

Delirium in Older People Admitted to the Intensive Care Unit and Its Association with Mechanical Restraint*

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Theme: Care processes and practices

Contribution to the field: By demonstrating that mechanical restraint significantly increases the risk of delirium in older people admitted to the intensive care unit, the results of this study highlight the need for care practices that reduce its use, prioritizing safer and more humanized approaches.

Abstract

Introduction: Advanced age is one of the most prevalent predisposing factors in cases of delirium, particularly in older patients hospitalized in intensive care units. Due to population aging and demographic transition, this study presents a specific sample analysis of a population subgroup. **Objectives:** To determine the prevalence of delirium in older patients hospitalized in the intensive care unit and to verify correlations with clinical and sociodemographic predictor variables. **Materials and Methods:** This is a cross-sectional study conducted in the countryside of the state of Pernambuco, Brazil, between July and November 2023. Older people aged 60 years or older (according to Brazilian law) and hospitalized for at least 24 hours were included. The Richmond Agitation-Sedation Scale (RASS) was used to screen sedation levels, and the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) was used to assess delirium. **Results:** The sample consisted of 83 older patients hospitalized in the intensive care unit. The prevalence rate of delirium was 36.1%, with a strong association with the predictor “use of mechanical restraint in bed”. Multivariate analysis showed that the use of mechanical restraint in bed increases the odds of delirium in older people by 21.5 times (OR = 21.542; 95% CI: 6.663–69.641). **Conclusions:** Reducing the use of mechanical restraint, adequately monitoring sedation, and preventing delirium are essential strategies for reducing healthcare costs and providing a more humane experience for patients and their families.

Keywords (Source: DeCS)

Delirium; physical restraint; cross-sectional study; aged; intensive care unit.

4 Delirio en adultos mayores en la Unidad de Cuidados Intensivos y su asociación con la contención mecánica*

* Artículo derivado de la tesis de maestría titulada *Prevalência de delirium em idosos internados em unidade de terapia intensiva e associação com sedoanalgesia e contenção mecânica: um estudo transversal no agreste pernambucano*, del programa asociado de estudios de posgrado en enfermería, Universidade de Pernambuco y Universidade Estadual da Paraíba. Disponible en: https://sucupira-legado.capes.gov.br/sucupira/public/consultas/coleta/trabalhoConclusao/viewTrabalhoConclusao.jsf?popup=true&id_trabalho=14981418

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Resumen

Introducción: la edad avanzada es uno de los factores predisponentes más prevalentes en los casos de delirio, acentuándose especialmente en pacientes mayores hospitalizados en la Unidad de Cuidados Intensivos. Ante el envejecimiento poblacional y la transición demográfica, este estudio presenta un análisis muestral específico de un subgrupo poblacional. **Objetivos:** determinar la prevalencia de delirio en pacientes mayores hospitalizados en la Unidad de Cuidados Intensivos y verificar las correlaciones con variables predictoras clínicas y sociodemográficas. **Materiales y métodos:** estudio transversal, realizado en el interior del estado de Pernambuco, Brasil, entre julio y noviembre de 2023. Se incluyeron pacientes mayores de 60 años (según la legislación brasileña) y hospitalizados durante al menos 24 horas. Se utilizó la Richmond Agitation-Sedation Scale (RASS) para evaluar los niveles de sedación y el Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) para evaluar el delirio. **Resultados:** la muestra estuvo conformada por 83 pacientes mayores hospitalizados en la Unidad de Cuidados Intensivos. La tasa de prevalencia de delirio fue del 36,1 %, con una fuerte asociación con el predictor “uso de contención mecánica en el lecho”. El análisis multivariado mostró que el uso de contención mecánica en el lecho aumenta la probabilidad de que el paciente mayor presente delirio por 21,5 veces (OR = 21,542; IC 95 %: 6,663-69,641). **Conclusiones:** reducir el uso de contención mecánica, monitorizar adecuadamente la sedación y prevenir el delirio son estrategias esenciales para disminuir los costos de la atención sanitaria y ofrecer una experiencia más humanizada a los pacientes y sus familias.

Palabras clave (Fuente: DeCS)

Delirio; restricción física; estudio transversal; adultos mayores; Unidad de Cuidados Intensivos.

