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# Prevalence and Clinical Correlates of Thrombocytopenia among Inpatients with Alcohol Dependence Syndrome: A Retrospective Cross-Sectional Study in a Tertiary Psychiatry Setting

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**Abstract:** ***Background**: Alcohol Dependence Syndrome is associated with hematological abnormalities including thrombocytopenia, yet its clinical correlates in psychiatric inpatient settings remain insufficiently studied. **Objective**: To determine the prevalence of thrombocytopenia and examine its association with dependence severity, withdrawal severity, and liver function parameters. **Methods**: A retrospective cross-sectional study analyzed records of 102 inpatients aged 18 to 65 years. Platelet counts, liver function tests, Severity of Alcohol Dependence Questionnaire scores, and Clinical Institute Withdrawal Assessment scores were evaluated using chi square test, Welch t test, and Spearman correlation. **Results**: Thrombocytopenia was identified in 18.63 percent of patients, predominantly mild to moderate. A significant association was observed with dependence severity, while no association was found with withdrawal severity or liver function indices. Platelet count showed a weak negative correlation with dependence severity. **Conclusion**: Thrombocytopenia is a clinically relevant abnormality associated with cumulative alcohol exposure. Routine platelet monitoring may support risk stratification during inpatient detoxification.*

**Keywords:** Alcohol Dependence Syndrome, Thrombocytopenia, Platelet Count, SADQ, CIWA-Ar, Liver Function Tests, Alcohol withdrawal, Hematological abnormalities, and Psychiatric inpatient detoxification.

## 1. Introduction

Alcohol Dependence Syndrome (ADS) is a chronic, relapsing neuropsychiatric disorder characterized by impaired control over alcohol use, tolerance, withdrawal symptoms, and persistent drinking despite harmful consequences. It represents a major public health concern worldwide and contributes substantially to medical morbidity, psychiatric comorbidity, and socioeconomic burden. Chronic alcohol consumption affects multiple organ systems, including the liver, cardiovascular system, nervous system, and hematopoietic system. Among the hematological abnormalities associated with prolonged alcohol use, thrombocytopenia is one of the most frequently observed laboratory findings [1].

Thrombocytopenia, defined as a platelet count below 150,000/µL, is commonly reported in individuals with chronic alcohol use. According to *Harrison's Principles of Internal Medicine (20th edition)*, thrombocytopenia occurs in approximately 3–43% of chronic alcohol users [1]. The pathogenesis is multifactorial and includes direct toxic suppression of bone marrow megakaryocytes, nutritional deficiencies such as folate and vitamin B12 deficiency, hypersplenism secondary to portal hypertension, immune-mediated platelet destruction, and liver dysfunction leading to decreased thrombopoietin production [1,2]. Alcohol-induced bone marrow suppression may reduce platelet production, while liver disease may further aggravate thrombocytopenia through splenic sequestration and impaired synthetic function [2,3].

Importantly, alcohol-related thrombocytopenia is often reversible with abstinence. Platelet counts typically begin to rise within several days of sobriety and may normalize within 5–10 days [1,4]. However, this recovery period frequently overlaps with the acute alcohol withdrawal phase- a clinically vulnerable period characterized by autonomic hyperactivity, tremors, seizures, and delirium tremens. During inpatient detoxification, thrombocytopenia may increase the risk of bleeding complications, influence pharmacological management (e.g., use of benzodiazepines or anticoagulants), and necessitate closer clinical monitoring [2,5]. Despite routine hematological evaluation during detoxification, platelet abnormalities are often not systematically correlated with clinical severity in psychiatric settings.

Several international studies have documented the association between chronic alcohol use and thrombocytopenia, as well as improvement in platelet counts following abstinence [3,4]. However, many of these studies have been conducted in small cohorts and have not comprehensively examined the relationship between platelet levels and clinical parameters such as severity of alcohol dependence, intensity of withdrawal symptoms, or liver function abnormalities [3,5]. In the Indian context, available studies are predominantly

prospective in design, limited by modest sample sizes, and frequently focus on platelet count as an isolated laboratory parameter without evaluating its broader clinical implications [5,6,7]. There is limited evidence derived from retrospective real-world inpatient data, particularly from psychiatry units managing detoxification.

