

Original Research Article

PREVALENCE OF ICU DELIRIUM AMONG PATIENTS ADMITTED TO GASTROENTEROLOGY AND MEDICAL ICUS OF A TERTIARY CARE TRUST HOSPITAL: A CROSS-SECTIONAL STUDY IN RAJASTHAN, INDIA

Tulika Sharma¹, Nikhil Ajmera², Sunita Purty³, Ashok Kumar⁴

¹Research Scholar, Department of Clinical Psychology, Mahatma Gandhi Medical College and Hospital, Jaipur, India.

²HOD, Department of Critical Care, Santokba Durlabhji Memorial Hospital, Jaipur, India.

³Professor & HOD, Department of Clinical Psychology, Mahatma Gandhi Medical College and Hospital, Jaipur, India.

⁴Assistant Professor and Biostatistician Department of Community Medicine, Mahatma Gandhi University of Medical Sciences and Technology, Jaipur, India.

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Corresponding Author:

Dr. Tulika Sharma,
Research Scholar, Department of
Clinical Psychology, Mahatma Gandhi
Medical College and Hospital, Jaipur,
India.
Email: sharmatulika99@gmail.com

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ABSTRACT

Background: Intensive Care Unit (ICU) delirium is an acute, fluctuating disturbance of attention and cognition associated with prolonged hospitalisation, increased mortality and long-term cognitive impairment. Indian data on non-ventilated ICU cohorts and on gastroenterology critical care are limited.

Objective: To determine the prevalence of ICU delirium among patients admitted to the Gastroenterology and Medical ICUs of a tertiary care trust hospital in Rajasthan, India, and to describe the demographic and clinical profile of delirium-positive patients.

Materials and Methods: A single-centre, cross-sectional observational study was carried out over six months (April 2023 – September 2023). Fifty adult patients (≥ 18 years) with an ICU stay of at least 24 hours were consecutively assessed once each using the Confusion Assessment Method for the ICU (CAM-ICU). Patients with pre-existing delirium, dementia or severe sensory impairment were excluded. Categorical variables are summarised as frequencies and percentages, and prevalence is reported for the whole sample and stratified by gender and ICU sub-group.

Results: The overall prevalence of ICU delirium was 22.0% (11/50). All delirium-positive cases were of the hyperactive subtype; no patient in the cohort was mechanically ventilated. Overall, 76.0% of patients were male, 56.0% had chronic illness, 36.0% reported alcohol use and 46.0% had a history of liver disease. Within the delirious sub-group ($n = 11$), 90.9% were male, 63.6% were aged ≤ 60 years, 72.7% had chronic illness, 54.5% reported alcohol use, 63.6% had liver disease, 36.4% had sepsis and 81.8% were admitted to the Medical ICU. Prevalence differed markedly by setting (Medical ICU 31.0% vs Gastroenterology ICU 9.5%) and by gender (males 26.3% vs females 8.3%). On CAM-ICU screening, acute onset / fluctuating course, inattention and altered level of consciousness were present in 100% of delirious patients, while disorganized thinking was present in 27.3%.

Conclusion: One in five patients admitted to the studied ICUs screened positive for delirium, with a male, non-ventilated, medically complex profile and an exclusively hyperactive presentation. The findings support routine CAM-ICU screening, targeted attention to Medical ICU patients with liver disease and alcohol use, and the adoption of multi-component, non-pharmacological strategies to reduce delirium burden. Larger, multi-centre studies are needed to confirm these observations and to inform Indian ICU delirium care pathways.

Keywords: ICU delirium, critical care, cognitive dysfunction, hyperactive delirium, CAM-ICU, healthcare strategies.

INTRODUCTION

ICU delirium is an acute cognitive dysfunction commonly observed in critically ill patients, marked by altered consciousness, disorganized thinking and impaired attention. Studies estimate that up to 80% of mechanically ventilated ICU patients experience delirium during their stay (Slooter et al., 2020). This condition extends beyond a transient episode and is associated with significant adverse outcomes such as prolonged hospitalisations, elevated healthcare costs and increased mortality (Chen et al., 2021). Furthermore, ICU delirium often results in long-term cognitive impairments, significantly impacting patients' quality of life and independence even after discharge (Needham et al., 2017).

