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Research Paper

The Endogenous Aspects of Addiction: Diathesis-Stress Interactions between PID-5 Personality Traits and Socio-Ecological Triggers in Substance Use Disorder Patients from North East India

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ABSTRACT

Substance use disorder (SUD) is a global public health crisis, with Northeast India exhibiting disproportionately high prevalence rates. Traditional socio-ecological models often emphasize familial and environmental factors in SUD etiology. This cross-sectional study investigated the interplay between self-reported triggers, family history, and pathological personality traits among N=62 male residents across three rehabilitation facilities in Jorhat, Assam. Utilizing the Personality Inventory for DSM-5 Brief Form (PID-5-BF), findings revealed that Disinhibition and Antagonism are the primary neuro-behavioral drivers of early onset, severe polysubstance use, and opioid endorsement. Contrary to socio-ecological assumptions, familial indicators (parental education and substance use) did not independently predict severity. However, a significant diathesis-stress interaction emerged: parental substance use exacerbated polysubstance severity exclusively among highly disinhibited individuals. Furthermore, comorbid gambling strongly aligned with intrapsychic triggers and a psychopathy-spectrum profile (high Detachment/Antagonism, low Negative Affect), indicating under-stimulation rather than distress. These results highlight the necessity of personality-targeted interventions, demonstrating that systemic family vulnerabilities catalyze severe SUD primarily in the presence of underlying personality pathology.

Keywords: *Substance Use Disorder, PID-5, Diathesis-Stress Model, Psychopathy, Disinhibition, North East India*

Global and National Burden of Substance Use Disorders

Substance use disorders (SUDs) contribute substantially to global morbidity and mortality and remain a major public health concern. In 2023, an estimated 316 million people (6% of the global population aged 15-64 years) used drugs in the past year (UNODC, 2025). The burden extends beyond prevalence, reflecting downstream harms such as medical comorbidity, social impairment, and treatment gaps, with a large proportion of individuals with drug use disorders remaining untreated (UNODC, 2025).

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In India, nationally representative evidence indicates a high magnitude of substance use and dependence. The National Survey on Extent and Pattern of Substance Use in India reported approximately 16 crore current alcohol users and estimated that 5.2% of alcohol users meet dependence criteria; opioids were used by about 2.06% of the population, and a substantial subgroup required treatment services (Ambekar et al., 2019). These national estimates also highlight marked heterogeneity across states and substances, emphasizing the need to interpret relapse and recovery within local risk ecologies (Ambekar et al., 2019).

Northeast India Context

Northeast India warrants focused attention because structural and geopolitical factors shape exposure, access, and drug markets. Proximity to cross-border trafficking routes linked to the Golden Triangle has been repeatedly discussed as a contextual risk factor for increased availability and circulation of opioids and other drugs in the region (Banerjee et al., 2006; Transnational Institute Report, 2011). At the same time, recovery processes in Assam have been described as multi-phase and socially and culturally embedded, involving transitions from recreational use to addiction and then supported community focused recovery, with cycling pathways rather than a single linear trajectory (Graber et al., 2024).

Studies examining tribal populations and urban centers in states like Assam and Manipur indicate that the prevalence of polysubstance and prescription opioid abuse is significantly higher than the national average (Chaturvedi et al., 2016; Ambekar et al., 2019). Community-level evidence from the urban slums of Jorhat, Assam, revealed that tobacco and alcohol are the most frequently abused substances among young people aged 10-24, with peers functioning as the primary gateway to early initiation (Kovilveettil, 2021).

Relapse and Readmission in India

Relapse remains one of the most persistent barriers to sustained recovery across treatment settings. Indian evidence indicates that relapse/readmission is associated with both clinical-history variables and social context—for example, prior relapse and family history have been implicated as correlates of readmission in inpatient samples (Sau et al., 2013; Singh et al., 2014), while education, socioeconomic status, follow-up duration, stressful life events, and perceived social support have been reported as salient relapse-related factors in Indian cohorts (Chauhan et al., 2018). Collectively, this literature suggests that relapse vulnerability is not reducible to exposure to cues alone; it reflects a dynamic interplay of intrapersonal states and external stressors (Sau et al., 2014; Chauhan et al., 2018).

