






Substance Abuse Patterns in Patients with Psychoactive Polysubstance Use: A Tertiary Hospital-based Study in India

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ABSTRACT

Background: This study examined patterns and clinical characteristics of substance use disorders (SUDs) among patients attending a tertiary-care hospital. **Methodology:** We conducted a cross-sectional observational study of 100 consecutive adults meeting ICD-10 criteria for SUDs, recruited according to predefined inclusion and exclusion criteria. Severity of substance use and psychiatric symptoms were assessed with the Addiction Severity Index (ASI) and Brief Psychiatric Rating Scale (BPRS), respectively; alcohol misuse was screened using the CAGE questionnaire. We described prevalence patterns and evaluated associations with comorbid psychiatric symptoms. **Results:** Of 100 participants, 96% were male and 81% were aged 18–39 years. By ICD-10 category, opioid-related disorders were most frequent (59%), followed by alcohol-related (22%), other psychoactive substances (16%), and cannabis-related disorders (3%). Age group was strongly associated with primary substance ($\chi^2 = 100.192$, $p < 0.001$), with opioid use more common in younger adults and alcohol use more prevalent in middle age. ASI scores were higher among opioid users (mean 0.65 ± 0.20) than among those with alcohol-related (0.42 ± 0.15) or cannabis-related disorders (0.38 ± 0.12), mean difference 0.23 (95% CI 0.14–0.32; $p < 0.001$). BPRS scores were highest in cannabis users (58 ± 14) and users of other psychoactive substances (60 ± 13), indicating greater psychiatric symptom burden (mean difference 11.2, 95% CI 6.5–15.8; $p < 0.001$). On CAGE screening, 82% scored ≥ 2 , suggesting probable alcohol misuse even among participants without alcohol as the primary substance. **Conclusion:** In this tertiary-care cohort, opioid use disorder predominated among young men and was associated with greater addiction severity, while cannabis and other substance use were linked to higher psychiatric symptom burden. The strong overlap between substance use, psychopathology, and CAGE positivity supports routine psychiatric screening and integrated addiction care. Early use of ASI, BPRS, and CAGE may enhance detection and rehabilitation outcomes.

KEYWORDS: Substance use disorder; psychiatric comorbidity; opioid use; Addiction Severity Index; Brief Psychiatric Rating Scale.

INTRODUCTION

Substance use disorders (SUDs) are a major and growing public health concern worldwide. They are characterised by persistent, compulsive use of alcohol or drugs despite adverse consequences, including medical complications, legal problems, and social disruption, and require careful clinical assessment and treatment. The World Health Organization defines substance misuse as recurrent

or intermittent drug use that is inconsistent with accepted medical practice. Commonly involved substances—alcohol, nicotine, opioids, cannabis, inhalants, sedatives/ hypnotics, and stimulants, impair social, educational, and occupational functioning [1–3]. The International Classification of Diseases, Tenth Revision (ICD-10), provides standardised criteria for diagnosing mental and behavioural

disorders due to psychoactive substance use across clinical and academic settings. Although trajectories of dependence vary, agents with high addictive potential (e.g., opioids, cocaine, alcohol) often produce rapid cycles of tolerance and withdrawal. All psychoactive substances, including cannabis and nicotine, carry risks of dependence, underscoring the importance of early identification of use patterns to guide timely intervention and treatment planning [4–6].

In India, SUDs are increasingly recognised as a pressing health issue with substantial psychiatric comorbidity, social impairment, and healthcare burden. The 2019 National Survey on the Extent and Pattern of Substance Use in India estimated that approximately 2.1% of the population uses opioids and 4.6% meet criteria for alcohol dependence, with marked regional heterogeneity. Northern states such as Punjab, Haryana, and Uttar Pradesh consistently report high levels of treatment seeking for opioid dependence, influenced by service availability and socio-cultural factors. Tertiary hospitals play a pivotal role in managing severe dependence and dual-diagnosis presentations, receiving referrals from emergency departments, primary care, and community de-addiction programmes, often after unsuccessful detoxification or due to prominent psychiatric symptoms such as depression, psychosis, or behavioural disturbance [3–5]. Despite this burden, systematic data describing diagnostic patterns and associated psychopathology among patients presenting to tertiary centres in this region remain limited [6].