Delirium em idosos na unidade de terapia intensiva e associação com contenção mecânica*

* Artigo derivado da dissertação de mestrado intitulada *Prevalência de delirium em idosos internados em unidade de terapia intensiva e associação com sedoanalgesia e contenção mecânica: um estudo transversal no agreste pernambucano*, do programa associado de pós-graduação em enfermagem, da Universidade de Pernambuco e da Universidade Estadual da Paraíba. Disponível em: https://sucupira-legado.capes.gov.br/sucupira/public/consultas/coleta/trabalhoConclusao/viewTrabalhoConclusao.jsf?popup=true&id_trabalho=14981418

Este artigo foi financiado pela Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, Brasil, com o código de financiamento 001.

Resumo

Introdução: A idade avançada é um dos fatores predisponentes mais prevalentes nos casos de *delirium*, acentuando-se principalmente em idosos hospitalizados na unidade de terapia intensiva. Em virtude do envelhecimento populacional e da transição demográfica, este estudo apresenta uma análise amostral específica de um subgrupo populacional. **Objetivos:** determinar a prevalência de *delirium* em idosos hospitalizados na unidade de terapia intensiva e verificar correlações com variáveis preditoras clínicas e sociodemográficas. **Materiais e métodos:** estudo transversal, realizado no interior do estado de Pernambuco, Brasil, entre julho e novembro de 2023. Foram incluídos idosos com idade igual ou superior a 60 anos (conforme legislação brasileira) e hospitalizados por no mínimo 24 horas. Utilizaram-se a Richmond Agitation-Sedation Scale (RASS) para a triagem dos níveis de sedação e o Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) para a avaliação do *delirium*. **Resultado:** A amostra foi composta por 83 idosos hospitalizados na unidade de terapia intensiva. A taxa de prevalência do *delirium* foi de 36,1 %, havendo forte associação com o preditor “uso de contenção mecânica no leito”. A análise multivariada evidenciou que o uso da contenção mecânica no leito aumenta em 21,5 vezes a chance de o idoso apresentar *delirium* (RC = 21,542; IC95 %: 6,663-69,641). **Conclusões:** Reduzir o uso de contenção mecânica, monitorar adequadamente a sedação e prevenir o *delirium* são estratégias essenciais para reduzir os custos de saúde e proporcionar uma experiência mais humanizada aos pacientes e suas famílias.

Palavras-chave (Fonte DeCS)

Delirium; restrição física; estudo transversal; idoso; unidade de terapia intensiva.

Introduction

Changes in mental status are frequent symptoms in older patients. Most often, they are related to disorders such as delirium, dementia, or depression, of which dementia and delirium are the most prevalent, although their course, prognosis, and treatment are distinct. Dementia is insidious, with a chronic onset, and is considered a progressive cognitive decline (1, 2). Delirium, on the other hand, is a complex neurological syndrome that frequently affects adults admitted to the intensive care unit (ICU), characterized by an acute confusional state, with the possibility of reversibility, which can be diagnosed within the first hours of hospital admission, during hospitalization, or even after hospital discharge (3, 4).

It is estimated that delirium is present in 10 to 15 percent of older patients admitted to emergency rooms, with significantly higher incidence and prevalence in hospitalized older populations, especially among patients undergoing mechanical ventilation in ICUs. The cumulative incidence of delirium, when associated with stupor and coma, exceeds 75%. The prevalence of delirium at the end of life is close to 85% in palliative care settings. Previous studies have shown that delirium is related to adverse events in patient safety, such as increased morbidity and mortality, prolonged use of mechanical ventilation and hospitalization, and increased hospitalization costs (3, 5, 6).

The gold standard for diagnosis are the guidelines of the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-V) or the International Statistical Classification of Diseases and Related Health Problems, 10th edition (ICD-10); however, these guidelines require a complete specialized assessment by a professional with knowledge of neuropsychiatry. Thus, clinical assessment scales were created for bedside use, with good accuracy and ease of application. Among several existing scales, the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) and the Intensive Care Delirium Screening Checklist (ICDSC) are the most validated and cross-culturally translated in the intensive care setting (7, 8).

