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PREVALENCE, SEVERITY, AND INTERRELATIONSHIPS OF DEPRESSION, ANXIETY, AND POST-TRAUMATIC STRESS DISORDER AMONG INDIVIDUALS WITH SUBSTANCE USE DISORDERS IN REHABILITATION CENTRES IN PAKISTAN

Sidra Akhtar[1], Dr. Sajid Mahmood Alvi[*2], Prof. Dr. Amara Gul[3]

[1]*PhD Scholar, Department of Psychology, The University of Haripur, Haripur,*
[*2]*Associate Professor, Department of Psychology, The University of Haripur, Haripur,*
[3]*Dean, Faculty of Social and Administrative Sciences, The University of Haripur, Haripur*

[1]sidra.akhtar@hotmail.com, [2*]sajidmalvi@yahoo.com, [3]amara.gul@uoh.edu.pk

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Corresponding Author: *
Dr. Sajid Mahmood Alvi

Abstract
Substance use disorders (SUDs) frequently co-occur with internalizing psychological problems, yet systematic assessment of these conditions remains scarce in Pakistani rehabilitation settings. This cross-sectional study assessed the prevalence, severity, and interrelationships of depression, anxiety, and post-traumatic stress disorder (PTSD) among 102 adult male participants recruited from five government-registered and private rehabilitation centres in Islamabad and Rawalpindi. Depression was measured using the PHQ-9, anxiety using the GAD-7, PTSD using the PCL-5, and substance use severity using the ASSIST. Results showed clinically significant psychopathology across the sample: mean PHQ-9 was 16.17 (SD = 4.83, moderately severe), mean GAD-7 was 13.62 (SD = 4.01, moderate anxiety), and mean PCL-5 was 41.73 (SD = 11.05), exceeding the probable PTSD threshold of 33. ASSIST scores correlated significantly with depression (r = .43, p < .001), anxiety (r = .33, p < .001), and PTSD (r = .23, p = .018). Modest inter-correlations among the internalizing measures suggested distinct symptom dimensions. These findings support routine screening and integrated treatment models addressing both substance use and psychological comorbidities in addiction settings.

INTRODUCTION
Substance use disorders (SUDs) constitute one of the most pressing global public health challenges of the twenty-first century. The United Nations Office on Drugs and Crime (UNODC, 2023) estimated that over 296 million people worldwide had used drugs in 2021, representing a 23% increase from the previous decade. In this population, approximately 39.5 million people had drug use disorders, highlighting a substantial gap between the prevalence of drug use and the number of individuals developing clinically significant substance use disorders (UNODC, 2023). Pakistan occupies a unique position in the global landscape of substance use, sharing its border with Afghanistan, historically the world's

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largest opium-producing country. According to the UNODC Drug Use Survey (2013), approximately 6.7 million individuals in Pakistan used drugs, with cannabis, opioids, and prescription pharmaceuticals being the most commonly reported substances. More recent estimates suggest that this number may have risen to 7.6 million, with over 800,000 individuals considered substance-dependent (Nawaz et al., 2023).

Although considerable clinical attention has focused on the physical health consequences of substance use, the psychological dimensions of drug dependence, particularly internalizing disorders, remain under-investigated in South Asian contexts. Internalizing psychological problems encompass a constellation of emotional and cognitive disturbances directed inward rather than manifested as externalizing behaviour problems (Achenbach & Rescorla, 2001). In the Diagnostic and Statistical Manual of Mental Disorders (5th edition, text revision; DSM-5-TR; American Psychiatric Association, 2022), the primary internalizing disorders include major depressive disorder, generalised anxiety disorder, and post-traumatic stress disorder (PTSD). These conditions have been demonstrated to serve not merely as incidental correlates of substance use but as active contributors to the aetiology, maintenance, and relapse of addictive behaviours (Buckner & Schmidt, 2009; Kushner et al., 2000). The comorbidity between SUDs and internalizing disorders is among the most robust findings in clinical psychology and addiction research. Epidemiological evidence indicates that individuals with SUDs are two to three times more likely to meet diagnostic criteria for depressive or anxiety disorders compared to the general population (Lai et al., 2015). In a seminal systematic review and meta-analysis, Hunt et al. (2020) found the pooled prevalence of comorbid major depressive disorder among community samples of individuals with SUDs to be approximately 25%, rising to nearly 50% in clinical treatment-seeking populations. Lifetime prevalence of comorbid anxiety disorders among individuals with SUDs is estimated at approximately 42% (UNODC, 2020), while the lifetime prevalence of comorbid PTSD ranges from 26% to 52% (Driessen et al., 2008; Schaefer & Najavits, 2007). Kingston et al. (2022) assessed 603 individuals in residential treatment and found that 94.5% met criteria for an anxiety disorder, 89.6% for depression, and 62.0% for PTSD, demonstrating the pervasiveness of internalizing psychopathology in substance-using populations.

