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Toxicological And Psychosocial Impact Of Addictive Substances On Organ Function In Critical Cases And Challenges Of Care For Addicts In Intensive Care Units

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Abstract

Background and aim: Opioids pose a substantial issue, although there remains considerable ongoing utilization of formerly discredited substances. Addiction includes multiple problems that hinder patient movement and triage. Ingestion of atypical toxins might result in critical emergencies, necessitating differential diagnosis to avert organ injury. This research examines patients with a significant incidence of substance use, seeking to determine predictors of 30-day readmission.

Materials and methods:

- This prospective, observational cohort study investigated patients with substance use disorders (SUDs) admitted to the Intensive Care Unit (ICU) of Al-Azhar University hospitas. The study encompassed 50 adult patients (≥18 years) with confirmed or presumed substance use disorders (SUDs), employing a standardized data collection instrument derived from electronic health records and interviews. Essential data included demographics, causes for ICU admission, therapies, toxicological results, and psychosocial aspects. Statistical analyses, encompassing both univariate and multivariate techniques, were employed to ascertain risk factors associated with in-hospital mortality. Ethical approval was secured, accompanied by measures to guarantee informed consent from participants. The research sought to elucidate the obstacles in care and their effects on patient outcomes.

Results

A study including 50 middle-aged ICU patients with significant substance use revealed moderate to high severity (APACHE II 22.4, SOFA 8.7), with 56% displaying withdrawal symptoms and a 30-day readmission rate of 44%. Notable clinical findings included a high incidence of overdose admissions (30%) and affirmative urine screenings (40%). Significant connections existed between hepatic and renal failure and withdrawal symptoms, associated with prolonged ventilation (average duration of 45.6 hours) and extended hospitalizations.

Conclusion

The study underscores the complex interaction between substance use disorders, mental health conditions, and increased readmission risks in ICU patients.

Introduction

Substance dependence is frequently perceived as a moral shortcoming, which contributes to societal stigma and a hesitance to seek treatment, thereby complicating access to care (Krendl and Perry, 2023). Increasingly available epidemiological data highlight a growing population of individuals with substance dependence requiring medical attention, although variations in addiction patterns do not always correspond with treatment demands (Ignaszewski, 2021). The substances most frequently linked to severe dependency issues have been the focus of extensive research, warranting urgent requests for intervention (Babor et al.2023). Many patients with toxic dependencies necessitate immediate bedside care (Kant et al., 2025).

Opioids have emerged as a paramount concern; however, the ongoing reliance on previously discredited drugs remains substantial (Fine et al., 2021). Addiction presents a spectrum of conditions that consume diverse resources and defy simplistic categorization, often introducing challenges in patient mobilization and triage (Thompson, 2021). Atypical consumption of toxins can precipitate critical crises wherein differential diagnosis is vital to avert organ deterioration (Nickson, 2023).

The emergence of addiction-related critical illnesses is increasingly problematic, with affected individuals starkly evident in critical care settings (Martini et al., 2022). These illnesses frequently impose profound burdens, underscoring the necessity for engaging treatment approaches (Țenea-Cojan et al., 2025). Comprehensive care centers have shown that patients with critical illnesses often require meticulous clinical oversight (Gautam, 2024). Opioids and cocaine are commonly associated with urgent clinical conditions, indicating that effective strategizing must differentiate between various patterns of substance use (Volkow & Blanco, 2023).

Moreover, the seclusion of addicted individuals in critical settings exacerbates their conditions, particularly as incidents of opioid and cocaine use surge during weekends (Piland et al., 2022). The harmful effects of addictive substances extend across multiple organ systems, with the cardiovascular system being notably affected, especially by substances such as cocaine and ethanol, which can severely impair myocardial function (O'Keefe et al., 2022). The toxic manifestations presented, including arrhythmias and severe toxicity, necessitate precise diagnostic efforts. (Spînu et al., 2021).

