi.org/10.1590/1980-220X-REEUSP-2021-0222.
21. Pinheiro FGMS, Santos ES, Barreto DC, Weiss C, Oliveira JC, Vaez AC, Silva FA. Prevalência e fatores de risco associados ao delirium em uma unidade de terapia intensiva. Acta Paul Enferm 2022 [cited 2025 Nov 1]; 35:eAPE00646. DOI: https://doi.org/10.37689/acta-ape/2022AO006466.
22. Gholi Z, Yadegarynia D, Eini-Zinab H, Vahdat Shariatpanahi Z. Vitamin D deficiency is associated with increased risk of delirium and mortality among critically ill, elderly Covid-19 patients. Complement Ther Med. 2022 Nov [cited 2025 Nov 1]; 70:102855. DOI: https://doi.org/10.1016/j.ctim.2022.102855.
23. Hulde N, Zittermann A, Tigges-Limmer K, Koster A, Weinrautner N, Gummert J, et al. preoperative risk factors and early outcomes of delirium in valvular open-heart surgery. Thorac Cardiovasc Surg. 2022 Oct [cited 2025 Nov 1]; 70(7):558-65. DOI: https://doi.org/10.1055/s-0041-1740984
24. Abraham MP, Hinds M, Tayidi I, Jeffcoach DR, Corder JM, Hamilton LA, et al. Quetiapine for delirium prophylaxis in high-risk critically ill patients. Surgeon. 2021 [cited 2025 Nov 1]; 19(2):65-71. DOI: https://doi.org/10.1016/j.surge.2020.02.002.
25. Matioli KBB, Moraes Filho IM, Sousa TV, Pereira M, Silva RM, Sá ES, et al . Delirium: prevalence and factors associated with the postoperative period of cardiovascular surgery in the elderly. Rev. baiana enferm. 2021 [cited 2025 Nov 1]; 35:e42203. DOI: http://dx.doi.org/10.18471/rbe.v35.42203.
26. Jäckel M, Aicher N, Rilinger J, Bemtgen X, Widmeier E, Wengenmayer T, et al. Incidence and predictors of delirium on the intensive care unit in patients with acute kidney injury, insight from a retrospective registry. Sci Rep. 2021 [cited 2025 Nov 1]; 11(1):17260. DOI: https://doi.org/10.1038/s41598-021-96839-x.
27. Oh TK, Park HY, Song IA. Factors associated with delirium among survivors of acute respiratory distress syndrome: a nationwide cohort study. BMC Pulm Med. 2021 [cited 2025 Nov 1]; 21(1):341. DOI: https://doi.org/10.1186/s12890-021-01714-0.
28. Pun BT, Badenes R, Heras La Calle G, Orun OM, Chen W, Raman R, et al. (Prevalence and risk factors for delirium in critically ill patients with COVID-19 (COVID-D): a multicentre cohort study. Lancet Respir Med. 2021; 9(3):239-50. DOI: https://doi.org/10.1016/s2213-2600(20)30552-x. Erratum in: Lancet Respir Med. 2021 [cited 2025 Nov 1]; 9(3):e29. DOI: https://doi.org/10.1016/S2213-2600(21)00047-3.
29. Wu Z, Li H, Liao K, Wang Y. Association between dexamethasone and delirium in critically ill patients: a retrospective cohort study of a large clinical database. J Surg Res. 2021 [cited 2025 Nov 1]; 263:89-101. DOI: https://doi.org/10.1016/j.jss.2021.01.027.
30. Abdelrahman I, Vieweg R, Irschik S, Steinvall I, Sjöberg F, Elmasry M. Development of delirium: association with old age, severe burns, and intensive care. Burns. 2020 [cited 2025 Nov 1]; 46(4):797-803. DOI: https://doi.org/10.1016/j.burns.2020.02.013.
31. Cai S, Zhang X, Pan W, Latour JM, Zheng J, Zhong J, et al. Prevalence, predictors, and early outcomes of post-operative delirium in patients with type a aortic dissection during intensive care unit stay. Front Med (Lausanne). 2020 [cited 2025 Nov 1]; 7:572581. DOI: https://doi.org/10.3389/fmed.2020.572581.