SUD-Personality Disorder Comorbidity and Trait Pathways

Comorbidity between personality disorders (PDs) and SUDs is common and clinically consequential. In the general population, PD prevalence has been reported to vary widely—approximately 4-15%—reflecting differences in samples and assessment methods, and cross-national work has reported a point prevalence around 6.1% (Parmar & Kaloiya, 2018). In treatment-seeking SUD populations, PD prevalence is substantially higher, ranging from 34.8% to 73.0% (median 56.5%), with antisocial and borderline PD frequently overrepresented, reflecting a well-documented comorbidity trend across international treatment-seeking cohorts (Parmar & Kaloiya, 2018; Verheul, 2001).

Indian inpatient evidence is consistent with these patterns: among male inpatients with alcohol dependence syndrome, nearly half met criteria for at least one PD (48%), with antisocial PD (26%) and avoidant PD (13%) most common; PD comorbidity was associated

with earlier age of first drink and higher daily alcohol consumption (Balachandran et al., 2023). Cross-cultural evidence from an Iranian rehabilitation setting similarly documented high rates of depression-spectrum personality features, psychoticism, and paranoia in drug-dependent inmates, reinforcing the universality of personality-SUD comorbidity (Alaghemandan et al., 2015).

Mechanistically, PD-SUD comorbidity has been conceptualized through pathways such as behavioral disinhibition (impulsivity/constraint deficits), stress-reduction (negative affectivity and self-medication), and reward sensitivity (novelty-seeking), each plausibly shaping relapse processes (Parmar & Kaloiya, 2018). In line with this trait-based perspective, evidence using the DSM-5 Alternative Model for Personality Disorders (AMPD) trait framework has linked negative affect and decision-making performance (e.g., Iowa Gambling Task indices) with treatment retention and dropout among SUD inpatients, supporting the relevance of intrapersonal vulnerabilities for course and outcome (Gómez-Bujedo et al., 2020).

Gap and Study Rationale

Despite a robust literature on relapse correlates and PD-SUD comorbidity, two critical limitations remain salient for the present work. First, relapse research in India has often prioritized broad correlates (e.g., social support, stressful events, family history) without systematically organizing relapse precipitants into clinically meaningful trigger typologies that can inform tailored relapse-prevention targets (Sau et al., 2013; Chauhan et al., 2018). Second, although personality pathology is recognized as common in SUD treatment populations, comparatively fewer studies explicitly link trigger typologies—particularly intrapsychic triggers (e.g., dysphoria, emotional dysregulation, impulsivity)—to elevations on maladaptive personality trait domains in a way that strengthens clinical formulation and group differentiation (Balachandran et al., 2023; Parmar & Kaloiya, 2018).

In the current study, intrapsychic triggers—such as negative affect, impulsivity, and emotional dysregulation—are conceptualized as a distinct pathway separate from those motivated purely by interpersonal conflicts (relational triggers) or environmental cues (systemic triggers). Patients whose relapse is driven by intrapsychic triggers consistently demonstrate elevations on signature personality traits associated with the DSM-5 AMPD. Specifically, these individuals exhibit pronounced elevations in the domains of negative affectivity and disinhibition (Choate et al., 2021), driving a cycle of self-medication in response to internal distress (McKernan et al., 2015).

To further buttress this argument, neuropsychological behavioral performance aligns perfectly with these trait vulnerabilities. For example, impulsive choice behaviors and poor decision-making on gambling-related tasks significantly correlate with high negative affect, serving as robust predictors for dropping out of treatment entirely (Gómez-Bujedo et al., 2020). In this context, the connection to poor gambling task performance is not indicative of gambling disorder per se; rather, it serves as concrete behavioral evidence that core intrapsychic vulnerabilities—impulsivity and negative emotionality—fundamentally compromise the cognitive control required to maintain abstinence, leading directly to relapse.
By integrating personality pathology with environmental data, this study seeks to pivot the narrative from a purely socio-ecological model to a **Diathesis-Stress model**, investigating how endogenous personality traits interact with environmental risks.

Hypotheses

1. **Hypothesis 1:** Pathological personality traits, specifically Disinhibition and Antagonism, will act as the primary endogenous drivers of SUD, significantly predicting earlier age of onset, greater polysubstance use, and opioid endorsement.
2. **Hypothesis 2:** Familial factors (parental substance use and education) will not independently predict SUD severity. Instead, they will exhibit a diathesis-stress interaction, exacerbating polysubstance severity only in highly disinhibited individuals.
3. **Hypothesis 3:** Comorbid gambling will align predominantly with intrapsychic triggers, characterized by a psychopathy-linked personality profile (high Detachment, high Antagonism, low Negative Affect), contrasting sharply with psychosocially triggered substance use.