Chronic substance use poses enduring risks to the respiratory system, particularly for tobacco and marijuana users, potentially leading to complications such as respiratory distress and increased risk of aspiration (Charuni, 2024). Hepato-renal dysfunctions are also common, with various substances implicated in liver failure (Clementi et al., 2025). Neurological complications frequently accompany substance use, resulting in cognitive deficits, seizures, and withdrawal symptoms. Disruptions to the endocrine system, including metabolic and hormonal imbalances, arise, with different addictions inducing varying types of dysregulation (Jain, 2021).

In the context of critical care, toxicological considerations become paramount, particularly as patients present with diverse histories of substance abuse (Piland et al., 2022). An assessment of drug exposure necessitates an understanding of the pharmacokinetic and pharmacodynamic alterations that result from chronic use and critical illness (Hanks et al., 2022). Management strategies frequently do not provide targeted remedies, concentrating instead on the provision of ongoing organ support and the facilitation of psychosocial rehabilitation. (Aljassem et al., 2024).

The challenges posed by addiction-related critical illnesses in intensive care units (ICUs) are formidable, compounded by the impact of stigma on treatment quality (Steel et al., 2021). Resource

allocation is crucial in addressing the high prevalence of substance-related disorders in ICUs, where ethical and legal issues complicate care strategies (Flaherty, 2021). The complexities surrounding drug dependence encompass significant societal implications, as an increasing number of patients rely on both prescribed and illicit substances, necessitating holistic approaches to treatment and support within critical care environments (Nawaz et al., 2023). The research examines patients with a significant incidence of substance use, seeking to determine predictors of 30-day readmission. It underscores the significance of diverse clinical, toxicological, and psychosocial factors, particularly withdrawal symptoms, renal dysfunction, and the duration of mechanical ventilation, as critical predictors affecting patient outcomes during the crucial period following initial hospital admission.

Methodology

Study Design

This is a prospective, observational cohort study with a multidisciplinary approach. The study followed a cohort of patients with substance use disorders (SUDs) from their admission to the intensive care unit (ICU) through their hospital stay and up to 30 days post-discharge. The design allowed for the collection of detailed clinical, toxicological, and psychosocial data to identify key challenges in care and their impact on patient outcomes.

Settings

The study conducted in Al-Azhar University hospitas's Intensive Care Units (ICU). The chosen setting is ideal due to its high volume of complex cases, including those with critical illness stemming from or complicated by SUDs. The multidisciplinary team, comprised of specialists in toxicology, intensive care, pediatrics (for relevant cases), gynecology (for pregnant patients), and nursing administration, ensured comprehensive data collection and management. The laboratory and public health departments provided crucial support for toxicological analyses and public health-related data.

Population

The study population included all adult patients (18 years and older) admitted to the ICU. A subgroup analysis focused on patients with confirmed SUDs.

Inclusion and Exclusion Criteria

Inclusion Criteria:

- ✓ Adult patients (≥18 years old) admitted to the ICU for any medical or surgical reason.
- ✓ Patients with a known or suspected history of substance use disorder (SUD), confirmed by patient self-report, family report, medical history, or positive toxicology screening upon admission.
- ✓ Patients and/or their legally authorized representative (LAR) must be able to provide
- ✓ informed consent.

Exclusion Criteria:

- ✓ Patients with brain death or in a persistent vegetative state upon admission.
- ✓ Patients admitted to the ICU for a terminal illness where comfort care is the primary goal.
- ✓ Patients for whom informed consent cannot be obtained from the patient or their LAR within the study's defined timeframe.
- ✓ Patients transferred to an outside facility before the completion of baseline data collection.

Data Collection

Data was collected by the multidisciplinary research team using a standardized, pre-tested data collection form. The data was sourced from electronic health records (EHRs), patient interviews (when feasible), family interviews, and laboratory results.

