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Psychiatric Comorbidities and Prognosis in Biochemically Screened Substance Using Adults: A Retrospective Emergency Department Cohort Study

Meltem Gürü[1], Habibe Selmin Özensoy[2]

[1]University of Health Sciences Türkiye, Ankara Etlik City Hospital, Clinic of Psychiatry, Ankara, Türkiye
[2]Ankara Bilkent City Hospital, Clinic of Emergency Medicine, Ankara, Türkiye

Abstract

Objective: This study examined demographic characteristics, psychiatric comorbidities, and short-term outcomes of substance-using adults with positive urine drug tests in an emergency department (ED) setting.

Materials and Methods: Retrospective cohort of adults (≥18 years) who presented to ED between May 2022 and November 2023 with at least one positive urine test. Data included demographics, psychiatric history, ED diagnosis, disposition, hospital stay, and 1-month mortality. Urine drug screening used a standard biochemical method.

Results: Among 427 patients, the median age was 27 years, and 72.6% were male. The most frequently detected substances were amphetamines, cannabinoids, and benzodiazepines. Psychiatric disorders were identified in 59% of patients based on prior medical records. Hospitalization was more common in those with psychiatric comorbidities. Amphetamine and benzodiazepine users were more often discharged, whereas those who used cannabinoids or synthetic cannabinoids had longer hospital stays.

Conclusion: Psychiatric comorbidities are associated with increased hospitalization among substance-using adults. Substance type appears to influence clinical outcomes: stimulants and sedatives were linked to higher discharge rates, while cannabinoids were associated with prolonged hospitalizations. These findings highlight the importance of integrated psychiatric care and routine screening in EDs.

Keywords: Substance-related disorders, mental health, amphetamine, benzodiazepines

Introduction

Substance use is a widespread issue presenting complex challenges to health care systems globally, including emergency departments (EDs). Rapid, accurate identification of substance use is essential to initiate appropriate clinical management and improve outcomes. Urine drug testing is a standard biochemical method to detect substance exposure [1].

In Europe, approximately 25% of adults aged 15-64 have used illicit drugs at least once in their lives [2,3]. In the United States, large-scale surveys such as the National Survey on Drug Use and Health (NSDUH) and the Monitoring the Future study highlight the persistent prevalence of substance use across various age groups [4,5]. According to the 2022 NSDUH report, tobacco, alcohol, and illicit drug use remain highly prevalent, particularly among adolescents and young adults. These findings also reveal a considerable overlap between substance use disorders (SUDs) and psychiatric conditions, supporting the development of targeted public health policies.

In emergency settings, the incidental detection of substance use through biochemical testing is particularly important. Many individuals who present to EDs for various medical issues may

Address for Correspondence: Meltem Gürü, University of Health Sciences Türkiye, Etlik City Hospital, Clinic of Psychiatry, Ankara, Türkiye
E-mail: meltemguru@gmail.com **ORCID-ID:** orcid.org/0000-0001-8751-6453
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not initially disclose their substance use. However, routine biochemical screenings can identify unsuspected cases, revealing a broader scope of SUDs in the population [6,7]. This incidental detection is critical for timely intervention, enabling the identification of at-risk individuals who might otherwise remain untreated. Data from such ED encounters also offer valuable epidemiological insights, helping to inform effective public health strategies [6-8].

Understanding the demographic and clinical characteristics of patients who test positive for substance use is essential for developing tailored medical interventions. Beyond physical health, substance use is closely linked to psychiatric conditions such as depression, anxiety, and psychosis, which complicate clinical management and worsen prognosis [9,10]. In some cases, individuals may begin using substances to self-medicate psychiatric symptoms, which ultimately exacerbates their mental health problems. Conversely, substance use can also trigger or intensify psychiatric conditions by altering brain structure and function [9].

