



DELIRIUM INCIDENCE AND OUTCOMES IN MECHANICALLY VENTILATED ICU PATIENTS: A PROSPECTIVE OBSERVATIONAL STUDY

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Abstract

Background: Delirium is a frequent neuropsychiatric complication among critically ill patients receiving mechanical ventilation in the intensive care unit (ICU). It is associated with adverse clinical outcomes, including prolonged mechanical ventilation, increased length of stay, and higher mortality. Early detection and management of delirium may improve patient outcomes and reduce healthcare burden.

Objectives: To determine the incidence of delirium and evaluate its impact on clinical outcomes among mechanically ventilated ICU patients admitted to a tertiary care hospital.

Methods: This prospective observational study was conducted in the Intensive Care Unit of Rajendra Institute of Medical Sciences (RIMS), Ranchi, Jharkhand, from March 2020 to October 2022. A total of 120 adult patients requiring mechanical ventilation for more than 24 hours were enrolled. Delirium was assessed daily using the Confusion Assessment Method for the ICU (CAM-ICU). Demographic characteristics, comorbidities, severity of illness, duration of mechanical ventilation, ICU length of stay, hospital length of stay, and mortality were recorded and analyzed.

Results: Among the 120 mechanically ventilated patients included in the study, 46 patients developed delirium, yielding an incidence of 38.3%. Patients with delirium had significantly longer

duration of mechanical ventilation (9.4 ± 3.6 vs. 5.8 ± 2.7 days, $p < 0.001$), prolonged ICU stay (12.7 ± 4.8 vs. 7.3 ± 3.1 days, $p < 0.001$), and increased hospital stay (18.9 ± 6.2 vs. 12.5 ± 4.9 days, $p < 0.001$) compared to non-delirious patients. Mortality was also significantly higher in the delirium group (32.6% vs. 16.2%, $p = 0.036$).

Conclusion: Delirium is a common complication among mechanically ventilated ICU patients and is associated with significantly worse clinical outcomes, including prolonged mechanical ventilation, extended ICU and hospital stay, and increased mortality. Routine delirium screening and implementation of preventive strategies should be integral components of ICU care to improve patient outcomes.

Key Words: Delirium, Mechanical Ventilation, Intensive Care Unit, CAM-ICU, Mortality, Critical Care.

Introduction

Delirium is an acute neuropsychiatric syndrome characterized by disturbances in attention, awareness, cognition, and perception that develop over a short period and tend to fluctuate throughout the day.[15] It is a common yet often underrecognized complication among critically ill patients admitted to intensive care units (ICUs).[5,7] The occurrence of delirium in ICU patients has gained increasing attention because of its association with adverse clinical outcomes, increased healthcare costs, and long-term cognitive impairment.[2,3,8]

Mechanically ventilated patients are particularly vulnerable to the development of delirium due to multiple predisposing and precipitating factors, including severe underlying illness, exposure to sedatives and analgesics, metabolic disturbances, sleep deprivation, pain, infection, and prolonged immobilization.[4,9,10] The incidence of delirium among mechanically ventilated patients has been reported to range from 30% to 80%, depending on patient characteristics, assessment methods, and ICU practices.[1,6,13] Despite its high prevalence, delirium remains underdiagnosed when standardized screening tools are not routinely utilized.[6,7]

The pathophysiology of delirium is complex and multifactorial. Neurotransmitter imbalance, systemic inflammation, oxidative stress, impaired cerebral perfusion, and disruption of circadian rhythms have all been implicated in its development.[5,9,11] Delirium may manifest as hyperactive, hypoactive, or mixed subtypes, with hypoactive delirium frequently being overlooked in routine clinical practice.[7,9] Early identification is therefore essential to initiate appropriate interventions and minimize complications.[4,6]

Several studies have demonstrated that delirium is associated with prolonged duration of mechanical ventilation, extended ICU and hospital stay, increased risk of self-extubation, higher healthcare expenditure, and increased mortality.[1,8,13,14] Furthermore, survivors of ICU delirium may experience persistent cognitive dysfunction, impaired quality of life, and functional disability long after hospital discharge.[2,3] These findings underscore the importance of routine delirium assessment and implementation of preventive strategies in critically ill patients.[4,10]

