

ORIGINAL ARTICLE

Psychiatric comorbidity in patient with substance use disorders: prevalence, patterns, and clinical correlate

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ABSTRACT

Background: Psychiatric comorbidity is common among patients with substance use disorders (SUDs) and is associated with poorer treatment outcomes. Data from inpatient rehabilitation settings in Saudi Arabia remain limited. This study estimated the prevalence, patterns, and clinical correlates of psychiatric comorbidity among inpatients with SUDs.

Methods: A retrospective cross-sectional review of inpatient records at a behavioral rehabilitation center in Riyadh covering January–December 2025 was conducted. 147 admission episodes from 135 unique patients were identified; the primary analysis used each patient's first admission ($n = 135$). Descriptive statistics, chi-square tests, Spearman correlations, and multivariable logistic regression were applied.

Results: Psychiatric comorbidity was documented in 90 of 135 patients (66.7%; 95% confidence interval, 58.0%–74.5%). Among comorbid patients, psychotic disorders (30/90, 33.3%), depressive disorders (23/90, 25.6%), and anxiety disorders (17/90, 18.9%) were most frequent, and 58/90 (64.4%) presentations were recorded as substance-induced. No examined variable was independently associated with comorbidity (model $p = 0.472$). Psychiatric follow-up was arranged for 41 of 90 comorbid patients (45.6%). Episode-level results were similar (95/147, 64.6%).

Conclusion: Approximately two-thirds of inpatients with SUDs had a documented psychiatric comorbidity, predominantly psychotic, depressive, and anxiety presentations. Fewer than half of comorbid patients had psychiatric follow-up arranged at discharge, indicating a need to strengthen psychiatric assessment and integrated discharge planning.

Keywords: Substance use disorders, psychiatric comorbidity, dual diagnosis, inpatient rehabilitation, Saudi Arabia.

Introduction

Substance use disorders (SUDs) frequently coexist with other psychiatric conditions, a phenomenon known as dual diagnosis or psychiatric comorbidity. Commonly reported comorbidities include depressive, anxiety, bipolar, psychotic, and personality disorders [1–5]. The Epidemiologic Catchment Area study found that more than half of individuals with a non-alcohol drug use disorder had a co-occurring mental disorder [6], a

finding since refined by large epidemiological surveys and meta-analyses of mood, anxiety, personality, and bipolar comorbidity [1–4]. A co-occurring psychiatric

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diagnosis has been associated with a higher risk of relapse after inpatient treatment [7].

Patients in inpatient rehabilitation settings often present with more severe addiction, repeated relapses, and complex psychosocial problems, which increase the likelihood of co-existing psychiatric illness. Nevertheless, psychiatric comorbidity may be under-recognized or incompletely documented, leading to fragmented care [8,9]. Studies from the Middle East and North Africa have reported psychiatric comorbidity in 60% of Egyptian male inpatients [10] and 71% of outpatients attending a Moroccan addiction treatment center [11]. In Saudi Arabia, depressive symptoms have been examined among male SUD inpatients [12], but data on the full range of psychiatric comorbidity in inpatient rehabilitation settings remain scarce.

This study aimed to determine the prevalence and patterns of psychiatric comorbidity among inpatients with SUDs at a behavioral rehabilitation center in Riyadh, to examine its association with the primary substance used, and to explore its relationship with admission history and length of stay (LOS).

Methods

Study design and setting

A retrospective cross-sectional study was conducted using inpatient medical records from a behavioral rehabilitation center in Riyadh, Saudi Arabia, covering admissions from January 1 to December 31, 2025.

Participants and unit of analysis

Records of patients aged ≥ 16 years admitted for inpatient treatment of an SUD (DSM-5/ICD criteria) with an available psychiatric assessment were eligible. Records that were incomplete or represented admissions primarily for non-addiction psychiatric conditions were excluded. The data-extraction form yielded 152 records. Each record carried a unique anonymized study identification code assigned per patient. Five records were exact duplicates (identical study code, admission date, admission type, age, and LOS) and were removed as data-entry duplicates, leaving 147 admission episodes from 135 unique patients; 11 patients contributed more than one episode during the study year (10 with two episodes and one with three).

