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A Study on Clinical Profile of Depressive Disorders Associated with Alcohol Use Disorder in Rural Area of West Bengal .

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Abstract

Background: Alcohol Use Disorder (AUD) and depressive disorders are two of the most common psychiatric morbidities encountered in rural community settings, and the two conditions frequently co-exist, each worsening the course and outcome of the other. Rural West Bengal, with its easy availability of country liquor and limited access to mental health services, presents a unique setting in which this dual burden remains largely under-recognized and under-treated. **Objectives**: The present study was conducted to determine the clinical profile of depressive disorders among patients with Alcohol Use Disorder in a rural area of West Bengal, to study the sociodemographic profile of the affected individuals, to identify the risk factors associated with co-occurring depression and AUD, and to suggest an appropriate clinical management approach. **Methodology**: A cross-sectional observational study was conducted among 74 patients diagnosed with Alcohol Use Disorder as per ICD-10 criteria, attending the psychiatry outpatient department and de-addiction centre of a rural hospital in West Bengal. Depressive symptoms were assessed using the Hamilton Depression Rating Scale (HAM-D), and severity of alcohol dependence was assessed using the Severity of Alcohol Dependence Questionnaire (SADQ). A structured, pre-tested questionnaire was used to collect sociodemographic and clinical data. Data were analysed using SPSS version 25, and odds ratios with 95% confidence intervals were calculated.**Results**: Out of 74 patients with Alcohol Use Disorder, 41 (55.4%) were found to have co-existing depressive

disorder of varying severity as per HAM-D scores. Depression was significantly more common among patients with longer duration of alcohol use, higher quantity of daily alcohol consumption, those belonging to lower socioeconomic status, those with a positive family history of alcohol use or psychiatric illness, and those with associated marital or occupational problems. Odds ratio analysis revealed that patients with more than 10 years of alcohol use had nearly 3.4 times higher odds of having co-existing depression (OR = 3.41, 95% CI: 1.27-9.16), and patients with a positive family history of alcohol dependence had 2.87 times higher odds (95% CI: 1.08-7.66).

Conclusion: Depressive disorders are highly prevalent among patients with Alcohol Use Disorder in rural West Bengal, and this dual diagnosis is significantly influenced by duration and quantity of alcohol use, family history, socioeconomic status, and psychosocial stressors. Integrated management combining de-addiction therapy, pharmacological treatment of depression, psychotherapy, and family-based intervention is essential for improving outcomes in this population. Strengthening community mental health services and de-addiction facilities at the primary care level is strongly recommended.

Keywords: Alcohol Use Disorder, depressive disorder, dual diagnosis, rural mental health, West Bengal, HAM-D.

Introduction

Alcohol Use Disorder (AUD) is one of the most common substance use disorders encountered in clinical practice and constitutes a major public health problem, particularly in rural India where the consumption of country liquor and locally brewed alcoholic beverages is widespread, socially accepted, and often deeply embedded in cultural and festive practices[1]. AUD is characterized by a pattern of alcohol use leading to clinically significant impairment, including tolerance, withdrawal symptoms, craving, and continued use despite knowledge of harmful consequences[2].

Depression, on the other hand, is one of the leading causes of disability worldwide and is among the most common psychiatric disorders associated with substance use. The relationship between depressive disorders and Alcohol Use Disorder is bidirectional and complex. On one hand, individuals suffering from depression may turn to alcohol as a means of self-medication to relieve feelings of sadness, hopelessness, and anxiety, a phenomenon often referred to as the 'self-medication hypothesis'. On the other hand, chronic and heavy alcohol consumption itself produces

neurochemical changes in the brain, particularly involving serotonergic and dopaminergic pathways, which can independently precipitate or worsen depressive symptoms[3].

This co-occurrence of depression and AUD, often termed 'dual diagnosis' or 'comorbid disorder', poses significant challenges in clinical management, as each disorder can mask, mimic, or exacerbate the symptoms of the other. Patients with this dual diagnosis tend to have a more severe and chronic course of illness, poorer treatment compliance, higher rates of relapse of alcohol use, increased risk of suicidal ideation and self-harm, and greater impairment in social, occupational, and family functioning compared to patients with either disorder alone[4].

In the rural Indian context, and particularly in rural West Bengal, several factors contribute to the high burden of this dual morbidity[5]. Easy availability and affordability of country-made liquor, limited recreational and occupational opportunities, agrarian distress, migration of male family members for work leaving families fragmented, and a strong cultural stigma attached to mental illness - which prevents timely help-seeking - all contribute to a scenario where both AUD and depression often go unrecognized and untreated for prolonged periods[6].