Initial treatment consists of a multidisciplinary approach, initially non-pharmacological. However, sedatives and analgesics may be used to manage some aspects of delirium syndrome, such as severe agitation and pain management (9). It is worth noting that the indiscriminate use of sedoanalgesia in critical care settings is also associated with an increased incidence of delirium, which is why its moderate use is recommended (7, 10).

The ICU environment is hostile to older patients due to restrictions on family visits, invasive procedures, pain or discomfort in general, changes in routine, alterations in the sleep-wake cycle, and even the actions of healthcare professionals. In addition, the physical structure of ICUs, due to their restricted nature, is also a risk factor for mental changes and, consequently, prolonged hospitalization (11).

The state of delirium, especially in its hyperactive form, requires, at certain times, a practice employed globally by nursing teams to prevent harm and adverse events, which is mechanical restraint. This, in turn, is intrinsically related to the quality of care provided, since its excessive use is associated with low-quality care and is characterized as a precipitating risk factor for delirium (5, 12).

In Brazil, there is a scarcity of observational studies researching the association of precipitating factors, such as sedation and mechanical restraint, with the prevalence of delirium (4, 6, 13). In addition, the phenomena of population aging and demographic transition on a global scale—which are accelerating, especially in middle-income countries—have led to a significant increase in the demand for hospitalization among the older population (14).

Therefore, a more specific sampling of this population group is necessary to enable a more accurate characterization and correlation, as well as an adequate analysis of the correlations between outcomes (15). In addition, this study aims to research whether the hypothesis that the use of mechanical restraint in bed in older adults admitted to the ICU—to prevent adverse events, such as falls and/or avulsion of invasive devices—is associated with a high prevalence of delirium in this population. The objective of this study was to determine the prevalence of delirium in older patients in critical care settings and to check the correlations with the use of sedoanalgesia, mechanical restraint, and other predictive variables.

Materials and Methods

This is an observational, analytical, cross-sectional study. The research was conducted at Hospital Mestre Vitalino, located in the municipality of Caruaru, in the northern agreste region of the state of Pernambuco, Brazil. Data were collected in three general ICUs, corresponding to 40 adult beds. The collection was performed exclusively by the main researcher, during the period from July 2023 to November 2023, on a weekly basis and divided into two stages.

The inclusion criteria were older patients aged 60 years or above who had been admitted to the ICU for at least 24 hours. Patients with a previous diagnosis of dementia or any neuropsychiatric disorder, decreased level of consciousness, deep sedation, history of stroke, or other cerebrovascular disease were excluded from the sample. The sample was selected by convenience, through a random draw from the daily patient census.

In the first stage, the Richmond Agitation-Sedation Scale (RASS) was applied to adequately screen the sedoanalgesia levels of the research participants (16). Patients with sedation levels between -2 and +4 on the RASS scale were selected.

In the second stage, the CAM-ICU instrument was used to assess delirium in the recruited participants. It consists of four items: 1 — acute onset; 2 — attention disturbance; 3 — altered level of consciousness; and 4 — disorganized thinking. To assess item 2, the Attention Screening Examination was employed, which consists of reading a sequence of letters (SAVEAHAART) spelled aloud by the researcher at a rate of one letter per second. During the exam, the patient was instructed to squeeze the examiner’s hand whenever they heard the letter “A.”

It was considered an error when the patient failed to squeeze the examiner’s hand upon hearing the letter “A” or when they squeezed the hand upon hearing a letter other than “A” (16). When the participant’s educational level hindered the use of the letter sequence, as in the case of illiteracy, a numerical sequence was used instead. For the diagnosis of delirium, the patient must have presented characteristics 1 and 2 (acute onset and attention disorder), plus either 3 (altered level of consciousness) or 4 (disorganized thinking). Both scales are validated and cross-culturally translated into Brazilian Portuguese (17). A structured form was used to compile the results of the scales applied, as well as to obtain sociodemographic data and clinical information from electronic medical records.

The presence or absence of delirium in the older people population was considered the study’s outcome variable. The predictor variables were as described in Table 1.

