

TO DETERMINE THE PERSONALITY TRAITS, CLINICAL CHARACTERISTICS AND COGNITIVE FUNCTIONS IN BIPOLAR DISORDER PATIENTS WITH COMORBID ALCOHOL USE DISORDERS

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ABSTRACT

BACKGROUND

Comorbidity of bipolar disorder and substance use disorder is common. It is difficult to treat bipolar disorder patients with comorbid alcohol use disorder since the disease course is more severe and they have greater difficulties in cognitive functions than those without alcohol use. Whether alcohol negatively affects specific cognitive functions or the deficits are more diffuse in nature is unclear. Alcoholic bipolar patients present with high scores in openness to experience and neuroticism personality traits. Personality to an extent mediates the co-occurrence of substance use in bipolar disorder. Thus, identifying these personality traits in bipolar or substance use disorder patients, will help us to prevent the co-occurrence of the second disorder.

The aim of the study is to evaluate the clinical characteristics, personality traits and cognitive functions of patients with bipolar and comorbid alcohol use disorders.

MATERIALS AND METHODS

A sample of 100 patients, 50 with bipolar and alcohol use disorder (cases) and 50 with bipolar disorder (controls) attending tertiary care hospital outpatient department at Chennai was selected. Alcohol status was assessed using AUDIT (alcohol use disorder identification test) and SADQ (severity of alcohol dependence questionnaire). Personality was assessed using NEO-five factor inventory. Cognition was assessed using frontal lobe assessment battery, Stroop test, DSST (digit symbol substitution test) and verbal N back test.

RESULTS

The cases group had more number of hospitalisations and mixed episodes than control group. They also performed poorer on frontal lobe assessment battery, Stroop test and digit symbol substitution test. Duration of alcohol use was associated positively with total number of hospitalisations and number of episodes. The cases group scored significantly higher on the personality traits of neuroticism and openness to experience.

CONCLUSION

The study confirmed the higher prevalence of neuroticism and openness to experience personality traits in bipolar with alcohol use disorders. The number of hospitalisations and mixed episodes were increased when both the illness coexisted. This also increased the deficits in executive functions, response inhibition and processing speed in bipolar patients with comorbid alcohol use disorders.

KEYWORDS

Bipolar Disorder, Alcohol, Cognitive Functions, Personality Traits.

HOW TO CITE THIS ARTICLE: Thinaharan A, Venkateswaran S, Mahalingam SM. To determine the personality traits, clinical characteristics and cognitive functions in bipolar disorder patients with comorbid alcohol use disorders. J. Evid. Based Med. Healthc. 2016; 3(102), 5628-5635. DOI: 10.18410/jebmh/2016/1164

BACKGROUND

Bipolar disorder is a widely prevalent disorder frequently associated with other psychiatric comorbidities. This increases its complexity and has negative prognostic

Financial or Other, Competing Interest: None.

Submission 23-11-2016, Peer Review 30-11-2016,

Acceptance 14-12-2016, Published 20-12-2016.

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DOI: 10.18410/jebmh/2016/1164

implications. Of all comorbidities, alcohol use disorders are most important. In a survey, persons with bipolar I disorder had 46% lifetime prevalence of alcohol-related disorders compared to 14% in general population.¹ Alcohol-related disorders significantly complicate the onset, course, treatment and prognosis of bipolar disorder causing increased distress, disability and expenditure.² There is also poor adherence to treatment and poor response to de-addiction programme.

Strakowski et al (2000) showed that alcohol use duration was associated with duration of mood episode.³ Strong association between substance use and dysphoric/mixed



mania than euphoric mania was demonstrated in various studies.⁴⁻⁷

Low level of education, male gender and co-occurring psychiatric illness were the risk factors identified for comorbidity of both disorders.⁴ Lifetime substance use disorders significantly increased the number of hospitalisations⁸ and number of suicide attempts.⁹ In a retrospective study, treatment non-adherence was found more in bipolar disorder patients with comorbid substance abuse (53%) than those without substance use (35%).¹⁰

The role of personality traits and comorbidity in bipolar disorder has not been extensively studied. In one of the very few studies done, bipolar disorder patients with current substance-related disorders had higher scores on novelty seeking than those without both past history and current substance use.¹¹

Various studies on neuropsychological research of bipolar disorder have established significant cognitive deficits persisting during euthymic state.¹² Deficits were more pronounced after multiple episodes.¹³ Similarly, cognitive deficits occur in alcohol dependence, which does not remit during abstinence.¹⁴