Retrospective analysis of existing inpatient records provides an ethical and resource-efficient approach to estimate the prevalence of thrombocytopenia and explore its clinical and biochemical correlates without additional patient intervention. Such data can help clinicians identify high-risk patients, strengthen risk stratification during detoxification, and reinforce the importance of routine hematological monitoring in individuals with ADS.

In view of the existing gaps in literature, the present retrospective cross-sectional study aims to determine the prevalence of thrombocytopenia among inpatients diagnosed with Alcohol Dependence Syndrome and to evaluate its association with severity of alcohol dependence, liver function abnormalities, and withdrawal severity at admission. Understanding these associations may support rational clinical decision-making and optimize inpatient management in alcohol detoxification settings.

## 2. Material and Methods

This retrospective cross-sectional study was conducted at R.L. Jalappa Hospital, Tamaka, Kolar, a tertiary care teaching hospital, over a four-month period from August 2025 to November 2025. The study utilized inpatient case records and laboratory reports of patients admitted under the Department of Psychiatry with a diagnosis of Alcohol Dependence Syndrome (ADS). All eligible inpatient records fulfilling predefined inclusion and exclusion criteria during the study period were reviewed until the required sample size was achieved.

The sample size was calculated based on the primary outcome, namely the prevalence of thrombocytopenia among patients with ADS. The expected prevalence of thrombocytopenia was assumed to be 18.8%, based on a previously published hospital-based observational study conducted in a similar clinical setting [8]. The required sample size for estimating prevalence was calculated using the standard formula $n = Z^2pq/d^2$, where $Z = 1.96$ for a 95% confidence level, $p = 0.188$, $q = 0.812$, and allowable absolute precision (d) = 0.08. The calculated minimum sample size was 92 participants. Considering an anticipated 10% attrition due to incomplete laboratory parameters or missing documentation in case records, the final target sample size was adjusted to approximately 100–105 participants (target ≈102), which was feasible within the defined study duration.

Patients aged 18–65 years diagnosed with Alcohol Dependence Syndrome as per DSM-5-TR criteria and admitted as inpatients during the study period were included. Availability of baseline laboratory investigations, particularly platelet count, was mandatory. Patients with known pre-existing hematological disorders (e.g., immune thrombocytopenic purpura, leukemia, aplastic anemia), those receiving medications known to affect platelet count (such as valproate/divalproex sodium, heparin, antiplatelet agents, chemotherapy, or immunosuppressants), individuals with severe systemic infections including sepsis or HIV, pregnant or lactating women, and case records lacking essential laboratory data (especially platelet counts or liver function tests) were excluded.

Data were extracted retrospectively using a structured data extraction proforma. Sociodemographic variables, clinical details, platelet counts, and liver function parameters were obtained from existing inpatient case records and laboratory reports. Alcoholic liver disease was considered present based on documented clinical diagnosis in case records, supported by abnormal liver function tests and/or ultrasonographic evidence wherever available. Severity of alcohol dependence was categorized using Severity of Alcohol Dependence Questionnaire (SADQ) scores as mild (<16), moderate (16–30), severe (31–45), and very severe (>45), in accordance with established scoring guidelines. Alcohol withdrawal severity at admission was categorized using Clinical Institute Withdrawal Assessment for Alcohol–Revised (CIWA-Ar) scores as mild (<10), moderate (10–18), and severe (>18). SADQ and CIWA-Ar scores were recorded wherever documented as part of routine clinical assessment; missing values were treated as unavailable.

