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Original Research Article

COMPARATIVE ANALYSIS OF EMOTION REGULATION IN PATIENTS WITH ALCOHOL AND CANNABIS DEPENDENCE SYNDROME

Soram Nganbaren[1], Manish Borasi[2], Chirag Patel[3], Pranshi Agrawal[1]

[1]PG Resident, Department of Psychiatry, Chirayu Medical College, Bhopal, Madhya Pradesh, India
[2]Professor and HOD, Department of Psychiatry, Chirayu Medical College, Bhopal, Madhya Pradesh, India
[3]Assistant Professor, Department of Psychiatry, Chirayu Medical College, Bhopal, Madhya Pradesh, India

ABSTRACT

Background: This study aimed to conduct a comprehensive comparative analysis of emotion regulation capacities in patients diagnosed with alcohol dependence syndrome and cannabis dependence syndrome. The primary objectives were to: (1) assess and compare the difficulties in emotion regulation between the two groups using standardized psychometric instruments, (2) identify group-specific deficits that could inform targeted therapeutic interventions for each population. **Materials and Methods:** A cross-sectional comparative study was conducted at a tertiary care de-addiction center involving 120 participants (60 with alcohol dependence syndrome and 60 with cannabis dependence syndrome) aged 18-55 years. Sociodemographic and clinical data including age, duration of substance use, quantity consumed, and previous treatment attempts were systematically recorded. **Result:** Both groups demonstrated significantly elevated emotion dysregulation compared to normative populations, with mean total DERS scores of 108.34±18.67 in the alcohol dependence group and 102.45±17.23 in the cannabis dependence group. The alcohol dependence group exhibited significantly higher scores on the Impulse Control subscale (19.87±4.23 vs. 17.12±3.89, p<0.01) and Limited Access to Strategies subscale (23.45±5.12 vs. 20.78±4.67, p<0.01). Cannabis-dependent individuals showed greater difficulties in Emotional Awareness (20.34±4.56 vs. 17.89±3.98, p<0.01) and Lack of Emotional Clarity (15.67±3.45 vs. 13.23±3.12, p<0.01). **Conclusion:** Both groups show substantial overall emotion regulation impairment, supporting emotion dysregulation as a transdiagnostic risk factor in substance use disorders. Clinical implications suggest the necessity for tailored interventions: behavioral activation and impulse control training for alcohol dependence, and mindfulness-based approaches emphasizing emotional awareness for cannabis dependence. Future longitudinal research examining whether these deficits precede or result from chronic substance use will be crucial for developing preventive strategies and optimizing treatment protocols for substance-dependent populations.

INTRODUCTION

Substance use disorders represent a major global public health challenge, affecting millions of individuals worldwide and imposing substantial burdens on healthcare systems, families, and communities. Among the various substances of abuse, alcohol and cannabis remain the most widely consumed psychoactive substances globally, with distinct patterns of use, neurobiological mechanisms, and associated health consequences.[1]

Neurobiological research has revealed that chronic substance use produces significant alterations in the neural circuitry underlying emotion processing and regulation. The prefrontal cortex, particularly the ventromedial and dorsolateral regions responsible for executive control and emotional modulation, shows functional and structural changes in individuals with substance use disorders. The amygdala, central to emotional reactivity and threat detection, demonstrates heightened responsivity to negative emotional stimuli in substance-dependent populations. Additionally, the extended amygdala network, including the bed nucleus of the stria terminalis and central nucleus of the amygdala, becomes upregulated during the withdrawal and

negative affect stage, contributing to the anti-reward system that drives continued use.

Clinical implications of emotion dysregulation in substance use disorders are substantial. Traditional addiction treatment approaches focusing primarily on abstinence, without addressing underlying emotion regulation deficits, may be insufficient for achieving lasting recovery. Increasingly, evidence-based interventions incorporate explicit emotion regulation training components. Mindfulness-based relapse prevention (MBRP) combines traditional relapse prevention strategies with mindfulness meditation practices designed to enhance emotional awareness, acceptance, and non-reactive responding to emotional experiences. Dialectical Behavior Therapy (DBT) skills training, originally developed for borderline personality disorder, has been adapted for substance use disorders and explicitly teaches emotion regulation skills including emotional awareness, distress tolerance, and adaptive regulation strategies.