Studies on cognitive deficits in dual diagnosis of bipolar disorder and alcohol use disorders are few and they report additional decline in executive function in patients with dual diagnosis than single diagnosis.¹⁵ This further hampers the recovery from the disease. The increased cognitive deficits in dually diagnosed patients might be due to the long-term neurotoxic effect of alcohol¹⁶ or due to severe and prolonged mood episode.¹⁷ New studies have pointed towards the possibility of intrinsic neurocognitive deficits in bipolar disorder existing prior to commencement of disease leading to mood instability and alcohol dependence.¹⁸ Significant deficits were found on tests of visual memory and measures of executive functioning in bipolar patients with use of alcohol.¹⁹ Significant deficits in verbal memory, phonemic fluency and response inhibition were also noted.

The current study was aimed at assessing the effect of alcohol on the disease outcome and cognitive deficits in bipolar disorder. It was also designed to identify the personality traits that maybe unique to patients with dual diagnosis of bipolar disorder and alcohol use disorders. The identification of personality traits in either of the disorder may help us to prevent the co-occurrence of the other disorder. This will reduce the disease severity and improve long-term outcome in the patients.

AIMS AND OBJECTIVES

The aim of the study is to evaluate the clinical characteristics, cognitive functions and personality traits of patients with bipolar and comorbid alcohol use disorders.

MATERIALS AND METHODS

The study is a cross-sectional case controlled study, conducted at Institute of Mental Health, Chennai, a government tertiary care hospital. Consecutive patients in the age group of 18-55 years attending outpatient department were screened. 50 patients suffering from

bipolar disorder and alcohol use disorders according to ICD 10 were selected as cases. Another 50 patients suffering from bipolar disorder according to ICD 10 and no history of alcohol use were selected as controls. In case group, patients should not have consumed alcohol for a minimum of 2 weeks prior to examination. Since, all 50 of cases were males, males were chosen as controls. All patients should have minimum 8 years of formal education, normal hearing and vision and should be in a euthymic state with 6 months of remission. Individuals with mental retardation, neurologic/other psychiatric illness, previous history of ECT and any other substance use other than nicotine were excluded from the study. Informed consent was obtained from all participants of the study. The study was conducted in August 2014 after getting approval from Institutional Ethical Committee. The data was analysed using Statistical Package for the Social Sciences, version 20.0.

MEASURES

Semi-Structured Proforma

Details were collected from participants using semi-structured proforma regarding age, education, occupation, socioeconomic status, marital status, religion, language and domicile, details regarding illness characteristics like age of onset of bipolar disorder, duration of illness, number of episodes, number of hospitalisations, number of suicide attempts, history of alcohol use, duration of alcohol use, age of onset of alcohol use.

Alcohol Use Disorders Identification Test (AUDIT)²⁰

The AUDIT screening questionnaire is a simple questionnaire developed by WHO to identify persons with hazardous and harmful patterns of alcohol consumption. Based on the scores of AUDIT, treatment intervention is planned. The questionnaire has 10 questions- 1-3 on alcohol consumption, 4-6 on behaviour of drinking and dependence, 7-10 on the consequences or problems related to drinking. 1-8 questions scored 0,1,2,3,4 (5-point scale). 9-10 questions scored 0,2,4 (3-point scale). A total score of 8 or above indicates a hazardous/harmful pattern of drinking.

Severity of Alcohol Dependence Questionnaire (SADQ)²¹

The Addiction Research Unit at the Maudsley Hospital developed the Severity of Alcohol Dependence Questionnaire. The SADQ has 20 questions, which measures alcohol withdrawal symptoms-physical, withdrawal symptoms-affective, relief drinking, alcohol use frequency, time taken for withdrawal symptoms onset. Answers are rated from 0-4 (4-point scale) from 'never' to 'always.' Scores- ≥ 31 - "severe alcohol dependence," 16-30- "moderate dependence," < 16 - "mild physical dependency." In scores above 16, detoxification is indicated.

NEO-Five Factor Inventory (NEO-FFI)²²

Costa and McCrae (1992) developed the NEO-FFI a 60-item scale based on 1985 version of the NEO Personality Inventory (NEO-PI). It was developed to provide quick and

concise assessment of the five basic personality traits of neuroticism, extraversion, openness, agreeableness and conscientiousness. For each trait, 12 items were selected from the pool of 180 NEO-PI items on the basis of their correlations with validimax factor. The instrument uses a 5-point Likert response format.

