

Cognitive Impairment in Euthymic Bipolar Affective Disorder Patients

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Abstract- Cognitive impairment is a replicable feature of Bipolar disorder with measurable changes being present both during episodes and in remission. An observational, cross-sectional clinical study was carried out to study the nature and frequency of cognitive impairment in Euthymic Bipolar Affective Disorder (BPAD) patients. Participants included 40 Euthymic BPAD patients as cases and 40 controls with no history of psychiatric illness. Current mood symptoms were assessed with Young Mania Rating Scale and Hamilton Depression Rating Scale, cognitive functions were assessed by Standardized Mini Mental State Examination (SMMSE), Trail Making Test Part-B (TMT-B) and Digit Symbol Substitution Test (DSST). There was significant difference between cases and controls in number of errors committed and the mean time taken to complete TMT-B and DSST ($p < 0.01$). In within group analysis of cases there was higher mean time taken and more errors were committed in subjects in the age group of 40-60 years, substance use, lower socioeconomic status, lower educational status and longer duration of illness. The degree of cognitive dysfunction in BD increases with each significant mood episode. The relationship of cognitive impairment to functional outcome in BD highlights its significance as a treatment target.

Index Terms- Cognitive Impairment, Bipolar Affective Disorder, Euthymia

I. INTRODUCTION

Bipolar disorder (BD) is characterized by episodic pathological mood alterations that can be manic, hypomanic, depressive or mixed.¹ An increasing number of studies have detected cognitive impairments in patients with bipolar disorders not only during acute phase but also during euthymic periods. Broad cognitive impairments were present even in early phase of illness and in unaffected relatives.² BD patients perform poorly on tests of visuomotor processing speed, verbal memory, sustained attention and executive functioning. Impairments of smaller effect size in visual and verbal memory, working memory, and sustained attention have also been reported.³ There is a growing need for clarification regarding the magnitude, clinical relevance and confounding variables of cognitive impairment in bipolar patients. The impact of bipolar illness on cognition can be influenced by age of onset, pharmacological treatments, individual response, familial risk factors, and clinical features.⁴ The most recent metaanalysis

available used 45 studies comparing 1423 euthymic bipolar patients with 1524 healthy controls. The results showed group differences with medium to large effect sizes for measures of executive function, verbal memory, psychomotor speed, and sustained attention. Cognitive deficits have an influence on social functioning and the course of the illness.⁵ A recent review concluded that Patients with BD might exhibit a cognitive impairment that could be similar to Schizophrenia in terms of their profile, although patients with Schizophrenia may have more severe and widespread impairments.⁶ The aim of present study was to evaluate the nature and frequency of cognitive impairment in Euthymic Bipolar Affective Disorder patients.

II. METHODOLOGY

The present study is an observational, cross-sectional and clinical study. Participants were recruited by purposive sampling who met inclusion and exclusion criteria. Cases for the study included 40 Bipolar Affective Disorder patients who met ICD-10 DCR criteria currently Euthymic (3 months), aged between 20 to 60 yrs, educated above primary school level. Those with preexisting neurodegenerative or significant medical disorders and individuals suffering from sensory impairment were excluded. Controls for the study included 40 individuals who had no history of psychiatric illness, aged between 20 to 60 yrs, matched to age and socioeconomic status to cases. Both cases and controls were recruited from out patient department of psychiatry in a tertiary care general hospital located in Mangalore, Karnataka, India. Study was conducted from March 2015 to August 2015.

Present mood symptoms were assessed with young mania rating scale.⁷ (scores less than 7 denoting remission) and Hamilton depression rating scale.⁸ (scores less than 8 denoting remission). Cognitive functions were assessed using Standardized Mini Mental State Examination. (SMMSE), Trail Making Test Part-B (TMT-B) and Digit Symbol Substitution Test (DSST). Socioeconomic status was assessed using Socio Economic Status Schedule (SESS). The demographic and clinical variables were recorded in a specific proforma prepared for the study. A written informed consent was obtained from all the participants. The present study was approved by institutional ethical committee. Statistical analysis was carried out using Chi-square test, Mann-Whitney test and Pearson correlation coefficient.