While many studies have addressed various aspects of substance use in emergency settings, comprehensive analyses that include psychiatric and medical comorbidities, hospitalization status, and short-term outcomes remain limited. The intersection of substance use and psychiatric disorders is particularly important, as it shapes both treatment strategies and clinical outcomes in emergency settings.

Although the psychiatric aspects of substance use have been acknowledged in previous research, few studies have systematically examined their joint impact on clinical outcomes in emergency settings. There remains a critical need for integrated approaches that address both substance use and mental health in ED populations. This study seeks to address this gap.

This study aims to address this gap by examining the demographic and clinical characteristics of patients who underwent urine drug testing in an ED. Specifically, it explores the impact of psychiatric comorbidities and substance use on 1-month mortality, hospital length of stay, and hospitalization status. Additionally, the study investigates associations between types of substances used and the presence of psychiatric disorders, internal diseases, or trauma.

The findings are expected to contribute to the existing literature by offering insights into clinical outcomes in substance-using adults and reinforcing the importance of integrated psychiatric and emergency care.

Materials and Methods

Ethics, Study Design, and Data Collection

Ethical approval was obtained from Ankara Bilkent City Hospital, No. 2 Clinical Research Ethics Committee on December 6, 2023 (approval number: E2-23-5864, date: 06.12.2023), and informed consent was waived due to the retrospective design. Informed consent was waived due to the retrospective nature of the study, in accordance with the decision of the ethics board. All procedures were conducted in compliance with data protection regulations and the principles of the Declaration of Helsinki.

The study was conducted in the ED of a tertiary care hospital and included visits between May 1, 2022, and November 30, 2023. Patients were included consecutively based on clinical suspicion of substance use, which prompted a urine drug test. Inclusion required a confirmed positive result for at least one substance. Patients with negative test results or incomplete records were excluded. Patient data were retrieved from the hospital's statistics unit and electronic medical records, in full compliance with personal data protection standards. For cases in which, 1-month mortality data were unavailable from electronic records, follow-up was attempted via telephone contact with the patient or a legal guardian. If follow-up could not be completed, the case was recorded as "mortality data unavailable" and excluded from mortality outcome analysis.

During the study period, 3,500 patients underwent urine drug testing based on clinical suspicion of substance use, and 427 tested positive for at least one substance. Collected variables included age, sex, known psychiatric diagnoses, presenting complaints, ED diagnoses, hospitalization status, hospital stay duration, and 1-month mortality. Psychiatric and medical comorbidities were categorized based on ICD-10 diagnostic codes as recorded in the electronic medical records. Diagnoses included mood disorders (F30-F39), anxiety disorders (F40-F48), psychotic disorders (F20-F29), and SUDs (F10-F19), among others.

Measurement of Substances

Urine drug screening used the Enzyme Multiplied Immunoassay Technique with the Siemens ADVIA Chemistry analyzer, which is a standard biochemical method for verifying substance use. This assay detects commonly used substances including amphetamines, cannabinoids, benzodiazepines, cocaine, opiates, and others. The detection limits for most substances ranged between 50 to 300 ng/mL, depending on the analyte, with detection windows varying from 1 to 5 days post-ingestion. Sensitivity and specificity values were consistent with manufacturer standards, typically exceeding 90% for the substances included. The integrity of urine samples was ensured through established quality control protocols. Only completed test results were included in the analysis.

Outcome Measures

Demographic variables (age, gender), clinical diagnoses (including psychiatric and medical comorbidities), hospitalization status, hospital length of stay, and 1-month

mortality were documented. The types of substances detected via urine screening were recorded and analyzed.

Associations between patient characteristics and clinical outcomes (hospitalization, length of stay, and 1-month mortality) were evaluated. Additionally, the relationship between specific substance types and clinical diagnoses (psychiatric disorders, internal diseases, or trauma) was assessed.

Statistical Analysis

Statistical analyses were performed using SPSS version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were presented as numbers and percentages. The Shapiro-Wilk test was used to assess the normality of continuous variables. As the data did not follow a normal distribution, non-parametric methods were applied.