32. Yamamoto T, Mizobata Y, Kawazoe Y, Miyamoto K, Ohta Y, Morimoto T, Yamamura H. Incidence, risk factors, and outcomes for sepsis-associated delirium in patients with mechanical ventilation: a sub-analysis of a multicenter randomized controlled trial. J Crit Care. 2020 [cited 2025 Nov 1]; 56:140-44. DOI: https://doi.org/10.1016/j.jcrc.2019.12.018.
33. Green C, Bonavia W, Toh C, Tiruvoipati R. Prediction of ICU delirium: validation of current delirium predictive models in routine clinical practice. Crit Care Med. 2019 [cited 2025 Nov 1]; 47(3):428-435. DOI: https://doi.org/10.1097/CCM.0000000000003577.
34. Pan Y, Yan J, Jiang Z, Luo J, Zhang J, Yang K. Incidence, risk factors, and cumulative risk of delirium among ICU patients: a case-control study. Int J Nurs Sci. 2019 [cited 2025 Nov 1]; 6(3):247-51. DOI: https://doi.org/10.1016/j.ijnss.2019.05.008.
35. 34.Guo Z, Liu J, Li J, Wang X, Guo H, Ma P, Su X, Li P. Postoperative delirium in severely burned patients undergoing early escharotomy: incidence, risk factors, and outcomes. J Burn Care Res. 2017 [cited 2025 Nov 1]; 38(1):e370-6. DOI: https://doi.org/10.1097/BCR.0000000000000397.
36. Kumar AK, Jayant A, Arya VK, Magoon R, Sharma R. Delirium after cardiac surgery: a pilot study from a single tertiary referral center. Ann Card Anaesth. 2017; 20(1):76-82. DOI: https://doi.org/10.4103/0971-9784.197841. Erratum in: Ann Card Anaesth. 2017 [cited 2025 Nov 1]; 20(2):281. DOI: https://doi.org/10.4103/0971-9784.201631.
37. 36.Mehta S, Cook D, Devlin JW, Skrobik Y, Meade M, Fergusson D. Prevalence, risk factors, and outcomes of delirium in mechanically ventilated adults. Crit Care Med. 2015 [cited 2025 Nov 1]; 43(3):557-66. DOI: https://doi.org/10.1097/CCM.0000000000000727.
38. Pipanmekaporn T, Chittawatanarat K, Chaiwat O, Thawitsri T, Wacharasint P, Kongsayreepong S; et al. Incidence and risk factors of delirium in multi-center Thai surgical intensive care units: a prospective cohort study. J Intensive Care. 2015 [cited 2025 Nov 1]; 3:53. DOI: https://doi.org/10.1186/s40560-015-0118-z.
39. Smith PJ, Rivelli SK, Waters AM, Hoyle A, Durheim MT, Reynolds JM, et al, Blumenthal JA. Delirium affects length of hospital stay after lung transplantation. J Crit Care. 2015 [cited 2025 Nov 1]; 30(1):126-9. DOI: https://doi.org/10.1016/j.jcrc.2014.09.010.
40. Limpawattana P, Panitchote A, Tangvoraphonkchai K, Suebsoh N, Eamma W, Chanthonglarng B, et al. Delirium in critical care: a study of incidence, prevalence, and associated factors in the tertiary care hospital of older Thai adults. Aging Ment Health. 2016 [cited 2025 Nov 1]; 20(1):74-80. DOI: https://doi.org/10.1080/13607863.2015.1035695.
41. Whitlock EL, Torres BA, Lin N, Helsten DL, Nadelson MR, Mashour GA, et al. Postoperative delirium in a substudy of cardiothoracic surgical patients in the BAG-RECALL clinical trial. Anesth Analg. 2014 [cited 2025 Nov 1]; 118(4):809-17. DOI: https://doi.org/10.1213/ANE.0000000000000028.