Furthermore, the rural primary healthcare system, although extensive in terms of infrastructure, often lacks adequately trained manpower and resources for systematic screening of psychiatric comorbidities among patients presenting with alcohol-related problems[7]. As a result, many patients with AUD who also suffer from significant depressive symptoms are managed only for their physical complaints related to alcohol use (such as liver disease, gastritis, or withdrawal symptoms), while the underlying depressive disorder remains undiagnosed, leading to incomplete recovery, poor quality of life, and a higher risk of relapse and suicide[8,9].

Despite the recognized importance of this dual diagnosis, there is a relative paucity of locally generated data from rural West Bengal describing the clinical profile of depressive disorders among patients with AUD, along with the associated sociodemographic and clinical risk factors[10,11,12]. Most of the available literature on this topic originates from urban tertiary care psychiatric centres, which may not adequately represent the unique sociocultural and clinical characteristics of the rural population[13].

The present study was, therefore, undertaken with the aim of bridging this gap by determining the prevalence and clinical profile of depressive disorders among patients with Alcohol Use Disorder

attending a rural healthcare facility in West Bengal, identifying the sociodemographic and clinical risk factors associated with this dual diagnosis, and proposing an integrated clinical management approach suitable for implementation at the primary and secondary care level in similar rural settings.

Objectives

1. To determine the prevalence of depressive disorders among patients diagnosed with Alcohol Use Disorder attending a rural healthcare facility in West Bengal.

2. To study the sociodemographic profile of patients with Alcohol Use Disorder and its association with co-existing depressive disorder.

3. To assess the clinical profile of Alcohol Use Disorder, including pattern, duration, and quantity of alcohol consumption, in relation to depressive symptoms.

4. To identify the risk factors associated with co-occurrence of depressive disorder and Alcohol Use Disorder.

Materials and Methods

Study Design

This was a hospital-based, cross-sectional observational study conducted to assess the clinical profile of depressive disorders among patients with Alcohol Use Disorder.

Study Setting

The study was conducted in the Psychiatry Outpatient Department and de-addiction centre of a rural hospital in a district of West Bengal, catering predominantly to a rural agrarian population.

Study Duration

The study was carried out over a period of six months, covering recruitment, clinical assessment, data collection, and analysis.

Study Population

Patients of either sex, aged 18 years and above, diagnosed with Alcohol Use Disorder as per ICD-10 Diagnostic Criteria for Research, attending the psychiatry outpatient department or de-addiction

centre during the study period and willing to give informed consent, constituted the study population.

Sample Size Calculation

The sample size for the present study was calculated using the standard formula for prevalence studies:

$$\mathbf{n = Z^2 \times P \times (1\text{-}P) / d^2}$$

Where:

n = required sample size

Z = Z-statistic for the level of confidence (for 95% confidence interval, Z = 1.96)

P = expected prevalence of depressive disorder among patients with Alcohol Use Disorder (taken as 50% i.e., 0.50, based on previous studies showing comorbid depression in 40-60% of AUD patients, and 0.50 was used to obtain the maximum possible sample size estimate)

d = absolute allowable error/margin of error (taken as 11%, i.e., 0.11)

Substituting the values in the formula:

$$n = (1.96)^2 \times 0.50 \times (1\text{-}0.50) / (0.11)^2$$

$$n = 3.8416 \times 0.50 \times 0.50 / 0.0121$$

$$n = 3.8416 \times 0.25 / 0.0121$$

$$n = 0.9604 / 0.0121$$

$$\mathbf{n = 79.37 \approx 80}$$

Considering the limited number of patients with AUD attending the de-addiction centre during the study period (finite population correction applied), feasibility of conducting detailed clinical interviews using HAM-D and SADQ within the available time frame, and an anticipated dropout/incomplete-assessment rate of approximately 8%, the final sample size was adjusted to 74 patients with Alcohol Use Disorder, which was considered adequate for estimating the prevalence

of depressive disorder and for performing the planned risk factor and odds ratio analyses with reasonable precision.

Method of Sampling

A consecutive sampling technique was employed for recruitment of study participants. All patients diagnosed with Alcohol Use Disorder as per ICD-10 criteria, who attended the psychiatry outpatient department or de-addiction centre of the rural hospital during the study period and fulfilled the inclusion criteria, were enrolled consecutively until the required sample size of 74 was achieved. This method was chosen as it ensures inclusion of all eligible patients presenting during the study period without selection bias, and is particularly suitable for hospital-based studies dealing with a clinical population that presents over time rather than being available in a single sampling frame at one point in time.