Frontal Assessment Battery (FAB)

Frontal assessment battery was devised by Dubois et al²³ to assess executive functions at bedside. The FAB has six subtests. Each subset has a score from 0 to 3. A score of 12 or below is considered abnormal. The functions analysed are conceptualisation (similarities task), mental flexibility (phonological fluency task), motor programming (Luria’s motor series), sensitivity to interference (conflicting instructions task), inhibitory control (go-no-go task) and environmental autonomy (prehension behaviour).

Digit Symbol Substitution Test (DSST)²⁴

It is a test for visual motor coordination, motor persistence and response speed. The test consists of sheet in which numbers 1-9 are randomly arranged in 4 rows of 25 squares each. The subject has to substitute each number with a symbol using number symbol key given on the top of the page. The time taken to complete the test forms the score. The number errors made are noted.

Verbal N-Back Test²⁵

The N back tests used for verbal working memory are the N1 back and N2 back versions. In this test, 30 randomly ordered consonants are presented vocally at one letter in 1 sec. A total of 9 consonants, which are chosen randomly are repeated. In the N1 back test, the subject has to respond when a consonant is repeated consecutively. In the N2 back test, the subject has to respond when a consonant is repeated after an intervening consonant. The number of hits and errors are scored. Errors included the number of omission and commission errors.

Stroop test²⁶

This test measures the response inhibition ability. On a sheet, the names of colours “blue”, “green”, “red” and “yellow” are printed in capital letters in 16 rows and 11 columns. The colour of the print and the word printed might not match up. The individual is asked to read the word and not the colour of the word first and then to name the colour in which the word is printed column wise.

Stroop effect score = Time taken to name - Time taken to read the words.

RESULTS

Variable	BPD and AUD (N=50)	BPD (N=50)	p-value
Age (Mean in years)	37.4	34.7	.099#
Religion			
Hinduism	47 (94%)	45 (90%)	.360*
Christianity	3 (6%)	3 (6%)	
Islam	0	2 (4%)	
Domicile			
Urban	22 (44%)	32 (64%)	.320*
Semiurban	17 (34%)	13 (26%)	
rural	11 (22%)	5 (10%)	
Language			
Tamil	49 (98%)	49 (98%)	1.000*
Telugu	1 (2%)	1 (2%)	
Socioeconomic Status			
Lower	32 (64%)	35 (70%)	0.070*
Lower Middle	9 (18%)	2 (4%)	
Middle	9 (18%)	13 (26%)	
Occupation			
Unemployed	12 (24%)	12 (24%)	0.395*
Unskilled	26 (52%)	26 (52%)	
Skilled	9 (18%)	9 (18%)	
Clerical	2 (4%)	2 (4%)	
Professional	1 (2%)	1 (2%)	
Marital Status			
Unmarried	15 (30%)	11 (22%)	0.111*
Married	24 (48%)	27 (54%)	
Widow/separated/divorce	11 (22%)	12 (24%)	
Education (years)			
8-9	30	25	0.11*
10-12	18	21	
13-14	2	0	
>15	0	4	

Table 1. Descriptive Analysis of Sociodemographic Data

BPD: Bipolar Disorder; AUD: Alcohol Use Disorder.

#Independent sample t test, p value *Chi-square test P value.

The mean age of subjects in the cases (BPD and AUD) group was 37.4 years. The mean age of subjects in control (BPD) group was 34.7 years. There was no significant statistical difference between cases and controls in age.

On comparison of sociodemographic variables- religion, language, domicile, socioeconomic status, occupation, education and marital status using chi-square test, no statistical significance was found between cases and controls and both groups were comparable.

Variables	Cases/Controls	Mean	Std. Dev.	t-Value	P-Value
Age of onset of illness in years	BPD and AUD	25.46	4.077	0.179	0.859
	BPD	25.28	5.842		
Duration of illness in years	BPD and AUD	11.92	7.943	1.735	0.086
	BPD	9.46	6.122		
Number of hospitalisations	BPD and AUD	2.70	1.581	2.562	0.012
	BPD	1.96	1.293		
Duration of longest episode in months	BPD and AUD	66.30	42.544	1.396	0.166
	BPD	52.60	54.802		
Total number of episodes	BPD and AUD	4.82	2.488	1.493	0.139
	BPD	4.10	2.332		
Number of manic/hypomanic episodes	BPD and AUD	3.64	1.804	1.722	0.088
	BPD	3.04	1.678		
Number of depressive episodes	BPD and AUD	0.70	0.707	1.247	0.264
	BPD	0.90	0.886		
Number of mixed episodes	BPD and AUD	0.52	0.707	3.003	0.005
	BPD	0.16	0.468		
Number of suicide attempts	BPD and AUD	0.50	0.707	1.852	0.095
	BPD	0.28	0.454		
Table 2. Independent Samples t-Test to Compare Mean Values of Bipolar Illness Variables between Cases (BPD and AUD) (N=50) and Controls (BPD) (N=50)					

BPD: Bipolar Disorder; AUD: Alcohol Use Disorder.