Three primary presentations of delirium are frequently described:

- 1) Hyperactive delirium — elevated sympathetic activity and agitation, with delusions, hallucinations and, at times, aggressive or uncooperative behaviour.
- 2) Hypoactive delirium — reduced alertness and increased somnolence. Because it is frequently overlooked or confused with depression or fatigue, hypoactive delirium is particularly dangerous and is linked to higher morbidity and mortality.
- 3) Mixed presentation — patients may fluctuate between hyperactive and hypoactive features (Ramírez Echeverría et al., 2025).

The onset of delirium in ICUs is influenced by various factors including severity of illness, sedative use and patient-specific variables such as age and pre-existing cognitive issues (Krewulak et al., 2018). Understanding the different subtypes enables more targeted treatment strategies, as these subtypes may respond differently to interventions (Hollinger et al., 2019). Although ICU care has advanced, the pathophysiology of delirium remains incompletely understood.

Pharmacological management of ICU delirium, including the use of antipsychotics, has shown limited efficacy. A significant study by Girard et al. (2018) revealed that neither Haloperidol nor Ziprasidone reduced delirium duration in critically ill patients. Conversely, non-pharmacological strategies like early mobilisation and careful sedation management, particularly with medications like Dexmedetomidine, have shown promise, especially in patients with conditions like sepsis (Page et al., 2017). ICU delirium also imposes a considerable economic burden, as affected patients often require longer ICU stays and extensive post-discharge care, emphasising the need for effective interventions to optimise patient outcomes and manage healthcare resources efficiently.

Review of Literature

ICU delirium is a prevalent issue affecting 30–80% of critically ill patients, with significant implications for morbidity, mortality and long-term cognitive

health (Hasegawa et al., 2021; Devlin et al., 2021). Risk factors such as advanced age, mechanical ventilation and high sedative use are frequently associated with its occurrence (Nikooie et al., 2020). Hypoactive delirium remains under-recognised in clinical practice due to its subtler behavioural manifestations (Lemiengre et al., 2022). Emerging evidence supports the use of non-pharmacological interventions, including early mobilisation protocols, reduction of nighttime interruptions and use of circadian lighting to promote sleep (Pun et al., 2019). Although pharmacological treatments like antipsychotics have shown mixed results, the use of standardised screening tools such as CAM-ICU is consistently recommended to enable early detection and management (Devlin et al., 2021; Kotfis et al., 2020).

A prospective observational study conducted in Indian ICUs aimed to determine the incidence, subtypes, risk factors, complications and outcomes of delirium in critically ill patients. Among 936 included patients, delirium was observed in 22.11%, with the hypoactive subtype being the most common (44.9%). Identified risk factors included advanced age, high APACHE-II scores, hyperuricaemia, renal and liver dysfunction, hypoalbuminaemia, alcoholism and smoking. Delirium was significantly associated with complications such as unintentional catheter removal (35.7%), aspiration (19.8%), reintubation (10.6%), decubitus ulcers (18.4%) and increased mortality (21.3% vs 5%) (Zirpe et al., 2023). Despite these findings, there is limited data from Indian ICUs, highlighting the need for focused research.

Rationale of the Study

ICU delirium is a pervasive yet often neglected complication with severe consequences, including longer hospital stays, higher mortality and increased risk of hospital-acquired complications. Early identification and targeted management are crucial to improving patient outcomes and enhancing ICU care quality. This study seeks to explore the prevalence and contributing factors of ICU delirium, providing insights to inform effective interventions and support improved care strategies.

MATERIALS AND METHODS

Objective

The study aims to determine the prevalence of ICU delirium among patients admitted to Gastroenterology and Medical ICUs of a tertiary care trust hospital.

Study Design

This study used a single-centre cross-sectional observational design in the Gastroenterology and Medical ICUs of a tertiary care hospital over a period of 6 months (April 2023 to September 2023). Each eligible ICU patient was assessed once for delirium, providing a snapshot of its prevalence within this critically ill population. This design allows for an

efficient estimation of delirium rates in ICU patients using the CAM-ICU tool.