Inclusion Criteria

1. Patients aged 18 years and above, of either sex, diagnosed with Alcohol Use Disorder as per ICD-10 Diagnostic Criteria for Research.

2. Patients who were in a clinically stable condition (not in acute alcohol withdrawal or intoxication) at the time of assessment.

3. Patients who provided written informed consent to participate in the study.

4. Patients who were residents of the rural catchment area of the hospital for at least the past one year.

Exclusion Criteria

1. Patients with a diagnosis of any other primary psychotic disorder (such as Schizophrenia) or organic brain disorder (such as dementia, delirium) that could independently account for depressive symptoms.

2. Patients who were acutely intoxicated or in a state of delirium tremens at the time of assessment.

3. Patients with dependence on substances other than alcohol (except nicotine) as the primary substance of concern.

4. Patients who were unwilling or unable to provide informed consent due to severe cognitive impairment.

Data Collection Tools and Techniques

A pre-designed, pre-tested, structured questionnaire was used to collect information regarding sociodemographic characteristics (age, sex, marital status, occupation, education, type of family, socioeconomic status based on the Modified Kuppuswamy Scale, religion), and clinical history pertaining to alcohol use (age at initiation, duration of regular use, quantity and frequency of consumption, type of alcohol consumed, history of withdrawal symptoms, and history of de-addiction treatment in the past).

Family history of alcohol use disorder and other psychiatric illnesses, history of marital discord, occupational problems, financial difficulties, and any history of self-harm or suicidal ideation were also recorded through detailed clinical interview.

Diagnosis of Alcohol Use Disorder

The diagnosis of Alcohol Use Disorder was made by a qualified psychiatrist based on ICD-10 Diagnostic Criteria for Research (DCR), and the severity of alcohol dependence was assessed using the Severity of Alcohol Dependence Questionnaire (SADQ), a 20-item validated tool that grades dependence as mild (score less than 16), moderate (score 16-30), and severe (score more than 30).

Assessment of Depressive Disorder

All enrolled patients were assessed for the presence and severity of depressive symptoms using the Hamilton Depression Rating Scale (HAM-D), a 17-item clinician-administered scale widely used and validated for assessment of severity of depression. Based on the HAM-D score, depression was categorized as: no depression (score 0-7), mild depression (score 8-13), moderate depression (score 14-18), severe depression (score 19-22), and very severe depression (score 23 and above). For the purpose of this study, a HAM-D score of 8 or more was taken as cut-off for diagnosing the presence of a clinically significant depressive disorder, and this diagnosis was further corroborated by clinical interview as per ICD-10 criteria for Depressive Episode by the treating psychiatrist.

Statistical Analysis

All data collected were entered into Microsoft Excel and analysed using SPSS (Statistical Package for Social Sciences) version 25.0. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarize the data. The Chi-square test was used to find the association between categorical variables. Independent sample t-test was used to compare mean HAM-D scores between groups. Odds ratios (OR) with 95% confidence intervals (CI) were calculated using simple 2x2 contingency tables to determine the strength of association between various risk factors and the presence of co-existing depressive disorder. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

The study protocol was approved by the Institutional Ethics Committee. Written informed consent was obtained from all participants prior to enrolment, and confidentiality of patient information was strictly maintained throughout the study. Patients identified with significant depressive symptoms or suicidal ideation were provided immediate clinical attention and appropriate management by the treating psychiatrist, independent of their participation in the study.

Results

A total of 74 patients diagnosed with Alcohol Use Disorder were enrolled in the study. The mean age of the participants was 42.6 ± 9.8 years, and 71 (95.9%) of the participants were male, reflecting the well-known male predominance of AUD in the Indian rural population. Based on HAM-D scores, 41 (55.4%) patients were found to have a clinically significant co-existing depressive disorder (HAM-D score ≥ 8), while 33 (44.6%) did not have significant depressive symptoms.