Tables 2 shows that cases (BPD and AUD) had significantly higher number of mixed episodes than controls (BPD). There is significant increase in number of hospitalisations in cases group.

Variables	Cases/Controls	Mean	Std. Dev.	t-Value	P-Value
Neuroticism	BPD and AUD	34.06	6.529	10.234	<0.001
	BPD	22.68	4.382		
Extraversion	BPD and AUD	21.68	2.744	1.082	0.282
	BPD	22.26	2.617		
Openness to experience	BPD and AUD	34.86	3.574	6.074	<0.001
	BPD	30.50	3.604		
Agreeableness	BPD and AUD	29.00	3.245	0.403	0.688
	BPD	29.26	3.200		
Conscientiousness	BPD and AUD	31.34	3.224	0.567	0.572
	BPD	31.72	3.476		
Table 3. Independent Sample t Test to Compare Mean Values of Personality Variables between Cases (BPD and AUD) (N=50) and Controls (BPD) (N=50)					

BPD- Bipolar Disorder, AUD- Alcohol Use Disorder

Avg. scores- Neuroticism- 13-21, Extraversion- 24-30, Openness to Experience- 23-30, Agreeableness- 29-35, Conscientiousness- 30-37.

Tables 3 shows that cases (BPD and AUD) had significantly higher scores on personality traits of neuroticism and openness to experience than controls (BPD).