ICD-10 Chapter V (F10–F19) delineates substance-specific categories—alcohol (F10), opioids (F11), cannabis (F12), sedatives/hypnotics (F13), cocaine (F14), stimulants including caffeine (F15), hallucinogens (F16), tobacco (F17), inhalants (F18), and multiple or other psychoactive substances (F19)—and subcategories that specify clinical states, including acute intoxication (.0), harmful use (.1), dependence syndrome (.2), withdrawal states (.3–.4), substance-induced psychotic disorder (.5), amnesic syndrome (.6), residual and late-onset psychotic disorders (.7), and unspecified disorders (.9). This framework enables uniform diagnosis, facilitates clinical decision-making, and enhances comparability of data across services [7–11].

Psychiatric comorbidity is common in SUDs and complicates both diagnosis and treatment. Patients frequently present with mood disorders (e.g., major depression, bipolar disorder), psychotic disorders (e.g., schizophrenia), anxiety disorders (e.g., post-traumatic stress disorder, generalised anxiety disorder), and personality disorders (e.g., antisocial personality disorder) [12–14]. Comorbidity may arise through shared genetic, neurobiological, or

environmental risk factors; as a consequence of substance-induced psychopathology; or via self-medication, whereby individuals use substances to alleviate pre-existing symptoms. As illustrated conceptually in Figure 1, depression, conduct disorder, attention-deficit/hyperactivity disorder, anxiety disorders, schizophrenia, and PTSD commonly co-occur with SUDs [15–17]. Failure to identify and treat coexisting psychiatric conditions—particularly depression and behavioural disorders—can worsen substance use trajectories and increase risks of self-harm and dangerous behaviour [18,19].

Patterns of comorbidity vary by substance class. Depressants such as alcohol and opioids are frequently associated with depressive and anxiety syndromes, whereas cannabis and hallucinogens are more often linked to cognitive and psychotic symptoms. Substance-induced mental disorders—spanning intoxication, withdrawal, and persistent mood, anxiety, or psychotic presentations—are recognised within ICD-10 and require careful differentiation from primary psychiatric illnesses because management strategies diverge [20–26]. An integrated, interdisciplinary approach is therefore essential, addressing both substance use and mental health to optimise outcomes.

Against this background, the present cross-sectional study from a tertiary psychiatric unit in Northern India investigates the patterns of psychoactive SUDs, their age and gender distribution, and associated psychopathological profiles using standardised diagnostic (ICD-10) and psychometric tools, including the Addiction Severity Index (ASI) and the Brief Psychiatric Rating Scale (BPRS). By characterising local caseloads and comorbidity profiles, the study aims to inform targeted clinical services, resource planning, and early intervention strategies tailored to regional needs.

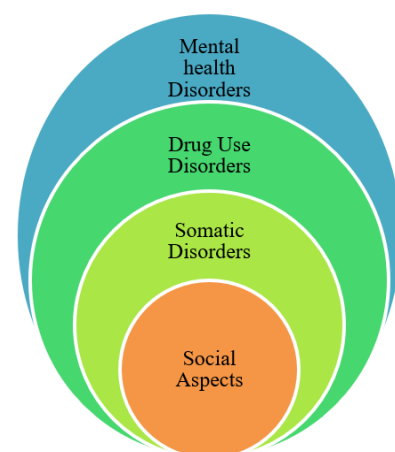


Figure 1: Drug Use Disorders and other co-occurring disorders

METHODOLOGY

Study design and setting

This cross-sectional observational study was conducted in the Department of Psychiatry at Shri Mahant Indires Hospital, a tertiary-care centre in India, over six months (January–June 2023). Both inpatients and outpatients attending routine services were screened by trained clinicians and considered for enrolment.