The current study addresses a significant gap in the literature by conducting a systematic comparative analysis of emotion regulation profiles in alcohol-dependent versus cannabis-dependent individuals. While both groups are expected to demonstrate emotion dysregulation relative to healthy populations, we hypothesize substance-specific patterns reflecting the distinct neurobiological and phenomenological effects of these substances. Specifically, we predict that alcohol-dependent individuals will demonstrate greater impairment in impulse control and behavioral regulation domains, reflecting alcohol's disinhibiting effects. Cannabis-dependent individuals are expected to show greater difficulties in emotional awareness and clarity, consistent with cannabis's dissociative and attention-modulating properties.

This research also contributes to the broader theoretical understanding of addiction heterogeneity. Rather than treating "addiction" as a unitary construct, recognizing substance-specific profiles of psychological and neurobiological dysfunction allows for more nuanced conceptual models and personalized treatment approaches. As precision medicine approaches gain prominence in addiction treatment, identifying specific vulnerabilities and deficits associated with substances will become increasingly important for matching individuals to optimally effective interventions.

MATERIALS AND METHODS

Study Design and Setting: This study employed a cross-sectional comparative design conducted at a tertiary care de-addiction and psychiatric center in northern India between January 2024 and September 2024. The center provides specialized inpatient and outpatient services for substance use disorders and maintains comprehensive medical, psychiatric, and psychosocial assessment protocols.

Participants: The study recruited 120 male participants, comprising two groups: 60 individuals diagnosed with alcohol dependence syndrome and 60 individuals diagnosed with cannabis dependence syndrome.

Inclusion Criteria

Participants were included if they: (1) were male individuals aged 18-55 years, (2) met ICD-10 diagnostic criteria for Dependence (3) had minimum three months of continuous substance use meeting dependence criteria, (4) were currently abstinent for at least 72 hours but not more than 14 days (to allow for acute withdrawal resolution while minimizing the confounding effects of protracted abstinence), (5) demonstrated adequate cognitive functioning to complete self-report questionnaires (Mini-Mental State Examination score ≥24), (6) provided written informed consent to participate, and (7) had completed at least eight years of formal education ensuring literacy adequate for questionnaire completion.

Exclusion Criteria

Participants were excluded if they: (1) met criteria for dependence on any substance other than the primary substance of interest (allowing occasional use of tobacco/nicotine), (2) had current or lifetime diagnosis of any psychotic disorder including schizophrenia or bipolar disorder, (3) had active major depressive disorder or anxiety disorder of moderate to severe intensity that would significantly confound emotion regulation assessment.

Assessment Instruments

Sociodemographic and Clinical Datasheet A structured proforma was developed to systematically collect sociodemographic information including age, education, occupation, marital status, family type, and socioeconomic status. Clinical variables recorded included age of initiation of substance use, duration of regular use, current pattern of use (quantity and frequency), number of previous treatment attempts, duration of current abstinence, and precipitating factors for current treatment-seeking.

Difficulties in Emotion Regulation Scale (DERS): The DERS is a comprehensive 36-item self-report measure assessing six dimensions of emotion dysregulation .The DERS demonstrates excellent psychometric properties with high internal consistency (Cronbach's α = 0.93) and good test-retest reliability.

Emotion Regulation Questionnaire (ERQ): The ERQ is a 10-item self-report measure assessing two emotion regulation strategies. The ERQ demonstrates good reliability and validity across diverse populations and cultural contexts.

Severity of Dependence Scale (SDS):
The SDS is a brief 5-item scale measuring the degree of dependence on a substance. The SDS demonstrates good concurrent validity with other measures of substance dependence and is sensitive to treatment-related changes.

Procedure Potential participants were identified through clinical screening at the de-addiction center. Individuals meeting initial eligibility criteria were approached by the research team and provided detailed information about the study objectives, procedures, potential risks and benefits, and their rights as research participants. Written informed consent was obtained from all participants prior to any study procedures.