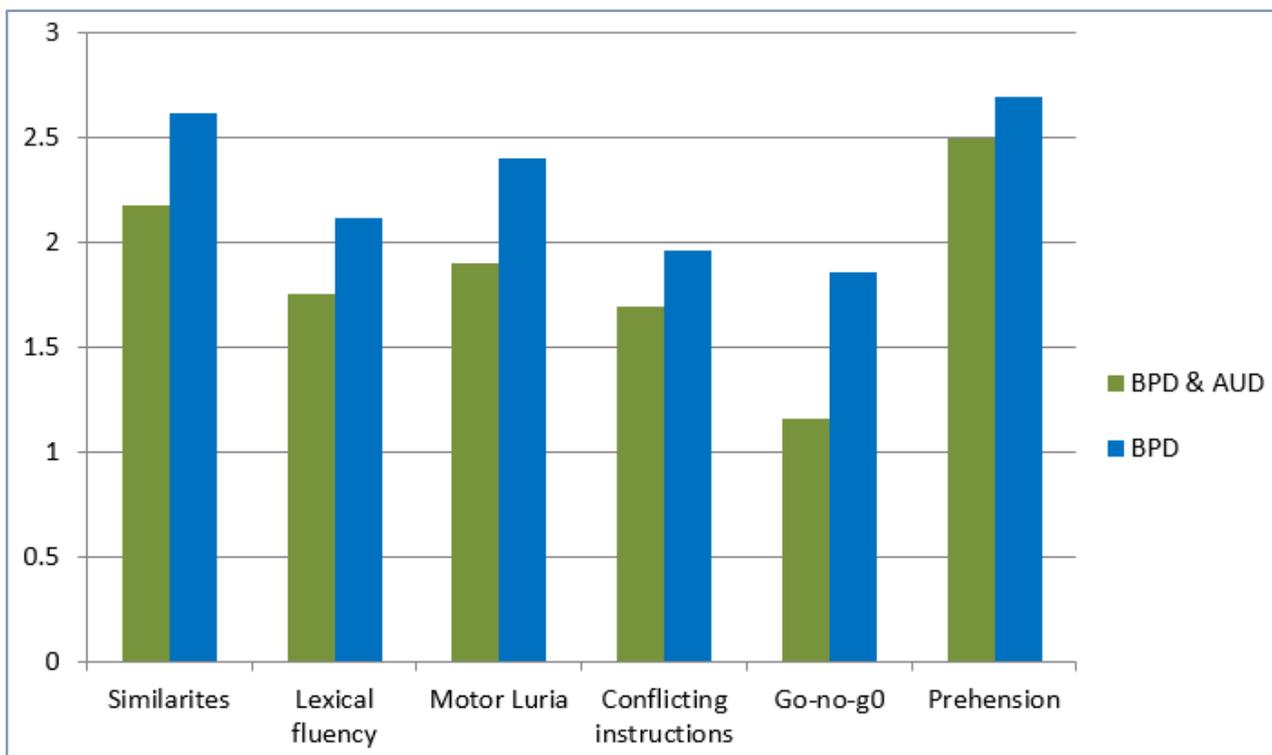


Chart 1. Comparison of Means of FAB Subsets Scores between Cases and Controls

Bipolar patients with comorbid alcohol use disorder have significantly lower scores on similarities (P-value <0.001), lexical fluency (P-value=0.001), motor luria (P-value <0.001) and go-no-go (P-value=0.001) subsets of frontal lobe assessment battery than bipolar disorder without alcohol use.

Variables	Cases/Controls	Mean	Std. Dev.	t-Value	p-value
FAB total score	BPD and AUD	11.24	2.832	5.273	<0.001
	BPD	13.74	1.794		
Stroop effect in secs.	BPD and AUD	285.96	42.618	13.198	<0.001
	BPD	198.10	19.985		
DSST in secs.	BPD and AUD	354.96	39.348	11.290	<0.001
	BPD	281.16	24.255		
N 1 back-hit	BPD and AUD	8.14	.572	0.179	0.859
	BPD	8.16	.548		
N 2 back-hit	BPD and AUD	6.26	1.026	0.00	1.000
	BPD	6.26	1.026		
N 1 back-error	BPD and AUD	1.58	.883	0.223	0.824
	BPD	1.54	.908		
N 2 back-error	BPD and AUD	4.00	1.666	0.185	0.854
	BPD	3.94	1.583		

Table 4. Independent Sample t Test to Compare Mean Values of Cognitive Variables between Cases (BPD and AUD) (N=50) and Controls (BPD) (N=50)

BPD- Bipolar Disorder, AUD- Alcohol Use Disorder.

Table 4 shows that bipolar patients with comorbid alcohol use disorder take significantly longer time to complete digit symbol substitution test than those without alcohol use. The Stroop effect score and FAB score are significantly higher in bipolar disorder with alcohol use group than only bipolar group. Both groups scored higher scores in Stroop test and DSST when compared to normative data.

		Age of Onset of Alcohol Use	Duration of Alcohol Use	Audit Scores	SADQ Scores
Age of onset of illness	Pearson correlation	.029	.043	.267	.253
	P-value	.844	.766	.061	.076
Duration of illness in years	Pearson correlation	.294*	.756**	.174	.237
	P-value	.038	.000	.226	.097
Number of hospitalisations	Pearson correlation	-.040	.403**	.125	.119
	P-value	.782	.004	.386	.409
Number of suicide attempts	Pearson correlation	-.331*	.310*	.043	.089
	P-value	.019	.029	.764	.539
Number of episodes	Pearson correlation	.040	.689**	.156	.220
	P-value	.782	.000	.279	.125
Number of manic episodes	Pearson correlation	.198	.608**	.170	.206
	P-value	.168	.000	.237	.152
Number of depressive episodes	Pearson correlation	-.189	.330*	-.105	-.012
	P-value	.190	.019	.466	.932
Number of mixed episodes	Pearson correlation	-.096	.350*	-.009	.046
	P-value	.505	.013	.949	.750

Table 5. Correlation between Clinical Variables and Alcohol-Related Variables in BPD and AUD Group N=50

		Age of Onset of Alcohol Use	Duration of Alcohol Use	Audit Scores	SADQ Scores
Neuroticism	Pearson correlation	.157	.300	.691	.691**
	P-value	.276	.034	.000	.000
Extraversion	Pearson correlation	-.114	.254	-.054	-.025
	P-value	.432	.076	.707	.865
Openness to experience	Pearson correlation	.201	-.177	.225	.249
	P-value	.161	.219	.115	.081
Agreeableness	Pearson correlation	.213	-.073	-.079	.035
	P-value	.138	.616	.585	.812
Conscientiousness	Pearson correlation	.144	-.075	.188	.289*
	P-value	.318	.607	.191	.042

Table 6. Correlations between Personality Traits and Alcohol Use Variables in BPD and AUD Group N=50