All laboratory investigations had been performed as part of routine clinical care using automated hematology and biochemistry analyzers available in the central laboratory. No additional investigations or patient interventions were carried out specifically for the purpose of this study. Extracted data were anonymized prior to entry into Microsoft Excel and subsequently analyzed using licensed SPSS software.

Records with missing key variables (platelet count or liver function parameters) were excluded, while missing SADQ and CIWA-Ar scores were retained as unavailable and not imputed. The proportion of missing SADQ and CIWA-Ar data was noted but not subjected to statistical correction due to the retrospective design.

No multivariate analysis was performed as the study was primarily exploratory and aimed at identifying univariate associations. Potential confounders such as nutritional status, duration of alcohol use, and comorbid liver disease were acknowledged but could not be adjusted due to limitations in retrospective data completeness.

Alcoholic liver disease was operationally defined based on documented clinical diagnosis supported by abnormal liver function tests and/or ultrasonographic findings wherever available.

## 3. Results

A total of 102 inpatients diagnosed with Alcohol Dependence Syndrome were included in this retrospective analysis. The mean age was 43.5 ± 10.99 years, with a predominance of males (82.35%). Thrombocytopenia (platelet count <150,000/mm³) was observed in 19 patients, yielding a prevalence of 18.63% (95% CI: 11.7%–27.8%) (Table 2).

**Table 1:** Sociodemographic and clinical profile of participants (n=102).

| Characteristic | Value |
|---|---|
| Total participants | 102 |
| Age (years), mean ± SD | 43.50 ± 10.99 |
| Duration of alcohol use (years), mean ± SD | 15.89 ± 7.36 |
| Sex: Male | 84 (82.35%) |
| Sex: Female | 18 (17.65%) |
| Residence: Rural | 43 (42.16%) |
| Residence: Urban | 33 (32.35%) |
| Residence: Semi-urban | 26 (25.49%) |
| SADQ category: Moderate | 34 (33.33%) |
| SADQ category: Severe | 31 (30.39%) |
| SADQ category: Very Severe | 22 (21.57%) |
| SADQ category: Mild | 15 (14.71%) |
| CIWA category (Day 1): Moderate | 40 (39.22%) |
| CIWA category (Day 1): Severe | 36 (35.29%) |
| CIWA category (Day 1): Mild | 26 (25.49%) |
| Alcoholic liver disease: Yes | 88 (86.27%) |
| Alcoholic liver disease: No | 14 (13.73%) |

**Table 2:** Prevalence and severity distribution of thrombocytopenia

| Measure | Value |
|---|---|
| Thrombocytopenia present (platelets <150,000/mm³) | 19 (18.63%) |
| No thrombocytopenia | 83 (81.37%) |
| Severity among thrombocytopenia: Mild | 11 (57.89%) |
| Severity among thrombocytopenia: Moderate | 8 (42.11%) |

Among affected individuals, 57.89% had mild and 42.11% had moderate thrombocytopenia. The overall mean platelet count was 218,647 ± 71,099/mm³ (Table 3).

**Table 3:** Distribution of platelet counts overall and by thrombocytopenia status.

| Group | Platelets Mean ± SD (/mm³) | Median (IQR) | Min–Max |
|---|---|---|---|
| Overall (n=102) | 218647 ± 71099 | 231258 (178105–278254) | 56275–319541 |
| Thrombocytopenia (n=19) | 102536 ± 26604 | 105535 (83482–120658) | 56275–144582 |
| No thrombocytopenia (n=83) | 245227 ± 47245 | 249315 (205704–284274) | 160239–319541 |

A statistically significant association was found between thrombocytopenia and severity of alcohol dependence as measured by the SADQ ($\chi^2$, p = 0.0149), with higher prevalence in severe and very severe categories (Table 4; Figure 1).