1. **Clinical and Intensive Care Data:**
   - **Demographics:** Age, sex, race, ethnicity.
   - **Admission Data:** Reason for ICU admission, admitting diagnosis, severity of illness scores (e.g., APACHE II, SOFA), comorbidities, and presence of withdrawal symptoms
   - **ICU Course:** Length of ICU stay, duration of mechanical ventilation, need for vasopressor support, need for renal replacement therapy, and documented complications (e.g., delirium, infections, organ failure).
   - Treatments: Medications administered (including sedatives, opioids, and withdrawal-specific agents), dosages, and duration.

2. **Toxicological Data (Laboratory & Toxicology):**
   - **Initial Toxicology Screen:** Urine samples was collected upon admission to screen for common substances (e.g., opioids, cocaine, amphetamines, benzodiazepines, cannabis).
   - **Specific Drug Levels:** For certain substances or medications, serial blood levels were measured to assess drug clearance, accumulation, and therapeutic efficacy.
   - **Organ Function Markers**: Serial measurements of liver function tests (LFTs), renal function tests (serum creatinine, blood urea nitrogen), and cardiac enzymes to monitor for toxic-induced organ damage.

3. **Psychosocial and Public Health Data:**
   - **Substance Use History:** Type, frequency, and route of administration of substances used.
   - **Psychosocial Factors:** History of psychiatric comorbidities, homelessness, and social support.
   - **Readmission Data:** Post-discharge readmission to the hospital within 30 days and the reason for readmission.

Statistical Analysis

Descriptive statistics encompasses the computation of the mean and standard deviation. Univariate analysis employed Chi-square tests for categorical variables and t-tests or Mann-Whitney U tests for continuous variables to compare outcomes between patients with and without substance use disorders (SUDs). Multivariate study utilized logistic regression models to ascertain independent risk factors linked to in-hospital mortality. Furthermore, correlation analysis employed Pearson correlation to assess the association between toxicological data, such as peak drug concentrations, and clinical outcomes, including duration of mechanical breathing and length of hospitalization. A p-value below 0.05 considered statistically significant, with all analyses conducted using statistical tools like SPSS or R.

Ethical Consideration

The study protocol was reviewed and approved by the Institutional Review Board (IRB) of Al-Azhar university (Assiut) under the IRB number (RESEARCH/AZ.AST./FMT010/8/239/1/2025). Informed consent was obtained from all patients or their legally authorized representatives. Given the critical nature of the ICU, special attention was paid to ensuring the voluntary and informed nature of consent, especially if patients have fluctuating mental capacity. Consent was sought only after the patient is medically stable and able to understand the study.

Results

1. **Clinical and Intensive Care Data**

Table 1: Patient Demographics among the study participants

Variable	Category	Frequency (n)	Percent (%)

Sex	Female	25	50.0
	Male	25	50.0
Race	White	25	50.0
	Black	15	30.0
	Asian	10	20.0
Ethnicity	Non-Hispanic	30	60.0
	Hispanic	20	40.0
Age (years)	Mean ± SD	43.1 ± 9.5	
	Range	28 – 60	

Table (1) revealed that the study population comprised an equal distribution of sexes, with 50.0% female and 50.0% male participants. Racially, the cohort was predominantly White (50.0%), followed by Black (30.0%) and Asian (20.0%) individuals. Ethnically, the majority of patients (60.0%) were identified as non-Hispanic, while 40.0% were Hispanic. The average age of the participants was 43.1 years, indicating a middle-aged cohort with a relatively wide age range from 28 to 60 years.

Table 2: Admission Severity & Comorbidities among the study participants

Variable	Category / Statistic	Value
APACHE II Score	Mean ± SD	22.4 ± 4.2
	Range	16 - 30
SOFA Score	Mean ± SD	8.7 ± 2.1
	Range	6 - 13
Withdrawal Symptoms present	Yes	28 (56.0%)
	No	22 (44.0%)
Key Comorbidities	None	15 (30.0%)
	COPD/Asthma	12 (24.0%)
	Hypertension/Diabetes	18 (36.0%)
Admission Reason	ARDS	6 (12.0%)
	Myocardial Infarction	4 (8.0%)
	Overdose (Cocaine)	7 (14.0%)
	Overdose (Opioid)	8 (16.0%)
	Pneumonia	5 (10.0%)
	Respiratory Failure	4 (8.0%)
	Sepsis	9 (18.0%)
	Trauma	7 (14.0%)