Validated tools such as the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) have improved the recognition and diagnosis of delirium in critically ill patients, including those who are mechanically ventilated.[6] Regular screening using such tools allows timely identification of delirium and facilitates interventions aimed at reducing its incidence and severity.[4,10]

Data regarding the burden and outcomes of delirium among mechanically ventilated ICU patients in Eastern India remain limited. Understanding the incidence and clinical consequences of delirium in this population may help improve patient management and resource utilization in critical care settings. Therefore, the present prospective observational study was conducted in the Intensive Care Unit of Rajendra Institute of Medical Sciences (RIMS), Ranchi, Jharkhand, to determine the incidence of delirium among mechanically ventilated ICU patients and evaluate its impact on clinical outcomes including duration of mechanical ventilation, length of ICU stay, hospital stay, and mortality.

Objectives

Primary Objective

To determine the incidence of delirium among mechanically ventilated patients admitted to the intensive care unit.

Secondary Objectives

1. To evaluate the effect of delirium on the duration of mechanical ventilation.
2. To assess the impact of delirium on ICU length of stay.
3. To determine the association between delirium and hospital length of stay.
4. To compare mortality rates between patients with and without delirium.

Materials And Methods

Study Design and Setting

This prospective observational study was conducted in the Intensive Care Unit (ICU) of Rajendra Institute of Medical Sciences (RIMS), Ranchi, Jharkhand, India, over a period of 2 years and 8 months from March 2020 to October 2022. The study was approved by the Institutional Ethics Committee, and informed consent was obtained from the patients' legally authorized representatives before enrollment.

Study Population

Adult patients admitted to the ICU who required invasive mechanical ventilation for more than 24 hours during the study period were screened for eligibility.

Sample Size

A total of 120 mechanically ventilated patients fulfilling the eligibility criteria were included in the study.

Sample Size Calculation

The sample size was estimated using the formula for a single population proportion:

$$n = Z_{1-\alpha/2}^2 \times p \times q / d^2$$

Where:

- **n** = required sample size
- **$Z_{1-\alpha/2}$** = standard normal deviate at 95% confidence level = 1.96
- **p** = anticipated proportion (incidence of delirium) = 0.40
- **q** = $1 - p = 0.60$
- **d** = absolute precision (allowable error) = 0.09

Inclusion Criteria

1. Patients aged 18 years and above.
2. Patients requiring invasive mechanical ventilation for more than 24 hours.
3. Patients admitted to the medical, surgical, or mixed ICU during the study period.
4. Consent obtained from the patient's legally authorized representative.

Exclusion Criteria

1. Patients with pre-existing dementia or severe cognitive impairment.
2. Patients with documented psychiatric illnesses such as schizophrenia or severe depression.
3. Patients with persistent coma (Richmond Agitation Sedation Scale [RASS] score of -4 or -5 throughout ICU stay).
4. Patients with severe hearing or visual impairment preventing delirium assessment.
5. Patients with acute neurological conditions interfering with cognitive assessment, including major stroke, traumatic brain injury, or post-cardiac arrest encephalopathy.
6. Patients who died or were discharged within 24 hours of ICU admission.

Data Collection

Data were collected prospectively from mechanically ventilated patients admitted to the Intensive Care Unit (ICU) of Rajendra Institute of Medical Sciences (RIMS), Ranchi, between March 2020 and October 2022 using a predesigned and structured data collection form. Baseline demographic characteristics including age, sex, primary diagnosis, indication for mechanical ventilation, comorbidities, and severity of illness assessed by APACHE II score were recorded at the time of ICU admission.

Patients were assessed daily for delirium using the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) after evaluation of sedation level with the Richmond Agitation-Sedation Scale (RASS). Clinical variables including duration of mechanical ventilation, use of sedatives, length of ICU stay, length of hospital stay, and mortality outcomes were documented throughout the ICU stay. Patients were categorized into delirium and non-delirium groups, and the collected data were analyzed to determine the incidence of delirium and its association with clinical outcomes.

