Correlating Substance Abuse Disorders and Mood Disorder: Clinical Implications of a Dimensional Approach

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ABSTRACT

Background: Substance use disorder (SUD) often co-occurs with mood disorders like anxiety and depression. This study investigates the relationship between SUD and mood disorders using a dimensional approach. **Methods**: A total of 290 participants, including 145 with SUD and 145 healthy controls, were assessed. The General Health Questionnaire (GHQ-12) evaluated mental health, followed by interviews using the Hamilton Anxiety Rating Scale (HAM-A) and Hamilton Depression Rating Scale (HAM-D). Demographic information, substance use behaviours, and mental health symptoms were collected and analysed. **Results:** Of the participants, 90% were men and 10% women; 68.2% were married. Most SUD patients were smokers (71.0%) and alcohol users (35.8%), with others using drugs or tobacco (33.7% and 19.3%). The majority (84.8%) used drugs for a high. HAM-D results showed moderate to severe depression in 7.5% of SUD patients and 5.5% of controls. HAM-A results indicated 80.6% of the SUD group had anxiety, compared to 88.9% of controls with no anxiety. **Conclusion:** SUD patients frequently experience concurrent anxiety and depression, highlighting the need for dual diagnosis and integrated treatment for SUD and mood disorders.

INTRODUCTION

Substance use disorders (SUDs) are a growing public health concern in Uttarakhand, with severe social, financial, and health consequences for individuals and communities (1). Evidence suggests that SUDs often co-occur with neurotic illnesses like anxiety and depression, but the nature of this relationship is complex and variable (2,3).

Exploring the link between SUDs and mood disorders is crucial for developing effective treatment and prevention strategies that address underlying causes and comorbidities (4). In Uttarakhand, where mental health issues are prevalent and access to specialist care is limited, understanding the etiology and co-morbidity of SUDs and mood disorders is particularly important (5,6).

This study aims to assess the relationship between SUDs and mood disorders in Uttarakhand's population using systematic and validated techniques. The General Health Questionnaire (GHQ-12) will screen for general mental health, while the Hamilton Anxiety Rating Scale (HAM-A) and Hamilton Depression Rating Scale (HAM-D) will interview individuals for anxiety and depression, respectively (7–9). These tools will facilitate data comparisons with existing research and ensure accurate and consistent data collection.

The results will provide insights into how SUDs and mood disorders interact in Uttarakhand, revealing potential risk factors and highlighting the need for coordinated, evidence-based treatment and prevention methods. The findings will inform policymakers, healthcare professionals, and those affected by SUDs and mood disorders, guiding interventions that target underlying causes and comorbidities.

MATERIAL & METHODS

Study Design: This study compares the prevalence of mood disorders in substance users with the general population using a case-control design. The study was conducted in Kurkawala, a suburban district of Uttarakhand, India. The study enrolled a total of 290 subjects, with 145 individuals in each group.

"Assuming the prevalence of anxiety among cases and controls is 26% and 15%, respectively (6), the sample size is calculated by using the formula:

$$n = \frac{r+1}{r} \times \frac{(\bar{p})(1-\bar{p}) \times 7.84}{(p1-p2)^2}$$

where, r = ratio of control to cases, 1 for equal number of cases and control
$\bar{p}$ = average proportion exposed
p1 − p2 = 0.11"

Participant Selection: The study excluded individuals with a history of psychiatric illness before being diagnosed with SUD and those with chronic medical illnesses. Participants were recruited through community outreach and referrals from primary healthcare providers in the area.

Data Collection: The study used three validated questionnaires to collect data from participants:

1. "General Health Questionnaire (GHQ-12) (7): The GHQ-12 is a screening tool for general (non-psychotic) mental health issues. The questionnaire comprises 12 elements that include general symptoms experienced by the patient in the past two weeks. Each of the 12 elements is scored using the Likert method, where scores range from 0-3 on each element. Higher scores indicate a disorder with greater severity; the total score can vary from 0 to 36."

2. "Hamilton Anxiety Rating Scale (HAM-A) (8): The HAM-A comprises 14 elements that assess both psychological and somatic symptoms of anxiety. Each of the 14 elements is scored on a numeric basis from 0 to 4, depending on its severity. The total score ranges from 0-56; results between 17 and 24 indicate mild anxiety, while scores between 25 and 30 indicate moderate-severe anxiety."