Table 1: Sociodemographic Profile of Study Participants (N=74)

Sociodemographic Variable	Category	Number (n)	Percentage (%)
Age Group (years)	18-30	9	12.2
	31-45	33	44.6
	46-60	24	32.4
	Above 60	8	10.8
Sex	Male	71	95.9
	Female	3	4.1

Marital Status	Married	58	78.4
	Unmarried/Separated/Widowed	16	21.6
Education	Illiterate	21	28.4
	Primary to Secondary	39	52.7
	Higher Secondary & Above	14	18.9
Occupation	Agricultural Labourer/Farmer	37	50.0
	Daily Wage Worker/Other Manual	24	32.4
	Service/Business/Others	13	17.6
Type of Family	Nuclear	44	59.5
	Joint	30	40.5
Socioeconomic Status (Kuppuswamy Scale)	Upper/Upper Middle	12	16.2
	Lower Middle	28	37.8
	Upper Lower/Lower	34	45.9
Religion	Hindu	56	75.7
	Muslim	16	21.6
	Others	2	2.7

Table 1 shows that the majority of the participants (44.6%) belonged to the 31-45 years age group, and the population was overwhelmingly male (95.9%), consistent with the gender distribution of Alcohol Use Disorder commonly seen in rural Indian settings. Half of the participants (50.0%) were agricultural labourers or farmers by occupation, and a substantial proportion (45.9%) belonged to the upper lower/lower socioeconomic class as per the Modified Kuppuswamy Scale, reflecting the predominantly poor agrarian background of the study population.

Prevalence and Severity of Depressive Disorder (HAM-D Score)

Depression Status (HAM-D Score)	Severity Category	Number (n)	Percentage (%)
No Depression	Score 0-7	33	44.6
Mild Depression	Score 8-13	17	23.0
Moderate Depression	Score 14-18	14	18.9
Severe Depression	Score 19-22	7	9.5

Very Severe Depression	Score ≥ 23	3	4.0
Total	-	74	100.0

As shown in the above table, mild depression was the most common category among those with depressive symptoms (23.0%), followed by moderate depression (18.9%). Severe and very severe depression together accounted for 13.5% of the total study population, and these patients required urgent psychiatric attention and close monitoring for risk of self-harm.

Clinical Profile of Alcohol Use Disorder

Clinical Variable	Category	Number (n)	Percentage (%)
Age at Initiation of Alcohol Use (years)	Below 20	26	35.1
	20 and above	48	64.9
Duration of Regular Alcohol Use (years)	Less than 10	31	41.9
	10 years and above	43	58.1
Quantity of Alcohol per Day	≤ 180 ml (equivalent)	29	39.2
	> 180 ml (equivalent)	45	60.8
Severity of Alcohol Dependence (SADQ)	Mild (Score <16)	19	25.7
	Moderate (Score 16-30)	38	51.4
	Severe (Score >30)	17	22.9
History of Withdrawal Symptoms	Present	49	66.2
	Absent	25	33.8
Past History of De-addiction Treatment	Yes	22	29.7
	No	52	70.3

It is observed from the above table that more than half of the patients (58.1%) had been consuming alcohol regularly for 10 years or more, and 60.8% were consuming more than 180 ml of country liquor (or its equivalent in standard units) per day. Moderate alcohol dependence as per SADQ score was the most common category (51.4%), and a majority of patients (66.2%) reported a

history of withdrawal symptoms such as tremors, sweating, or sleep disturbance on attempting to reduce or stop alcohol intake.

Table 2: Risk Factors Associated with Co-existing Depressive Disorder Among Patients with AUD

Risk Factor	Category	Depression Present (n=41)	Depression Absent (n=33)	Total (n=74)	Chi-square (p-value)
Duration of Alcohol Use	≥ 10 years	28 (68.3%)	15 (45.5%)	43	p = 0.043*
	< 10 years	13 (31.7%)	18 (54.5%)	31	
Quantity of Alcohol/day	> 180 ml equivalent	30 (73.2%)	15 (45.5%)	45	p = 0.013*
	≤ 180 ml equivalent	11 (26.8%)	18 (54.5%)	29	
Socioeconomic Status	Lower/Upper Lower	26 (63.4%)	8 (24.2%)	34	p = 0.001*
	Upper/Middle	15 (36.6%)	25 (75.8%)	40	
Family History of AUD/ Psychiatric Illness	Present	23 (56.1%)	9 (27.3%)	32	p = 0.011*
	Absent	18 (43.9%)	24 (72.7%)	42	
Marital/Occupational Problems	Present	27 (65.9%)	10 (30.3%)	37	p = 0.002*
	Absent	14 (34.1%)	23 (69.7%)	37	
Severity of Alcohol Dependence (SADQ)	Moderate to Severe	36 (87.8%)	19 (57.6%)	55	p = 0.003*
	Mild	5 (12.2%)	14 (42.4%)	19	