Following enrollment, participants underwent a comprehensive psychiatric evaluation by a qualified psychiatrist using ICD-10 diagnostic criteria to confirm the diagnosis of alcohol or cannabis dependence syndrome and rule out exclusion criteria. The Mini-Mental State Examination was administered to screen for cognitive impairment. Participants then completed the sociodemographic and clinical datasheet through a structured interview conducted by trained research assistants.

The psychological assessment battery comprising the DERS, ERQ, and SDS was administered to participants in a quiet, private setting. Research assistants provided standardized instructions and remained available to clarify questions while being careful not to influence responses. Assessments were completed individually and typically required 30-45 minutes. Participants were assured of confidentiality and informed that their responses would not affect their clinical care.

RESULTS

Table 1: sociodemographic and clinical characteristics

Variable	Alcohol Group (n=60) Mean ± SD	Cannabis Group (n=60) Mean ± SD	t-value	p-value
Age (years)	36.45 ± 8.23	28.67 ± 6.89	5.63	<0.001
Education (years)	11.23 ± 3.45	12.67 ± 2.98	-2.46	0.015
Age of initiation (years)	19.87 ± 4.12	17.23 ± 3.56	3.78	<0.001
Duration of use (years)	14.56 ± 6.78	10.34 ± 5.23	3.89	<0.001
Previous treatments (n)	2.34 ± 1.87	1.45 ± 1.23	3.12	0.002
Days abstinent	6.78 ± 2.45	7.23 ± 2.67	-0.98	0.329
SDS Total Score	11.23 ± 2.45	9.67 ± 2.78	3.28	0.001

Table 2: comparison of ders subscale and total scores

DERS Subscale	Alcohol Mean ± SD	Cannabis Mean ± SD	t-value	p-value	Cohen's d
Non-acceptance	14.78 ± 3.67	14.23 ± 3.45	0.87	0.386	0.15
Goals	18.34 ± 4.12	17.89 ± 3.98	0.63	0.531	0.11
Impulse Control	19.87 ± 4.23	17.12 ± 3.89	3.79	<0.001	0.67
Awareness	17.89 ± 3.98	20.34 ± 4.56	-3.22	0.002	-0.57
Strategies	23.45 ± 5.12	20.78 ± 4.67	3.05	0.003	0.54
Clarity	13.23 ± 3.12	15.67 ± 3.45	-4.11	<0.001	-0.73
DERS Total	108.34 ± 18.67	102.45 ± 17.23	1.84	0.068	0.33

Table 3: comparison of emotion regulation strategies (ERQ)

ERQ Subscale	Alcohol Group Mean ± SD	Cannabis Group Mean ± SD	t-value	p-value
Cognitive Reappraisal	22.34 ± 5.67	24.78 ± 6.12	-2.33	0.021
Expressive Suppression	19.87 ± 4.45	18.23 ± 4.78	1.98	0.050

Table 4: correlation between emotion regulation and dependence severity

Correlation	Alcohol Group R-value	p-value	Cannabis Group R-value	p-value
DERS Total vs SDS	0.68	<0.001	0.62	<0.001
Impulse vs SDS	0.72	<0.001	0.58	<0.001
Strategies vs SDS	0.65	<0.001	0.54	<0.001
Awareness vs SDS	0.42	0.001	0.61	<0.001
Clarity vs SDS	0.38	0.003	0.59	<0.001
Duration of use vs DERS	0.56	<0.001	0.48	<0.001

Sociodemographic and Clinical Characteristics: The alcohol dependence group had a significantly higher mean age (36.45±8.23 years) compared to the cannabis dependence group. The cannabis group demonstrated slightly higher educational attainment.

Difficulties in Emotion Regulation Scale (DERS): Both groups demonstrated substantially elevated emotion dysregulation compared to published normative data for healthy populations. The total DERS score showed a trend toward higher dysregulation in the alcohol group (108.34±18.67 vs. 102.45±17.23), though this difference did not reach statistical significance, t(118)=1.84, p=0.068, Cohen's d=0.33.No significant differences emerged between groups on Non-acceptance of Emotional Responses (14.78±3.67 vs. 14.23±3.45), t(118)=0.87, p=0.386, or Difficulties Engaging in Goal-Directed Behavior (18.34±4.12 vs. 17.89±3.98), t(118)=0.63, p=0.531, suggesting that both groups experience comparable difficulties in these regulatory domains.