Categorical variables were compared using the chi-square or Fisher's exact test. The Mann-Whitney U test was used for comparing two independent groups. For multiple group comparisons, the Kruskal-Wallis test was employed, followed by post hoc pairwise analysis using the Mann-Whitney U test. Correlations between continuous variables were analyzed using Spearman's correlation test. A p-value <0.05 was considered statistically significant.

Results

Demographic and Descriptive Findings

The median age of the patients was 27 years (range: 18-61). Among 427 patients, median age was 27 years (range: 18-61), 72.6% were male, and 70% were single. Psychiatric disorders were identified in 59% of patients (n=252). Among these, 183 patients (42.9%) tested positive for more than one substance. Intensive care unit (ICU) admission occurred in 14.5% of cases; 7 patients (1.6%) died within 1 month. Substance use was considered a contributing factor in 4 of these deaths, based on ED documentation and clinical assessment, while the remaining 3 deaths were attributed to pre-existing medical conditions or trauma. The most frequently detected substances were amphetamines (n=195), followed by cannabinoids and benzodiazepines (Table 1). Additionally, we conducted subgroup analyses by substance type and age group. For example, the median age was 25 years [interquartile range (IQR) 22-29] among amphetamine users, compared to 30 years (IQR 26-35) among cannabinoid users, suggesting a younger profile in stimulant users.

At presentation, the most common complaints were self-harm behaviors (8.7%) and falls from height (4%). Agitation was the predominant psychiatric symptom (16.6%), whereas suicide attempts via drug ingestion were the main reason for internal medicine admissions (14.5%).

Clinical Outcomes and Substance Associations

Hospitalization was significantly more common among patients with a history of psychiatric disorders (p=0.004). Patients using amphetamines and benzodiazepines were more frequently discharged from either the ward or ICU (p=0.002 and p=0.001, respectively). These findings indicate a statistical association, but not a causal relationship. Clinical explanations such as milder intoxication severity, effective symptom control, or less complex medical needs may underlie these higher discharge rates. In contrast, cannabinoid and synthetic cannabinoid use was associated with longer hospital stays (p=0.001 and p<0.001, respectively) (Table 2). This may reflect factors such as behavioral dysregulation, agitation, or delayed recovery often seen with these substances.

When examining the association between diagnosis and substance type, amphetamine users were most commonly diagnosed with psychiatric conditions as 53% (p=0.042). Although other substances such as ecstasy, benzodiazepines, cannabinoids, synthetic cannabinoids, cocaine, heroin, and opiates were also found in patients with psychiatric diagnoses, no statistically significant relationships were observed between these substances and specific diagnosis groups (Table 3).

Discussion

This study investigated the demographic and clinical characteristics, psychiatric comorbidities, and short-term outcomes of adults with substance use detected via urine drug screening in an ED setting. Amphetamines, cannabinoids, and benzodiazepines were the most commonly identified substances. Psychiatric disorders were prevalent among the patient cohort, and agitation and self-harm were frequent presenting complaints. Patients with a known history of psychiatric illness were significantly more likely to be hospitalized. In contrast, patients who used amphetamines and benzodiazepines were more likely to be discharged. This is a statistical association rather than a causal relationship. It may reflect milder clinical presentations, less severe intoxication, or more predictable recovery profiles in these groups. Differences in clinical management strategies and decision-making thresholds may also have played a role. Additionally, cannabinoid and synthetic cannabinoid use was associated with prolonged hospital stays. This may be attributed to clinical and behavioral factors such as acute agitation, psychotic symptoms, or delayed physiological recovery, which often necessitate extended observation and supportive care. From a clinical and hospital resource perspective, longer stays among cannabinoid users may increase bed occupancy and staff workload, suggesting the need for ED protocols to identify, manage, and possibly expedite care for these patients.