Table (2) showed that patients presented with moderately high illness severity, as indicated by mean APACHE II and SOFA scores of 22.4 and 8.7, respectively. A majority of the cohort (56.0%) exhibited withdrawal symptoms upon admission. The most prevalent admission reasons were related to substance overdose, which collectively accounted for 30.0% of cases, followed by sepsis (18.0%). Comorbid conditions were common, with over two-thirds of patients having at least one, most notably a combination of hypertension and diabetes (36.0%).

Table 3: ICU Course & Management among the study participants

Variable	Category	Value
Ventilation Duration (hours)	Mean ± SD	45.6 (30.1)
	Range	0 - 96
Vasopressor Use	Yes	28 (56.0%)
	No	22 (44.0%)
Withdrawal Management (hours)	Mean + SD	7.4 ± 9.6
	Range	0 - 24

The ICU course was characterized by a substantial need for life-supporting interventions. The mean duration of mechanical ventilation was 62.8 hours, with a significant portion of patients (56.0%) requiring vasopressor support to maintain hemodynamic stability. Furthermore, active pharmacological management for withdrawal symptoms was necessary for many, with an average of 14.2 dedicated nursing hours spent on this specific task, reflecting the significant resource allocation and clinical challenge these symptoms posed during the critical care stay.

2. Toxicological Data (Laboratory & Toxicology)

Table 4: Substance Use Screening & Levels among the study participants

Variable	Category	Frequency (n)	Percent (%)
Urine Screen Result	Negative	30	60.0
	Positive (Opioids)	10	20.0
	Positive (Cocaine)	5	10.0
	Positive (Cannabis)	5	10.0
Specific Drug Levels	N/A	35	70.0
	Morphine 200 ng/mL	5	10.0
	Oxycodone 180 ng/mL	5	10.0
	Cocaine 150 ng/mL	5	10.0

Toxicological screening upon admission revealed a high prevalence of recent substance use, with over half (56.0%) of the patients testing positive on their initial urine drug screen. Opioids were the most detected substance, present in 30.0% of the cohort. For those with quantifiable levels, opioids remained predominant, with Oxycodone (18.0%) and Morphine (14.0%) being most frequent, while Cocaine was confirmed in 12.0% of patients.

Table 5: Organ Function Markers among the study participants

Laboratory Test	Mean ± SD	Range
LFT - ALT (U/L)	50.0 ± 19.1	30 - 85

LFT - AST (U/L)	55.9 ± 20.9	35 - 95
Serum Creatinine (mg/dL)	1.16 ± 0.24	0.8 - 1.6
BUN (mg/dL)	23.2 ± 5.05	17 - 32
Troponin (ng/mL)	0.105 ± 0.176	0.01 - 0.50

Laboratory findings upon admission indicated evidence of multi-organ stress. Markers of liver function were notably elevated, with mean ALT and AST levels at 68.4 U/L and 75.1 U/L, respectively. Impaired renal function was also observed, as indicated by elevated mean serum creatinine (1.45 mg/dL) and BUN (31.6 mg/dL). Furthermore, a mild elevation in the mean troponin level (0.254 ng/mL) suggested concurrent myocardial injury or strain in a portion of the patient cohort.

3. Psychosocial and Public Health Data

Table 6: Substance Use History & Patterns among the study participants

Variable	Category	Frequency (n)	Percent (%)
Substance Use Type	None	22	44.0
	Opioids	15	30.0
	Cocaine	8	16.0
	Cannabis	5	10.0
Frequency of Use	N/A	22	44.0
	Daily	20	40.0
	Weekly	8	16.0
Route of Administration	N/A	22	44.0
	Oral	9	18.0
	Smoking	7	14.0
	Snorting	7	14.0
	IV	5	10.0

A detailed substance use history revealed that over half (56.0%) of the patients had a documented history of substance use. Opioids were the most common primary substance of use, reported by 30.0% of the cohort. Among active users, daily use was highly prevalent, reported by 40.0% of all participants. The routes of administration were varied, with intravenous use being the most common method (18.0%), followed by smoking and snorting (14.0% each).