To preserve statistical independence, the patient was the unit of analysis: the primary analysis included each patient's first chronological admission in 2025 ($n = 135$). As a sensitivity analysis, all 147 episodes were analyzed, with cluster-robust standard errors by patient in the regression model.

Variables and definitions

Extracted variables comprised demographics (age, gender, and marital status), substance-use characteristics (primary substance, duration of use, age of onset, daily use before admission), admission history, psychiatric status, and discharge variables (LOS,

discharge status, psychiatric follow-up arranged, and clinician-rated relapse risk). *Admission type* recorded whether the index admission was the patient's first or a repeat admission to the study center. *Previous inpatient rehabilitation admissions* recorded the patient's history of prior inpatient rehabilitation at any facility (1 or ≥ 2). Because the two fields capture different periods and settings, they are not expected to coincide; consistent with this, they were uncorrelated (Spearman $\rho = -0.01$, $P = 0.914$). The previous-admissions field was undocumented in 48 of 135 patients (35.6%); these values were treated as missing rather than as zero, and analyses involving this variable were restricted to the 87 patients with documented values.

Psychiatric diagnoses and their timing relative to substance use (substance-induced, pre-existing, or unclear) were extracted as recorded in the medical record by the treating psychiatrist during the admission, based on routine clinical assessment with reference to DSM-5-TR/ICD-11 criteria [13,14]; no structured diagnostic interview was administered for this study. Free-text diagnoses were grouped into standard categories. Five patients flagged as comorbid had only symptom-level descriptors (e.g., hallucinations, suspiciousness, and agitation) without a formal diagnosis; these are reported separately as *undifferentiated psychiatric symptoms*, and prevalence is also presented excluding them.

Statistical analysis

Categorical variables are presented as frequencies and percentages and continuous variables as mean $\pm$ standard deviation (SD) or median and interquartile range (IQR). The prevalence of comorbidity is reported with an exact binomial 95% CI. Associations between categorical variables were tested with chi-square tests, with rare substance categories (stimulants, cannabis, and opioids) combined as *other single substance*. Spearman correlations among continuous and ordinal variables were examined, and LOS was compared using the Mann-Whitney U test. Multivariable logistic regression examined age (continuous), gender, duration of use (ordinal: <1 , 1–5, 6–10, >10 years, coded 0–3 and entered as a linear term), admission type, and primary substance (reference: multiple substances). Previous admissions was not entered because of its substantial missingness and its conceptual overlap with admission type; age of onset was not entered because of its strong correlation with age. Multicollinearity was assessed using variance inflation factors (VIFs). Statistical significance was set at $p < 0.05$.

Ethical considerations

The study was approved by the institutional review board, with a waiver of informed consent owing to its retrospective design. Data were anonymized before analysis.



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Results

Sample characteristics

The 135 patients had a mean age of 33.6 ± 10.6 years; 107 (79.3%) were male, and 97 (71.9%) used multiple substances (Table 1). Nearly half (67, 49.6%) left against medical advice.

Prevalence and pattern of psychiatric comorbidity

Psychiatric comorbidity was documented in 90 of 135 patients (66.7%; 95% CI, 58.0%-74.5%) (Figure 1). Excluding the five patients with undifferentiated symptoms only, prevalence was 85/135 (63.0%; 95% CI, 54.2%-71.1%). Psychotic disorders were most common

(30/90, 33.3%), followed by depressive (23/90, 25.6%) and anxiety disorders (17/90, 18.9%) (Table 2, Figure 2). The disorder was recorded as substance-induced in 58/90 (64.4%), pre-existing in 14/90 (15.6%), and of unclear timing in 18/90 (20.0%) (Figure 3).

Substance type and psychiatric comorbidity

Comorbidity was documented in 15/21 (71.4%) alcohol users, 65/97 (67.0%) patients using multiple substances, and 10/17 (58.8%) users of other single substances ($\chi^2(2) = 0.69$, $p = 0.708$) (Figure 4). The distribution of diagnostic categories did not differ by substance ($\chi^2(10) = 15.10$, $p = 0.128$), although several expected cell counts were small.

Table 1. Demographic and clinical characteristics of the study patients (N = 135).