3. "Hamilton Depression Rating Scale (HAM-D) (9): The HAM-D is a refined version of the prior extended questionnaire, comprising 17 elements that assess the signs and symptoms of depression. Most of the elements are scored on a numeric basis from 0 to 4, depending on their severity, while a few are scored from 0-2. 8 to 16 points denote mild depression, 17 to 23 points moderate depression, and 24 points severe depression."

Data Analysis: The demographic characteristics were studied using descriptive statistics, and the results were shown as mean values and percentages with a standard deviation. To ascertain the association between the demographic variables, chi-square test was used. The independent sample t-test was used to compare the two groups' prevalence of mood disorders. A p-value of 0.05 was considered statistically significant.

Ethical Considerations: The Institutional Ethics Committee gave its approval for this investigation. All participants provided their informed consent after receiving assurances of secrecy and anonymity. The study followed all applicable national laws as well as the principles outlined in the Helsinki Declaration.

RESULTS

Participants' Sociodemographic Characteristics: This study involved 290 participants, of whom 145 had a substance use disorder (SUD) and 145 were healthy controls. The majority of participants were male and between 36 and 40 years old. Most participants in both groups were married. Education-wise, 49.6% of SUD patients had completed middle school, while the majority of controls had no formal education. In terms of occupation, most SUD patients were unskilled or semiskilled, while most controls were skilled employees or unemployed. The majority of participants worked the day shift. Among SUD patients, drugs were the most commonly reported substance used by peers, while hypertension was the most common comorbid condition. There were statistically significant differences in education, occupation, work shift, substance use among peers, and comorbidities between SUD patients and controls, with p<0.001 for education and occupation (Table 1).

Table 1: Sociodemographic comparison between SUD and control groups

Variable		SUD (n=145)		Control (n=145)		χ2/Fischer's Exact* p-value
		n	%	n	%	
Age	20-25 years	20	13.79	17	11.72	1.854/ 0.603
	26-30 years	22	15.17	17	11.72	
	31-35 years	29	20.00	37	25.52	
	36-40 years	74	51.03	74	51.03	
Sex	Male	135	93.10	126	86.90	3.103/ 0.078
	Female	10	6.90	19	13.10	
Marital Status	Single / Divorced / Widower	46	31.72	44	30.34	0.064/ 0.8
	Married / Domestic Partnership	99	68.28	101	69.66	
Education	No schooling	36	24.83	44	30.34	24.179*/ <0.001
	Middle School	72	49.66	42	28.97	
	High School	24	16.55	19	13.10	
	Higher Secondary	8	5.52	30	20.69	
	Undergraduate	4	2.76	8	5.52	
	Postgraduate	1	0.69	2	1.38	
Occupation	Unemployed / Housewife	26	17.93	64	44.14	45.766/ <0.001
	Unskilled / Daily Wager / Student	57	39.31	12	8.28	
	Semiskilled / Skilled / Professionals	62	42.76	69	47.59	
Work Shift	Day Shift	112	77.24	99	68.28	2.94/ 0.086
	Night Shift / Random / Unemployed	33	22.76	46	31.72	
Substance Use Among	Friends	129	88.97	40	27.59	168.51/ <0.001
	Parents	20	13.79	7	4.83	
	Siblings	46	31.72	6	4.14	
	Relatives	47	32.41	19	13.10	
	None	7	4.83	100	68.97	
Comorbidities	Hypertension	20	13.79	9	6.21	8.464/ 0.206
	Diabetes	17	11.72	11	7.59	
	Cardiovascular diseases	8	5.52	5	3.45	
	Stroke	1	0.69	0	0.00	
	Gastrointestinal disease including liver diseases	9	6.21	13	8.97	
	Iatrogenic Illness	1	0.69	0	0.00	
	None	106	73.10	111	76.55	

Clinical Characteristics of Participants: Table 2 presents the clinical characteristics of the SUD group (n = 145). Smoking was the most common substance used (71.03%), followed by alcohol (35.86%), tobacco (33.79%), and drugs (19.31%). The primary reason for substance use was to experience the feeling (84.83%), while the second most common reason was to reduce tension, worries, or problems (46.90%). The majority of participants initiated their

current pattern of substance use between the ages of 18 and 25 (55.17%). The frequency of substance use varied, with 31.03% of patients using it every day, 40.00% using it several times a week, 24.14% using it every weekend, and 4.83% using it once or twice a month.