Table 1. Predictive Variables

Clinical	Use of sedoanalgesia (no; yes) Use of mechanical restraint (no; yes) Use of mechanical ventilation (no; yes) Diagnostic hypotheses (main pathology for hospitalization) Level of sedation (RASS scale/Levels: +4; +3; +2; +1; 0; -1; -2) and Hospitalization time (1, 2, 3, 4, 5, 6, 7, or more)
Sociodemographic	Sex (male; female) Level of education (illiterate; can read and write; incomplete elementary education; complete elementary education; incomplete secondary education; complete secondary education; incomplete higher education; complete higher education) and Age (age ranges: 60 to 64 years old; 65 to 70 years old; 71 to 74 years old; 75 to 79 years old; 80 years old or above)

Source: Prepared by the authors.

Based on the analysis of the exposure variable sedoanalgesia, latent variables emerged from the pharmacological classes of the respective sedatives and analgesics.

For the sampling calculation, a formula that considers the use of multiple logistic regression analysis and a finite population of the mean number of patients admitted monthly to the three general

ICUs during the last year, which was 307 individuals, was used. Thus, the parameters for the sample calculation were a finite population of 307 older individuals, with an expected proportion of 80% delirium, and the use of nine independent variables in the model (3). Based on this calculation, a minimum sample of 76 participants was estimated.

The data were tabulated in Microsoft Excel® and subsequently imported and saved in Statistical Package for Social Sciences®, version 21, in which the respective descriptive and inferential statistical analyses were performed. Bivariate tests were applied to assess the existence of a statistically significant relationship between the exposure variables, and a significance level of up to 20% (p -value = 0.200) was applied for the variables eligible for the multivariate model.

Kendall's Tau B correlation tests were used for numerical variables with nonparametric distribution; Student's t -test for independent samples was used when comparing a numerical variable with a dichotomous categorical variable; and One-Way Analysis of Variance (ANOVA) was used when comparing a numerical variable with a polytomous categorical variable. The bootstrapping technique (1000 resamples) was applied to correct the sample's deviation from normality and to allow the application of Student's t -tests and One-Way ANOVA. For categorical variables, the Chi-squared test of independence was performed, adjusted by Fisher's exact test when necessary. In addition, a binary logistic regression (enter method) was performed to investigate the extent to which delirium (yes or no), as measured by the CAM-ICU, could be adequately predicted by the study's predictor variables.

The study was submitted to the Research Ethics Committee of the State University of Paraíba and approved under Opinion 6.146.879/2023. All research participants signed an informed consent form (ICF). In specific cases where the research subject was not in full cognitive capacity to sign the ICF, consent was obtained through their first-degree relative during visiting hours in the ICU. To mitigate the risks of exposure and loss of data confidentiality, certain measures were employed, such as limiting access to data, not using information that identified the patient, and encoding the records.

Results

Of a total of 88 participants, five were excluded due to preexisting cerebrovascular disease, which was not mentioned during patient recruitment, resulting in a final sample of 83 hospitalized older individuals. The minimum age was 60 years, and the maximum age was 92 years. The median age was 72 years, with an interquartile range of 12, meaning that half of the sample popu-

lation was between 60 and 84 years old. There was a slight difference between males (53%) and females (47%), and it was found that most individuals had a low level of education.

Regarding the clinical profile, the main pathologies affecting hospitalized older patients were high-risk immediate postoperative period (21.7%), sepsis (12%), chronic obstructive pulmonary disease (10.8%), and congestive heart failure (8.4%). The mean length of stay for older patients in the ICUs at the study site was six days. Regarding the use of devices, 55.4% of patients were breathing ambient air and 44.6% were using invasive mechanical ventilation support. The prevalence rate of mechanical restraint use in critically ill older patients was 33.7%. These data are shown in Table 2.

Table 2. Clinical Profile of Older Patients Admitted to Critical Care Units in the Study, Caruaru, Pernambuco, 2023 (n = 83)

Variable	n	%
Diagnostic hypothesis		
Congestive heart failure	7	8.4
Chronic obstructive pulmonary disease	9	10.8
Chronic kidney disease	5	6.0
Post-cardiac arrest syndrome	4	4.8
Electrolyte imbalance	2	2.4
Acute coronary syndrome	6	7.2
Septic shock	6	7.2
High-risk immediate postoperative period	18	21.7
Pneumonia	5	6.0
Acute pulmonary edema	4	4.8
Sepsis	10	12.0
Acute respiratory distress syndrome	1	1.2
Cardiogenic shock	2	2.4
COVID-19	1	1.2
Cardiac arrhythmias	2	2.4
Acute renal failure	1	1.2
Hospital stay (days)		
Median ± interquartile range	6 ± 7	
Minimum ^a - maximum ^b	1 - 31	
Use of invasive mechanical ventilation		
No	46	55.4
Yes	37	44.6
Use of mechanical restraint in bed		
No	55	66.3
Yes	28	33.7

Note: ^a Minimum = minimum value; ^b Maximum = maximum value.