METHODOLOGY

Participants

The sample consisted of 62 male residents from 3 Drug De-Addiction/Rehabilitation facilities in Jorhat receiving inpatient treatment for Substance Use Disorder. Data was collected from three separate de-addiction rehabilitation facilities operating in Jorhat, Assam, during December 2024 and January 2025.

Inclusion Criteria:

1. Male adults aged 18 years or older
2. Meeting the diagnostic criteria of SUD based on DSM-5/ICD-11 criteria
3. Minimum of two weeks in the rehabilitation program to ensure acute detoxification was complete
4. Ability to comprehend and respond to the survey questionnaire in the administered language

Exclusion Criteria:

1. Patients in active, acute withdrawal or intoxication
2. Presence of severe cognitive impairment or active psychosis that would preclude informed consent or accurate self-reporting

Measures

Data was collected using a comprehensive, structured survey questionnaire comprised of three sections:

1. **Sociodemographic and Clinical History:** Collected data on age, age of first substance use onset, types of substances used (composite scoring), admission history (first-time vs. readmitted), parental education levels, and parental substance use history. Comorbid gambling behavior was also recorded as a binary variable.
2. **Self-Reported Triggers:** Patients identified the primary triggers for their substance use, which were thematically grouped into three overarching domains:
    - **Systemic:** Family/environmental issues
    - **Relational:** Peer influence/relationship issues
    - **Intrapsychic:** Psychological distress/self-medication/under-stimulation
3. **Personality Inventory for DSM-5 Brief Form (PID-5-BF):** A standardized 25-item self-report scale measuring five maladaptive personality domains defined by the DSM-5 AMPD: Negative Affect, Detachment, Antagonism, Disinhibition, and Psychoticism.

4. **Substance Use Composite:** Regular substance use was assessed retrospectively as the participant's typical pattern prior to admission and operationalized as use "on most days" during the active-use period (no fixed time window). Substances assessed included tambul, sadha, biri, cigarette, local liquor, foreign liquor, ganja, dendrite, phensydyl, brown sugar, spasmoproxyvon, and heroin; each substance endorsed as regularly used was scored 1 and summed to create a composite count (higher scores indicate greater polysubstance involvement). Gambling was excluded from this composite to maintain construct purity.
5. **Parental Literacy & Education:** Parental education was treated as household educational capital, operationalized as the maximum of mother's and father's education (rather than mean/sum), and then dichotomized as higher-secondary-and-above vs below for stable estimation in multivariable models

Procedure

The study utilized a cross-sectional, correlational design. Prior to data collection, the research team underwent intensive training sessions to ensure the standardization of the interview process, questionnaire administration, and ethical compliance. Facility administrators were briefed, and informed consent was obtained from each subject after explaining the study's purpose, confidentiality protocols, and their right to withdraw.

Statistical Analysis

Data analysis utilized multiple linear regression and simple linear regression for continuous outcomes (age of substance onset, polysubstance use composite score), binary logistic regression for categorical outcomes (opioid endorsement, early vs. late onset), univariate ANOVA with Type III sums of squares for between-subjects effects on polysubstance use (Table 06), and independent samples t-tests for group comparisons (e.g., gambling phenotype). Continuous predictors were dichotomized at medians to enhance model stability with the sample size (N=62) and clinical interpretability. Statistical assumptions were verified: residuals normally distributed (Shapiro-Wilk $p>0.05$), no multicollinearity (VIF<1.5), adequate events per variable (>10/group), and good logistic fit (Hosmer-Lemeshow $p=0.377$). Interaction terms and median-split subgroup analyses tested the diathesis-stress model of personality × environment effects. All analyses set at $\alpha=0.05$.

Ethical Considerations

The study utilized de-identified routine clinical data. Voluntary informed consent was obtained from all participants. The study adhered to ethical guidelines for research with vulnerable populations.

RESULTS & DISCUSSIONS

The sample comprised of 62 male participants who met the inclusion criteria. Mean age was 28.82 years (SD=6.98). Caste (collapsed) distribution was OBC 37.1%, GEN 33.9%, SC/ST 29.0%, and family type (collapsed) was nuclear 75.8%, single-parent 14.5%, joint 9.7%. Age at first substance use averaged 17.8 years (SD=4.2). Conversion to dichotomous coding with early onset defined as <17 years, reflected 51.6% early vs 48.4% later cases of onset. Admission history showed that 56.5% were newly admitted as opposed to 43.5%, who have been previously admitted. Regarding substance use patterns, 69.4% (n=43) were classified as opioid users (endorsing heroin, brown sugar, or cough syrup), while 30.6% (n=19) were non-opioid users. The mean polysubstance composite score was 5.81 substances (SD=2.10, range

1-10). Regarding admission history, 37.1% (n=23) were first-time admissions, while 62.9% (n=39) were readmissions.