III. RESULTS

Majority of subjects were from age group of 30 to 50 years, cases (62.5%), controls (60.5%), equal number of male and female gender in both the groups. Most of the participants were from rural area following hindu religion belonging to lower middle socioeconomic status. most of individuals in cases and control group were educated till high school. There was no statistical difference between the cases and controls in respect to socioeconomic and demographic variables. There was statistical significance between the cases and controls in mean time taken to complete TMT-B and DSST ($P < 0.01$), There was statistical significance between the cases and controls in committing more errors in TMT-B and DSST ($p < 0.01$). there was no significant differences between both the groups in mean SMMSE scores.

Within group analysis showed lower mean SMMSE scores in the age group of 51 to 60 yrs, more errors were committed and higher mean time take to complete TMT- B and DSST in individuals belonging to lower socioeconomic status, those with substance use and lower educational status. There was significant correlation between the total duration of the illness and time taken to complete both TMT-B and DSST, and commission of more errors ($p < 0.01$)

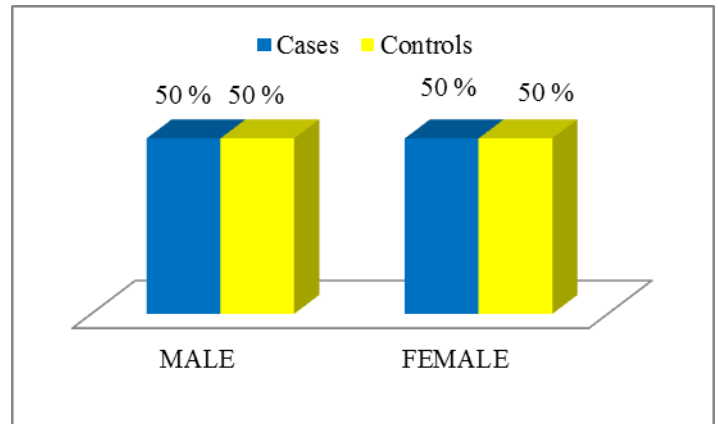


Figure 2: Gender distribution

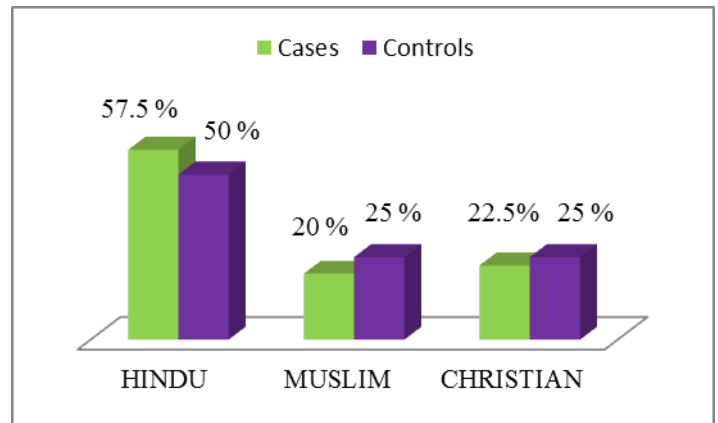


Figure 3 : Religion

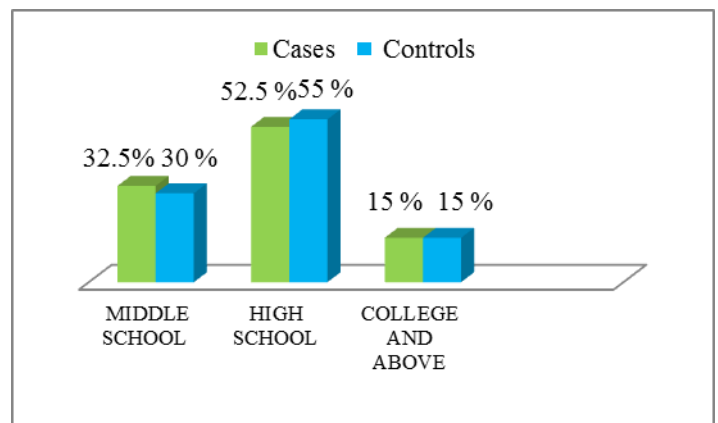


Figure 4 : Educational status

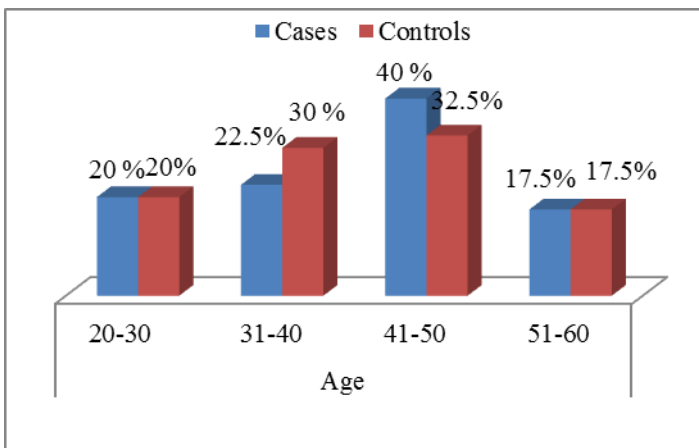


Figure 1: Age distribution of cases and controls

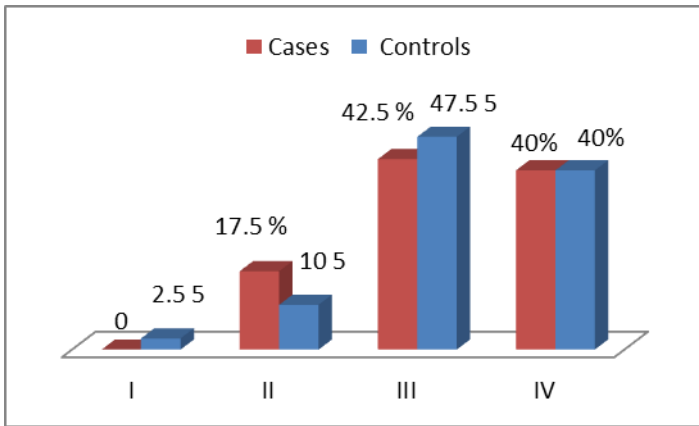


Figure 5 : Educational status

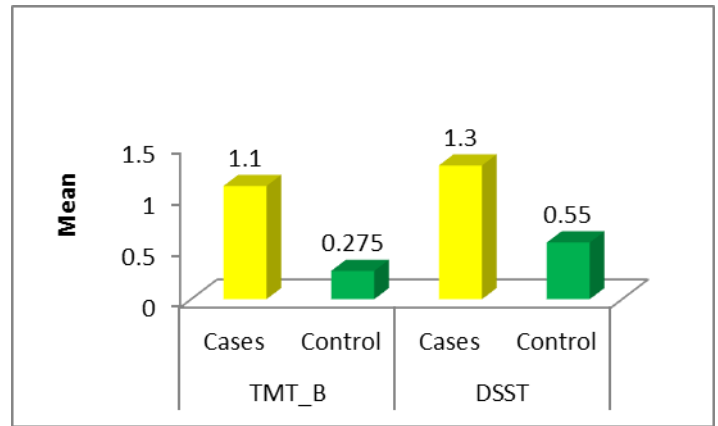


Figure 8 : Mean Errors committed in TMT-B and DSST

Variable	Chi-square test, p-value
Age	.851 (NS)
Gender	1.000 (NS)
Marital status	.849 (NS)
Religion	.785 (NS)
Domicile	.934 (NS)
Educational status	.792 (NS)
Socioeconomic status	.508 (NS)