Emotion Regulation Questionnaire (ERQ):
Analysis of emotion regulation strategies revealed that the cannabis group reported significantly greater use of Cognitive Reappraisal (24.78±6.12 vs. 22.34±5.67), t (118) =-2.33, p=0.021, suggesting somewhat greater capacity or tendency to reframe emotional situations. The alcohol group showed marginally higher Expressive Suppression (19.87±4.45 vs. 18.23±4.78), t (118) =1.98, p=0.050, though both groups demonstrated elevated suppression relative to normative populations.

Statistical Analysis: Data were entered into SPSS version 26.0 for statistical analysis. Descriptive statistics including means, standard deviations, frequencies, and percentages were calculated for all variables. Normal distribution of continuous variables was assessed using the Shapiro-Wilk test and visual inspection of histograms and Q-Q plots. Strong positive correlations emerged between total DERS scores and severity of dependence (SDS scores) in both the alcohol group (r=0.68, p<0.001) and cannabis group (r=0.62, p<0.001), indicating that greater emotion dysregulation is associated with more severe dependence regardless of substance type.

Multiple comparison corrections were not applied to the DERS subscale analyses as these represented a priori planned comparisons based on theoretical predictions rather than exploratory analyses. However, readers should interpret findings with appropriate caution given the number of statistical tests conducted.

DISCUSSION

This comparative study provides empirical evidence for distinct patterns of emotion dysregulation across alcohol and cannabis dependence syndromes, contributing important insights to our understanding of substance-specific psychological vulnerabilities and informing the development of targeted therapeutic interventions.

The finding that both groups demonstrated substantially elevated emotion dysregulation relative to normative populations (total DERS scores approximately 30-35 points higher than healthy controls) provides strong support for emotion dysregulation as a transdiagnostic feature of substance use disorders.[1] This is consistent with meta-analytic evidence documenting large effect sizes (Hedges' g=1.05) when comparing individuals with substance use disorders to controls on measures of emotion regulation.[2] The elevated dysregulation observed across both substances underscores the fundamental role of impaired emotional processing in the maintenance of addictive behaviors, regardless of the specific pharmacological agent involved.

However, the more nuanced finding of this study lies in the substance-specific patterns of emotion regulation deficits. The alcohol dependence group demonstrated significantly greater difficulties with

impulse control when experiencing negative emotions (Cohen's d=0.67) and limited access to adaptive emotion regulation strategies (Cohen's d=0.54). These findings align with the well-established disinhibiting neurobiological effects of chronic alcohol use on prefrontal cortical systems responsible for executive control and behavioral regulation.[3] Alcohol's primary action on GABAergic and glutamatergic neurotransmission produces acute disinhibition during intoxication, and chronic use leads to persistent impairments in impulse control that extend into periods of abstinence.[4]

The pronounced impulse control deficits in alcohol-dependent individuals may reflect both pre-existing vulnerabilities that increase risk for alcohol use and consequences of chronic alcohol neurotoxicity. Neuroimaging studies have documented structural and functional alterations in the prefrontal cortex, anterior cingulate cortex, and orbitofrontal regions in alcohol-dependent individuals—areas critical for impulse control and emotion regulation.[5] These neurobiological changes may create a particularly vicious cycle: impaired impulse control increases vulnerability to emotional reactivity and impulsive substance use, while continued alcohol use further degrades the neural systems responsible for self-regulation.

The finding that alcohol-dependent individuals report limited access to adaptive emotion regulation strategies suggests fundamental deficits in the regulatory "toolkit" available for managing distressing emotions. This may reflect both a lack of knowledge about effective strategies and an inability to successfully implement strategies even when known. Chronic reliance on alcohol for emotion regulation may prevent the development and practice of adaptive coping skills, leaving individuals ill-equipped to manage negative emotions without substance use.[6] This has direct clinical implications: alcohol-dependent individuals may require explicit, structured teaching of concrete emotion regulation skills, potentially through modalities such as Dialectical Behavior Therapy or Cognitive Behavioral Therapy that emphasize skills acquisition and practice.