Delirium Assessment

Delirium assessment was performed daily in all enrolled patients using the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU), a validated tool for the detection of delirium in critically ill patients. Prior to assessment, the level of consciousness and sedation was evaluated using the Richmond Agitation-Sedation Scale (RASS). Patients with a RASS score of -3 or higher were considered eligible for delirium assessment.

A diagnosis of delirium was made when the CAM-ICU assessment was positive, based on the presence of acute onset or fluctuating mental status changes, inattention, and either altered level of consciousness or disorganized thinking. Patients who tested positive for delirium at any time during their ICU stay were categorized into the delirium group. Daily assessments were continued until extubation, ICU discharge, or death.

Table 1. Richmond Agitation-Sedation Scale (RASS)

Score	Description
+4	Combative
+3	Very Agitated
+2	Agitated
+1	Restless
0	Alert and calm
-1	Drowsy
-2	Light Sedation
-3	Moderate Sedation
-4	Deep Sedation
-5	Unarousable

Note: RASS was assessed daily before delirium screening to determine the patient's level of consciousness and sedation. Patients with a RASS score ≥ -3 were evaluated for delirium using CAM-ICU, while those with RASS scores of -4 or -5 were considered too deeply sedated for assessment.

Table 2. CAM-ICU Diagnostic Criteria

Feature	Description
1	Acute onset or fluctuating course
2	Inattention
3	Altered level of consciousness

4	Disorganized thinking
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Note: The Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) is a validated bedside tool used for delirium screening in critically ill patients. Delirium was diagnosed when Features 1 and 2, along with either Feature 3 or Feature 4, were present during daily assessment.

Outcome Measures

Primary Outcome

The primary outcome of the study was the incidence of delirium among mechanically ventilated ICU patients during their ICU stay. Delirium was diagnosed using the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU), and the incidence was calculated as the proportion of patients who developed delirium at any time during the study period.

Secondary Outcomes

The secondary outcomes included:

1.Duration of Mechanical Ventilation: Defined as the total number of days a patient remained on invasive mechanical ventilation from initiation until successful extubation or death.

2.Length of ICU Stay: Defined as the total number of days from ICU admission to ICU discharge or death.

3.Length of Hospital Stay: Defined as the total number of days from hospital admission to hospital discharge or death.

4.Mortality: ICU mortality and in-hospital mortality were recorded and compared between patients with and without delirium.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using the Statistical Package for the Social Sciences (SPSS) software version 25.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean $\pm$ standard deviation (SD) or median with interquartile range (IQR), depending on the distribution of data, while categorical variables were presented as frequencies and percentages.

Comparisons between patients with and without delirium were performed using the student's t-test for normally distributed continuous variables and the Mann-Whitney U test for non-normally distributed variables. Categorical variables were compared using the Chi-square test or Fisher's exact test, as appropriate. A p-value of less than 0.05 was considered statistically significant. The association between delirium and clinical outcomes, including duration of mechanical ventilation, ICU stay, hospital stay, and mortality, was assessed using appropriate statistical tests.

Ethical Considerations

The study was conducted after obtaining approval from the Institutional Ethics Committee (IEC) of Rajendra Institute of Medical Sciences (RIMS), Ranchi. Written informed consent was obtained from the legally authorized representatives of all participants prior to enrollment. The study adhered to the ethical principles of the Declaration of Helsinki, and confidentiality of patient information was maintained throughout the study. Participation in the study did not affect the standard treatment provided, and all data were collected and analyzed solely for research purposes.

Results

A total of 120 mechanically ventilated patients were enrolled in the study during the study period (March 2020 to October 2022). Among them, 46 patients (38.3%) developed delirium during their ICU stay, while 74 patients (61.7%) did not develop delirium.