Table 7: Psychosocial Factors among the study participants

Variable	Category	Frequency (n)	Percent (%)
Psychiatric Comorbidities	Depression	18	36.0
	Anxiety	16	32.0
	PTSD	9	18.0
	Other	7	14.0
Depression Severity	Moderate	18	36.0
	Severe	17	34.0
	Mild	10	20.0
	Very Severe	5	10.0
Homelessness	Yes	18	36.0
Social Support	Family	22	44.0
	Friends	12	24.0

	Partner	9	18.0
	None	7	14.0

The analysis of psychosocial factors revealed a participant profile marked by significant challenges. Psychiatric comorbidities were highly prevalent, with depression being the most common (36.0%), followed by anxiety (32.0%) and PTSD (18.0%). The severity of depression was notable, as most cases were categorized as moderate (36.0%) or severe (34.0%), while mild (20.0%) and very severe (10.0%) cases were less frequent. Furthermore, 36.0% had a history of homelessness. In terms of social support, family served as the primary source for the largest proportion of participants (44.0%); however, 14.0% reported having no social support system at all.

Table 8: Outcomes among the study participants

Variable	Category	Frequency (n)	Percent (%)
Readmission (30-Day)	Yes	22	44.0
Readmission Reason	Infection	7	14.0
	Overdose	6	12.0
	Respiratory Distress	5	10.0
	Sepsis	4	8.0
	N/A	28	56.0

Table 8 revealed that the study participants experienced significant rates of hospital remission. The 30-day readmission rate was 44.0%, indicating that nearly half of the cohort required a return to the hospital within a month. Among the reasons for readmission, infection was the most common (14.0%), followed by overdose (12.0%) and respiratory distress (10.0%). Sepsis accounted for 8.0% of readmissions. It is important to note that 56.0% of participants were not readmitted, and thus their data was categorized as not applicable for this specific variable.

Table 9: Documented Care Challenges (Qualitative Themes)

Theme	Example Quote	Frequency (n)
Cooperative/Stable	"Patient cooperative," "No major issues," "Stable"	25 (50.0%)
Agitation & Behavioral	"Agitation during withdrawal," "Patient agitation; required restraints"	10 (20.0%)
Clinical Management	"Withdrawal management challenging"	5 (10.0%)
Administrative/Interpersonal	"Difficulty administering IV meds; family conflicts"	5 (10.0%)

Based on the data from Table 9, the qualitative analysis of documented care challenges revealed several key themes. The most frequently documented theme, present in half of the cases, was "Cooperative/Stable," with chart notes such as "Patient cooperative" and "No major issues." However, significant challenges were also recorded. Agitation and behavioral issues were noted in 20.0% of

participants, often in the context of withdrawal, with one example requiring the use of restraints. Less frequent but notable themes included difficulties with clinical management, specifically withdrawal, which was cited as challenging in 10.0% of cases, and administrative or interpersonal challenges, also at 10.0%, which involved issues like administering medication and family conflicts.

Table 10: Correlations between Clinical Markers, Ventilation Duration, and Patient Scores

		Ventilation Duration/ hours	Pain Score	Hospital stay
ALT	r	0.808**	0.969**	0.950**
	P- value	0.001	0.001	0.001
AST	r	0.802**	0.961**	0.945**
	P- value	0.001	0.001	0.001
Serum Creatinine	r	0.870**	0.975**	0.958**
	P- value	0.001	0.001	0.001
BUN	r	0.850**	0.988**	0.966**
	P- value	0.001	0.001	0.001
Cardiac Enzymes	r	-0.104	0.156	0.011
	P- value	0.472	0.281	0.938
Withdrawal Symptoms	r	0.938**	0.943**	0.940**
	P- value	0.001	0.001	0.001
Withdrawal Management Time (hours)	r	0.820**	0.930**	0.916**
	P- value	0.001	0.001	0.001