Table 2: Clinical characteristics of SUD group

Variable	n	%
Type of Substance Use		
Smoking	103	71.03
Tobacco	49	33.79
Alcohol	52	35.86
Drugs	28	19.31
Reason for Substance Use		
Like the feeling	123	84.83
To be liked by friends	45	31.03
To feel like an adult	36	24.83
To reduce tension, full of worries, or problems	68	46.90
None	6	4.14
Initiation of Current Pattern of Substance Use		
Below 18 yrs. of age	46	31.72
Between 18-25 yrs. of age	80	55.17
After 25 yrs. of age	19	13.10
Frequency of Substance Use		
Every day	45	31.03
Several times a week	58	40.00
Every weekend	35	24.14
Once or twice in a month	7	4.83

Levels of Anxiety and Depression Among Participants: The results showed that 80.7% of the SUD group had no anxiety, while 88.9% of the control group had no anxiety. Mild anxiety was found in 11.7% of the SUD group and 5.5% of the control group. Moderate and severe anxiety were reported in 6.2% and 1.4% of the SUD group and 4.8% and 0.7% of the control group, respectively. In terms of depression, 87.6% of the SUD group had no depression, compared to 95.9% of the control group. Mild depression was reported in 7.6% of the SUD group and 2.8% of the control group. Moderate and severe depression were found in 4.1% and 0.7% of the SUD group and 0.7% and 0.7% of the control group, respectively.

The chi-square test's findings revealed no discernible difference in the two groups' levels of anxiety. The levels of depression in the SUD and control groups did, however, differ significantly (p = 0.0371). Overall, the study found that SUD patients had a higher prevalence of depression than the control group.

Table 3: Comparison of anxiety and depression levels between SUD and control groups using HAM-A and HAM-D scales

Variables	SUD (n=145)		Control (n=145)		χ2/ p-value
	n	%	n	%	
Level of Anxiety					
Absent	117	80.69	129	88.97	0.221
Mild	17	11.72	8	5.52	
Moderate	9	6.21	7	4.83	
Severe	2	1.38	1	0.69	
Level of Depression					
Absent	127	87.59	139	95.86	0.078
Mild	11	7.59	4	2.76	
Moderate	6	4.14	1	0.69	
Severe	1	0.69	1	0.69	
Level of Anxiety					
Absent	117	80.69	129	88.97	4.299/
Mild	17	11.72	8	5.52	0.116
Moderate to Severe	11	7.59	8	5.52	
Level of Depression					
Absent	127	87.59	139	95.86	6.585/
Mild	11	7.59	4	2.76	0.0371
Moderate to Severe	7	4.83	2	1.38	

Correlation Between GHQ-12, HAM-A, and HAM-D Scores: The GHQ-12 score had a significant positive correlation with the HAM-A score (r = 0.464, p<0.01) and the HAM-D score (r = 0.501, p<0.01). The association between the HAM-A and HAM-D scores was also highly significant (r = 0.564, p<0.01) (Table 4). The findings demonstrate a substantial correlation between anxiety, depression, and general health status among the study's subjects.

Table 4: Pearson's correlation between GHQ-12, HAM-A, and HAM-D outcome measures

Score (n=290)	GHQ-12 (0-36)	HAM-A (0-56)	HAM-D (0-52)
GHQ-12 (0-36)			
HAM-A (0-56)	0.464**		
HAM-D (0-52)	0.501**	0.564*	
All correlation coefficients were significant (p <0.01)			