These results reflect data-derived observations and are presented separately from interpretive commentary to maintain analytical clarity.

Taken together, the findings contribute to a deeper understanding of the complex interplay between substance use, mental health, and acute care needs in ED populations. SUDs continue to pose a significant public health challenge, as reflected in recent epidemiological surveys [2-5]. Although some data indicate stabilization or slight declines in use among certain populations, emerging substances and shifting usage patterns continue to demand updated clinical and public health responses [4,5,11].

Routine biochemical screenings in emergency settings play a crucial role in detecting hidden substance use. Many patients do not disclose drug use voluntarily, and incidental detection via urine testing provides opportunities for early intervention [6-8]. These data are also valuable for public health surveillance and resource planning.

The high rate of psychiatric comorbidities observed in this study supports previous findings that individuals with SUDs often suffer from concurrent mental health conditions [9,10]. This dual burden complicates diagnosis and management and requires an integrated care approach. Patients may use substances to self-medicate psychiatric symptoms, which may temporarily alleviate distress but often worsens the underlying psychiatric condition over time. Conversely, prolonged substance use may trigger or exacerbate psychiatric illness by altering brain structure and function [9]. These dynamics highlight the need for comprehensive mental health services in emergency settings.

Table 1. Demographic and descriptive data of substance using adults in an emergency department

Age [median years (min.-max.)]	27 (18-61)	
Hospital stay [median hour (min.-max.)]	8 (1-2304)	
Gender	Male [n (%)]	310 (72.6)
	Female [n (%)]	117 (27.4)
Marital status	Single [n (%)]	299 (70)
	Married [n (%)]	90 (21.1)
	Divorced [n (%)]	38 (8.9)
Psychiatric disorder (known before in history)	Schizophrenia [n (%)]	10 (2.3)
	Bipolar disorder [n (%)]	23 (5.4)
	Drug addiction [n (%)]	43 (10.1)
	Depression [n (%)]	15 (3.5)
Other disease (known before in history)	Epilepsy [n (%)]	5 (1.2)
	Hypertension [n (%)]	4 (0.9)
Diagnosis (made in ED)	Traumatic injury [n (%)]	96 (22.5)
	Psychiatric disorder [n (%)]	252 (59)
	Other [n (%)]	79 (18,5)
ED disposition	Discharge* [n (%)]	322 (75.4)
	Service [n (%)]	43 (10.1)
	ICU [n (%)]	62 (14.5)
1-month mortality	Alive [n (%)]	420 (98.4)
	Exitus [n (%)]	7 (1.6)
Detected substance [number of cases and mean blood concentration (µg/L)]	Amphetamine	195, 775.27
	Cannabinoid	143, 64.73
	Benzodiazepine	122, 349.70
	Ecstasy	109, 206.30
	Synthetic cannabinoid	48, 1.98
	Cocaine	21, 28.35
	Heroin	12, 1.22
	Opiate	33, 299.11

*Of the discharged patients, 49 refused treatment and follow-up in the ED, while 50 left the hospital without permission and without notifying the medical team.
min.-max.: Minimum-Maximum, n: number, ED: Emergency department, ICU: Intensive care unit

Table 2. Comparative analysis of hospitalization and hospital stay with descriptive and clinical data in substance-using adults in an emergency department*

Variable	Hospitalization			Hospital stay	
	Discharge	Hospitalized	p	Hours (median)	p
Age (min.-max.)	27 (18-61)	29 (18-59)	0.291		0.303
Marital status[a] (n)	223	76	0.625	10	0.029
Gender[b] (n)	226	84	0.114	7	0.388
Prior psychiatric disorder[c] (n)	250	86	0.438	8	0.213
Psychiatric diagnosis[d] (n)	188	64	<0.001	8	0.233
Amphetamine (n)	159	36	0.004	8	0.387
Ecstasy (n)	84	25	0.554	8	0.122
Benzodiazepine (n)	76	46	<0.001	4	0.130
Cannobinoid (n)	107	36	0.271	8	0.001
Synthetic cannobinoid (n)	38	10	0.626	6	<0.001
Cocaine (n)	17	4	0.515	7	0.735
Heroin (n)	7	5	0.170	8	0.998
Opiate (n)	21	12	0.119	0	0.990

[a]Data refer to divorced patients

[b]Data refer to male patients

[c]Data refer to patients with no previously established diagnosis of psychiatric conditions.