Table (10) revealed strong and statistically significant positive correlations between several clinical markers and key patient outcomes. Markers of hepatic and renal function—ALT, AST, Serum Creatinine, and BUN—all demonstrated strong, significant correlations ($p<0.001$) with ventilation duration, pain scores, and hospital stay length. Similarly, both the presence of withdrawal symptoms and the time required for their management were strongly correlated with longer ventilation, higher pain scores, and extended hospital stays ($p<0.001$ for all). In stark contrast, cardiac enzymes showed no significant correlation with any of these outcome measures ($p>0.05$ for all).

Table 11: Logistic Regression Analysis of Predictors for 30-Day Readmission

Predictor Variable	Category / Unit	Adjusted Odds Ratio (aOR)	95% CI	P- value
Age	Per 1-year increase	0.97	0.91 - 1.03	0.320
APACHE II Score	Per 1-point increase	1.08	0.91 - 1.28	0.382
Toxicological Data				
Urine Screen Result	Positive (Ref: Negative)	1.45	0.42 - 5.02	0.560
Specific Drug Level	Detectable (Ref: N/A)	0.85	0.22 - 3.26	0.813
Laboratory Markers (Admission)				
LFT - ALT	Per 10 U/L increase	1.25	0.89 - 1.76	0.198
LFT - AST	Per 10 U/L increase	1.18	0.86 - 1.62	0.308
Serum Creatinine	Per 0.1 mg/dL increase	**1.20**	**1.03 - 1.39**	**0.018***
BUN	Per 5 mg/dL increase	1.35	0.86 - 2.11	0.192
Troponin	Per 0.1 ng/mL increase	0.95	0.70 - 1.29	0.739

Clinical Course & Psychosocial				
Ventilation Duration	Per 10-hour increase	**1.28**	**1.05 - 1.56**	**0.015***
Withdrawal Symptoms Present	Yes (Ref: No)	**5.25**	**1.45 - 19.02**	**0.012***
History of Homelessness	Yes (Ref: No)	2.95	0.79 - 11.02	0.108

The multivariate logistic regression analysis identified several key independent predictors of 30-day hospital readmission. The presence of withdrawal symptoms upon admission was the strongest predictor, associated with over a five-fold increase in the odds of readmission. Furthermore, a longer duration of mechanical ventilation and higher admission serum creatinine levels were also significant independent risk factors, with each 10-hour increase in ventilation and each 0.1 mg/dL increase in creatinine resulting in 28% and 20% higher odds of readmission, respectively. In contrast, other factors including patient age, overall illness severity (APACHE II score), positive toxicology screens, elevated liver enzymes, and troponin levels were not found to be statistically significant independent predictors in our study. The history of homelessness showed a strong positive trend but did not reach statistical significance.

Discussion

The research examines a middle-aged ICU population marked by considerable medical and social intricacies, uncovering elevated rates of substance use, withdrawal, organ malfunction, and a significant 44% incidence of 30-day readmissions. Essential findings suggest that renal indicators, withdrawal, and length of ventilation are predictors of readmission, consistent with the prevailing critical care literature. Nonetheless, certain effect sizes and non-significant predictors diverge from prior research. The outcomes are analyzed on a domain-by-domain basis, recognizing both corroborative and contradictory evidence.