For parental factors, Parental education was treated as *household educational capital*, operationalized as the **maximum** of mother's and father's education (rather than mean/sum), and then dichotomized as **higher-secondary-and-above vs below** for stable estimation in multivariable models. Accordingly, 29.0% (n=18) had at least one parent with higher Secondary Education or above, while 71.0% (n=44) came from families where neither parent had completed higher secondary education. Parental substance use was measured as a composite figure of individual substances consumed by both parents that averaged 2.3 substances (SD=1.8). Comorbid gambling among subjects was reported in 27.4% (n=17) cases.

Table 1: Participant Demographics and Substance Use Patterns (N= 62)

Sr. No.	Characteristic	Value
1.	Age, years (M, SD)	28.82 (6.98)
2.	Age at first substance use, years (M, SD)	17.8 (4.2)
3.	Opioid users, n (%)	43 (69.4%)
4.	Non-opioid users, n (%)	19 (30.6%)
5.	Polysubstance composite score (M, SD; range)	5.81 (2.10; 1-10)
6.	First-time admissions, n (%)	23 (37.1%)
7.	Readmissions, n (%)	39 (62.9%)
8.	At least one parent with higher education, n (%)	18 (29.0%)
9.	Neither parent with higher education, n (%)	44 (71.0%)
10.	Parental substance use composite (M, SD)	2.3 (1.8)
11.	Comorbid gambling, n (%)	17 (27.4%)

Personality as the Core Driver of SUD Severity

Table 2: Variable(s) in the Equation: NEGATIVE AFFECT, DETACHMENT, ANTAGONISM, DISINHIBITION, PSYCHOTICISM.

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	NEGATIVE AFFECT	.036	.115	.097	1	.756	1.036	.828	1.298
	DETACHMENT	.137	.102	1.812	1	.178	1.147	.939	1.401
	ANTAGONISM	-.340	.138	6.046	1	.014	.712	.543	.933
	DISINHIBITION	-.345	.135	6.584	1	.010	.708	.544	.922
	PSYCHOTICISM	-.075	.119	.404	1	.525	.927	.735	1.170
	Constant	3.420	1.374	6.197	1	.013	30.582		

Across all major clinical outcomes, pathological personality traits—specifically Disinhibition and Antagonism—emerged as the primary engines driving SUD severity.

Substance Use Type (Opioid vs. Non-Opioid): Total PID-5 scores significantly predicted the likelihood of opioid endorsement (p=0.003). In a multivariate model of the five domains, both Disinhibition (p=0.010) and Antagonism (p=0.014) independently predicted opioid use, while Negative Affect did not (p=0.756)

Age of Onset: Higher Total PID-5 scores strongly predicted an earlier age of onset (p=0.001). Specifically, Disinhibition (B=-0.54, p=.002; β=-.41) was highly significant (p=0.002); for every 1-point increase in Disinhibition, the age of first substance use decreased by approximately 0.5 years.

Admission History: Relapse and readmission were not driven by total personality pathology (p=0.661) or general psychiatric distress, but were predicted almost entirely by the Disinhibition domain (p=0.019), highlighting impulse control as the primary factor in post-treatment failure.

Polysubstance Trends: Disinhibition was the sole personality domain that significantly predicted a higher composite score of polysubstance use (p=0.001).

Table.03: Dependent Variable: SUBJECT_COMPOSITE_SCORE

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	3.162	.941		3.360	.001
DISINHIBITION	.290	.079	.480	3.671	.001
NEGATIVE AFFECT	-.078	.077	-.132	-1.013	.315
DETACHMENT	-.005	.066	-.010	-.077	.939
ANTAGONISM	.086	.088	.132	.977	.333
PSYCHOTICISM	-.008	.082	-.014	-.097	.923

The Diathesis-Stress Interaction: Family Factors vs. Disinhibition

Contrary to traditional socio-ecological models, familial indicators (parental substance use and parental education) failed to independently predict the subject's substance use severity or opioid endorsement across the total sample. However, an interaction analysis revealed a profound Diathesis-Stress mechanism.