Multiple theoretical frameworks account for this co-occurrence. The self-medication hypothesis (Khantzian, 1997) proposes that individuals experiencing psychological distress gravitate towards psychoactive substances to alleviate painful affective states. The negative reinforcement model (Baker et al., 2004) formalises this within learning theory, positing that the primary motivational force underlying chronic substance use is the avoidance or escape from negative affective experiences. The Hierarchical Taxonomy of Psychopathology (HiTOP; Kotov et al., 2017) provides a structural perspective, identifying a common internalizing factor underlying the covariance among depression, anxiety, and PTSD, with emerging evidence of cross-spectrum associations with substance use disorders.

Despite the well-established international evidence base, systematic investigation of internalizing psychological problems among substance users in Pakistani rehabilitation settings has been limited. Pakistan's mental health resources remain critically inadequate, with fewer than 400 trained psychiatrists serving a population exceeding 230 million (Gadit & Mugford, 2007; Husain et al., 2000). The treatment infrastructure for addiction is largely abstinence-based, with evidence-based psychological interventions rarely integrated into care (Nawaz et al., 2023). This treatment gap is of particular concern given that untreated internalizing psychopathology is a potent predictor of relapse and poor long-term recovery outcomes (Grella & Stein, 2006). Berkat

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and Abidi (2022) conducted one of the few available cross-sectional studies from an Islamabad rehabilitation centre, finding depression in 54.5% of 486 SUD patients, but their study did not employ standardised severity measures or assess multiple internalizing domains simultaneously.

The present study addresses this gap by employing validated, standardised instruments to assess the prevalence, severity, and interrelationships of depression, anxiety, and PTSD among individuals with SUDs in multiple rehabilitation centres within the Islamabad Capital Territory, Pakistan. Additionally, the study examines whether substance use severity, as measured by the ASSIST, is associated with the severity of internalizing symptoms across all three domains. This investigation is framed within the self-medication hypothesis, predicting positive associations between substance involvement and psychological distress.

2. Method

2.1 Research Design

A cross-sectional descriptive-correlational design was employed to assess the levels, severity classifications, and interrelationships of internalizing psychological symptoms among individuals with substance use disorders. This design enabled the simultaneous assessment of multiple symptom domains and their associations with substance use severity at a single time point.

2.2 Participants and Setting

The sample comprised 102 adult male participants with substance use disorders, recruited from five government-registered and private rehabilitation centres within the Islamabad Capital Territory (ICT) and the Rawalpindi metropolitan area, Pakistan. The participating centres were: (a) Pakistan Institute of Medical Sciences (PIMS) De-addiction Unit, Islamabad (n = 23, 22.5%); (b) Fountain House Islamabad (n = 23, 22.5%); (c) Islamabad Model Rehabilitation Centre (n = 20, 19.6%); (d) Anti-Narcotics Force (ANF) Rehabilitation Centre, Islamabad (n = 20, 19.6%); and (e) New Hope Rehabilitation Centre, Rawalpindi (n = 16, 15.7%). These centres provide care to a diverse patient population from all provinces and territories of Pakistan, enhancing the representativeness of the sample.