Variable	Category	n	%
Age (years)	Mean $\pm$ SD: 33.6 ± 10.6 (range 18–68)	—	—
Gender	Male	107	79.3
	Female	28	20.7
Marital status	Single	83	61.5
	Married	34	25.2
	Divorced	18	13.3
Admission type	First admission	118	87.4
	Readmission	17	12.6
Primary substance	Multiple substances	97	71.9
	Alcohol	21	15.6
	Stimulants	9	6.7
	Cannabis	7	5.2
	Opioids	1	0.7
Duration of use	<1 year	5	3.7
	1–5 years	45	33.3
	6–10 years	42	31.1
	>10 years	43	31.9
Age of onset (years)	Mean $\pm$ SD: 24.4 ± 9.2	—	—
Previous inpatient rehabilitation admissions	1	37	27.4
	≥ 2	50	37.0
	Not documented	48	35.6
Daily use before admission	Yes	103	76.3
History of relapse after previous treatment	Yes	112	83.0
Length of stay (days)	Median (IQR): 29 (15–89.5)	—	—
Discharge status	Left against medical advice	67	49.6
	Completed program	65	48.1
	Referred	3	2.2
Psychiatric follow-up arranged	Yes	56	41.5
Relapse risk at discharge	High	58	43.0
	Moderate	61	45.2
	Low	16	11.9

SD, standard deviation; IQR, interquartile range.



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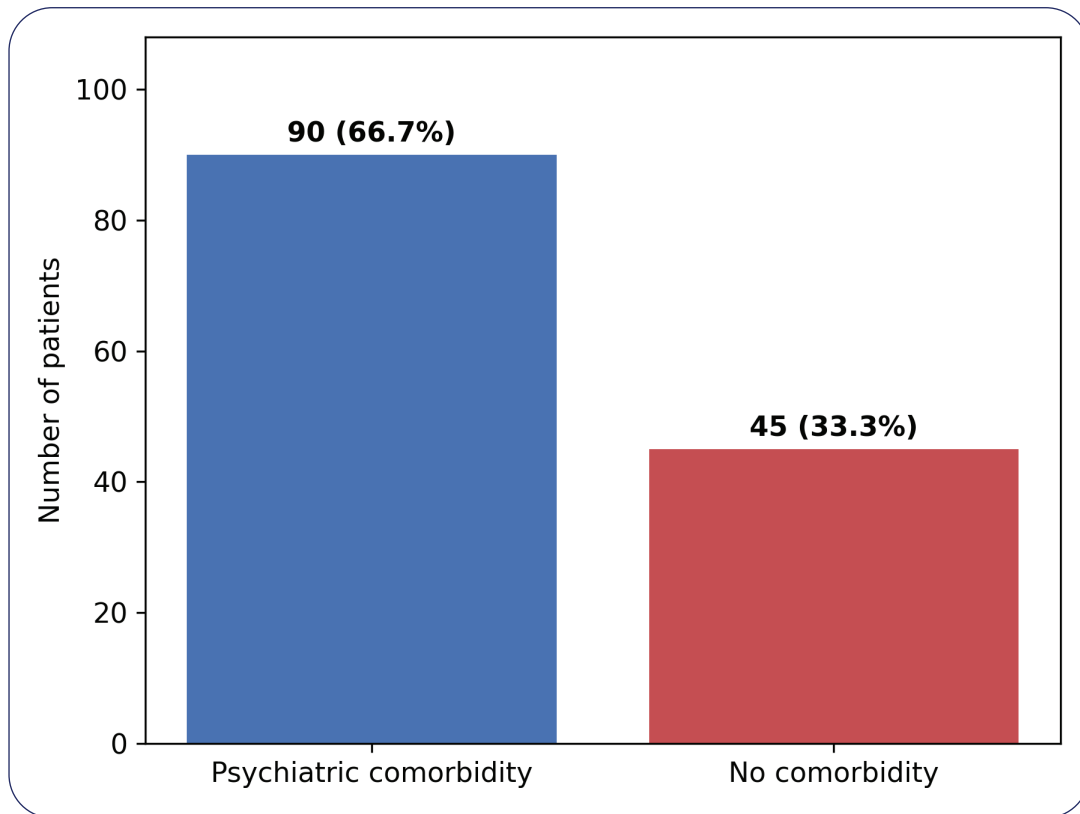


Figure 1. Prevalence of psychiatric comorbidity among inpatients with substance use disorders (N = 135).