Source: Prepare by the authors.

In Table 3, regarding findings related to sedoanalgesia, 33.7% of the older patients received some form of sedative or analgesic during their hospitalization. More than half of the individuals (55.4%) had a sedation level of RASS = 0, which is equivalent to an alert and calm state of consciousness.

Table 3. Data Related to the Use of Sedoanalgesia by Older Patients Admitted to the ICU, Caruaru, Pernambuco, 2023 (n = 83)

Variable	n	%
RASS Sedation Scale Score^{a?}		
+4	0	0.0
+3	0	0.0
+2	3	3.6
+1	8	9.6
0	46	55.4
-1	15	18.1
-2	11	13.3
CAM-ICU^b Positive for delirium?		
No	53	63.9
Yes	30	36.1
Use of sedation or analgesia?		
No	55	66.3
Yes	28	33.7
Use of benzodiazepines?		
No	67	80.7
Yes	16	19.3
Which benzodiazepines?		
Midazolam	16	100.0
Diazepam	0	0.0
Clonazepam	0	0.0
Use of opioids?		
No	56	67.5
Yes	26	31.3
Which opioids?		
Fentanyl	26	96.3
Tramadol	1	3.7
Morphine	0	0.0
Use of non-opioids?		
No	83	100.0
Yes	0	0.0

Variable	n	%
Use of general anesthetic?		
No	77	92.8
Yes	6	7.2
Which general anesthetic?		
Propofol	5	83.3
Ketamine	1	16.7
Use of alpha-adrenergic agonists?		
No	82	98.8
Yes	1	1.2
Which alpha-adrenergic agonist?		
Dexmedetomidine	1	100.0

Source: Prepared by the authors.

The most commonly used pharmacological classes were opioid analgesics (31.3%) and benzodiazepines (19.3%), preferably administered via continuous infusion. Among individuals who used analgesics or sedatives, fentanyl (96.3%) and midazolam (100%) were the most prevalent. Of the sample, only one older person was treated with an alpha-adrenergic agonist (dexmedetomidine). The present study found a prevalence rate of delirium of 36.1% among older people admitted to critical care settings.

In bivariate analyses aiming to determine whether there was an association between the presence of delirium (yes and no) and factors related to hospitalization, a significant association was found between delirium and the use of invasive mechanical ventilation, mechanical restraint in bed, sedation, benzodiazepines, and opioids, with the use of mechanical restraint showing the greatest effect size among the variables tested. Only the variable “use of anesthetics” did not show a statistically significant relationship, as shown in Table 4.

Table 4. Association between Delirium and Clinical Variables Related to Hospitalization, according to Bivariate Analysis, Caruaru, Pernambuco, 2023

	Delirium		$\chi^2_{(a)}(\text{gl})^b$	<i>p</i> -value	Effect size ^c
	No	Yes			
Use of invasive mechanical ventilation ^d					
No	35	11	6.68 (1)	0.010	0.284
Yes	18	19			
Use of mechanical restraint in bed ^d					
No	47	8	32.95 (1)	<0.001	0.630
Yes	6	22			

	Delirium		$\chi^2_{(a)} (gl)^b$	<i>p-value</i>	Effect size ^c
	No	Yes			
Use of sedation^d					
No	42	13	11.05 (1)	0.001	0.365
Yes	11	17			
Use of benzodiazepines^d					
No	48	19	9.13 (1)	0.003	0.332
Yes	5	11			
Use of opioids^d					
No	42	14	9.26 (1)	0.002	0.334
Yes	11	16			
Use of anesthetic^e					
No	51	26	2.61 (1)	0.182	-
Yes	2	4			

Note: ^a χ^2 = value of Pearson's Chi-squared test of independence; ^b gl = degrees of freedom; ^c Effect size measured by Phi (Φ); ^d Pearson's Chi-squared test of independence; ^e Fisher's exact test.