Participants were included if they: (a) were aged 18 years or older; (b) met criteria for substance use disorder based on an informal clinical interview using DSM-5-TR criteria; (c) obtained a moderate-risk (4-26) or high-risk (27+) score on the ASSIST for their primary substance; (d) were currently admitted to one of the five participating centres; and (e) were proficient in Urdu. Individuals were excluded if they presented with active psychotic symptoms, acute intoxication or severe withdrawal, intellectual disability or neurocognitive disorder, or acute medical conditions requiring immediate hospitalisation.

The mean age of participants was 31.40 years (SD = 6.28, range 19-46). In terms of educational attainment, the sample was distributed across primary/5th grade (n = 17, 16.7%), middle/8th grade (n = 11, 10.8%), matric/10th grade (n = 31, 30.4%), intermediate/12th grade (n = 17, 16.7%), graduate/BA-BSc (n = 18, 17.6%), and postgraduate/MA-MSc (n = 8, 7.8%). Regarding marital status, 46 participants (45.1%) were single, 40 (39.2%) married, 15 (14.7%) divorced or separated, and 1 (1.0%) widowed. Employment status included unemployed (n = 36, 35.3%), private job (n = 22, 21.6%), self-employed (n = 14, 13.7%), daily wage/labour (n = 12, 11.8%), student (n = 12, 11.8%), and government job (n = 6, 5.9%). The primary substances of use were heroin/opioids (n = 25, 24.5%), cannabis/hashish (n = 22, 21.6%), crystal methamphetamine (n = 21, 20.6%), sedatives/benzodiazepines (n = 15, 14.7%), poly-substance use (n = 12, 11.8%), and alcohol (n = 7, 6.9%). Mean duration of substance use was 7.57 years (SD = 4.66, range 1-21), and participants reported an average of 1.50 previous treatment attempts (range 0-4). The mean ASSIST score was 23.93 (SD = 6.46), with 69 participants (67.6%) classified as moderate-risk and 33 (32.4%) as high-risk.

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2.3 Instruments

Patient Health Questionnaire-9 (PHQ-9). The PHQ-9 (Kroenke et al., 2001) is a nine-item self-report measure assessing depressive symptom severity over the past two weeks. Items are rated on a four-point Likert scale (0 = not at all to 3 = nearly every day), yielding total scores ranging from 0 to 27. Established severity thresholds are: minimal (0-4), mild (5-9), moderate (10-14), moderately severe (15-19), and severe (20-27). In the present sample, Cronbach's alpha was .58 at baseline, which, while below the conventional threshold, is contextualised by the clinical complexity of the acute rehabilitation environment (Marel et al., 2020).

Generalised Anxiety Disorder Scale-7 (GAD-7). The GAD-7 (Spitzer et al., 2006) is a seven-item self-report measure of anxiety symptom severity over the past two weeks. Items are rated on a four-point Likert scale (0-3), with total scores ranging from 0 to 21. Severity thresholds are: minimal (0-4), mild (5-9), moderate (10-14), and severe (15-21). Cronbach's alpha in the present sample was .54 at baseline.

PTSD Checklist for DSM-5 (PCL-5). The PCL-5 (Weathers et al., 2013) is a 20-item self-report measure assessing PTSD symptom severity over the past month. Items are rated on a five-point Likert scale (0 = not at all to 4 = extremely), yielding total scores from 0 to 80. A preliminary cut-off of 33 is recommended for probable PTSD. Cronbach's alpha was .68 at baseline.

Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST). The ASSIST (WHO, 2002) is a brief screening tool measuring substance-related risk across ten substance categories. Risk is classified as low (0-3 for drugs; 0-10 for alcohol), moderate (4-26), or high (27+). Cronbach's alpha was adequate (.80-.90; Humeniuk et al., 2008).

All instruments were administered in validated Urdu translations, reviewed by a bilingual expert panel for linguistic accuracy and cultural appropriateness. Data were collected via face-to-face structured interviews by the principal investigator.