When the sample was split by the median Disinhibition score, distinct patterns emerged:

Low Disinhibition Group (N=36): For subjects with relatively normal impulse control, parental substance use had absolutely no effect on their polysubstance severity (p=0.813) or their age of onset (p=0.671). The healthy personality architecture acted as a shield against familial modeling.

High Disinhibition Group (N=26): For subjects with high impulsivity, the environment acted as a severe catalyst. In this group, parental substance use was a highly significant predictor of the subject's polysubstance severity (p=0.037), and age of onset dropped drastically (p=0.002).

The formal interaction between Parental Substance Use × Disinhibition trended toward significance (p=0.071), confirming that systemic family dysfunction translates into severe offspring addiction only when the offspring possesses a vulnerable, highly disinhibited personality.

Table.04: Disinhibition and Parental Influence (n= 62)

Group	N	Parental Substance Use Effect on Polysubstance Severity	p	Parental Substance Use Effect on Age of Onset	p	Interaction (PSU × Disinhibition)	p
Low Disinhibition	36	No effect	0.813	No effect	0.671	-	-
High Disinhibition	26	Significant predictor	0.037	Drastically earlier	0.002	Trend toward significance	0.071

Gambling, Intrapsychic Triggers, and the Psychopathy Phenotype

Among the 43 patients who reported at least one trigger, three domains were identified: Intrapsychic (55.8%, n=24), Relational (41.9%, n=18), and Systemic (27.9%, n=12). Within the pure single-domain patients (n=33), a clear escalating trend emerged in polysubstance use: Intrapsychic triggers (M=4.76 substances), Relational triggers (M=6.00 substances), and Systemic triggers (M=6.57 substances).

Gambling (endorsed by 27% of the sample) did not predict the number of substances used (p=0.968) or opioid use (p=0.661). However, gambling was disproportionately linked to Intrapsychic triggers (54.5% of gamblers vs. 34.4% of non-gamblers).

Personality profiling of the gambling subset revealed a distinct, psychopathy-spectrum phenotype. Gamblers exhibited modest, non-significant elevations in Detachment (9.47 vs. 7.56, p=0.114) and Antagonism (7.00 vs. 5.62, p=0.108), coupled with lower Negative Affect (8.88 vs. 9.76), reflecting a trend consistent with psychopathy-spectrum profiles, indicating a state of chronic under-stimulation rather than psychosocial distress.

Table.05: Gambling Phenotype (n= 62)

Gamblers vs Non-Gamblers (t-tests)				
Domain	**Gamblers M (SD)**	**Non Gamblers M(SD)**	**t**	**p**
Detachment	9.47(4.16)	7.56(4.05)	1.63	0.114
Antagonism	7.00(2.76)	5.62(2.4)	1.62	0.108

Disinhibition as the Universal Engine

The current study challenges the prevailing socio-ecological narratives dominating SUD research in North East India. By integrating the PID-5 AMPD framework. The findings clearly identify Disinhibition ($F=19.63$, $p<.001$) emerged as the strongest predictor of addiction severity extending foundational models that link broad disinhibitory personality traits directly to substance use pathways (Trull & Sher, 1994).. High disinhibition drives the patient to experiment at an earlier age; this early onset, compounded by continuous poor impulse control and callousness (Antagonism), pushes the patient toward severe polysubstance use and high-risk opioid consumption. Furthermore, even post-rehabilitation, Disinhibition acts as the primary predictor of relapse and readmission. This aligns with Chaote et al. (2021) where PID-5 Disinhibition facets predicted SUD treatment dropout, particularly in young males.

Re-evaluating the Socio-Ecological Model

Perhaps the most critical clinical finding is the moderation effect of personality on familial environment. Previous studies have often placed the onus on the family system—uneducated parents or generational substance abuse. This study's diathesis-stress interaction exonerates the family as an independent cause. The data proves that familial environment is entirely eclipsed by the subject's personality in cases of low disinhibition. However, for those with a neurological deficit in impulse control (high Disinhibition), a dysfunctional environment acts as a massive amplifier. This provides an alternative, empirically backed, framework for family therapy, shifting the focus from familial blame to personality vulnerability.