Inclusion Criteria

- Patients aged 18 years and older.
- Patients admitted to the Gastroenterology and Medical ICUs.
- Patients with an ICU stay of at least 24 hours.

Exclusion Criteria

- Patients with a pre-existing diagnosis of delirium.
- Patients with severe hearing or vision impairment that would preclude delirium assessment.
- Patients with a documented history of significant cognitive impairment or dementia.

Sample Size

The sample size for this study was set at 50 ICU patients. This sample allows for an initial estimate of delirium prevalence in the specific ICU population at the tertiary care hospital. Given the observational nature of the study and the limited resources, this sample size is considered feasible for a cross-sectional design within the specified timeframe. Although small, this sample provides a preliminary dataset that can inform future studies with larger, more diverse populations for more generalisable prevalence estimates.

Tool

The CAM-ICU is a modified version of the Confusion Assessment Method developed by Dr. Sharon K. Inouye (1990) and is the most commonly utilised tool for diagnosing delirium by internists and non-psychiatric clinicians. It is one of two recommended monitoring instruments in the Society of Critical Care Medicine's Clinical Practice Guidelines for the Management of Pain, Agitation and Delirium in Adult ICU Patients. The CAM-ICU is recognised for its validity and exhibits strong inter-rater reliability, with kappa values ranging from 0.79 to 0.96. When compared with a reference standard diagnosis of delirium made by psychiatrists, the CAM-ICU, as administered by study nurses, demonstrates sensitivities between 93–100% and specificities between 89–100%. A patient is scored delirium-positive when Feature 1 (acute onset / fluctuating course) AND Feature 2 (inattention) are present, together with either Feature 3 (altered level of consciousness) OR Feature 4 (disorganized thinking).

Procedure

This cross-sectional observational study was conducted in the Gastroenterology and Medical ICUs of a single-centre tertiary care hospital, with a sample

of 50 patients. Delirium was evaluated upon ICU admission using the CAM-ICU. Informed consent was taken prior to assessment. The researcher assured participants that their responses would be used solely for research purposes and emphasised the confidentiality of their personal information.

Statistical Analysis

Data were entered into Microsoft Excel and analysed using descriptive statistics. Categorical variables are summarised as frequencies and percentages. Prevalence of delirium is reported as the proportion of CAM-ICU positive patients within the total sample and stratified by clinical and demographic subgroups.

RESULTS

A total of 50 patients admitted to the Gastroenterology and Medical ICUs during the six-month study period were assessed using the CAM-ICU. The overall prevalence of ICU delirium was 22.0% (11 of 50 patients). All delirium-positive cases exhibited the hyperactive subtype; no hypoactive or mixed presentations were identified. None of the patients in the sample required mechanical ventilation, highlighting the multifactorial nature of delirium in this cohort.

Demographic and clinical characteristics of the full sample

Of the 50 patients, 38 (76.0%) were male and 12 (24.0%) were female. Chronic illness was documented in 28 patients (56.0%) and acute illness in 22 (44.0%). Alcohol use (36.0%) was the most prevalent personal habit, followed by smoking (20.0%) and tobacco use (8.0%); no patient reported polysubstance use. Twenty-nine patients (58.0%) were admitted to the Medical ICU and 21 (42.0%) to the Gastroenterology ICU. Comorbidity was absent in 25 patients (50.0%), with 9 (18.0%) having one condition, 8 (16.0%) having two and 8 (16.0%) having more than two comorbidities. Sepsis was recorded in 7 patients (14.0%). All 50 patients (100.0%) were managed without mechanical ventilation. A history of COVID-19 was reported by 9 patients (18.0%), while 10 (20.0%) were uncertain of their exposure. COVID-19 vaccination had been received by 44 patients (88.0%). A history of brain injury, kidney disease and liver disease was documented in 5 (10.0%), 11 (22.0%) and 23 (46.0%) patients respectively. Detailed frequencies are presented in Table 1.