Table 2. Psychiatric diagnoses among patients with comorbidity (n = 90).

Diagnostic category	n	%
Psychotic disorders	30	33.3
Depressive disorders	23	25.6
Anxiety disorders	17	18.9
Bipolar disorder	6	6.7
Personality disorders	5	5.6
Post-traumatic stress disorder	3	3.3
Attention-deficit/hyperactivity disorder	1	1.1
Undifferentiated psychiatric symptoms ^a	5	5.6

^aSymptom-level descriptors (e.g., hallucinations, suspiciousness, agitation) without a formal diagnosis recorded.

Correlations among clinical variables

Age and age of onset were strongly correlated ($\rho = 0.72$, $p < 0.001$); all other correlations were weak to moderate ($|\rho| \leq 0.47$) (Table 3).

Factors associated with psychiatric comorbidity

The logistic regression model was not statistically significant (likelihood-ratio $\chi^2(6) = 5.58$, $p = 0.472$; pseudo $R^2 = 0.032$), and no variable was independently associated with comorbidity (Table 4). All VIFs were ≤ 1.6 . In the episode-level sensitivity analysis ($n = 147$,

cluster-robust standard errors), no variable reached significance (all $p \geq 0.10$).

Admission history, length of stay, and psychiatric follow-up

Median LOS was 29 days in both patients with and without comorbidity (Mann-Whitney $p = 0.803$). Among the 87 patients with documented previous admissions, a higher number of previous admissions correlated with longer LOS ($\rho = 0.47$, $p < 0.001$), but was not associated with comorbidity [22/37 (59.5%) with one versus 33/50 (66.0%) with ≥ 2 ; $\chi^2(1) = 0.16$, $p = 0.689$]. Psychiatric follow-



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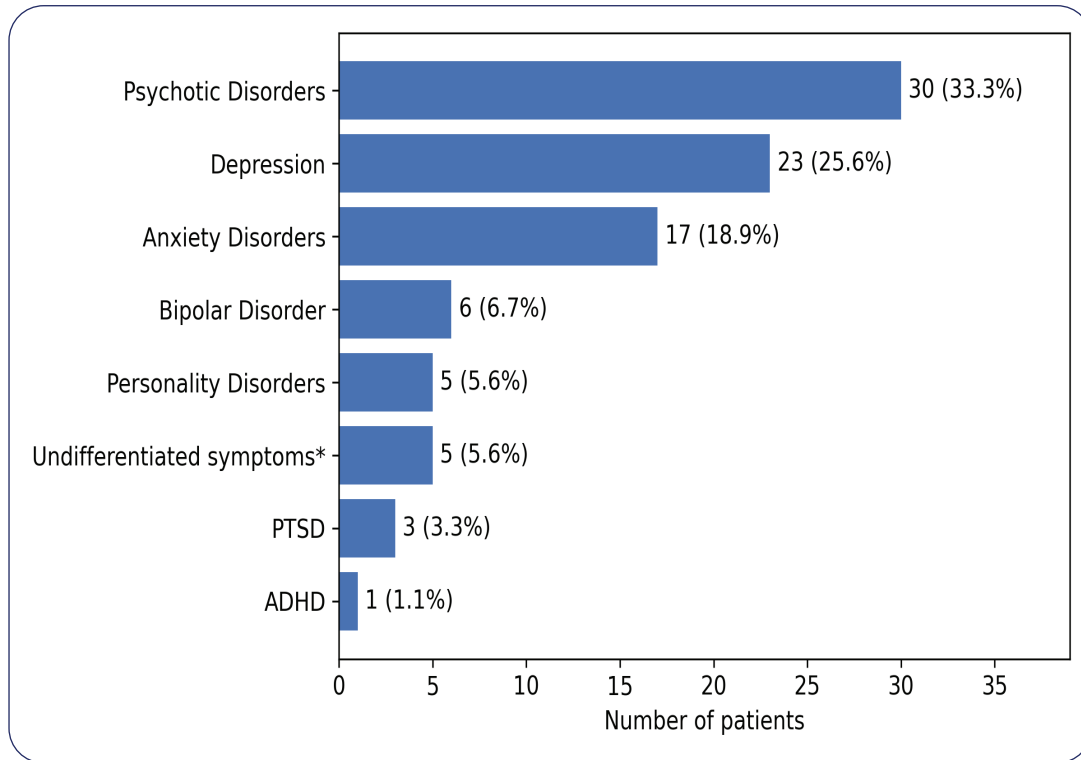