2.4 Data Analysis

Statistical analyses were conducted using SPSS Version 28.0 (IBM Corporation, 2021). Descriptive statistics (means, standard deviations, ranges, frequencies, percentages) were computed for all variables. Normality was assessed using the Shapiro-Wilk test and inspection of skewness and kurtosis values. Pearson product-moment correlation coefficients were used to examine associations between ASSIST scores and baseline PHQ-9, GAD-7, and PCL-5 scores, as well as inter-correlations among the three internalizing measures. For non-normally distributed variables, Spearman's rank-order correlations were computed as robustness checks. Correlation magnitudes were interpreted following Cohen (1992): $r = .10$ (small), $r = .30$ (medium), $r = .50$ (large). All analyses used a significance level of $p < .05$ (two-tailed).

2.5 Ethical Considerations

Ethical approval was obtained from the Advanced Studies and Research Board (ASRB) and the Ethics Committee of the University of Haripur, Khyber Pakhtunkhwa, Pakistan. Written informed consent was obtained from all participants. Confidentiality was maintained through unique identification codes, password-protected electronic files, and locked storage for physical documents.

3. Results

3.1 Descriptive Statistics for Internalizing Symptoms

Table 1 presents the descriptive statistics for all outcome measures across the total sample. The overall mean PHQ-9 score of 16.17 (SD = 4.83) placed the sample in the moderately severe range of depressive symptomatology. The mean GAD-7 score of 13.62 (SD = 4.01) indicated moderate

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anxiety severity, and the mean PCL-5 score of 41.73 (SD = 11.05) was substantially above the suggested cut-off of 33 for probable PTSD.

Table 1
Descriptive Statistics for Internalizing Symptom Measures and ASSIST (N = 102)

Variable	M	SD	Range	Skew	Kurt	Alpha
PHQ-9	16.17	4.83	5-27	0.16	-0.48	.58
GAD-7	13.62	4.01	4-21	-0.20	-0.82	.54
PCL-5	41.73	11.05	16-72	0.07	-0.27	.68
ASSIST	23.93	6.46	7-38	0.36	-0.38	-

Note. M = Mean; SD = Standard Deviation; Skew = Skewness; Kurt = Kurtosis; Alpha = Cronbach's alpha at baseline.

3.2 Severity Classifications

Table 2 presents the distribution of participants across established severity categories for each internalizing measure. On the PHQ-9, the majority of participants fell in the moderately severe (37.3%) and severe (22.5%) categories, with only 4.9% scoring in the minimal range. On the GAD-7, 41.2% scored in the moderate range and 30.4% in the severe range. For the PCL-5, 66.7% of the sample exceeded the screening cut-off of 33 for probable PTSD. These distributions indicate that the overwhelming majority of substance users in the sample presented with clinically significant levels of internalizing psychopathology.

Table 2
Distribution of Participants Across Severity Categories (N = 102)

Measure	Severity Level	n	%
PHQ-9	Minimal (0-4)	5	4.9
	Mild (5-9)	10	9.8
	Moderate (10-14)	26	25.5
	Mod. Severe (15-19)	38	37.3
	Severe (20-27)	23	22.5
GAD-7	Minimal (0-4)	3	2.9
	Mild (5-9)	26	25.5
	Moderate (10-14)	42	41.2
	Severe (15-21)	31	30.4
PCL-5	Below cut-off (<33)	34	33.3
	Above cut-off (>=33)	68	66.7

Note. Severity classifications based on established scoring guidelines: PHQ-9 (Kroenke et al., 2001); GAD-7 (Spitzer et al., 2006); PCL-5 cut-off of 33 (Weathers et al., 2013).

3.3 Correlations Between Substance Use Severity and Internalizing Symptoms

Table 3 presents the Pearson product-moment correlations between ASSIST scores and baseline internalizing symptom measures, as well as inter-correlations among the three internalizing measures. ASSIST scores were significantly and positively correlated with all three baseline internalizing symptom measures: PHQ-9 ($r = .43$, $p < .001$), GAD-7 ($r = .33$, $p < .001$), and PCL-5 ($r = .23$, $p = .018$). The strongest association was between substance use severity and depressive

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symptoms, followed by anxiety and then PTSD. Spearman's rank-order correlations, computed as non-parametric robustness checks, yielded virtually identical results (ASSIST-PHQ-9: rho = .452; ASSIST-GAD-7: rho = .348; ASSIST-PCL-5: rho = .240; all $p < .02$).