Research Article
Artigo de Pesquisa
Artículo de Investigación

DOI: https://doi.org/10.12957/reuerj.2025.93984

42. Zhang Z, Pan L, Deng H, Ni H, Xu X. Prediction of delirium in critically ill patients with elevated C-reactive protein. J Crit Care. 2014 [cited 2025 Nov 1]; 29(1):88-92. DOI: https://doi.org/10.1016/j.jcrc.2013.09.002.
43. Guenther U, Theuerkauf N, Frommann I, Brimmers K, Malik R, Stori S, et al. Predisposing and precipitating factors of delirium after cardiac surgery: a prospective observational cohort study. Ann Surg. 2013 [cited 2025 Nov 1]; 257(6):1160-7. DOI: https://doi.org/10.1097/SLA.0b013e318281b01c.
44. Norkienė I, Ringaitienė D, Kuzminskaitė V, Šipylaitė J. Incidence and risk factors of early delirium after cardiac surgery. Biomed Res Int. 2013 [cited 2025 Nov 1]; 2013:323491. DOI: https://doi.org/10.1155/2013/323491.
45. Ormseth CH, LaHue SC, Oldham MA, Josephson SA, Whitaker E, Douglas VC. Predisposing and precipitating factors associated with delirium: a systematic review. JAMA Netw Open. 2023 [cited 2025 Aug 19]; 6(1):e2249950. DOI: https://doi.org/10.1001/jamanetworkopen.2022.49950
46. Stollings JL, Rumbaugh KA, Wang L, Hayhurst CJ, Ely EW, Hughes CG. Correlation of the critical care pain observation tool and numeric rating scale in intensive care unit patients. J Intensive Care Med. 2024 [cited 2025 Aug 19]; 39(1):12-20. DOI: https://doi.org/10.1177/08850666231187336.
47. Contreras CCT, Páez-Esteban AN, Rincon-Romero MK, Carvajal RR, Herrera MM, Díaz del Castillo AH. Nursing intervention to prevent delirium in critically ill adults. Rev Esc Enferm USP. 2021 [cited 2025 Aug 19]; 55:e03685. DOI: https://doi.org/10.1590/S1980-220X2019035003685.
48. Mart MF, Williams Roberson S, Salas B, Pandharipande PP, Ely EW. Prevention and management of delirium in the intensive care unit. Semin Respir Crit Care Med. 2021 [cited 2025 Aug 19]; 42(1):112-26. DOI: https://doi.org/10.1055/s-0040-1710572.
49. Williams EC, Estime S, Kuza CM. Delirium in trauma ICUs: a review of incidence, risk factors, outcomes, and management. Curr Opin Anaesthesiol. 2023 [cited 2025 Aug 19]; 36(2):137-46. DOI: https://doi.org/10.1097/ACO.0000000000001233.

Authors contributions

Conceptualization, L.A.C.C., M.D.L.C., G.M.S., R.C.F, M.L.S.B. and E.C.M.D; methodology, L.A.C.C., M.D.L.C., G.M.S., R.C.F, M.L.S.B. and E.C.M.D; investigation, L.A.C.C., M.D.L.C., G.M.S., R.C.F, M.L.S.B. and E.C.M.D; formal analysis, L.A.C.C., M.D.L.C., G.M.S., R.C.F, M.L.S.B. and E.C.M.D; manuscript writing, L.A.C.C., M.D.L.C., G.M.S., R.C.F, M.L.S.B. and E.C.M.D; review and editing, L.A.C.C., M.D.L.C., G.M.S., R.C.F, M.L.S.B. and E.C.M.D; supervision, L.A.C.C. and E.C.M.D.; project administration, L.A.C.C. and E.C.M.D.; financing acquisition, L.A.C.C. and E.C.M.D. All authors read and agreed with the published version of the manuscript.

Use of artificial intelligence tools

Authors declare that no artificial intelligence tools were used in the composition of the manuscript "*Risk of delirium as a diagnosis proposal: an integrative review*".