**Statistically significant ($p < 0.05$)*

Table 2 demonstrates that the presence of co-existing depressive disorder was significantly higher among patients with a longer duration of alcohol use (≥10 years), those consuming a higher quantity of alcohol per day (>180 ml equivalent), those belonging to lower socioeconomic strata, those having a positive family history of alcohol use disorder or other psychiatric illness, those reporting marital or occupational problems, and those with moderate to severe alcohol dependence as per SADQ scoring ($p<0.05$ for all these variables). These findings indicate that depression in

patients with AUD is closely linked not only to the biological severity of alcohol dependence but also to the psychosocial environment and stressors surrounding the patient.

Table 3: Odds Ratio Analysis for Risk Factors Associated with Co-existing Depression

Risk Factor	Odds Ratio (OR)	95% Confidence Interval (CI)	Interpretation
Duration of Alcohol Use ≥ 10 years (vs <10 years)	2.59	1.01 - 6.62	Significant
Quantity of Alcohol >180 ml/day (vs ≤180 ml/day)	3.27	1.24 - 8.62	Significant
Lower Socioeconomic Status (vs Upper/Middle)	5.42	1.94 - 15.13	Significant
Positive Family History of AUD/Psychiatric Illness	3.41	1.27 - 9.16	Significant
Marital/Occupational Problems Present	4.43	1.67 - 11.75	Significant
Moderate to Severe Alcohol Dependence (SADQ)	5.31	1.66 - 16.95	Significant

The odds ratio analysis presented in Table 3 was calculated using simple 2x2 contingency tables for each risk factor against the presence or absence of co-existing depressive disorder. An odds ratio greater than 1 indicates an increased likelihood of having depression in the presence of that particular risk factor, and a confidence interval that does not include the value 1 confirms that this association is statistically significant.

In simple words, the findings can be explained as follows: patients who had been using alcohol for 10 years or more had about 2.59 times higher odds of having co-existing depression compared to those who had been using alcohol for less than 10 years, suggesting that the chronicity of alcohol exposure plays an important role in the development of depressive symptoms, possibly through cumulative neurochemical changes in mood-regulating pathways of the brain.

Patients consuming more than 180 ml of alcohol equivalent per day had about 3.27 times higher odds of depression compared to those consuming lesser quantities, indicating a dose-dependent relationship between the amount of alcohol consumed and the likelihood of depression. This was further supported by the finding that patients with moderate to severe alcohol dependence on the

SADQ scale had more than five times higher odds (OR=5.31) of having co-existing depression compared to those with mild dependence, the strongest association observed among the clinical variables in this study.

The strongest single risk factor in the entire analysis was socioeconomic status, with patients from lower/upper lower socioeconomic strata having 5.42 times higher odds of having co-existing depression compared to those from upper/middle socioeconomic strata. This points towards the significant role of poverty, financial insecurity, and the associated chronic stress in the development of depressive symptoms among patients with AUD in this rural population.

A positive family history of alcohol use disorder or other psychiatric illness was associated with 3.41 times higher odds of depression, which may reflect both a genetic predisposition to mood disorders as well as the impact of growing up in or living within a family environment affected by substance use and mental illness. Finally, patients reporting marital or occupational problems had 4.43 times higher odds of co-existing depression, highlighting the bidirectional relationship between alcohol-related psychosocial dysfunction and depressive symptomatology - alcohol use leading to marital/occupational difficulties, which in turn contribute to depression, which may further drive continued alcohol use as a maladaptive coping mechanism.

Clinical Management of Identified Cases

All 41 patients identified with co-existing depressive disorder, as well as the remaining 33 patients with Alcohol Use Disorder without significant depression, were managed in a structured, integrated manner as outlined below:

1. Detailed Clinical Assessment: Every patient underwent a detailed psychiatric history-taking and mental status examination by a qualified psychiatrist, with particular attention to assessment of suicidal ideation, hopelessness, and any history of self-harm, given the well-known increased risk of suicide in patients with comorbid depression and AUD. Patients with active suicidal ideation (4 patients in this study) were managed on a priority basis with close family involvement and, where necessary, inpatient admission for safety.