Ethical approval and consent

The protocol received Institutional Ethics Committee approval (SGRR/IEC/06/23). All participants provided written informed consent before inclusion, and data were de-identified before analysis to protect confidentiality.

Participants and eligibility

Adults aged 18 years or older of any sex were eligible if they reported psychoactive substance use or met ICD-10 criteria for a substance use disorder, with or without psychiatric comorbidity. Individuals with a previously diagnosed neurological illness were excluded. Consecutive sampling was employed to minimise selection bias and to reflect real-world caseloads.

Sampling and enrolment

Across the study period, 120 individuals were screened and 100 who met the eligibility criteria were recruited consecutively. This approach achieved the target sample derived from a prevalence/proportion-based calculation and ensured representation of the treatment-seeking clinical population.

Data collection procedures

Data were recorded on a structured case-record form capturing demographic characteristics (e.g., age, sex, occupation), past and current medical and psychiatric history, medication use, substance-use history, relevant laboratory findings where available, and current psychopharmacological and psychosocial treatments.

Diagnostic framework and measures

Substance use disorders were diagnosed and coded according to ICD-10 (Chapter V; F10–F19), applying specifiers for harmful use, dependence, withdrawal, and substance-induced disorders. Severity of addiction was quantified with the Addiction Severity Index, Fifth Edition (ASI), with composite scores computed according to the manual to index problem severity across alcohol/drug, medical, employment/support, legal, family/social, and psychiatric domains. Psychiatric symptom burden

was assessed with the Brief Psychiatric Rating Scale (BPRS) based on clinician interview and observation, yielding total and subscale scores. Alcohol misuse was screened using the CAGE questionnaire, with scores ≥ 2 interpreted as suggestive of probable alcohol dependence and prompting further evaluation.

Data quality assurance

All data collectors received protocol-specific training. Case-record forms were checked contemporaneously for completeness and internal consistency. Data were double-entered and cross-verified before database lock to minimise transcription errors.

Outcomes

Primary outcomes were the distribution of ICD-10 substance categories and age/sex profiles. Secondary outcomes included ASI domain-specific composite scores, BPRS total and subscale scores, CAGE positivity (≥ 2), and associations between primary substance category and psychopathology.

Statistical analysis

Analyses were performed using IBM SPSS Statistics, version 26.0. Categorical variables were summarised as counts and percentages, and continuous variables as mean (standard deviation) or median (interquartile range), as appropriate. Group comparisons used χ^2 tests (or Fisher's exact test where indicated) for categorical data and t-tests/ANOVA or non-parametric equivalents for continuous data. Associations between substance category and psychopathology were examined using multivariable logistic regression adjusted for age and sex, with adjusted odds ratios and 95% confidence intervals reported. Correlations were assessed with Pearson's r (or Spearman's ρ for non-normal data). Two-sided p -values < 0.05 were considered statistically significant, and missing data were handled by complete-case analysis owing to minimal missingness.

Data governance

Source documents were stored in locked cabinets within the department, and electronic data were maintained on password-protected devices accessible only to study personnel. Direct identifiers were removed before analysis to preserve participant confidentiality, and only de-identified datasets were used for statistical procedures.

Table 1: Gender Wise Distribution

Gender	No. of Participants	Percent (%)
Male	96	96
Female	4	4
Total	100	100

Table 2: Age Wise Distribution

Age Group (Years)	No. of Patients	Percent (%)
18 – 39	81	81
40 - 59	13	13
60 – 99	6	6
Total	100	100

Table 3: Patient Diagnosis according to the ICD 10 Guidelines

Diagnosis according to the ICD 10 Guidelines	No. of Patients	Percent (%)
Alcohol Related Disorders	22	22
Opioids Related Disorders	59	59
Cannabis Related Disorders	3	3
Other Psychoactive Disorders	16	16
Total	100	100

Table 4: Substance Abuse Patterns in different Age-Groups

Age Group	Alcohol Related Disorders	Opioid Related Disorders	Cannabis Related Disorders	Other Psychoactive Disorders	χ^2	P Value
Young Adults	7	58	0	16	100.192	0.000
Middle Aged Adults	12	1	0	0		
Older Adults	3	0	3	0		
Total	22	59	3	16		