**Table 4:** Association between thrombocytopenia and SADQ category (Chi-square p = 0.0149).

| SADQ Category | Thrombocytopenia Yes | Thrombocytopenia No | Total |
|---|---|---|---|
| Mild | 0 (0.00%) | 15 (100.00%) | 15 |
| Moderate | 3 (8.82%) | 31 (91.18%) | 34 |
| Severe | 10 (32.26%) | 21 (67.74%) | 31 |
| Very Severe | 6 (27.27%) | 16 (72.73%) | 22 |

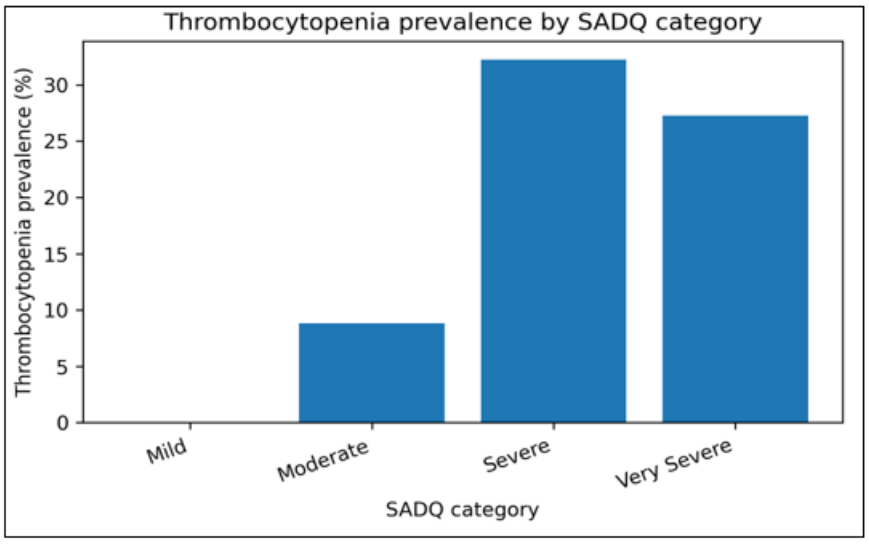


**Figure 1:** Thrombocytopenia prevalence by SADQ category.

Platelet count demonstrated a weak but significant negative correlation with SADQ score (rho = −0.246, p = 0.0125) (Table 7). No significant association was observed between thrombocytopenia and withdrawal severity assessed using CIWA-Ar (p = 0.1653) (Table 5; Figure 2). Liver function parameters did not differ significantly between groups (Table 6).

**Table 5:** Association between thrombocytopenia and CIWA-Ar category on Day 1 (Chi-square p = 0.1653).

| CIWA Category (Day 1) | Thrombocytopenia Yes | Thrombocytopenia No | Total |
|---|---|---|---|
| Mild | 4 (15.38%) | 22 (84.62%) | 26 |
| Moderate | 11 (27.50%) | 29 (72.50%) | 40 |
| Severe | 4 (11.11%) | 32 (88.89%) | 36 |

**Table 6:** Comparison of liver function parameters between thrombocytopenia and no thrombocytopenia groups.

| Parameter | Thrombocytopenia (n=19) Mean ± SD | No thrombocytopenia (n=83) Mean ± SD | p-value (Welch t-test) |
|---|---|---|---|
| AST (IU/L) | 115.42 ± 39.76 | 101.88 ± 38.93 | 0.1903 |
| ALT (IU/L) | 90.00 ± 41.73 | 97.59 ± 38.41 | 0.4747 |
| Total Bilirubin (mg/dL) | 2.15 ± 0.84 | 2.17 ± 0.79 | 0.9196 |
| Albumin (g/dL) | 3.60 ± 0.50 | 3.71 ± 0.49 | 0.4000 |

**Table 7:** Correlation of platelet count with dependence severity, withdrawal severity, and liver function parameters (Spearman correlation).

| Variable | Spearman rho (Platelets vs Variable) | p-value |
|---|---|---|
| SADQ Score | -0.246 | 0.0125 |
| CIWA Day 1 | 0.017 | 0.8614 |
| AST (IU/L) | -0.104 | 0.2963 |
| Total Bilirubin (mg/dL) | 0.016 | 0.8743 |
| Albumin (g/dL) | 0.078 | 0.4337 |