Table 3. Baseline Demographic and Clinical Characteristics of Study Participants

Variable	Delirium (n=46)	No Delirium (n=74)	p-value
Age (years), Mean $\pm$ SD	59.2 $\pm$ 14.3	54.6 $\pm$ 13.7	0.082
Male Gender, n (%)	31 (67.4)	48 (64.9)	0.781
Diabetes Mellitus, n (%)	18 (39.1)	22 (29.7)	0.287
Hypertension, n (%)	21 (45.7)	28 (37.8)	0.392
APACHE II Score, Mean $\pm$ SD	20.4 $\pm$ 4.5	17.6 $\pm$ 3.9	0.001

Note: Values are expressed as mean $\pm$ standard deviation (SD) for continuous variables and as frequency (percentage) for categorical variables. Comparison between groups was performed using Student's t-test for continuous variables and Chi-square test for categorical variables; $p < 0.05$ was considered statistically significant.

Table 4. Risk Factors Associated with Delirium

Variable	Delirium	No Delirium	p-value
Age >60 years	24	25	0.045
Diabetes	18	22	0.287
Hypertension	21	28	0.392
APACHE II >20	28	18	<0.001

Note: Risk factors for delirium were compared between patients who developed delirium and those who did not. Variables were analyzed using appropriate statistical tests, and a p-value <0.05 was considered statistically significant. Higher APACHE II scores were significantly associated with the development of delirium.

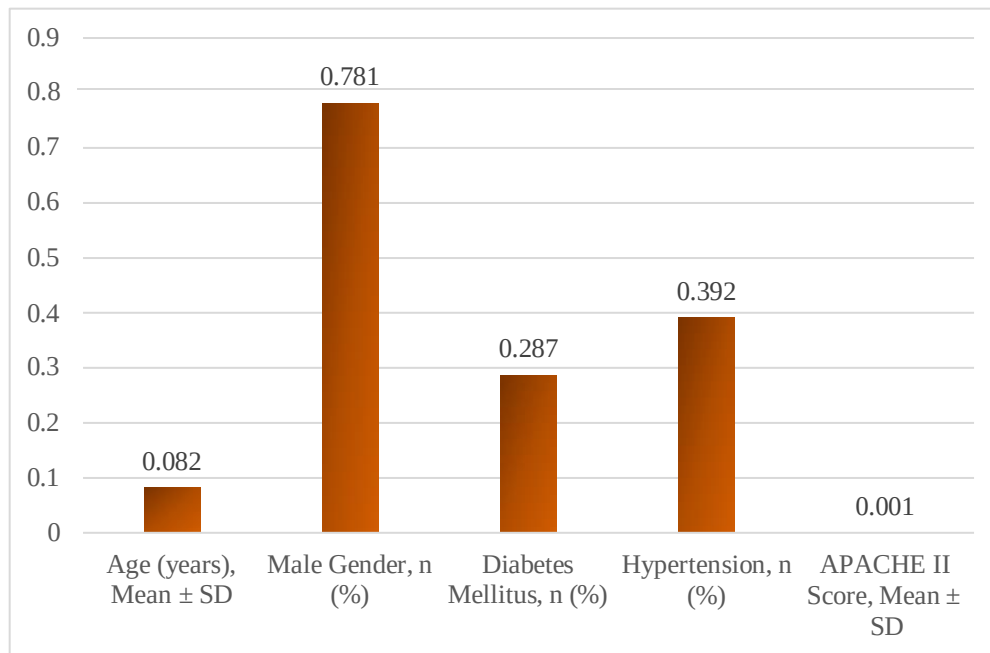


Figure 1. Baseline Demographic and Clinical Characteristics of Study Participants

Figure Note: The bar chart represents baseline demographic and clinical characteristics of patients with and without delirium. Age and APACHE II score are shown as mean values, while male gender, diabetes mellitus, and hypertension are shown as percentages. Higher APACHE II scores were observed among patients who developed delirium.

Incidence of Delirium

Among the 120 mechanically ventilated patients included in the study, 46 patients developed delirium during their ICU stay, resulting in an overall incidence of 38.3%. The remaining 74 patients (61.7%) did not develop delirium. Delirium was diagnosed using the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) during daily assessments. The findings indicate that delirium is a common complication among mechanically ventilated ICU patients.