Figure 6 : p value for the socio-demographic variables cases and controls

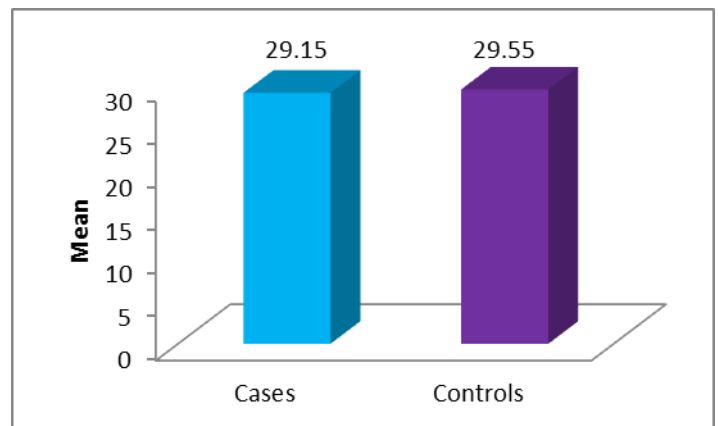


Figure 9 : Mean SMMSE scores between cases and controls

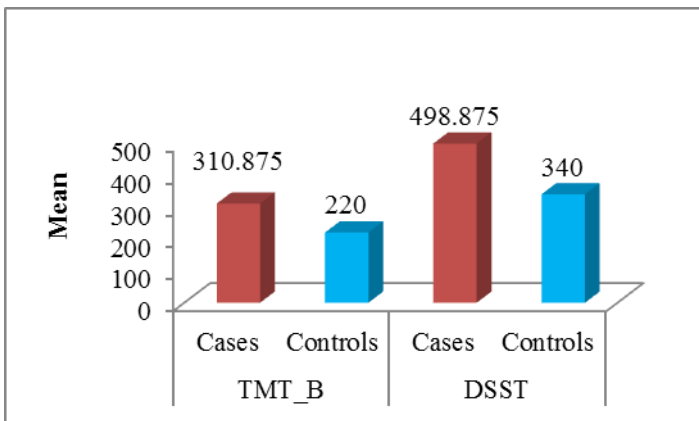


Figure 7 : Mean time taken to complete TMT-B and DSST

Group	Mean	SD	p- value
SMMSE CASES CONTROLS	29.15 29.55	1.231 .783	.196 (NS)
TMT-B (TT) CASES CONTROLS	310.88 220.00	107.016 84.800	p < 0.001 (HS)
TMT-B (E) CASES CONTROLS	1.10 .28	1.150 .599	p < 0.001 (HS)
DSST (TT) CASES CONTROLS	498.88 340.00	166.046 124.895	P< 0.001 (HS)
DSST (E) CASES CONTROLS	1.30 .55	1.436 1.085	P= 0.004 SIG

Figure 9: TT- Total time taken
E - Errors committed

	Age at illness onset		Duration of illness		Euthymic (months)	
	Pears on correlation	p	Pears on correlation	p	Pears on correlation	p
SMMSE	-.365	0.020	-.430	<0.01	.08	.962
TMT-B						
TT	.198	.222	.619	<0.01	.178	.273
E	.017	.918	.497	<0.01	.117	.472
DSST						
TT	.175	.280	.629	<0.01	.357	.024
E	.126	.438	.521	<0.01	.240	.137

Figure 10: Correlation Between Cognitive Functions And Disease Variables

IV. DISCUSSION

The present study revealed that there is statistically significant cognitive impairment in bipolar affective disorder patients who are in remission compared to healthy controls who are matched to socio-demographic variables. We found statistically significant differences in time to taken to complete the tests by the BPAD group compared to healthy controls, and also subjects in cases group committed more errors in the tests. Within group analysis showed a significant cognitive impairment in subjects with longer duration of the illness, those with the substance use, individuals from lower socioeconomic status and those with lower educational status.

In BPD, the cognitive dysfunction probably has a multifactorial aetiology involving a gene environment interaction. Results of recent meta-analytic studies have documented the existence of cognitive deficits in all phases of BPD, which are apparently independent of the affective state. These involve selective attention/processing speed, concentration, immediate episodic memory, attentional deviance, strategic thinking, abstraction, verbal learning/immediate memory/planning, and perseveration. Also, the deficits in executive function are probably related to dysfunction of the prefrontal cortex and may be responsible for reducing the patient's coping abilities, making individuals more vulnerable to recurrence of symptoms.⁹ In a longitudinal study Individuals with bipolar disorder showed consistent impairment on speed of processing and attention over time, despite significant changes in mood.¹⁰ A study compared cognitive impairment in older BD patients and patients with major depressive disorder, which found more cognitive impairment in BD patients.¹¹ Patients with co-occurring BD and alcohol dependence may suffer from more severe cognitive dysfunction and less favorable recovery of cognitive deficits than patients without SUD over the course of remission from a mood episode.¹² present study is consistent with previous literature which have noted cognitive impairment in euthymic BD patients.

The possibility that cognitive decline is associated with the onset of syndromal disease highlights the value of early recognition and intervention in BD. Furthermore, as existing research suggests that the degree of cognitive dysfunction in BD increases with each significant mood episode early intervention in BD should be viewed as a key priority for service development. The relationship of cognitive impairment to functional outcome in BD highlights its significance as a treatment target.¹ the present study has some limitations, the effect of medications were not assessed which would affect cognitive functions, not all domains of cognitive functions were assessed, relatively small sample size. Despite the limitations the present study shows BD patients perform poorly on tests of attention, visual scanning, executive function, psychomotor performance when compared to healthy controls.

V. CONCLUSIONS

The relationship of cognitive impairment to functional outcome in BD highlights its significance as a treatment target, it also directs attention to the potential neuroprotective effects of existing medication, such as lithium, and encourages the development of new pharmacological and psychological interventions.

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