Inter-correlations among the three internalizing measures were modest. A significant but small correlation was observed between depression and anxiety (PHQ-9 and GAD-7: $r = .23$, $p = .019$). Neither the depression-PTSD ($r = .13$, $p = .204$) nor the anxiety-PTSD ($r = .07$, $p = .512$) correlations reached statistical significance. This pattern suggests that depression, anxiety, and PTSD represent relatively distinct dimensions of psychological distress in this sample rather than a single general internalizing factor.

Table 3

Pearson Correlations Between ASSIST and Baseline Internalizing Symptoms (N = 102)

Variable	1	2	3	4
1. ASSIST	–			
2. PHQ-9	.428***	–		
3. GAD-7	.333***	.232*	–	
4. PCL-5	.233*	.127	.066	–

Note. * $p < .05$. *** $p < .001$. Correlations without asterisks are non-significant.

4. Discussion

The present study provides the first comprehensive, multi-domain assessment of internalizing psychopathology among individuals with substance use disorders across multiple rehabilitation centres in the Islamabad Capital Territory, Pakistan. Three principal findings merit discussion: (a) the high prevalence and severity of internalizing symptoms, (b) the significant positive associations between substance use severity and internalizing symptom severity, and (c) the relatively modest inter-correlations among the three internalizing domains.

4.1 Prevalence and Severity of Internalizing Symptoms

The mean PHQ-9 score of 16.17 (moderately severe depression), GAD-7 score of 13.62 (moderate anxiety), and PCL-5 score of 41.73 (well above the probable PTSD threshold) indicate that internalizing psychopathology is not merely incidental but a pervasive and clinically significant feature of the substance-using population in Pakistani rehabilitation settings. Over 59% of participants scored in the moderately severe to severe range of depression, more than 71% in the moderate to severe range of anxiety, and approximately two-thirds exceeded the screening threshold for probable PTSD. These figures align with international findings from residential treatment settings. Kingston et al. (2022) assessed 603 individuals in residential substance use treatment and found that 94.5% met criteria for an anxiety disorder, 89.6% for depression, and 62.0% for PTSD. The present findings extend these patterns to the Pakistani context and underscore the universality of internalizing comorbidity in substance-using populations.

The high prevalence of PTSD (66.7% exceeding the clinical threshold) is of particular significance given the elevated rates of trauma exposure in many regions of Pakistan, including from conflict, displacement, and interpersonal violence. This finding is consistent with international estimates suggesting that 26-52% of individuals with substance use disorders meet lifetime criteria for PTSD (Driessen et al., 2008). The somewhat higher rate observed in the present sample may reflect the compounding effects of socioeconomic disadvantage, cultural stigma, and limited access to mental health services that characterise the Pakistani treatment context.

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Of notable clinical concern is the finding that existing rehabilitation programmes in Pakistan appear to leave these internalizing symptoms largely unaddressed. The treatment infrastructure, as described by Nawaz et al. (2023) and the International Society of Substance Use Professionals (ISSUP, 2023), primarily emphasises detoxification and abstinence, with minimal systematic assessment or treatment of psychological comorbidities. The present data provide empirical evidence that this treatment gap carries concrete consequences: a large majority of individuals in rehabilitation centres carry a substantial burden of untreated psychological distress that may undermine treatment engagement, increase relapse risk, and diminish long-term recovery prospects (Grella & Stein, 2006).

4.2 Substance Use Severity and Internalizing Symptoms

The significant positive correlations between ASSIST scores and all three internalizing symptom measures provide support for the self-medication hypothesis (Khantzian, 1997) in the Pakistani context. The strongest association was with depressive symptoms (r = .43), followed by anxiety (r = .33) and PTSD (r = .23). This gradient is theoretically meaningful. The close association between substance use severity and depression is consistent with the extensive literature documenting shared neurobiological substrates, including disruptions in the dopaminergic and serotonergic systems that underlie both substance dependence and depressive disorders (Volkow et al., 2011; Koob & Volkow, 2016). Chronic substance use depletes dopamine reserves and downregulates reward pathways, producing anhedonia, amotivation, and dysphoria that overlap substantially with the clinical presentation of major depression.