Table 5. Incidence of Delirium Among Mechanically Ventilated ICU Patients

Delirium Status	Number of Patients (n)	Percentage (%)
Delirium Present	46	38.3
Delirium Absent	74	61.7
Total	120	100.0

Note: Incidence of delirium was calculated as the proportion of patients who developed delirium during their ICU stay, as assessed by the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU). Values are presented as frequency (n) and percentage (%).

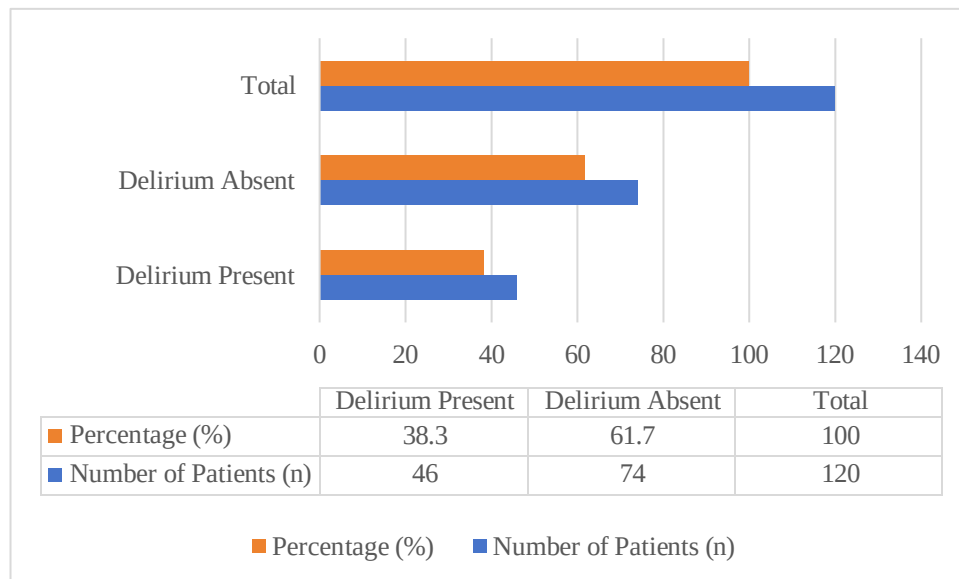


Figure 2. Incidence of Delirium Among Mechanically Ventilated ICU Patients

Note: The figure illustrates the incidence of delirium among mechanically ventilated ICU patients during the study period (March 2020 to October 2022). Of the 120 patients included, 46 (38.3%) developed delirium, while 74 (61.7%) remained free of delirium during their ICU stay, as assessed using the CAM-ICU screening tool.

Table 6. Distribution of Delirium Subtypes Among Mechanically Ventilated ICU Patients

Subtype	n	%
Hypoactive	22	47.8
Hyperactive	14	30.4
Mixed	10	21.8
Total	46	100

Note: Delirium was classified into hypoactive, hyperactive, and mixed subtypes based on patients' clinical presentation during CAM-ICU-positive assessments. Hypoactive delirium was the most common subtype observed, highlighting the importance of routine screening as this form is frequently underrecognized in clinical practice.

Clinical Outcomes

Patients who developed delirium experienced significantly worse clinical outcomes compared to those without delirium. The mean duration of mechanical ventilation was significantly longer in the delirium group (9.4 ± 3.6 days) compared to the non-delirium group (5.8 ± 2.7 days; $p < 0.001$). Similarly, patients with delirium had a prolonged ICU stay (12.7 ± 4.8 vs. 7.3 ± 3.1 days; $p < 0.001$) and a longer hospital stay (18.9 ± 6.2 vs. 12.5 ± 4.9 days; $p < 0.001$). Mortality was also significantly higher among patients who developed delirium (32.6% vs. 16.2%; $p = 0.036$).

