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Delirium Prevalence in ICU Elderly Patients: A Prospective Observational Study

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Abstract

Background: Delirium is a common neuropsychiatric syndrome in elderly intensive care unit (ICU) patients and is associated with increased morbidity, mortality, prolonged hospital stay, and long-term cognitive decline. Early recognition remains challenging due to fluctuating presentation and overlap with dementia. ***Materials and Methods*** A prospective observational study was conducted among 200 elderly patients (≥60 years) admitted to the ICU of a tertiary care hospital over 12 months. Delirium was assessed using the Confusion Assessment Method for ICU (CAM-ICU). Demographic data, comorbidities, laboratory parameters, mechanical ventilation, and outcomes were recorded. Statistical analysis was performed using SPSS version 25. ***Results*** The prevalence of ICU delirium was 38%. Higher incidence was observed in patients aged ≥75 years, those on mechanical ventilation, and those with sepsis. Delirium was significantly associated with prolonged ICU stay and increased mortality ($p<0.05$). ***Conclusion*** Delirium is highly prevalent among elderly ICU patients and significantly affects outcomes. Routine screening using validated tools such as CAM-ICU is essential for early detection and improved management.

Keywords: Delirium, Elderly, ICU, CAM-ICU, Mechanical Ventilation, Mortality

INTRODUCTION

Delirium is an acute disturbance of attention and cognition characterized by fluctuating mental status and impaired awareness[1]. It is particularly common among elderly individuals admitted to intensive care units (ICUs), with reported prevalence ranging from 20% to 80% depending on the population studied[2]. The elderly population is inherently vulnerable due to age-related neurodegenerative changes, reduced physiological reserve, polypharmacy, and multiple comorbidities[3].

ICU delirium represents a form of acute brain dysfunction and is now recognized as an independent predictor of poor clinical outcomes, including increased mortality, prolonged mechanical ventilation, extended ICU stay, and long-term cognitive impairment[4–6]. Studies indicate that delirium may persist even after discharge, contributing to post-intensive care syndrome (PICS)[7]. Despite its high prevalence, delirium remains underdiagnosed, especially the hypoactive subtype, which may be mistaken for depression or fatigue[8].

Pathophysiologically, delirium is multifactorial, involving neurotransmitter imbalance (particularly acetylcholine deficiency and dopamine excess), systemic inflammation, oxidative stress, and disruption of the blood-brain barrier[9–11]. Elevated inflammatory markers such as interleukin-6 and C-reactive protein have been implicated in ICU delirium[12]. Risk factors include advanced age, pre-existing cognitive impairment, infection, metabolic derangements, sedative exposure, and mechanical ventilation[13–15].

Validated screening tools such as the Confusion Assessment Method for ICU (CAM-ICU) and Intensive Care Delirium Screening Checklist (ICDSC) have improved detection rates[16]. However, routine implementation remains inconsistent in many resource-limited settings[17]. Early identification is crucial because preventive strategies—including sedation minimization, early mobilization, sleep promotion, and reorientation protocols—have demonstrated effectiveness in reducing incidence[18–20].

In India and other developing countries, data on ICU delirium prevalence among elderly patients remain limited[21]. Variations in healthcare infrastructure, staffing patterns, and sedation practices may influence incidence

rates. Understanding local epidemiology is essential to guide preventive strategies and resource allocation[22].

Therefore, this study aimed to determine the prevalence of delirium among elderly ICU patients and identify associated risk factors and outcomes in a tertiary care setting.

MATERIALS AND METHODS

This prospective observational study was conducted in the medical and surgical ICUs of a tertiary care teaching hospital over a 12-month period.

Study Population

A total of 200 elderly patients aged ≥60 years admitted to the ICU for more than 24 hours were enrolled consecutively.

Inclusion Criteria

- Age ≥60 years
- ICU stay >24 hours
- Ability to undergo delirium assessment
- Consent from patient/attendant

Exclusion Criteria

- Pre-existing severe dementia
- Persistent coma (RASS -4 or -5)
- Severe hearing or visual impairment interfering with assessment
- Acute psychiatric illness
- Refusal of consent

Data Collection

Demographic details (age, gender), primary diagnosis, comorbidities (diabetes, hypertension, CKD, COPD), APACHE II score, laboratory parameters (electrolytes, renal function), mechanical ventilation, sedative use, and duration of ICU stay were recorded.

Delirium Assessment

Delirium was assessed twice daily using CAM-ICU by trained clinicians. Richmond Agitation-Sedation Scale (RASS) was used prior to CAM-ICU assessment to ensure appropriate arousal level.

Outcome Measures

Primary outcome: Prevalence of delirium.
Secondary outcomes: ICU length of stay, duration of mechanical ventilation, and mortality.

Statistical Analysis

Data were analyzed using SPSS version 25. Continuous variables were expressed as mean ± SD. Categorical variables were expressed as percentages. Chi-square test and independent t-test were used. $p<0.05$ was considered statistically significant.

RESULTS

Table 1: Age Distribution

Age Group	Total (n=200)	Delirium (n=76)	Percentage
60–69	82	22	26.8%
70–79	74	30	40.5%
≥80	44	24	54.5%

Delirium prevalence increased significantly with advancing age ($p=0.01$).

Table 2: Gender Distribution

Gender	Total	Delirium	Percentage
Male	118	46	39%
Female	82	30	36.5%

Slight male predominance was observed but not statistically significant.

Table 3: Mechanical Ventilation

Ventilation	Total	Delirium	Percentage
Yes	96	52	54%
No	104	24	23%

Mechanically ventilated patients had significantly higher delirium incidence ($p<0.001$).

Table 4: Primary Diagnosis

Diagnosis	Delirium (%)
Sepsis	48%
Postoperative	35%
Cardiac	28%
Respiratory	42%

Sepsis showed highest association.