Figure 2. Distribution of psychiatric diagnoses among patients with comorbidity (n = 90);
*undifferentiated symptoms without a formal diagnosis.

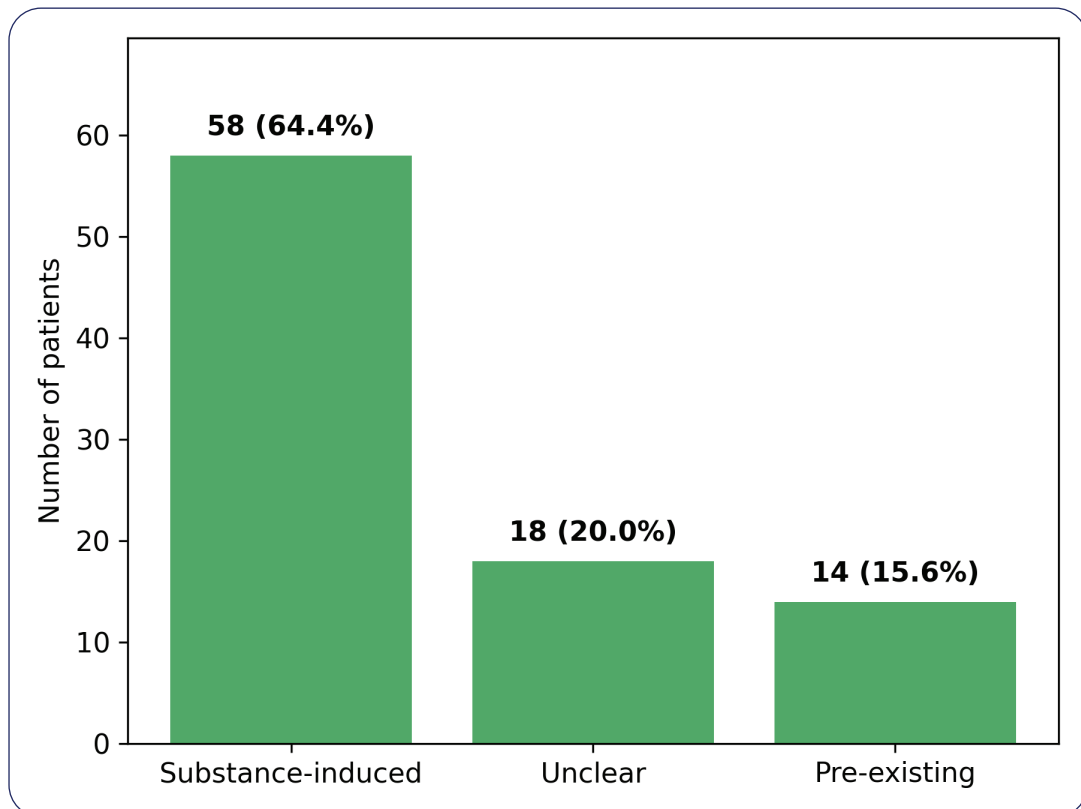


Figure 3. Recorded timing of the psychiatric disorder relative to substance use (n = 90).