Source: Prepared by the authors.

Meanwhile, in Table 5, the bivariate analysis using the Chi-squared test of independence (2x5) found a significant association ($\chi^2(4) = 19,773$, *p-value* = 0,001; Cramer's V = 0,488) between the presence of delirium and the patient's level of sedation according to the RASS scale.

Table 5. Bivariate Analysis of the Diagnostic Hypothesis and Level of Sedation with the Occurrence of Delirium in the Study Population, Caruaru, Pernambuco, 2023

Diagnostic hypothesis ^a	Delirium	
	No	Yes
Cardiovascular disease(n) ^b	12	9
Adjusted residual	-0.7	0.7
Lung disease (n) ^b	12	3
Adjusted residual	1.4	-1.4
Kidney disease (n) ^b	4	4
Adjusted residual	-0.9	0.9
Post-cardiac arrest syndrome (n) ^b	2	2
Adjusted residual	-0.6	0.6
Septicemia (n) ^b	8	9
Adjusted residual	-1.6	1.6
Immediate postoperative period (n) ^b	15	3
Adjusted residual	1.9	-1.9

RASS Scale ^c	Delirium	
	No	Yes
-2 / Light sedation (n) ^b	7	4
Adjusted residual	0	0
-1 / Drowsy (n) ^b	4	11
Adjusted residual	-3.3 ^d	3.3 ^d
0 / Calm and alert (n) ^b	37	9
Adjusted residual	3.5 ^d	-3.5 ^d
+1 / Restless (n) ^b	5	3
Adjusted residual	-0.1	0.1
+2 / Agitated (n) ^b	0	3
Adjusted residual	-2.3 ^d	2.3 ^d

Note: ^a Pearson's Chi-squared test of independence (2x6); ^b n = number of cases; ^c Pearson's Chi-squared test of independence (2x5); ^d p-value < 0.01
Source: Prepared by the authors.

Analyses of adjusted standardized residuals demonstrated that sedation levels of “-1 (drowsy),” “o (calm and alert),” and “+2 (agitated)” were associated with the presence of delirium. Odds ratio analyses showed that individuals who had a sedation level of -1 (drowsy) on the RASS scale were 12 times more likely to have delirium when compared to older individuals classified as having a sedation level of o (calm and alert) on the RASS scale. While the Chi-squared test of independence (2x6) was used to investigate whether there was an association between the presence of delirium and the diagnostic hypotheses, no significant association was found between delirium and any of the diagnostic hypotheses ($\chi^2(5) = 8.139$, $p\text{-value} = 0.149$).

The model containing the predictor mechanical restraint in bed was the only statistically significant one [$\chi^2(1) = 33.887$, $p\text{-value} < 0.001$; Nagelkerke $R^2 = 0.459$]. In addition, it was able to accurately predict 83.1% of case classifications (with 88.7% of cases correctly classified for those who did not have delirium and 73.3% of cases correctly classified for those who did have delirium). Multivariate analysis also showed that the use of mechanical restraint in bed increases the odds of the subject developing delirium by 21.5 times (OR = 21.542 [CI95%: 6.663-69.641]), as described in Table 6.

Table 6. Multivariate Analysis with Odds Ratio (OR) and Raw and Adjusted 95% Confidence Interval (95% CI) of Mechanical Restraint in Bed as a Predictor Variable for Delirium. Caruaru, Pernambuco, 2023

	Wald ^a	gl ^b	Raw OR	Raw (CI 95%)	p-value ^c	Adjusted OR	Adjusted (CI 95%)	p-value ^d
Mechanical restraint	26.29	1	21.54	(6.66;69.64)	<0.001	21.54	(6.66;69.64)	<0.001
Constant	21.43	1	-	-	-	0.170	-	<0.001

Note: ^a Wald = Wald test; ^b gl = degrees of freedom; ^c p-value = probability of significance — Pearson's Chi-squared test; ^d p-value = probability of significance — final binary logistic regression model.
Source: Prepared by the authors.