Table 1: Demographic and clinical characteristics of the full sample (N = 50)

Item	Category	Frequency (n)	Percentage (%)
Gender	Male	38	76.0
	Female	12	24.0
Age (years)	≤20	3	6.0
	21–30	9	18.0
	31–40	10	20.0
	41–50	8	16.0
	51–60	7	14.0

	61–70	9	18.0
	71–80	3	6.0
	>80	1	2.0
Type of illness	Acute	22	44.0
	Chronic	28	56.0
Personal habits*	Smoking	10	20.0
	Alcohol	18	36.0
	Tobacco	4	8.0
	Polysubstance	0	0.0
Diagnosis	Medical	50	100.0
	Surgical	0	0.0
ICU duration (days)	<4 days	22	44.0
	4–8 days	28	56.0
Type of ICU	Medical	29	58.0
	Gastroenterology	21	42.0
Comorbidity	None	25	50.0
	One disease	9	18.0
	Two diseases	8	16.0
	More than two diseases	8	16.0
Sepsis	Yes	7	14.0
	No	43	86.0
Patient status	Unventilated	50	100.0
	Mechanically ventilated	0	0.0
H/O COVID-19	Yes	9	18.0
	No	31	62.0
	Not known	10	20.0
COVID-19 vaccinated	Yes	44	88.0
	No	1	2.0
	Not applicable / unknown	5	10.0
H/O Brain injury	Yes	5	10.0
	No	45	90.0
H/O Kidney disease	Yes	11	22.0
	No	39	78.0
H/O Liver disease	Yes	23	46.0
	No	27	54.0

*Categories under Personal habits are not mutually exclusive; a patient could report more than one habit.

Age distribution

The age distribution of the cohort spanned from adolescents (≤ 20 years) to patients above 80 years, with the largest concentrations in the 31–40 (20.0%), 21–30 (18.0%) and 61–70 (18.0%) year age bands. Among the delirious sub-group, cases occurred across the 31–40, 41–50, 51–60, 61–70 and >80-year age bands, indicating that delirium was not confined to any single age stratum. [Figure 1]

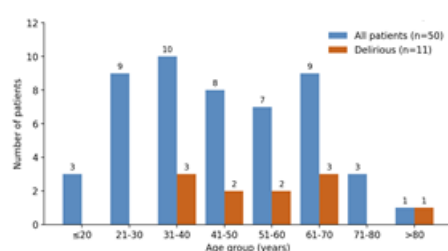


Figure 1: Age distribution of the full cohort (n = 50) and the delirious sub-group (n = 11).

Gender-wise prevalence of delirium

Stratification by gender showed a substantially higher observed prevalence of delirium among male patients. Delirium was identified in 10 of 38 male patients (26.3%) and in 1 of 12 female patients (8.3%). This male preponderance in the delirium-positive sub-group is illustrated in Figure 2 and may partially reflect the higher burden of alcohol use, smoking and liver disease within the male sub-set of the cohort.

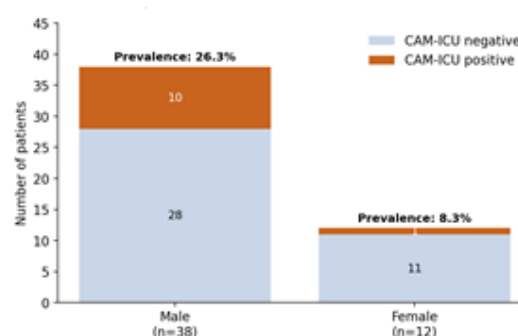


Figure 2: Gender-wise prevalence of ICU delirium.

Prevalence of delirium by ICU sub-group

When stratified by ICU sub-group, delirium was identified in 9 of 29 Medical ICU patients (31.0%) and 2 of 21 Gastroenterology ICU patients (9.5%). The within-unit prevalence therefore differed by more than threefold between the two settings (Figure 3), underscoring the differential risk profile between the two ICUs and pointing toward greater underlying medical complexity in the Medical ICU population.