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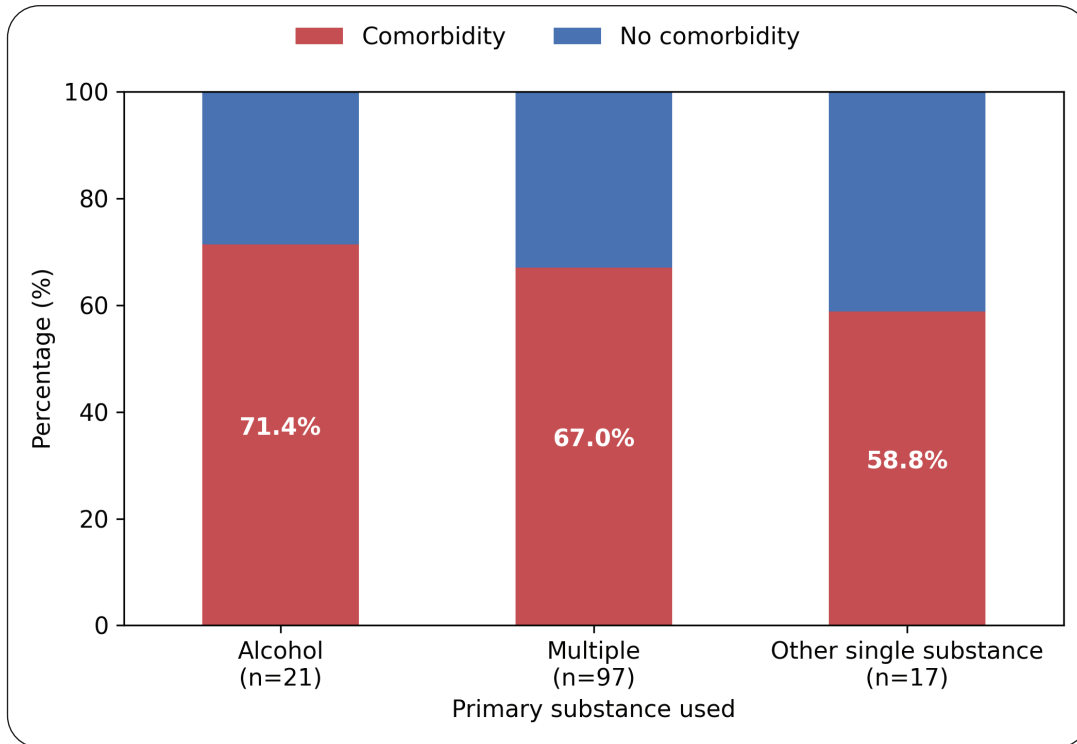


Figure 4. Psychiatric comorbidity by primary substance used (N = 135).

Table 3. Spearman correlations among continuous and ordinal clinical variables.

Variable pair	n	Spearman ρ	p
Age $\times$ age of onset	135	0.72	<0.001
Age $\times$ duration of use	135	0.29	0.001
Age $\times$ LOS	135	-0.07	0.447
Age of onset $\times$ duration of use	135	-0.31	<0.001
Age of onset $\times$ LOS	135	-0.23	0.006
Duration of use $\times$ LOS	135	0.25	0.004
Previous admissions $\times$ age	87	0.04	0.686
Previous admissions $\times$ age of onset	87	-0.24	0.023
Previous admissions $\times$ duration of use	87	0.35	0.001
Previous admissions $\times$ LOS	87	0.47	<0.001

LOS, length of stay. Analyses involving previous admissions are restricted to patients with documented values.

Table 4. Multivariable logistic regression of factors associated with psychiatric comorbidity (n = 135).

Variable	OR	95% CI	p
Age (per year)	1.02	0.98-1.07	0.306
Male gender (ref: female)	0.77	0.29-2.06	0.608
Duration of use (per category) ^a	1.30	0.82-2.05	0.262
Readmission (ref: first admission)	0.49	0.17-1.40	0.186
Alcohol (ref: multiple substances)	0.77	0.21-2.82	0.690
Other single substance (ref: multiple substances)	0.67	0.23-1.99	0.473

OR, odds ratio; CI, confidence interval; ref, reference category. ^aOrdinal: <1, 1-5, 6-10, >10 years.



up was arranged for 41 of 90 comorbid patients (45.6%) and 15 of 45 non-comorbid patients (33.3%) ($\chi^2(1) = 1.38$, $p = 0.241$).

Discussion

Two-thirds of inpatients with SUDs (66.7%) had a documented psychiatric comorbidity, and the estimate remained above 60% after excluding undifferentiated symptoms and when all episodes were analyzed. This is consistent with the high dual-diagnosis burden reported in inpatient addiction settings, including 66% in an Australian inpatient detoxification cohort [15], and is closely aligned with an Egyptian inpatient sample (60%) [10]. A Moroccan study reported 71%, although in outpatients and as a congress abstract [11].