[d]Data refer to patients who received a psychiatric diagnosis during the emergency department visit.

*Some cases had more than one detected substance.

min.-max.: Minimum-Maximum, n: number

Table 3. Distribution of substances used by diagnosis groups in substance-using adults in an emergency department

Variable	Trauma (n, %)	Psychiatric disease (n, %)	Internal disease (n, %)	p
Amphetamine	53, 27%	103, 53%	39, 20%	0.042
Ecstasy	32, 29%	56, 52%	21, 19%	0.122
Benzodiazepine	25, 20%	77, 63%	20, 17%	0.538
Cannobinoid	33, 23%	93, 65%	17, 12%	0.036
Synthetic cannabinoid	12, 25%	28, 58%	8, 17%	0.951
Cocaine	5, 24%	15, 71%	1, 5%	0.237
Heroin	3, 25%	7, 58%	2, 17%	0.969
Opiate	6, 18%	20, 60%	7, 22%	0.807

Another important finding was the association between specific substances and hospitalization characteristics. As noted, patients using amphetamines and benzodiazepines were more frequently discharged likely reflecting lower severity or faster clinical resolution. On the other hand, cannabinoid and synthetic cannabinoid users had longer hospital stays. These differences suggest that the type of substance used can influence both care pathways and resource utilization in the ED. Clinicians should consider these variations when triaging and managing patients with suspected or confirmed substance use.

Lastly, although this study did not find statistically significant associations between most individual substances and specific diagnostic categories, amphetamine use was more frequently observed in patients diagnosed with psychiatric disorders. This trend is consistent with literature suggesting an overlap between stimulant use and psychiatric illness [9,10,12].

Study Limitations

This study has several limitations. In addition to being a retrospective, single-center analysis with limited generalizability, the quality and completeness of the available data may vary. Some variables included self-reported information, which may have certain limitations in terms of detail or completeness. Clinical decisions regarding hospitalization or discharge were not standardized and may differ among physicians, contributing to variability in outcomes. Additionally, not all substances are detectable by

standard urine screening panels, and the 1-month follow-up period limits the assessment of long-term outcomes. Psychiatric comorbidities were identified based on historical medical records, without differentiating between acute psychiatric presentations and chronic conditions, which may influence the interpretation of the findings. Future research should aim to address these limitations through multicenter, prospective designs with larger sample sizes, expanded toxicology panels, and longer follow-up periods.

Conclusion

In conclusion, this study highlights the multifactorial nature of substance use in emergency settings and emphasizes the need for integrated psychiatric evaluation and management. Psychiatric comorbidities are common among substance-using adults and are associated with increased hospitalization rates. Furthermore, different substances appear to influence the length of hospital stay and clinical outcomes. These findings support the implementation of routine biochemical screening and mental health assessment in EDs and underscore the need for public health strategies that address both substance use and co-occurring psychiatric conditions.

Ethics

Ethics Committee Approval: Ethical approval was obtained from Ankara Bilkent City Hospital, No. 2 Clinical Research Ethics Committee (approval number: E2-23-5864, date: 06.12.2023).

Informed Consent: Retrospective study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: M.G., H.S.Ö., Concept: M.G., H.S.Ö., Design: M.G., H.S.Ö., Data Collection or Processing: M.G., H.S.Ö., Analysis or Interpretation: M.G., H.S.Ö., Literature Search: M.G., H.S.Ö., Writing: M.G., H.S.Ö.

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