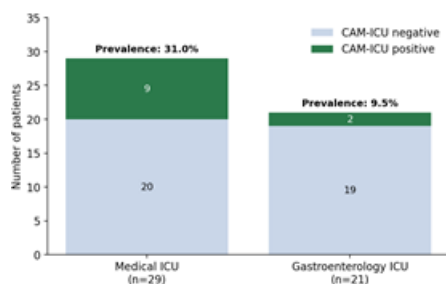


Figure 3: Prevalence of ICU delirium by ICU sub-group

Characteristics of the delirium-positive sub-group

Of the 50 patients, 11 (22.0%) were CAM-ICU positive. Within this sub-group, 10 (90.9%) were male and 1 (9.1%) female. Seven patients (63.6%) were aged 60 years or younger and four (36.4%) were older than 60 years. Chronic illness was the

predominant presentation, observed in 8 of the 11 delirious patients (72.7%), while acute illness accounted for 3 (27.3%). Alcohol consumption was reported in more than half of the delirious patients (6, 54.5%), followed by smoking (3, 27.3%) and tobacco use (2, 18.2%). Eight of the delirious patients (72.7%) had ICU stays of 4–8 days and 3 (27.3%) stayed fewer than 4 days. Sepsis was present in 4 delirious cases (36.4%). Comorbidity profiles varied: 4 patients (36.4%) had a single chronic condition, 1 (9.1%) had two, 2 (18.2%) had more than two, and 4 (36.4%) had none recorded. Nine delirious patients (81.8%) were admitted to the Medical ICU and 2 (18.2%) to the Gastroenterology ICU. Organ-specific histories among delirious patients included liver disease (7, 63.6%), kidney disease (2, 18.2%) and brain injury (1, 9.1%). These findings are summarised in Table 2.

Table 2: Characteristics of delirium-positive patients (n = 11)

Parameter	Count (n = 11)	% of delirious patients
Gender – Male	10	90.9
Gender – Female	1	9.1
Age ≤ 60 years	7	63.6
Age > 60 years	4	36.4
Chronic illness	8	72.7
Acute illness	3	27.3
Smoking	3	27.3
Alcohol use	6	54.5
Tobacco use	2	18.2
ICU stay < 4 days	3	27.3
ICU stay 4–8 days	8	72.7
Sepsis	4	36.4
No comorbidity	4	36.4
One disease	4	36.4
Two diseases	1	9.1
More than two diseases	2	18.2
ICU type – Medical	9	81.8
ICU type – Gastroenterology	2	18.2
H/O Brain injury	1	9.1
H/O Kidney disease	2	18.2
H/O Liver disease	7	63.6

ICU sub-group distribution among delirious patients

As shown in Figure 4, a majority of delirium-positive patients were drawn from the Medical ICU (9/11, 81.8%) rather than the Gastroenterology ICU (2/11, 18.2%). This pattern is consistent with the higher within-unit prevalence reported in Figure 3 and may reflect differences in patient profiles, treatment complexity or underlying conditions.

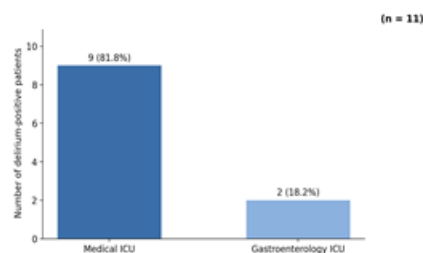


Figure 4: Distribution of CAM-ICU positive patients across ICU sub-groups

CAM-ICU feature profile among delirious patients

The frequency of positive CAM-ICU features among delirious patients is presented in Figure 5. Acute onset / fluctuating course, inattention and altered level of consciousness were each present in 100% of delirious cases (11/11), while disorganized thinking was observed in only 3 patients (27.3%). These findings highlight the core diagnostic indicators of delirium in this cohort and reveal variability in the cognitive component of the presentation.