Table 7. Comparison of Clinical Outcomes Between Delirium and Non-Delirium Groups

Outcome	Delirium (n = 46)	No Delirium (n = 74)	p-value
Duration of Mechanical Ventilation (days), Mean $\pm$ SD	9.4 $\pm$ 3.6	5.8 $\pm$ 2.7	<0.001
ICU Length of Stay (days), Mean $\pm$ SD	12.7 $\pm$ 4.8	7.3 $\pm$ 3.1	<0.001
Hospital Length of Stay (days), Mean $\pm$ SD	18.9 $\pm$ 6.2	12.5 $\pm$ 4.9	<0.001
Mortality, n (%)	15 (32.6)	12 (16.2)	0.036

Note: Clinical outcomes were compared between patients with and without delirium. Continuous variables are expressed as mean $\pm$ standard deviation (SD) and were analyzed using Student's t-test, while mortality was compared using the Chi-square test. A p-value < 0.05 was considered statistically significant.

Table 8. Excess Burden Associated with Delirium

Outcome	Delirium	No Delirium	Difference
Ventilator Days	9.4	5.8	+3.6
ICU Stay (days)	12.7	7.3	+5.4
Hospital Stay (days)	18.9	12.5	+6.4
Mortality (%)	32.6	16.2	+16.4

Note: Excess burden associated with delirium was calculated by comparing key clinical outcomes between delirious and non-delirious patients. Patients who developed delirium experienced longer durations of mechanical ventilation, prolonged ICU and hospital stays, and higher mortality, indicating a substantial impact on patient outcomes and healthcare resource utilization.

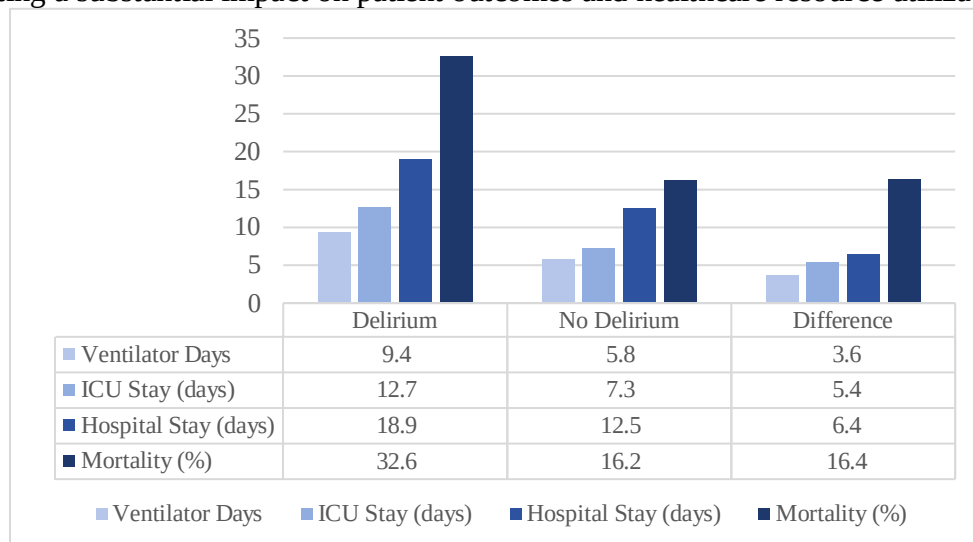


Figure 3. Excess Burden Associated with Delirium on Clinical Outcomes

Note: The figure compares the excess burden of delirium on major clinical outcomes among mechanically ventilated ICU patients. Patients with delirium experienced longer durations of mechanical ventilation, prolonged ICU and hospital stays, and higher mortality rates compared to those without delirium, demonstrating the significant adverse impact of delirium on patient outcomes.

Mortality Analysis

A total of 27 deaths were recorded among the 120 mechanically ventilated ICU patients, resulting in an overall mortality rate of 22.5%. Mortality was significantly higher among patients who developed delirium compared to those who did not develop delirium (32.6% vs. 16.2%, $p = 0.036$). Of the 46 patients with delirium, 15 patients died, whereas 12 of the 74 patients without delirium succumbed during their hospital stay. These findings suggest that the development of delirium is associated with an increased risk of mortality among mechanically ventilated ICU patients.