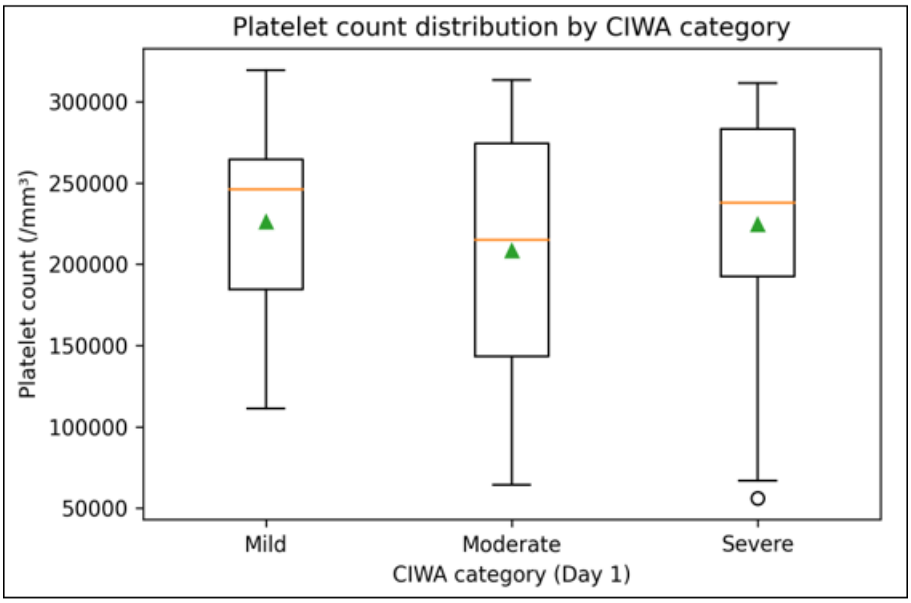


**Figure 2:** Platelet count distribution by CIWA category (Day 1).

## 4. Discussion

The present retrospective cross-sectional study evaluated the prevalence of thrombocytopenia and its clinical correlates among inpatients diagnosed with Alcohol Dependence Syndrome (ADS). The present study demonstrated a prevalence of thrombocytopenia of 18.63% among inpatients with Alcohol Dependence Syndrome, which is consistent with previously reported ranges in alcohol-dependent populations. [9,10]. The observed prevalence is comparable to prior hospital-based Indian studies examining hematological abnormalities in alcohol-dependent populations [11], thereby supporting the relevance of routine platelet assessment in psychiatric inpatient detoxification settings.

Alcohol-related thrombocytopenia is well documented and is considered multifactorial in origin. Chronic ethanol exposure directly suppresses bone marrow megakaryocyte production, reduces platelet survival, and may induce nutritional deficiencies such as folate deficiency that further impair hematopoiesis [9,11]. In addition, liver dysfunction associated with prolonged alcohol use may contribute through hypersplenism and reduced thrombopoietin synthesis [12]. In the present study, most thrombocytopenic cases were mild to moderate in severity, and no severe thrombocytopenia was observed. This finding aligns with earlier reports suggesting that alcohol-induced thrombocytopenia is often transient and reversible with abstinence [10,13]. The relatively moderate severity in our sample may reflect early inpatient admission during withdrawal and the reversible nature of alcohol-mediated marrow suppression.

A key finding of this study was the statistically significant association between thrombocytopenia and severity of alcohol dependence as measured by the SADQ ($p = 0.0149$). Thrombocytopenia was more frequent in severe and very severe dependence categories, and platelet count demonstrated a weak but significant negative correlation with SADQ scores (rho = −0.246, $p = 0.0125$). This suggests that increasing severity of alcohol dependence—and by implication, cumulative alcohol exposure—may exert progressive suppressive effects on hematopoiesis. Similar associations between heavy alcohol consumption and hematological abnormalities, including thrombocytopenia and macrocytosis, have been reported in previous clinical studies [10,11]. The negative correlation observed, though modest in strength, supports the concept that platelet count may serve as a biological indicator of sustained alcohol toxicity.