Table 5: Psychopathology Outcomes (ASI&BPRS) by Disorder Type

Disorder Type	ASI Severity (Mean ± SD)	BPRS Total (Mean ± SD)
Alcohol	0.42 ± 0.15	45 ± 10
Opioids	0.65 ± 0.20	50 ± 12
Cannabis	0.38 ± 0.12	58 ± 14
Other	0.55 ± 0.18	60 ± 13

Table 6: CAGE Questionnaire Score Among Participants

CAGE Score Category	No. of Patients	Percentage (%)	Interpretation	χ^2	P Value
0-1	18	18%	No significant alcohol use problem	8.56	< 0.01
≥ 2	82	82%	Probable alcohol dependence		
Total	100	100	-		

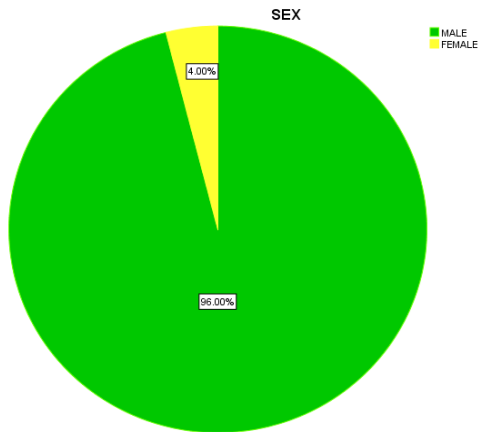


Figure 2: Pie chart demonstrating dominance of male participants (96%) in study population.

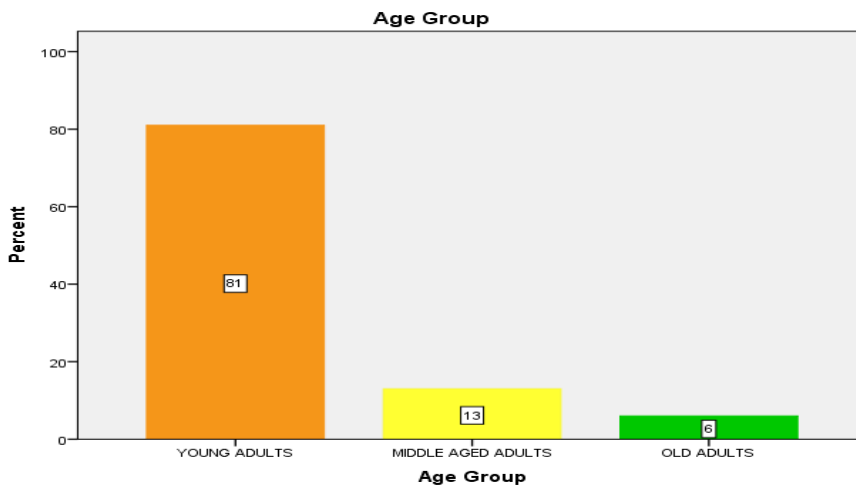


Figure 3: Histogram of patient distribution by age group. Young adults between 18 and 39 years constituted the bulk of the cases (81%) which is represented in orange colour. However, the Yellow colour represents Middle Aged Adults and Green colour represents Old Adults.