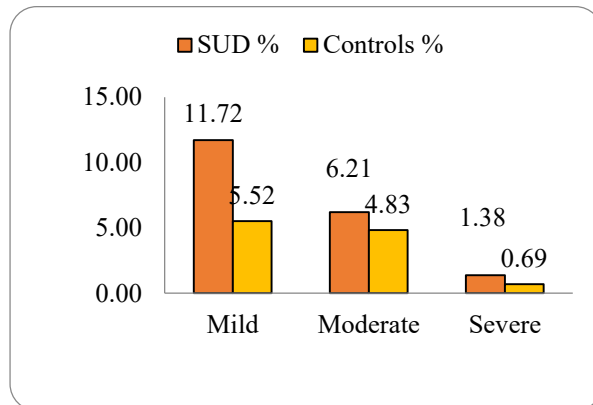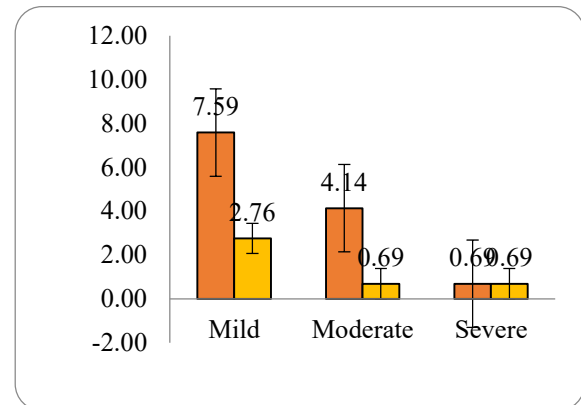**Figure 1: Comparison of anxiety levels between SUD and control groups using HAM-A scale**

Figure 2: Comparison of depression levels between SUD and control groups using HAM-D scale

DISCUSSION

The purpose of this study was to assess the incidence of anxiety and depressive symptoms in people with substance use disorders (SUDs) and the general population. It also aimed to look at the relationship between these symptoms and SUD patients' demographic factors. The majority of drug addicts, as found in the study, were polydrug users, likely due to using one drug as a primary drug and adding other drugs to compensate for its adverse effects or enhance the overall experience. This finding is consistent with previous studies that demonstrated polydrug addiction as the norm among drug addicts (10–11). In contrast, other studies found that lone drug users were more prevalent among drug addicts. According to the study's findings, the majority of drug users experienced significant levels of anxiety and despair, compared to the majority of non-addicts, who only experienced mild worry. This provides credence to a number of ideas, including causation, multiple risk factors and environmental triggers, heredity, and super sensitivity theories, that explain the connection between SUDs and mental illness. (12,13).

Other studies have confirmed our findings, showing that drug users experience higher levels of anxiety and despair than non-addicts (14,15). The direct causation paradigm holds that one condition causes or lowers the threshold for the development of another disorder (16). According to this study, anxiety and depression are related. However, the shared aetiology theory postulates that depression and anxiety are brought on by the same set of risk factors (17). These results differ from those of Bellos et al., who claimed that anxiety and depression have a weakly positive correlation (18). In contrast, Grant et al. discovered that sadness and anxiety are positively and strongly associated (2).

CONCLUSION

Our research shows that those with substance use disorders are more likely to experience severe levels of anxiety and depression. The severity of these co-occurring mental health disorders is significantly associated with the severity of substance use. The high frequency of anxiety and depression among SUD patients emphasizes the significance of taking both diseases into account when formulating a treatment plan and treating them concurrently.

These findings suggest that a dimensional approach may be more effective in treating patients with co-occurring SUD and anxiety or depression than a categorical approach that separates the two disorders. This method entails evaluating the intensity of the symptoms and adjusting the course of treatment accordingly. Clinicians need to be aware of the increased risk of anxiety and depression in patients with SUDs and ensure that the disorders are properly treated by utilizing the appropriate medications. To better understand the complicated interplay between SUDs, anxiety, and depression, as well as to create more potent therapies for

those with co-occurring disorders, additional study is required.

RECOMMENDATION

This study is crucial for understanding the interplay between substance use disorders (SUDs) and mood disorders in Uttarakhand. It aims to inform policymakers and healthcare professionals about the prevalence and comorbidities of these conditions, guiding future strategies to address these significant public health issues.

RELEVANCE OF THE STUDY

This study highlights the significant co-occurrence of substance use disorders (SUDs) and mood disorders, such as anxiety and depression, in Uttarakhand. It underscores the need for dual diagnosis and integrated treatment approaches, providing localized data that can inform regional healthcare strategies. The findings emphasize the importance of addressing mental health comorbidities in SUD patients and can guide policymakers and healthcare professionals in developing targeted interventions to improve treatment outcomes and overall mental health care in the region.

AUTHORS CONTRIBUTION

All authors have contributed equally.

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CONFLICT OF INTEREST

There is no conflict of interest.

DECLARATION OF GENERATIVE AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors haven't used any generative AI/AI assisted technologies in the writing process.

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