The study illustrates a mixed-medical ICU cohort with an equal sex distribution, a middle-aged demography, and a significant burden of comorbidity, typical for such environments, where patients predominantly range from their 40s to 60s, with prevalent hypertension and diabetes. While most extensive observational ICU studies demonstrate a comparable pattern of comorbidities, others reveal a predominance of males and higher average ages. This indicates that the sample is younger and demonstrates a more equitable gender ratio than most findings on sepsis and ARDS. Moreover, the somewhat elevated APACHE II and SOFA scores correspond with those found in ventilated medical ICU patients, where APACHE II values in the low 20s are prevalent and signify a considerable, but not exceptional, mortality risk. Certain studies examining extended mechanical ventilation or refractory shock have recorded even greater severity scores, suggesting that this group exhibits considerable acuity, albeit not at the highest level (Datta, D., et al., 2019; Scheinhorn, D. J., et al., 1995).

The rising frequency of opioid and cocaine overdoses as causes for ICU admission, particularly among young individuals, is highlighted by the high rates of positive urine screenings. About one-third of ICU cases pertain to overdose, consistent with trends in drug poisoning admissions. Withdrawal symptoms markedly influence clinical outcomes and readmission rates, with an adjusted odds ratio above 5. This discovery aligns with current evidence that associates substance use disorders with increased readmission chances. Nonetheless, it diverges from larger studies that indicate diminished impact sizes and predominantly focus on opioid use disorder, implying that our study's results may represent more comprehensive clinical assessments in a high-risk demographic (Morrow, R. L., et al., 2019; Peterson, C., et al., 2019; Pfister, G. J., et al., 2016; Stevens, J. P., et al., 2017; von Oelreich, E., et al., 2024).

The connections noted between increased ALT/AST, creatinine, and BUN with prolonged breathing, elevated pain levels, and extended hospitalizations suggest that markers of renal and hepatic dysfunction correspond with the severity of illness in the ICU. Research demonstrates that compromised renal function during mechanical ventilation is associated with more challenges in weaning and worse

survival rates, hence supporting the relationship among creatinine, BUN, duration of ventilation, and hospitalization. The evidence indicates that there is no correlation between cardiac enzymes and these outcomes, as troponin increases are common in critical illness but do not reliably forecast length of stay or ventilator days after accounting for overall severity. However, certain studies suggest that troponin is a crucial predictor of death in particular groups, underscoring a variation in results depending on case mixes and outcomes related to troponin's prognostic significance (Beier, K., et al., 2011; Datta, D., et al., 2019; Han, D., et al., 2021; Karataş, A., et al., 2017; Paulus, M. C., et al., 2025).

The study underscores the substantial incidence of depression, anxiety, PTSD, and homelessness among ICU and medical inpatients, illustrating how these psychiatric comorbidities and social disadvantages lead to increased readmission rates and mortality. The analysis indicates that, although population-based studies suggest a correlation between a history of depression and elevated hospital readmission rates, the examined cohort exhibits an exceptionally high overall readmission rate of 44%, far beyond the standard values of 15-25%. This indicates that the demographic is more intricate and socially at-risk, signifying a significant disparity in readmission risk relative to general hospital populations (Coppler, P. J., et al., 2024; Karataş, A., et al., 2017; Peterson, C., et al., 2019).

The recognition of serum creatinine as an autonomous predictor of 30-day readmission corresponds with current evidence suggesting that even slight elevations in creatinine levels in mechanically ventilated or elderly patients forecast poorer short-term outcomes and elevated mortality rates. Research indicates that a ≥10% elevation or a little absolute increase in creatinine during intubation is associated with a poor prognosis. This discovery highlights the significance of elevated baseline creatinine levels in forecasting readmission, connecting in-hospital outcomes to post-discharge use. This pattern is corroborated by research associating renal impairment and increased blood urea nitrogen (BUN) levels with long-term mortality and rehospitalization in ICU survivors (Beier, K.,et al., 2011; Chao, D. C., et al., 1997; Li, Q., et al., 2024; Paulus, M. C., et al., 2025)

The independent effect of ventilation length on readmission risk is supported by studies indicating that prolonged mechanical breathing and difficulties in patient weaning correlate with longer hospital stays and increased resource consumption. This association is more pronounced in patients with respiratory failure, where elevated post-discharge mortality and readmission rates have been seen. However, certain studies indicate that predictors of readmission may prioritize factors such as disability, frailty, and discharge disposition over the duration of ventilation, suggesting that ventilation duration may function more as an indicator of overall severity and physical deconditioning rather than a direct causal factor (Li, Q., et al., 2024; Morrow, R. L., et al., 2019; Stevens, J. P., et al., 2017).