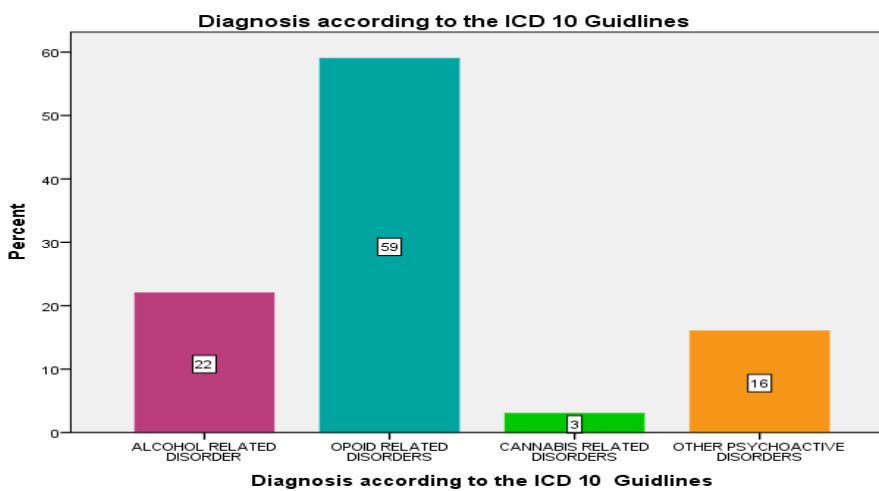


Figure 4: Bar chart displaying prevalence of substance use disorders. Opioid use disorder was the highest frequency of diagnosis (59%), followed by alcohol use disorders (22%).

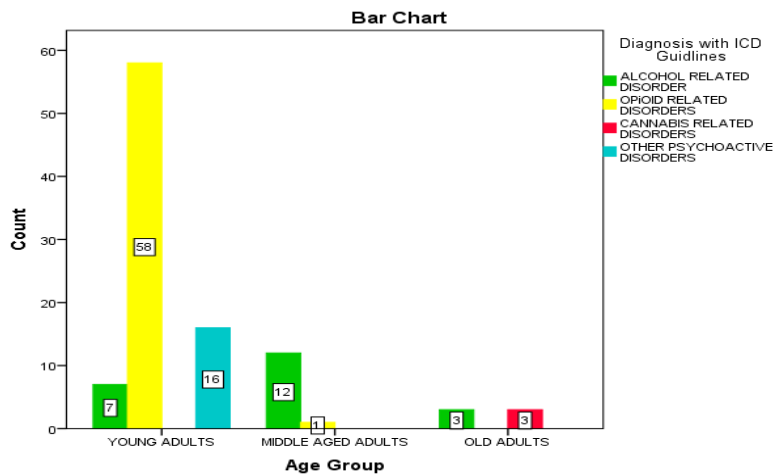


Figure 5: Clustered bar chart illustrating the correlation between the age group and the type of psychoactive substance consumed. Statistically significant differences were found ($p^* < 0.001$, χ^2 test).

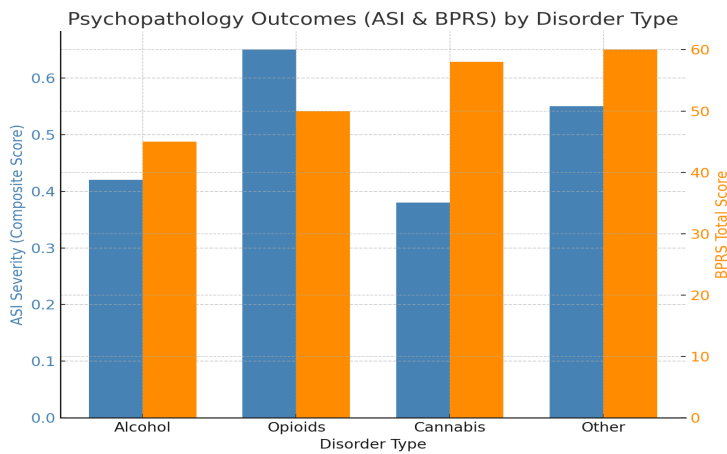


Figure 6: Psychopathology Outcomes (ASI & BPRS) by Disorder Type. Comparison of mean ASI and BPRS scores across various categories of substance use disorders. Opioid users had the highest ASI scores, while other psychoactive substance users had higher BPRS symptom scores.