Tests of Between-Subjects Effects

Dependent Variable:SUBJECT_COMPOSITE_NONGAMBLE_NONSPAZMOSCORE

Table.06: R Squared = .280 (Adjusted R Squared = .230)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	75.537[a]	4	18.884	5.544	.001
Intercept	1690.914	1	1690.914	496.456	.000
DISINHIBITION_BINARY	66.852	1	66.852	19.628	.000
PARENT_COMPOSITE_COUNT_BINARY	3.399	1	3.399	.998	.322
PARENTS_EDU_CAP	5.360	2	2.680	.787	.460
Error	194.140	57	3.406		
Total	2360.000	62			
Corrected Total	269.677	61			

Table.07: Dependent Variable: SUBJECT_COMPOSITE_SUBSTANCE_COUNT_ BINARY

Estimates

DISINHIBITION_BINARY	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1 (LOW)	5.074	.339	4.396	5.752
2 (HIGH)	7.182	.387	6.407	7.957

The Psychopathy Phenotype in Intrapsychic Triggers

This study utilized gambling not as a separate pathology, but as an extreme behavioral manifestation of intrapsychic triggers. The personality profile of the gambling subset---high Detachment, high Antagonism, and low Negative Affect---maps onto Factor 1 Psychopathy within the Triarchic model (Patrick et al., 2009).

According to the Low Arousal Theory (Raine, 2018), such individuals experience profound cortical under-arousal and emotional flatness (Detachment) without concomitant anxiety (low Negative Affect). Consequently, their self-reported intrapsychic triggers do not represent typical psychological pain (e.g., depression), but rather an internal void. They utilize the high-stakes variable reinforcement of gambling and opioid use as a means to achieve neurological stimulation.

In context of the present study, this is explained by the fact that 54% of gamblers cited Intrapsychic triggers compared to only 34% of non-gamblers. The personality data provides the *why* behind the trigger data. This transdiagnostic primacy of disinhibition and

psychopathic traits in severe SUD strongly aligns with the concept of a general psychopathology '*p* factor' where externalizing behaviors share a common neuro-behavioral root (Caspi et al., 2014).

Clinical Implications

The findings have direct implications for treatment planning in Northeast Indian rehabilitation settings:

1. **Personality screening at intake:** PID-5-BF administration can identify high-Disinhibition patients who require intensive impulse-control interventions (e.g., dialectical behavior therapy skills training).
2. **Family-based interventions should be stratified:** For low-Disinhibition patients, family therapy addressing systemic dysfunction may be beneficial. For high-Disinhibition patients, family psychoeducation should focus on reducing enabling behaviors and managing high-risk environments.
3. **Relapse prevention for the psychopathy-spectrum cluster:** Patients with the gambling/intrapsychic profile (high Detachment/Antagonism, low Negative Affect) require stimulation-focused interventions—structured activity scheduling, contingency management with immediate rewards—rather than insight-oriented or emotion-focused therapies that assume distress motivation.

Limitations and Future Directions

This study is limited by its cross-sectional design and reliance on self-reported retrospective data (e.g., age of onset), which may be subject to recall bias. The sample size (N=62) from three facilities in Jorhat, while sufficient for robust regression and interaction analyses, limits broad generalization across all demographics of Northeast India.

Interviews were conducted during residential treatment; therefore, regular use accounts reflect pre-treatment patterns rather than in-treatment substance use. Substance-use indices were based on self-report and may be affected by recall and social desirability biases, particularly in treatment settings, and were not corroborated with objective toxicology.

The cough syrup item (e.g., Phensedyl) did not specify the active ingredient; it may have captured both codeine-containing and non-opioid formulations. However, the potential exposure misclassification is mitigated in the present study with only one participant responding with a yes to phensedyl use.

Future longitudinal research should track personality-matched treatment outcomes to verify if interventions targeting specific PID-5 domains reduce readmission rates more effectively than standard psychosocial counseling. Additionally, neuroimaging studies examining cortical arousal patterns in the gambling/intrapsychic subgroup could provide biological validation of the psychopathy-spectrum hypothesis.

CONCLUSION

This study provides a vital neuro-behavioral update to the epidemiological literature on Substance Use Disorders in North East India. By demonstrating that Disinhibition and Antagonism govern the addiction trajectory, and that familial risk factors only catalyze addiction in the presence of these pathological traits, the findings pivot the clinical focus from environmental blame to endogenous vulnerability.

Furthermore, mapping comorbid gambling onto a psychopathy-spectrum profile clarifies the nature of intrapsychic triggers as mechanisms of under-stimulation rather than distress. Ultimately, addressing the SUD crisis in Northeast India requires moving beyond generic socio-ecological rehabilitation toward more nuanced approaches, one that is driven by personality-focussed clinical interventions that acknowledge the primacy of neuro-behavioral architecture in determining treatment course and outcome.

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Conflict of Interest

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