Discussion

The most common comorbidities found were a high-risk immediate postoperative period and sepsis. Septic patients and those undergoing anesthetic-surgical procedures are among the clinical profiles most affected by delirium. Additionally, the risk increases when these patients are older (18, 19). However, this study found no significant association between delirium and the diagnostic hypotheses tested in the bivariate analysis.

The rate of mechanical restraint use in older patients was 33.7%, which is significantly lower than that reported in a cross-sectional study conducted in Iran (74.5%), but higher than that reported in another multicenter study conducted in Switzerland and Austria (8.7% [20, 21]). The level of use of mechanical restraint has been shown to be an indicator of the performance of nursing teams and even of good patient safety practices in healthcare institutions. Recent results have shown that the use of mechanical restraint is higher in low- and middle-income countries (20–24).

The prevalence of delirium in older patients admitted to ICUs was 36.1%, a figure that corroborates the findings of several longitudinal studies, in which older patients under sedation and mechanical ventilation have an incidence that can reach 75% and a prevalence of over 80% (3, 8, 25). The epidemiology of delirium can be influenced by factors such as the care environment, assessment method, practices adopted by the care team, and preventive measures implemented (6, 26). It should be noted that, in the ICUs analyzed, there was no standardized routine for assessing delirium using systematic instruments.

Approximately 44.6% of patients were under invasive mechanical ventilation, and 33.7% received some form of sedative and/or analgesic during their ICU stay. These percentages are lower when compared to a prospective cohort study conducted in China with 115 participants (84.3% mechanical ventilation; 75% sedative or analgesic) and another large retrospective cohort study in the United States with 7,879 participants (45.6% [5, 27, 28]). The most commonly used medications were fentanyl and midazolam, respectively.

This result confirms previous findings (4, 27). In the bivariate analysis of delirium with exposure variables related to hospitalization, significant associations were found with mechanical ventilation, mechanical restraint in bed, sedation, benzodiazepines, and opioids. These are precipitating risk factors that converge with the most recent literature (5, 25, 29–32).

It was also possible to detect a strong correlation with the sedation level “-1 (drowsy)” on the RASS scale, with a 12-fold increased odds ratio of delirium compared to older patients at level “0 (calm and alert).” This result corroborates a randomized,

multicenter clinical trial conducted in Scandinavia, in which the group undergoing sedoanalgesia showed a significant association with the occurrence of delirium when compared to the group without sedoanalgesia (33).

However, in the multivariate model, only the variable “mechanical restraint in bed” was statistically significant. This indicates that older patients subjected to mechanical restraint are 21.5 times more likely to develop delirium compared to those who were not restrained. It can therefore be noted that mechanical restraint in bed is an important predictor of the occurrence of delirium, explaining approximately 45.9% of the variability found in the onset of this condition. According to a recent retrospective cross-sectional study conducted in China, there is an important correlation between the use of mechanical restraint, impaired mobility in older people, and cases of delirium (24).

Although the use of mechanical restraints in some circumstances is justified for patient safety reasons, such as preventing falls and/or the removal of medical devices, the literature indicates that the use of physical restraints does not prevent these adverse events. Another relevant point is that the professional-patient ratio interferes with the unnecessary use of restraints, especially in instances where there is work overload and a shortage of nursing professionals (5, 20-24).

Conclusions

The main contribution of this study is the identification of mechanical restraint as a significant risk factor for the development of delirium in older patients admitted to the ICU. With an odds ratio of 21.5 times higher for the development of delirium, it is clear that the use of mechanical restraint warrants special attention. In this context, it is crucial to adopt an alternative approach to care, prioritizing early mobilization and non-pharmacological strategies.

This study has some methodological limitations, starting with its design (cross-sectional), which hinders establishing a causal relationship between variables. In addition, the small sample size may have contributed to the scarcity of significant variables in the multivariate analysis. It can also be noted that the study was conducted in a single center, representing only one ethnic group from the countryside of the Northeast Region of Brazil, thus hindering the generalization of the data.

In practical terms, the results of this study can guide the implementation of specific care protocols for older adults in the ICU. Reducing the use of mechanical restraint, adequately monitoring sedation, and preventing delirium are essential strategies. These measures not only improve clinical outcomes but also reduce healthcare costs and provide a more humane experience for the patients and their families.

Conflict of interest

The authors declare that there is no conflict of interest.

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