Table 5: ICU Stay Duration

Group	Mean ICU Stay (days)
Delirium	9.2 ± 3.1
No Delirium	5.6 ± 2.4

Delirium significantly prolonged ICU stay ($p<0.001$).

Table 6: Mortality

Outcome	Delirium	No Delirium
Survived	54	110
Died	22	14

Mortality was significantly higher in delirium group (28.9% vs 11.3%, p=0.002).

DISCUSSION

The present study demonstrated a delirium prevalence of 38% among elderly ICU patients, which aligns with contemporary literature reporting rates between 30% and 60% in similar populations[1–3]. Variability in reported prevalence across studies may be attributed to differences in study design, patient demographics, illness severity, sedation practices, and diagnostic tools used. The use of a validated screening instrument such as CAM-ICU in the current study likely improved detection accuracy, particularly for hypoactive delirium, which is frequently under-recognized in routine clinical practice[4]. Advanced age emerged as a significant risk factor for delirium in our cohort. Patients aged ≥80 years demonstrated the highest incidence (54.5%), supporting previous findings that aging is independently associated with acute brain vulnerability[5,6]. Age-related neurodegenerative changes, reduced cholinergic reserve, blood-brain barrier permeability alterations, and increased inflammatory responses contribute to heightened susceptibility[7]. Moreover, elderly individuals often have multiple comorbidities and polypharmacy exposure, both recognized contributors to delirium pathogenesis[8].

Mechanical ventilation was strongly associated with delirium in this study, with 54% of ventilated patients developing the condition. This observation is consistent with large multicenter ICU studies demonstrating mechanical ventilation as one of the strongest modifiable risk factors[9,10]. The need for sedation, particularly benzodiazepines and high-dose opioids, significantly increases delirium risk by altering neurotransmitter balance and suppressing cortical function[11]. Contemporary ICU guidelines emphasize light sedation strategies and avoidance of benzodiazepines whenever possible[12]. Implementation of sedation protocols and daily awakening trials have been shown to reduce delirium incidence and improve outcomes[13].

Sepsis was identified as the most common underlying diagnosis associated with delirium. Sepsis-associated encephalopathy is a well-recognized entity resulting from systemic inflammation, cytokine release, oxidative stress, and microcirculatory dysfunction[14]. Elevated inflammatory markers such as IL-6, TNF-α, and C-reactive protein have been correlated with delirium severity[15]. Neuroinflammation disrupts neuronal signaling and contributes to cognitive dysfunction. Our findings corroborate previous studies demonstrating that septic patients are nearly twice as likely to develop delirium compared to non-septic ICU patients[16].

Delirium was significantly associated with prolonged ICU stay (mean 9.2 vs 5.6 days) in the present study. This finding is consistent with multiple systematic reviews that identify delirium as an independent predictor of longer hospitalization[17,18]. Prolonged ICU stay increases healthcare costs, resource utilization, and risk of additional complications such as nosocomial infections and pressure ulcers. Importantly, delirium itself may delay recovery due to impaired participation in rehabilitation and increased need for sedation or restraints[19].

Mortality was significantly higher in patients who developed delirium (28.9% vs 11.3%). This aligns with landmark studies by Ely et al. and subsequent meta-analyses demonstrating that ICU delirium independently predicts short-term and long-term mortality[20,21]. The pathophysiological mechanisms linking delirium to mortality are multifactorial. Delirium reflects acute brain dysfunction, which may represent systemic organ failure. Additionally, delirium may contribute to adverse events such as accidental extubation, aspiration, and reduced adherence to treatment[22]. Long-term follow-up studies have shown persistent cognitive decline and functional impairment in survivors, emphasizing delirium's lasting impact[23].

Gender differences were not statistically significant in our study, which corresponds with most contemporary research indicating that sex is not a strong independent predictor when adjusted for other factors[24]. However, some studies suggest that hormonal and inflammatory differences may influence vulnerability, warranting further investigation[25].

The findings of this study underscore the importance of routine delirium monitoring using standardized tools. The CAM-ICU has high sensitivity and specificity and can be administered quickly by trained staff[26]. Despite guideline recommendations, delirium screening remains underutilized in many ICUs, particularly in low- and middle-income countries[27]. Barriers include lack of training, staffing constraints, and prioritization of physiological parameters over neurocognitive assessment.

Preventive strategies are critical in mitigating delirium risk. Multicomponent interventions, such as the ABCDEF bundle (Assess, prevent and manage pain; Both spontaneous awakening and breathing trials; Choice of sedation; Delirium assessment; Early mobility; Family engagement), have shown significant reductions in delirium incidence and improved survival[28,29]. Non-pharmacological measures—including sleep hygiene, orientation cues, vision/hearing aids,

hydration optimization, and early mobilization—are particularly effective in elderly patients[30].

Pharmacological management remains controversial. Antipsychotics are frequently used for hyperactive delirium, yet evidence for mortality benefit is limited[31]. Recent trials suggest that dexmedetomidine may reduce delirium duration compared to other sedatives due to its minimal respiratory depression and neuroprotective properties[32]. Future research should explore biomarkers and neuroimaging modalities for early prediction and targeted therapy.

CONCLUSION

Delirium affects over one-third of elderly ICU patients and is associated with increased ICU stay and mortality. Advanced age, sepsis, and mechanical ventilation are significant risk factors. Routine screening and preventive strategies should be incorporated into ICU protocols to improve outcomes. Our findings reaffirm that delirium is a prevalent and serious complication among elderly ICU patients, significantly affecting morbidity and mortality. Early identification, risk stratification, and implementation of evidence-based prevention bundles are essential to improving outcomes in this vulnerable population.

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