Table 9. Association Between Delirium and Mortality

Outcome	Delirium (n = 46)	No Delirium (n = 74)	Total (n = 120)	p-value
Survived, n (%)	31 (67.4)	62 (83.8)	93 (77.5)	-
Died, n (%)	15 (32.6)	12 (16.2)	27 (22.5)	0.036

Note: Values are presented as frequency (percentage). The association between delirium and mortality was analyzed using the Chi-square test, and a p -value < 0.05 was considered statistically significant. Patients with delirium had a significantly higher mortality rate compared to those without delirium.

Discussion

The present prospective observational study was conducted to determine the incidence of delirium and its impact on clinical outcomes among mechanically ventilated ICU patients during the period from March 2020 to October 2022. Among the 120 patients included in the study, delirium developed in 46 patients, yielding an incidence of 38.3%. This finding is consistent with previous studies that have reported delirium incidence rates ranging from 30% to 80% among critically ill mechanically ventilated patients. [1,6,13] The variation in incidence reported across studies may be attributed to differences in patient populations, severity of illness, sedation practices, and methods of delirium assessment.

In the present study, patients who developed delirium had significantly higher APACHE II scores compared to those without delirium, indicating that greater severity of illness may contribute to the development of delirium. Similar observations have been reported by Ely et al. and Pandharipande et al., who demonstrated that critically ill patients with higher disease severity are at increased risk of developing delirium. [1,2] The multifactorial pathogenesis of delirium involving systemic inflammation, metabolic disturbances, organ dysfunction, and exposure to sedative medications may explain this association. [5,9]

A significant association was observed between delirium and duration of mechanical ventilation. Patients with delirium required mechanical ventilation for a longer duration than non-delirious patients. This finding is in agreement with previous studies showing that delirium delays weaning from ventilatory support and increases the risk of ventilator-related complications. [1,7,12] Delirious patients often exhibit altered cognition, agitation, or impaired cooperation, which may complicate ventilator management and prolong dependence on mechanical ventilation.

The present study also demonstrated that delirium was associated with prolonged ICU and hospital stay. Patients who developed delirium remained in the ICU and hospital significantly longer than those without delirium. These findings are comparable to those reported in previous investigations, which identified delirium as an independent predictor of increased healthcare utilization and resource consumption. [8,13] Prolonged hospitalization may result from delayed recovery, increased risk of complications, and the need for additional monitoring and supportive care.

Mortality analysis revealed a significantly higher mortality rate among patients with delirium compared to those without delirium. The mortality rate in the delirium group was approximately twice that observed in the non-delirium group. Similar findings have been reported by numerous studies, suggesting that delirium is not only a marker of disease severity but may also independently contribute to adverse outcomes. [1,8,14] Delirium has been associated with physiological stress, prolonged organ dysfunction, and increased susceptibility to secondary complications, all of which may contribute to increased mortality.

The findings of the present study emphasize the importance of routine delirium screening in mechanically ventilated ICU patients using validated tools such as CAM-ICU.[6] Early identification of delirium allows timely implementation of preventive and therapeutic measures, including optimization of sedation practices, early mobilization, adequate pain control, sleep promotion, and family engagement.[4,10] Such interventions have been shown to reduce the incidence and duration of delirium and improve overall patient outcomes.

The present study has certain limitations. Being a single-center study, the findings may not be generalizable to all ICU settings. The sample size was relatively small, and long-term cognitive outcomes following hospital discharge were not assessed. Additionally, the influence of specific sedative agents and other potential confounding factors was not evaluated in detail. [2,3]

Despite these limitations, the study provides valuable insight into the burden of delirium among mechanically ventilated ICU patients in a tertiary care teaching hospital. The results highlight the need for routine delirium surveillance and implementation of evidence-based preventive strategies to improve clinical outcomes and reduce mortality in critically ill patients. [4,8,11].

Hypoactive delirium constituted the largest proportion of delirium cases in the present study and is frequently under-recognized in routine ICU practice. Daily assessment using validated tools such as CAM-ICU, combined with sedation monitoring using RASS, facilitates early diagnosis and timely implementation of preventive strategies. Adoption of evidence-based ICU delirium bundles focusing on analgesia optimization, sedation minimization, early mobilization, sleep promotion, and family engagement may reduce delirium incidence and improve patient outcomes.