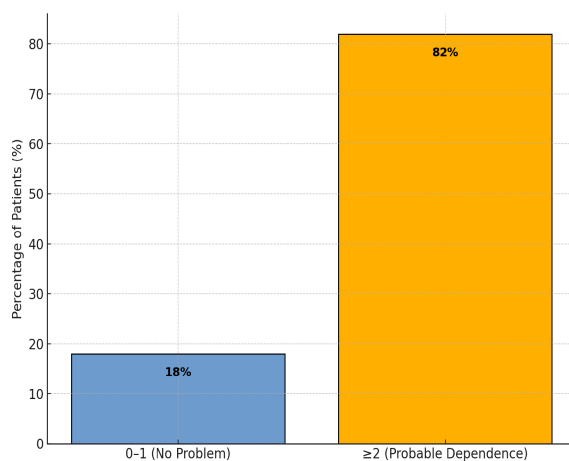


Figure 7: Distribution of CAGE scores among participants in a bar chart. Most of the participants (82%) had ≥ 2 score, indicative of probable alcohol dependence.

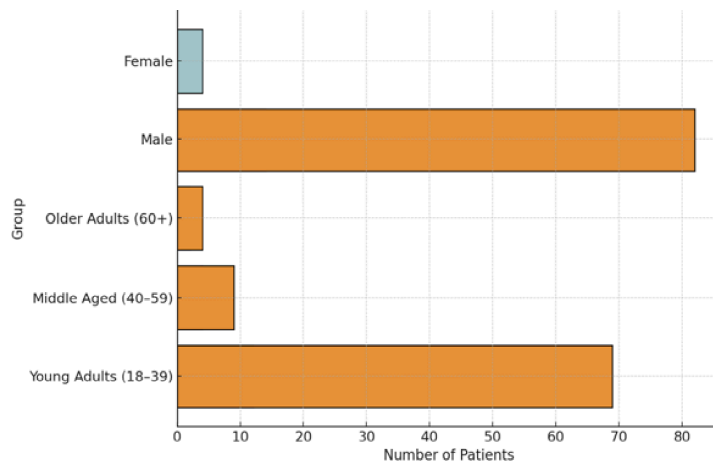


Figure 8: Clustered bar chart contrasting CAGE-positive versus CAGE-negative participants across age and gender. Young male adults showed the highest proportion of alcohol dependence risk.

DISCUSSION

Substance use disorders (SUDs) remain a substantial global public health challenge, with patterns of use and associated psychiatric comorbidities varying across regions and populations. Understanding these patterns is essential for designing effective prevention and treatment strategies. This study explored the prevalence and distribution of SUDs, characterised associated psychiatric symptoms, and compared the findings with previously published research.

We analysed the sociodemographic and clinical profiles of patients with ICD-10–diagnosed SUDs presenting to a tertiary-care service. Opioid-related disorders comprised the majority of cases (59%), followed by alcohol-related disorders (22%), other psychoactive substance disorders (16%), and cannabis-related disorders (3%). These findings are consistent with national reports of rising opioid misuse in India and other low- and middle-income countries [25,26]. Several authors have reported that opioids have surpassed alcohol as the leading substance of dependence among young people, driven by availability, peer pressure, and psychological stressors [27,28].

Men were markedly over-represented (96%), aligning with prior research indicating that SUDs are more prevalent in men, influenced by socio-cultural permissiveness, peer dynamics, and workplace stress [29,30]. Nevertheless, the inclusion of women, albeit a small proportion, underscores the increasing vulnerability of women to substance misuse, often linked to psychosocial distress or partner use [31].

The age distribution indicated that most participants were young adults (18–39 years), consistent with early initiation and persistence of use. Similar observations have been reported by Kumar et al. and Singh et al., who emphasised that initiation typically occurs in adolescence or early adulthood and progresses to dependence if untreated [32,33]. The strong association between age group and primary substance ($\chi^2 = 100.19$, $p < 0.001$) in our cohort

reinforces the need for age-specific prevention programmes.

Psychopathological assessment showed that opioid users had the highest Addiction Severity Index (ASI) scores, reflecting greater dependence, functional impairment, and social consequences. This accords with reports by Ray et al. and Grover et al. describing opioid dependence as characterised by high relapse rates, psychiatric comorbidity, and medical complications [34,35]. In contrast, patients with cannabis and other psychoactive substance disorders exhibited higher Brief Psychiatric Rating Scale (BPRS) scores, indicating more pronounced psychotic and affective disturbances—findings consistent with literature linking cannabis use to psychosis and mood dysregulation [36,37].