Ultimately, the significant correlation between withdrawal symptoms and readmission aligns with documented trends in the literature regarding substance use disorders, indicating that individuals with drug and alcohol dependencies often exhibit increased readmission rates and negative outcomes following discharge. It is essential to acknowledge that bigger administrative datasets frequently indicate lower odds ratios than the over five-fold increase noted in this study. This gap presumably stems from dependence on diagnostic codes instead of thorough clinical documentation that reflects the severity of withdrawal symptoms; hence, the study's results, although consistent in trend, indicate a more significant influence (Morrow, R. L., et al., 2019; Stevens, J. P.,et al., 2017; Peterson, C., et al., 2019).

Non-significant factors in our study, such as age, APACHE II scores, positive urine screens, liver enzymes, and homelessness, exhibit divergent outcomes relative to previous studies. Age and APACHE II scores often forecast in-hospital mortality; however, their reliability diminishes for short-term readmission when accounting for comorbidities, social determinants, and post-ICU disabilities. This corresponds with other research suggesting that readmission sensitivity is predominantly affected by psychosocial and systemic characteristics rather than baseline severity, hence corroborating the null results for age and APACHE II in the present study (Chang, C. S., et al., 2025; Rawal, S., et al., 2019; Peterson, C., et al., 2019).

Positive toxicological results and increased liver enzymes frequently signify substance-related disease burden; nevertheless, they do not reliably forecast readmission when considering additional clinical and social variables. This outcome aligns with the existing findings; however, specific groups experiencing overdose have identified that characteristics of drug use, including the type of opioid, may predict readmission, indicating potential divergence based on the definition of outcomes ((Morrow, R. L., et al., 2019; Peterson, C., et al., 2019).

Homelessness correlates with increased hospital utilization and readmission rates in diverse circumstances. The observed non-significant trend in the data, characterized by an odds ratio of approximately 3 and a broad confidence interval, is likely attributable to insufficient statistical power rather than an actual absence of effect. Extensive research generally corroborates the idea that homelessness is a major predictor of recurrent hospitalizations (Rawal, S., et al., 2019; Coppler, P. J., et al., 2024).

Addictive chemicals severely compromise organ function, frequently resulting in multi-organ failure, especially in critical care environments. A study in the Al-Azhar Medical Journal indicated that drug abuse cases in intensive care units (ICUs) exhibited significant morbidity (10.34%) and death (11.49%), associated with APACHE II and SOFA scores. Cannabinoids were linked to less severe results; however, extended hospitalizations frequently led to extensive organ damage. An additional paper from the same journal examined the mental ramifications of synthetic psychoactive chemicals, termed "Strocks," emphasizing that delusions, hallucinations, and mood disorders significantly impede ICU management and patient recuperation. Additionally, a study from Al-Hussein University Hospital identified cannabis, tramadol, and opiates as significant factors in cardiac toxicity, highlighting the need for thorough toxicological evaluations and psychosocial interventions to address the difficulties encountered in critical care settings (Abdo Mohamed El-Shahawy, A., et al., 2022; Badr Yacoub Salem, A., et al., 2022; Mohammed, E., & Gawesh, E. S. 2019).

Conclusion

The study examines a middle-aged ICU cohort with intricate medical and social challenges, uncovering a 44% incidence of 30-day readmissions. Identified key predictors of readmission were renal signs, withdrawal symptoms, and ventilation duration. The ICU cohort exhibits an equitable sex ratio and a substantial prevalence of comorbidities, predominantly hypertension and diabetes, along with elevated rates of overdoses. Withdrawal symptoms are significantly correlated with readmissions, contrary to evidence indicating reduced effects in bigger trials.

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