Limitations

The present study has several limitations. First, it was conducted at a single tertiary care center, which may limit the generalizability of the findings to other healthcare settings. Second, the sample size was relatively small, and a larger multicenter study would provide more robust evidence. Third, long-term cognitive and functional outcomes of patients after hospital discharge were not assessed. Finally, the effects of specific sedative medications and other potential confounding factors influencing the development of delirium were not evaluated in detail.

Conclusion

Delirium is a common complication among mechanically ventilated ICU patients, with an incidence of 38.3% in the present study conducted between March 2020 and October 2022. Patients who developed delirium experienced significantly longer durations of mechanical ventilation, prolonged ICU and hospital stays, and higher mortality rates compared to those without delirium. These findings highlight the substantial impact of delirium on patient outcomes and healthcare resource utilization. Routine delirium screening using validated assessment tools such as CAM-ICU, along with early preventive and management strategies, may help reduce the burden of delirium and improve clinical outcomes among critically ill mechanically ventilated patients.

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Conflict Of Interest

The authors declare that there is no conflict of interest with respect to the research, authorship, and publication of this article.

References

1. Ely EW, Shintani A, Truman B, Speroff T, Gordon SM, Harrell FE Jr, et al. Delirium as a predictor of mortality in mechanically ventilated patients in the intensive care unit. *JAMA*. 2004;291(14):1753–1762.
2. Pandharipande PP, Girard TD, Jackson JC, Morandi A, Thompson JL, Pun BT, et al. Long-term cognitive impairment after critical illness. *N Engl J Med*. 2013;369(14):1306–1316.
3. Girard TD, Jackson JC, Pandharipande PP, Pun BT, Thompson JL, Shintani AK, et al. Delirium as a predictor of long-term cognitive impairment in survivors of critical illness. *Crit Care Med*. 2010;38(7):1513–1520.
4. Devlin JW, Skrobik Y, Gélinas C, Needham DM, Slooter AJC, Pandharipande PP, et al. Clinical practice guidelines for the prevention and management of pain, agitation/sedation, delirium, immobility, and sleep disruption in adult patients in the ICU. *Crit Care Med*. 2018;46(9):e873.
5. Inouye SK. Delirium in older persons. *N Engl J Med*. 2006;354(11):1157–1165.
6. Ely EW, Margolin R, Francis J, May L, Truman B, Dittus R, et al. Evaluation of delirium in critically ill patients: Validation of the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU). *Crit Care Med*. 2001;29(7):1370–1379.
7. Pun BT, Ely EW. The importance of diagnosing and managing ICU delirium. *Chest*. 2007;132(2):624–636.
8. Salluh JIF, Wang H, Schneider EB, Nagaraja N, Yenokyan G, Damluji A, et al. Outcome of delirium in critically ill patients: Systematic review and meta-analysis. *BMJ*. 2015;350.
9. Jackson P, Khan A. Delirium in critically ill patients. *Crit Care Clin*. 2015;31(3):589–603.
10. Brummel NE, Girard TD. Preventing delirium in the intensive care unit. *Crit Care Clin*. 2013;29(1):51–65.
11. Kotfis K, Marra A, Ely EW. ICU delirium—A diagnostic and therapeutic challenge in the intensive care unit. *Anaesthesiol Intensive Ther*. 2018;50(2):160–167.
12. Patel SB, Poston JT, Pohlman A, Hall JB, Kress JP. Rapidly reversible, sedation-related delirium versus persistent delirium in the intensive care unit. *Am J Respir Crit Care Med*. 2014;189(6):658–665.
13. Ouimet S, Kavanagh BP, Gottfried SB, Skrobik Y. Incidence, risk factors and consequences of ICU delirium. *Intensive Care Med*. 2007;33(1):66–73.
14. Pisani MA, Kong SYJ, Kasl SV, Murphy TE, Araujo KLB, Van Ness PH. Days of delirium are associated with 1-year mortality in an older intensive care unit population. *Am J Respir Crit Care Med*. 2009;180(11):1092–1097.
15. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*. 5th ed. Washington, DC: American Psychiatric Publishing; 2013.