We also observed a high prevalence of probable alcohol dependence (82% with CAGE ≥ 2) among patients with SUDs. This highlights the substantial burden of alcohol-related problems in tertiary psychiatric settings and mirrors other Indian hospital-based reports in which alcohol misuse commonly co-occurs with opioid and other substance dependence [38,39]. The predominance of alcohol dependence among younger adult men (18–39 years) is consistent with national data from the 2019 National Survey on the Extent and Pattern of Substance Use in India, which indicates peak alcohol use among males in early to mid-adulthood [40]. Elevated CAGE positivity in this group may reflect social acceptance of alcohol, work-related stress, peer influence, and early initiation [41,42].

The robust correlation between CAGE positivity and higher ASI alcohol composite scores further supports the clinical utility of CAGE as a rapid screening tool to identify individuals requiring comprehensive assessment and treatment. Prior studies attest to the sensitivity and specificity of CAGE for detecting alcohol dependence, particularly in medical and psychiatric populations [43]. Taken together, these

observations reinforce the bidirectional relationship between psychiatric disorders and substance use—psychiatric illness can precipitate or predispose to substance use, while chronic substance use can exacerbate underlying psychopathology [44,45]. Accordingly, integrated care is required, combining pharmacological management with psychological interventions to address both domains effectively [46,47].

CONCLUSION

This study underscores the substantial burden of substance use disorders, with a marked predominance among males (96%) and high vulnerability in young adults aged 18–39 years (81%). Opioid-related disorders were the most frequently diagnosed category (59% by ICD-10). The high prevalence of psychiatric comorbidities—including anxiety, somatic concerns, guilt, and tension—highlights the complex interplay between substance use and mental health. Psychopathological assessment showed greater addiction severity among opioid users (ASI = 0.65 ± 0.20) and a higher overall psychiatric symptom load (BPRS = 50 ± 12), while cannabis and other substance users exhibited more prominent psychotic symptoms (BPRS 58–60). In addition, 82% of participants scored ≥2 on the CAGE questionnaire, indicating probable alcohol dependence even among individuals without alcohol as their primary substance. These findings emphasise the need for comprehensive, integrated care addressing both addiction and co-occurring psychiatric symptoms, particularly in high-risk demographic groups.

In summary, polysubstance use and co-occurring psychiatric symptoms are common among treatment-seeking patients. Standardised screening (CAGE, ASI, BPRS), early identification of dual diagnosis, and integrated treatment strategies are critical to improving outcomes.

Strengths And Limitations

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This study has several strengths. It employed validated instruments—the Addiction Severity Index (ASI), the Brief Psychiatric Rating Scale (BPRS), and the CAGE questionnaire—ensuring robust assessment of substance-use severity, psychopathology, and alcohol-related risk. ICD-10 diagnostic criteria enhanced clinical validity and facilitated international comparability. Inclusion of a broad adult age range within a tertiary-care setting supports clinical applicability.

However, the cross-sectional design precludes causal inference between substance-use patterns and psychiatric comorbidity. As a single-centre study with a modest sample size (n = 100), generalisability may be limited, and formal power analysis was not undertaken. Potential confounders—such as socioeconomic status and prior treatment exposure—were not statistically controlled, and reliance on some self-report data introduces the possibility of recall or reporting bias. Notwithstanding these limitations, the study provides useful baseline information on psychoactive substance use and associated psychopathology in a tertiary setting.

Declarations

Consent for publication: Before data collection, all eligible patients were informed about the purpose and nature of the study, and written informed consent was obtained.

Availability of data and materials: Data are available on reasonable request.

Competing interests: The authors declare no competing interests.

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Statement of AI use: The authors reviewed, verified, and edited all AI-assisted content to ensure accuracy and originality.

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