In contrast, the cannabis dependence group exhibited significantly greater difficulties with emotional awareness (Cohen's d=-0.57) and emotional clarity (Cohen's d=-0.73). These individuals demonstrated more pronounced deficits in attending to and acknowledging their emotions (awareness) and in clearly identifying and understanding what emotions they were experiencing (clarity). These findings are consistent with emerging research on the dissociative and attention-modulating properties of cannabinoids.[7] Cannabis use, particularly chronic use of high-potency products, can produce a blunting or numbing of emotional experience during acute intoxication. Over time, regular use may interfere with the normal development of emotional awareness

and the ability to differentiate between subtle emotional states.[8]

The endocannabinoid system plays a crucial role in emotional processing, memory consolidation, and extinction learning. Chronic exogenous cannabinoid exposure through cannabis use produces downregulation of CB1 receptors and alterations in endogenous endocannabinoid signaling that may impair normal emotional processing.[9] Neuroimaging research has shown that cannabis use is associated with reduced engagement of prefrontal regions during emotional processing tasks and decreased attentional monitoring of negative emotional content.[10] These neurobiological alterations may manifest phenomenologically as the observed deficits in emotional awareness and clarity. The clinical implications of these awareness and clarity deficits in cannabis-dependent individuals suggest that treatment approaches emphasizing mindfulness-based interventions may be particularly beneficial. Mindfulness practices explicitly cultivate present-moment awareness of internal experiences, including emotions, sensations, and thoughts, without judgment or reactivity.[11] By systematically training attention toward internal emotional states, mindfulness-based interventions may help cannabis-dependent individuals develop the foundational capacities for emotional awareness and clarity that have been compromised by chronic use. Mindfulness-Based Relapse Prevention (MBRP) has demonstrated efficacy in reducing substance use outcomes and may be particularly well-suited for cannabis-dependent populations given their specific regulatory deficits.[12]

Interestingly, both groups demonstrated comparable elevations in non-acceptance of emotional responses and difficulties engaging in goal-directed behavior when distressed. This suggests that certain aspects of emotion dysregulation may be more transdiagnostic across substance types, reflecting common underlying vulnerabilities or consequences of addiction processes. Non-acceptance—having negative secondary emotional reactions to one's negative emotions (e.g., feeling anxious about feeling anxious)—has been identified as a particularly maladaptive pattern that amplifies emotional distress and drives avoidant coping strategies including substance use.[13] Addressing non-acceptance through acceptance-based interventions such as Acceptance and Commitment Therapy may benefit both alcohol and cannabis-dependent populations.

The correlation analyses provide important insights into the relationships between emotion dysregulation severity and dependence severity. The strong positive correlations (r=0.62-0.68) between total DERS scores and SDS scores in both groups indicate that more severe emotion regulation impairments are associated with more severe dependence, regardless of substance type. This supports theoretical models positioning emotion dysregulation as a central maintaining factor in addiction.[14] Individuals with greater regulatory deficits may rely more heavily on

substances for emotional management, driving escalation of use and development of physiological and psychological dependence.

The differential correlation patterns are particularly informative. In the alcohol group, impulse control difficulties showed the strongest relationship with dependence severity (r=0.72), suggesting that impulsive reactivity to negative emotions may be the most critical regulatory deficit driving problematic alcohol use. In contrast, in the cannabis group, emotional awareness (r=0.61) and clarity (r=0.59) showed the strongest relationships with dependence severity. These differential patterns provide empirical support for substance-specific mechanisms linking emotion dysregulation to dependence and suggest that interventions targeting these specific deficits may yield the greatest therapeutic benefit for each population.

The ERQ findings revealed that while both groups rely heavily on expressive suppression—a maladaptive emotion regulation strategy involving inhibition of emotional expression—the cannabis group reported somewhat greater use of cognitive reappraisal, an adaptive strategy involving reinterpreting emotional situations. This seemingly paradoxical finding may reflect several factors. Cannabis users may intellectually engage in reappraisal attempts, but the underlying awareness and clarity deficits may limit the effectiveness of these efforts. Alternatively, this may reflect differences in the phenomenology of cannabis versus alcohol intoxication, with cannabis potentially facilitating certain types of cognitive reframing while impairing emotional awareness. Further research using experience sampling methods could clarify the real-world effectiveness of different regulation strategies in these populations.