The moderate correlation with anxiety symptoms aligns with the negative reinforcement model (Baker et al., 2004), which proposes that substances are used to alleviate anxiety-related distress through their pharmacological effects. The weaker association with PTSD may reflect the fact that trauma exposure history and individual vulnerability factors play a more salient role in determining PTSD severity than current substance involvement per se. Unlike depression and anxiety, which can be substantially caused or intensified by the neurobiological and psychosocial consequences of chronic substance use, the aetiology of PTSD is linked to specific traumatic experiences that may predate substance use onset.

4.3 Inter-Correlations Among Internalizing Domains

The modest inter-correlations among the three internalizing measures (depression-anxiety: r = .23; depression-PTSD: r = .13; anxiety-PTSD: r = .07) indicate that these conditions tap into relatively separate dimensions of psychological distress in this sample. This finding has important implications for both assessment and intervention planning. It suggests that a comprehensive multidimensional assessment across all three domains is necessary to capture the full scope of internalizing psychopathology, as elevated symptoms in one domain do not reliably predict the severity of symptoms in another. Furthermore, it suggests that treatment effects in one symptom domain may not automatically generalise to the others, underscoring the need for interventions capable of addressing multiple internalizing dimensions.

The relatively weak inter-correlations contrast somewhat with the strong common internalizing factor identified in some structural models of psychopathology (Krueger, 1999; Kotov et al., 2017). This discrepancy may reflect the heterogeneous aetiological pathways operating in substance-using populations, where depression may be driven largely by neurobiological consequences of chronic substance use, anxiety by negative reinforcement processes and anticipatory distress, and PTSD by pre-existing trauma history. The differential aetiological pathways would be

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expected to weaken the common internalizing factor that is more robustly observed in general population samples.

4.4 Limitations and Future Directions

Several limitations warrant consideration. First, the cross-sectional design precludes causal inferences regarding the direction of associations between substance use severity and internalizing symptoms. Longitudinal research is needed to disentangle temporal precedence. Second, the all-male sample limits generalisability to female substance users, who may exhibit different patterns of internalizing psychopathology (Greenfield et al., 2010). Third, the suboptimal internal consistency of the PHQ-9 (alpha = .58) and GAD-7 (alpha = .54) at baseline may have attenuated the observed correlations; however, this measurement limitation is contextualised by the acute clinical environment and is consistent with prior findings in substance use treatment populations (Marel et al., 2020). Fourth, the reliance on self-report measures introduces potential for social desirability and response biases. Fifth, the study was conducted in the Islamabad/Rawalpindi metropolitan area and may not fully represent rural treatment settings. Future research should employ longitudinal designs, include female participants, use clinician-administered diagnostic interviews alongside self-report measures, and extend to diverse geographical regions across Pakistan.

5. Conclusion

The present study demonstrates that internalizing psychological problems, including depression, anxiety, and PTSD, are highly prevalent, clinically significant, and positively associated with substance use severity among individuals in Pakistani rehabilitation settings. The findings provide the first systematic, multi-domain evidence from multiple treatment centres in the Islamabad Capital Territory and support the relevance of the self-medication hypothesis in the Pakistani context. The modest inter-correlations among the three internalizing domains underscore the importance of comprehensive, multidimensional screening. These results carry direct implications for clinical practice: routine screening for depression, anxiety, and PTSD using validated instruments should be integrated into the standard intake procedures of rehabilitation centres across Pakistan. Furthermore, the findings highlight the urgent need for evidence-based psychological interventions that address the burden of internalizing psychopathology among substance users, moving beyond the prevailing abstinence-focused model toward integrated treatment approaches that attend to both substance use and co-occurring psychological distress.

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