In contrast, no significant association was found between thrombocytopenia and withdrawal severity assessed using CIWA-Ar scores at admission ($p = 0.1653$). Furthermore, platelet count did not correlate significantly with CIWA scores. This suggests that platelet abnormalities reflect chronic systemic effects of alcohol rather than acute neurophysiological withdrawal processes. Withdrawal

severity is primarily mediated by neuroadaptive changes in GABAergic and glutamatergic pathways following abrupt cessation of alcohol intake [12], whereas thrombocytopenia reflects longer-term toxic and metabolic consequences of sustained alcohol exposure. Similar findings have been documented in previous inpatient detoxification cohorts [13].

Another important observation was the absence of significant differences in liver function parameters (AST, ALT, bilirubin, albumin) between thrombocytopenic and non-thrombocytopenic groups. Although alcoholic liver disease was highly prevalent in this cohort (86.27%), platelet count did not show significant correlation with liver function indices. While advanced liver disease may cause thrombocytopenia through portal hypertension and splenic sequestration [12,13], our findings suggest that direct bone marrow suppression may play a more prominent role in the studied population. Previous studies have reported variable associations between platelet levels and liver enzyme elevations, indicating that thrombocytopenia in ADS cannot be attributed solely to hepatic dysfunction [9,13].

From a clinical perspective, the identification of thrombocytopenia in nearly one-fifth of ADS inpatients underscores the importance of routine hematological monitoring during detoxification. Even mild thrombocytopenia may increase bleeding risk, influence medication choices, and necessitate closer monitoring during inpatient management. Early identification may assist clinicians in risk stratification and individualized care planning, particularly among patients with severe alcohol dependence.

The strengths of this study include the use of real-world inpatient data and standardized clinical measures such as SADQ and CIWA-Ar. However, certain limitations must be acknowledged. The retrospective design limits causal inference and depends on completeness of documentation. Serial platelet monitoring to assess normalization following abstinence was not available. Nutritional parameters such as folate and vitamin B12 levels were not consistently documented, and splenic imaging to evaluate hypersplenism was not performed. Future prospective longitudinal studies with repeated hematological assessments could provide deeper insight into the dynamic relationship between abstinence, hepatic recovery, and platelet normalization.

In conclusion, thrombocytopenia was observed in 18.63% of inpatients with Alcohol Dependence Syndrome and was significantly associated with severity of alcohol dependence but not with withdrawal severity or liver function parameters. These findings emphasize the clinical relevance of platelet monitoring in ADS and suggest that hematological alterations predominantly reflect chronic alcohol exposure rather than acute withdrawal physiology.

## 5. Conclusion

Thrombocytopenia affects a substantial proportion of patients undergoing inpatient detoxification for alcohol dependence and is associated with dependence severity rather than withdrawal intensity or hepatic biochemical indices. These findings highlight the importance of integrating routine platelet assessment into detoxification protocols to enhance clinical risk stratification. Prospective longitudinal studies are required to clarify causal pathways and temporal recovery patterns.

The study was accorded Ethical Committee Approval vide Ethics Committee No.
SDUAHER/KLR/CEC/S/PG/90/2025-26 dated 19/01/26

Informed Consent was waivered as this is a retrospective record-based study involving analysis of existing case records and laboratory reports. No direct patient contact or additional investigations will be undertaken.

During hospital admission, patients routinely provide consent for diagnostic blood sampling and use of anonymized clinical data for academic and research purposes as per institutional policy. As the study involves secondary analysis of existing data with no intervention or risk to participants.

The study was carried out in accordance with the principles as enunciated in the Declaration of Helsinki

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