The finding that duration of substance use correlated significantly with emotion dysregulation severity in both groups (alcohol: r=0.56; cannabis: r=0.48) raises important questions about directionality and causation. While the cross-sectional design precludes causal inferences, several interpretations are plausible. Longer substance use exposure may produce cumulative neurotoxic effects that progressively degrade emotion regulation capacities. Alternatively, individuals with pre-existing emotion regulation deficits may be more likely to initiate early use and maintain chronic use, resulting in longer duration. Most likely, bidirectional and dynamic processes operate: pre-existing vulnerabilities increase risk for substance use initiation and escalation, while chronic use further compromises regulatory capacities, creating a downward spiral of worsening dysregulation and increasing dependence.[15]

Several study limitations warrant consideration. The cross-sectional design limits causal inference regarding whether emotion regulation deficits precede substance use or result from chronic use. Longitudinal research following individuals from pre-initiation through development of dependence

and into recovery would clarify temporal relationships and identify potential vulnerability markers. The restriction to male participants limits generalizability, as gender differences in emotion regulation and substance use patterns are well-documented.[16] The reliance on self-report measures introduces potential biases including social desirability and limited insight, though the DERS and ERQ have demonstrated good validity. Future research incorporating behavioral tasks assessing emotion regulation capacities and neuroimaging measures of emotional processing would complement self-report findings.

The study's focus on individuals seeking treatment may introduce selection bias, as treatment-seeking populations may differ from non-treatment-seeking substance users in motivation, severity, and comorbidity. The requirement for recent but not acute abstinence was designed to allow resolution of acute withdrawal while minimizing protracted abstinence effects, but the specific timing of assessment relative to last use could influence emotion regulation assessment. The exclusion of individuals with comorbid psychiatric disorders, while methodologically appropriate for isolating substance-specific effects, limits generalizability as comorbidity is the norm rather than exception in clinical populations.[17-20]

Despite these limitations, this study makes important contributions. The direct comparison of alcohol and cannabis dependence groups using comprehensive emotion regulation assessment reveals substance-specific patterns with clear clinical implications. The finding of differential regulatory deficits suggests that optimal treatment approaches should be tailored to the specific emotional processing impairments associated with each substance. For alcohol dependence, interventions emphasizing impulse control training, behavioral activation, and explicit teaching of adaptive regulation strategies may be most beneficial. For cannabis dependence, mindfulness-based approaches emphasizing cultivation of emotional awareness and clarity may be particularly indicated.

Future research directions include longitudinal studies examining trajectories of emotion dysregulation from pre-substance use through active use and into sustained recovery. Such research could identify whether specific regulatory deficits predict substance use initiation, escalation to dependence, and relapse following treatment. Examining whether successful development of emotion regulation skills predicts better treatment outcomes and sustained abstinence would provide crucial evidence for the clinical utility of regulation-focused interventions. Comparative studies including additional substances such as opioids, stimulants, and sedatives would clarify whether distinct regulatory profiles characterize different substance classes.

Research examining potential moderators and mediators of the relationship between emotion dysregulation and substance dependence would refine theoretical models. Variables such as childhood trauma exposure, attachment patterns, genetic vulnerabilities, and environmental stressors may influence both the development of emotion regulation capacities and vulnerability to substance use. Understanding these complex pathways would inform prevention efforts targeting at-risk populations before substance use initiation.

From a treatment development perspective, dismantling studies examining which specific components of multicomponent emotion regulation interventions are most effective for different substances would optimize therapeutic efficiency. Personalized medicine approaches matching individuals to specific interventions based on their regulatory deficit profiles represent an important frontier. Neuroimaging research examining whether successful emotion regulation training produces changes in neural activation patterns during emotional processing tasks would elucidate mechanisms of therapeutic change.

CONCLUSION

In conclusion, emotion dysregulation represents a critical therapeutic target in substance dependence treatment, with substance-specific patterns suggesting the need for tailored intervention strategies. By systematically assessing emotion regulation capacities and implementing targeted interventions addressing identified deficits, clinicians can enhance treatment effectiveness and support individuals in developing adaptive emotional processing skills that reduce reliance on substances for emotion management and promote sustained recovery.

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