2. Management of Alcohol Withdrawal: Patients presenting with significant withdrawal symptoms or those with moderate to severe dependence as per SADQ (55 out of 74 patients) were initially managed for safe withdrawal using a tapering regimen of benzodiazepines (such as Lorazepam or

Chlordiazepoxide) along with adequate hydration, multivitamin supplementation (particularly Thiamine, to prevent Wernicke's encephalopathy), and monitoring of vital parameters, either on an outpatient basis for mild-to-moderate withdrawal or with short inpatient admission for those with severe withdrawal or a past history of complicated withdrawal (such as seizures or delirium tremens).

3. Pharmacological Management of Depression: Patients diagnosed with clinically significant depressive disorder (HAM-D score ≥8) were started on antidepressant medication, with Selective Serotonin Reuptake Inhibitors (SSRIs) such as Sertraline or Escitalopram being preferred as first-line agents due to their favourable side-effect profile, low potential for interaction with alcohol, and relatively lower risk in overdose compared to older antidepressants such as Tricyclic Antidepressants (TCAs), which were avoided in view of the risk of impulsive overdose in this population. Patients with severe and very severe depression (10 patients) were started on antidepressants at an early stage, even during the initial withdrawal management period, under close psychiatric supervision, once the acute withdrawal phase was stabilized.

4. Relapse Prevention Pharmacotherapy: For patients with moderate to severe alcohol dependence who were motivated for abstinence, relapse prevention medications such as Disulfiram (in selected, well-motivated patients with good family support and no contraindications) or Naltrexone (where available) were considered as adjuncts to psychosocial intervention, after detailed counselling regarding their mechanism of action and potential adverse effects.

5. Psychotherapy and Counselling: All patients and, wherever possible, their family members were offered structured counselling sessions incorporating elements of Motivational Enhancement Therapy (MET) to address ambivalence towards change in alcohol use behaviour, and basic Cognitive Behavioural Therapy (CBT) techniques to address negative thought patterns associated with depression, problem-solving skills for managing marital and occupational stressors, and psychoeducation regarding the relationship between alcohol use and depression, so that patients could understand that both conditions needed to be addressed together for sustained recovery.

6. Family-Based Intervention: Given the high proportion of patients with marital and occupational problems and positive family history of AUD/psychiatric illness, family members were actively involved in the treatment process through joint counselling sessions, with emphasis on improving

family communication, reducing enabling behaviours that perpetuate alcohol use, and creating a supportive home environment conducive to recovery.

7. Follow-up and Monitoring: All patients were followed up at 2 weeks, 4 weeks, 8 weeks, and 12 weeks after initiation of treatment, with reassessment of HAM-D scores to monitor response to antidepressant therapy, and SADQ scores along with self-reported abstinence/relapse status to monitor progress of de-addiction treatment. Patients showing inadequate response to first-line antidepressant therapy at 6-8 weeks were considered for dose optimization or switch to an alternative antidepressant after psychiatric reassessment.

8. Referral Linkages: Patients requiring specialized de-addiction services beyond the scope of the rural facility, or those with treatment-resistant depression or high suicide risk requiring inpatient psychiatric care, were referred to the nearest district mental health programme centre or tertiary care psychiatric institute, with proper documentation and follow-up arrangements to ensure continuity of care.

This integrated, stepwise approach to clinical management ensured that both the alcohol use disorder and the co-existing depressive disorder were addressed simultaneously rather than in isolation, which is essential given the well-documented bidirectional relationship between the two conditions and the poor outcomes associated with treating only one component of this dual diagnosis.

Discussion

The present cross-sectional study was conducted among 74 patients with Alcohol Use Disorder attending a rural healthcare facility in West Bengal, with the aim of determining the clinical profile of co-existing depressive disorders and the associated risk factors. The overall prevalence of clinically significant depressive disorder (HAM-D score ≥8) in the present study was found to be 55.4%, which is in keeping with the wide range of 30% to 60% reported by various studies conducted among patients with AUD across different settings in India and globally, and reflects the strong and consistent association between these two conditions across diverse populations[14,15,16].

The sociodemographic profile of the study population, with an overwhelming male predominance (95.9%) and a mean age of 42.6 years, is consistent with the well-established epidemiological

pattern of Alcohol Use Disorder in rural India, where alcohol consumption remains a predominantly male behaviour, often initiated in young adulthood and continuing into middle age, by which time chronic complications, including psychiatric comorbidities such as depression, begin to manifest[17]. The predominance of agricultural labourers and daily wage workers (82.4% combined) among the study participants reflects the occupational profile of the rural catchment area and highlights the intersection of alcohol use with the chronic economic stress associated with agrarian livelihoods[18].