		Age of Onset of Alcohol Use	Duration of Alcohol Use	Audit Scores	SADQ Scores
FAB total score	Pearson correlation	-.119	-.527**	-.666**	-.738**
	P-value	.410	.000	.000	.000
Stroop effect	Pearson correlation	-.003	.494**	.561**	.638**
	P-value	.981	.000	.000	.000
DSST	Pearson correlation	-.023	.463**	.520**	.585**
	P-value	.872	.001	.000	.000

Table 7. Correlation of Scores of Cognitive Tests and Alcohol Use Related Variables in BPD and AUD Group N=50

Tables 5,6,7 show that bivariate analysis found significant association between duration of alcohol use and number of hospitalisations due to illness, number of suicide attempts, number of episodes (manic, depressive, mixed) and scores of FAB, Stroop effect and digit symbol substitution test. Significant association between SADQ scores and personality traits of neuroticism was found. The analysis also found significance association between AUDIT and SADQ scores and scores of FAB, Stroop effect and digit symbol substitution test.

DISCUSSION

Our study was conducted at a government tertiary care centre, which offers free treatment. Hence, majority of patients were from urban areas, mostly unskilled workers of lower income group and had lesser years of education. In our study, we could not find any significant difference in marital status or employment between bipolar disorder patients with and without alcohol use. Results similar to ours were shown in certain studies,²⁷ but other studies found dual diagnosis predominantly in unmarried and unemployed.²⁸

Review of literature showed early onset of bipolar illness with comorbid substance use,^{4,28,29} but our findings like Boaz Levy et al did not show early onset of bipolar illness with alcohol use.¹⁹ Similar to Gruenbaum et al²⁷ in our study, the duration of bipolar episode was not affected by alcohol use. But, previous studies showed poor long-term recovery in bipolar patients with substance use.^{10,30} Sonne SC et al showed higher incidence of mixed episodes in bipolar disorder with substance abuse, which was reflected in our study.⁴ Similar to previous studies, our study showed significant increase in hospitalisation in bipolar illness with alcohol use disorder.^{4,8} But, certain studies did not find any increase in hospitalisation in dually diagnosed patients.^{19,27} Our study reflected Etain B et al's findings³¹ of no difference in number of suicide attempts in bipolar patients with and without alcohol use. But, Grunebaum et al demonstrated frequent suicide attempts in patients with dual diagnosis.²⁷

Consistent with previous studies,^{11,32} bipolar disorder patients with and without alcohol use disorders showed high scores on neuroticism and novelty seeking behaviour was significantly higher in alcohol use group.

Similar to other studies, in our study, bipolar with alcohol use disorder patients performed poorly in the frontal lobe assessment battery, which tested the executive functions^{15,19,29,33} particularly in subsets of conceptualisation, mental flexibility, programming and inhibitory control. Stroop test completion time was prolonged in both the groups. But, alcohol use group took significantly longer time and scores on Stroop effect was higher similar to other studies.^{19,33} The time taken to complete digit symbol substitution test was prolonged in both groups when compared to normative data. But, bipolar disorder with alcohol use had significantly higher scores.

Our study showed that neuroticism scores were positively associated with duration of alcohol use and SADQ scores. Higher scores on neuroticism trait may point towards predisposition to alcohol dependence in bipolar disorder. SADQ scores were associated with poor performance in areas of conceptualisation and environmental autonomy. These results show that cognitive deficits were more prominent with the severity of dependence. David F Marshall et al also demonstrated significant effect of substance use on conceptual reasoning in bipolar patients with substance use disorders.²⁹

LIMITATIONS

This is a retrospective study with potential recall bias of the events of illness. The medications used by the subjects were not taken into account. Mood stabilisers and antipsychotics might affect results of cognitive testing. Results could not be generalised as all subjects were males predominantly from lower socioeconomic status and particular religion and region. Minority groups were not represented in the sample and ethnicity, culture may play a role in cognitive functioning.

CONCLUSIONS

Bipolar patients with very high neuroticism and high openness to experience score are predisposed to alcohol use disorders. Neuroticism is associated positively with severity of alcohol dependence. Assessment of personality traits routinely in subjects during onset of illness maybe helpful in anticipation and prevention of comorbid alcohol use disorders occurring. Cognitive functioning should be assessed routinely at the onset of illness, which might help us to evaluate if cognitive deficit at onset predisposes to occurrence of comorbid alcohol use disorders. Treatment and rehabilitation interventions should take into account the presence of comorbid illness and intervention strategies should be planned accordingly.

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