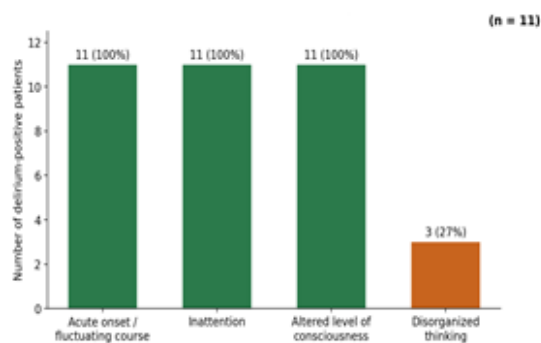


Figure 5: Frequency of positive CAM-ICU features among delirium-positive patients

DISCUSSION

The study identified a 22.0% prevalence of ICU delirium, emphasising its significance in critically ill populations. This finding is consistent with the prospective observational study conducted across Indian ICUs by Zirpe et al. (2023), who reported a delirium incidence of 22.1%. While that study identified hypoactive delirium as the most common subtype, the present cohort exclusively demonstrated the hyperactive form, which may have implications for both clinical recognition and management. Factors such as chronic illness (72.7% of delirious patients), advanced liver disease (63.6%) and alcohol use (54.5%) may have contributed to this presentation, while the absence of mechanical ventilation in the cohort highlights the multifactorial nature of the condition and points toward triggers beyond respiratory support and heavy sedation. Delirium frequently occurs in critically ill ICU patients. Although some contributing factors, such as age and disease severity, are non-modifiable, many others can be managed proactively. Addressing this issue calls for an interprofessional approach, involving continuous assessment by nurses as well as other professionals such as psychologists, occupational therapists and physical therapists. The goal is to design multi-component strategies tailored to the individual patient. We recommend implementing multi-component strategies such as non-pharmacological interventions (light cycles, family presence), while also addressing often overlooked concerns like pain management and the rational use of sedatives (Ali & Cascella, 2024). The predominance of CAM-ICU positive cases in the Medical ICU (81.8%) compared to the Gastroenterology ICU (18.2%) — corresponding to a within-unit prevalence of 31.0% versus 9.5% respectively — suggests a differential risk profile that may reflect variations in underlying medical complexity, polypharmacy or systemic conditions prevalent among medical patients. This disparity supports previous literature emphasising the role of illness severity and cumulative risk factors in delirium onset (Devlin et al., 2021). Given this variation, ICU-specific approaches — particularly in the Medical ICU — may be beneficial. Strategies

such as delirium risk flagging at admission, routine CAM-ICU monitoring and staff training tailored to unit-specific challenges could enhance detection and improve outcomes. Future research exploring environmental and operational variables between ICU types could clarify their influence on delirium prevalence and guide personalised prevention efforts. The observed male preponderance among delirium-positive patients (90.9% male; within-gender prevalence 26.3% in males vs. 8.3% in females) may partially reflect the higher burden of alcohol use, smoking and liver disease within the male subset of the cohort, all of which are recognised risk factors for delirium in the Indian ICU literature (Zirpe et al., 2023).

CONCLUSION

This study provides preliminary insights into the prevalence and profile of ICU delirium in a tertiary care trust hospital in Rajasthan, India. With a prevalence of 22.0% and a predominantly hyperactive presentation in a non-ventilated cohort, the findings underscore the need for psychological support, structured screening and multidisciplinary care in ICU settings. While the limitations indicate the need for further research with larger and more diverse populations, this study lays the groundwork for advancing knowledge and practice in this area. Ultimately, the results stress the necessity of adopting comprehensive strategies to enhance patient wellbeing during hospitalisation.

Future Implications

This study emphasises the need for targeted interventions and systemic changes including staff education, technology-driven screening tools and patient-centred care protocols to address ICU delirium effectively. Future research should focus on validating findings across diverse populations, developing personalised prevention strategies and exploring the efficacy of non-pharmacological interventions such as early mobilisation and family involvement. Longitudinal studies are crucial to understanding the long-term impacts of ICU delirium and tracking recovery trajectories and quality of life post-ICU discharge. Policies should prioritise continuous staff training, early psychological assessment and structured follow-up care to improve patient outcomes and reduce healthcare costs.

Authors' Contribution

Tulika Sharma conceived the study, conducted data collection and analysis, and drafted the manuscript. Dr. Nikhil Ajmera provided on-site support during data collection and contributed to manuscript review. Dr. Sunita Purty offered critical feedback and editorial guidance during the writing process.

Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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