Psychotic disorders were the most frequent comorbid category, whereas mood and anxiety disorders usually predominate in community samples [1,4]. This may reflect the severity of the inpatient population and the high rate of polysubstance use (71.9%); substance use disorders are also highly prevalent among people with schizophrenia-spectrum disorders [5]. Nearly two-thirds of comorbid presentations were recorded as substance-induced. This distinction is clinically important, as a substantial proportion of substance-induced psychoses later transition to schizophrenia-spectrum disorders [16,17], supporting longitudinal reassessment rather than a single assessment at discharge. Because these classifications reflect routine clinical documentation rather than structured interviews, they should be interpreted with caution.

No demographic or substance-use variable was independently associated with comorbidity. However, the wide confidence intervals indicate limited statistical power, so the absence of significant predictors does not establish that no clinically useful risk profile exists. Larger prospective studies are needed to identify such factors. Pending such evidence, the high overall prevalence supports routine psychiatric assessment as part of standard inpatient care, consistent with integrated dual-diagnosis models [8,9].

Psychiatric follow-up was arranged for fewer than half (45.6%) of comorbid patients, while nearly half of all patients left against medical advice and 43.0% were rated at high relapse risk. Co-occurring mental disorders and incomplete treatment are associated with relapse after inpatient treatment [7], and integrated services are most effective when they are continuous and assertive [8,9]. This gap therefore represents a practical target for service improvement.

Patients with more previous admissions had longer LOS, consistent with more complex treatment histories, whereas comorbidity itself was not associated with LOS, possibly because most comorbid presentations were substance-induced and resolved during stabilization.

Limitations

This single-center retrospective study may not generalize to outpatient or other inpatient settings. Diagnoses were based on routine clinical documentation rather than structured interviews, and free-text entries required post-hoc categorization. Previous-admission data were missing for 35.6% of patients, reducing the power of analyses involving this variable. Small numbers in some substance and diagnostic categories limited subgroup comparisons, and the sample may have been underpowered to detect moderate associations in the regression model. Comorbidity may have been under-recorded where assessment was incomplete.

Recommendations

- Incorporate routine psychiatric assessment into standard inpatient care for patients with SUDs, while further research examines whether a targeted risk-based approach is feasible.
- Introduce a documented discharge protocol ensuring psychiatric follow-up for all patients with identified comorbidity.
- Reassess patients after detoxification and stabilization to distinguish substance-induced from independent psychiatric disorders.
- Prioritize continuity-of-care planning for patients leaving against medical advice or rated at high relapse risk.
- Use structured diagnostic fields and complete admission-history documentation to improve the quality of future audits and research.

Conclusion

Psychiatric comorbidity was documented in two-thirds of inpatients with SUDs, predominantly psychotic, depressive, and anxiety presentations, most recorded as substance-induced. No independent predictor was identified, although statistical power was limited. Fewer than half of comorbid patients had psychiatric follow-up arranged at discharge, highlighting a clear opportunity to strengthen integrated dual-diagnosis care.

List of Abbreviations

CI	Confidence interval
DSM-5-TR	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision
ICD-11	International Classification of Diseases, Eleventh Revision
IQR	Interquartile range
LOS	Length of stay
OR	Odds ratio
SD	Standard deviation
SUD	Substance use disorder



VIF Variance inflation factor

Conflict of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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This research received no external funding. The study was conducted independently by the author(s) without financial support from any funding agency, commercial organization, or not-for-profit institution.

Consent to participate

Waiving from consent is already requested as a part of ethical approval. Patient informed consent was not required because it involved retrospective review of anonymized clinical records collected as part of routine clinical care, with no direct patient contact or intervention.

Ethical approval

Ethical approval for this study was obtained prior to the commencement of the research, from the Institutional Review Board of Care Medical, Approval number: IRB-014/110226. Approved date: 11 February 2026 All data were anonymized, and no interventions beyond routine care were introduced, ensuring a non-invasive approach that preserved treatment integrity.

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