Regarding the severity distribution of depression, mild depression was the most common category (23.0%), which is an important finding from a clinical perspective, as mild depressive symptoms in the context of AUD are often dismissed as 'normal' feelings of guilt or low mood associated with alcohol-related problems, and consequently remain undiagnosed and untreated unless a systematic screening tool such as the HAM-D is applied[19,20]. However, the presence of severe and very severe depression in 13.5% of the study population is a matter of significant clinical concern, given the well-documented association between this degree of depression and increased risk of suicidal behaviour, particularly in the setting of disinhibition associated with alcohol intoxication.

The finding that a longer duration of alcohol use (≥10 years) was significantly associated with co-existing depression (OR=2.59) is consistent with the concept of 'alcohol-induced depression', wherein chronic and prolonged alcohol exposure leads to persistent alterations in neurotransmitter systems, particularly involving serotonin, noradrenaline, and the hypothalamic-pituitary-adrenal axis, which are also implicated in the pathophysiology of primary depressive disorders. This neurobiological overlap provides a plausible mechanism for the observed association and underscores the importance of early intervention in AUD before such chronic neuroadaptive changes become established[21,22].

Similarly, the dose-dependent relationship observed between the quantity of alcohol consumed per day and the presence of depression (OR=3.27 for >180 ml equivalent per day), as well as the strong association with severity of dependence on the SADQ scale (OR=5.31 for moderate-to-severe dependence), further supports a biological gradient in this relationship - the greater the exposure to alcohol, both in terms of quantity and dependence severity, the higher the likelihood of co-existing depressive symptoms. This finding has important clinical implications, suggesting that the

intensity of alcohol use itself can serve as a clinical marker to identify patients who should be prioritized for depression screening[23,24].

The strongest association observed in the present study was between lower socioeconomic status and the presence of co-existing depression (OR=5.42), which is a particularly important finding in the rural West Bengal context. This association likely reflects the cumulative impact of chronic financial stress, food insecurity, indebtedness (often related to expenditure on alcohol itself), and limited access to healthcare and social support systems among economically disadvantaged families, all of which are well-recognized risk factors for depression independent of alcohol use, and which appear to compound the risk when combined with AUD.

The significant association between a positive family history of alcohol use disorder or other psychiatric illness and co-existing depression (OR=3.41) is consistent with the substantial body of evidence supporting a shared genetic vulnerability between AUD and depressive disorders, as well as the impact of an adverse family environment - characterized by parental alcohol use or mental illness - on the psychological development and coping mechanisms of affected individuals, predisposing them to both substance use and mood disorders in adulthood[25].

The finding that marital or occupational problems were significantly associated with co-existing depression (OR=4.43) reflects the well-documented vicious cycle between AUD and psychosocial dysfunction: alcohol use leads to marital discord, absenteeism from work, and occupational instability, which in turn generate chronic stress and feelings of failure, guilt, and hopelessness characteristic of depression, and this depression may further impair the individual's motivation and capacity to address their alcohol use or resolve these psychosocial problems, thereby perpetuating the cycle. Breaking this cycle requires an integrated approach addressing both the substance use and the psychosocial stressors simultaneously, rather than treating them as separate, unrelated problems[26].

These findings, taken together, strongly support the recommendation that all patients presenting with Alcohol Use Disorder, particularly those with a long duration of use, high daily quantity of consumption, severe dependence, lower socioeconomic status, positive family history, or significant marital/occupational problems, should be routinely screened for depressive symptoms using a simple, validated tool such as the HAM-D, so that co-existing depression can be identified

early and managed in an integrated manner alongside de-addiction treatment, rather than being missed or addressed only after the patient presents with more severe complications such as suicidal behaviour[27,28].

The findings of the present study are broadly consistent with those reported from other parts of India and from international literature examining the relationship between depression and Alcohol Use Disorder, lending support to the generalizability of these associations across different populations, while also highlighting certain locally relevant factors, particularly the strong role of socioeconomic deprivation, that are especially pertinent to the rural West Bengal context and should inform the design of locally appropriate intervention programmes.

Limitations of the Study

This study has certain limitations that need to be acknowledged. Firstly, being a cross-sectional study, it can establish association but cannot establish a definite temporal or causal relationship between AUD and depression - that is, it cannot determine with certainty whether depression preceded the alcohol use disorder (primary depression with secondary alcohol use as self-medication) or whether it developed as a consequence of chronic alcohol use (alcohol-induced depression), and this distinction has important treatment implications that would require a longitudinal study design to elucidate. Secondly, the sample size of 74, although adequate for the primary objective, was predominantly male (95.9%), reflecting the actual gender distribution of AUD patients attending the facility, but this limited the ability to draw meaningful conclusions regarding sex-based differences in the clinical profile. Thirdly, the diagnosis of depression was based on the HAM-D scale and clinical interview at a single point in time; repeat assessment after a period of sustained abstinence would have helped differentiate between alcohol-induced depressive symptoms (which often improve with abstinence) and an independent, primary depressive disorder (which typically persists despite abstinence). Lastly, the study was conducted at a single rural healthcare facility, and the findings, although likely representative of similar rural settings in West Bengal, may not be generalizable to urban populations or to other states with different patterns of alcohol use and sociocultural contexts.

Conclusion

The present study demonstrates that depressive disorders are highly prevalent among patients with Alcohol Use Disorder attending a rural healthcare facility in West Bengal, with more than half of the study participants (55.4%) found to have clinically significant depressive symptoms on the Hamilton Depression Rating Scale. Longer duration of alcohol use, higher daily quantity of alcohol consumption, greater severity of alcohol dependence, lower socioeconomic status, positive family history of alcohol use disorder or psychiatric illness, and presence of marital or occupational problems emerged as significant risk factors associated with this dual diagnosis.

These findings underscore the clinically and biologically intertwined nature of Alcohol Use Disorder and depressive disorders, particularly in a rural agrarian population characterized by chronic socioeconomic stress and limited access to mental health services. The study highlights the urgent need for routine screening of depressive symptoms in all patients presenting with AUD, and for the adoption of an integrated treatment approach that simultaneously addresses both the substance use disorder and the co-existing mood disorder, along with the relevant psychosocial stressors, in order to achieve sustained recovery and improve overall quality of life in this vulnerable population.

Recommendations

Based on the findings of the present study, the following recommendations are made:

Routine screening for depressive symptoms using a simple, validated screening tool should be made a mandatory component of clinical assessment for all patients presenting with Alcohol Use Disorder at primary and secondary healthcare facilities. Special attention should be given to screening for depression in patients with long duration of alcohol use (≥10 years), high daily quantity of consumption, and moderate-to-severe dependence as per SADQ scoring, as these patients are at particularly high risk of co-existing depression. An integrated treatment protocol combining safe alcohol withdrawal management, pharmacological treatment of depression with SSRIs, relapse prevention pharmacotherapy where indicated, and structured psychotherapy should be developed and implemented at the rural healthcare facility level. All patients with this dual diagnosis should be routinely assessed for suicidal ideation and risk of self-harm, given the well-documented increased risk in this population, with clear protocols for urgent referral of high-risk

patients.Family-based interventions should be an integral part of the management plan, given the strong association between marital/occupational problems, family history of AUD/psychiatric illness, and co-existing depression observed in this study.

Given the strong association between lower socioeconomic status and depression in patients with AUD, linkage with social welfare schemes and livelihood support programmes should be considered as part of a holistic management approach for economically disadvantaged patients.

Community-level awareness programmes should be conducted to reduce stigma associated with both alcohol use disorder and depression, encouraging early help-seeking behaviour among the rural population.

Capacity building of primary healthcare workers and medical officers in rural health facilities should be undertaken to improve recognition and initial management of this dual diagnosis, with clear referral pathways to specialized psychiatric services for complex cases.

Regular follow-up with reassessment of both HAM-D and SADQ scores should be ensured for all patients on treatment, to objectively monitor response to therapy and to identify relapse at an early stage.

Larger, longitudinal, multi-centric studies should be conducted in rural West Bengal to further elucidate the temporal relationship between AUD and depression, and to evaluate the long-term outcomes of integrated treatment approaches in this population.

Conflict of Interest

The authors declare that there is no conflict of interest associated with this study. The study was conducted purely for academic and research purposes, and the authors have no financial, personal, or professional relationships with any organization or product that could have inappropriately influenced the conduct of this study or the interpretation of its findings.

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Submission Declaration

We, the authors, hereby declare that this manuscript, entitled "A Study on Clinical Profile of Depressive Disorders Associated with Alcohol Use Disorder in Rural Area of West Bengal", is our original work and has not been published previously, in part or in full, and is not under consideration for publication elsewhere, either in print or electronic format. All the authors have read and approved the final version of the manuscript and agree with its submission to the journal.

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