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COGNITIVE FUNCTIONS IN FIRST-DEGREE NORMATIVE RELATIVES OF PATIENTS WITH BIPOLAR DISORDER TYPE-I

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KEYWORDS :

Introduction:

Bipolar disorders substantially reduce psychosocial functioning and are associated with a loss of approximately 10-20 potential & productive years of life. [1]

The disorder begins usually before the age of 30 years and in some patients persistent throughout life. The prevalence of bipolar mood disorder is around 1% in general population and is characterized by mood lability, suicidal thought, flights of ideas, distractibility, and in opposite low mood psychomotor retardation and decreased energy level.[2]

Patient of BIMD shows poor performance in cognitive function test that suggest frontotemporal lobe pathology. Bipolar disorder is a severe disorder and imposes a considerable burden on patients, their families and society. This is because of the early onset, frequent relapses, sometimes poor response to medication and chronic course of the illness. [3,4]

Bipolar disorders share genetic risk alleles with other mental and medical disorders. Bipolar I have a closer genetic association with schizophrenia relative to bipolar II, which has a closer genetic association with major depressive disorder. [1,4]

Bipolar disorder, like most mental disorders, shows complex inheritance, the transmission of the disorder most likely involves several genes and environmental factors that transmit the predisposition to the illness but not necessarily its expression. [5] It is still much unknown about the possible trait and more studies among BIMD patient and their relatives. [6,7]

Therefore, it is important to increase our knowledge about the disorder. Researchers agree that there is a high genetic contribution for developing bipolar disorder. It has been suggested that there are cognitive deficits and brain alterations that underlie the disease and probably contribute to the vulnerability to develop the disorder. [8]

METHODS

This Analytical cross-sectional study was conducted on first degree relative of patients with bipolar mood disorder in department of psychiatry, SMIMER hospital for 9-month duration after approval of ethics committee.

Out of all the patient visiting the psychiatry OPD and admitted in psychiatry ward in a spar of December 2021 to November 2022, every unaffected first degree relative of Bipolar mood disorder who fulfilled the selection criteria were requested to participate in the study and taken as 'case' and friend/non blood relative of a patient visiting the psychiatry OPD or admitted in other ward, who fulfilled the inclusion criteria were taken as 'control'. The case and controlled group were matched for age, gender and education. Sample selection method was convenience sampling. Total 60 case and control were included for the study considering inclusion and exclusion criteria The participants' inclusion criteria were between ages 18 years to 60 years, being able to read and write Gujarati, Hindi and English language and giving informed consent. First degree relative and control themselves were never diagnosed to have psychiatric illness and being free form any significant psychiatric and medical morbidity/on medication. They were interview with the semi-structured clinical interview for DSM-V and neuropsychological test was administered. & excluded those who were illiterate/poor intellectual functioning.

Neuropsychological assessment

The trail making test (TMTs) is popular neuropsychological instrument to examine attention, mental flexibility, and speed of processing and excusive function. In part A, the subject is asked to draw line to connect a series of 25 encircled numbers in numerical order. In part B subject connects 25 encircled number and letters in numerical and alphabetical order (e. g.; 1 A-2-B-3-C. etc.). The time take to complete part A and part B are recorded in seconds.

The Wisconsin card sorting test-64 (WCST-64) is used to assess the aspect of cognitive and neurological functioning. It measures planning strategies, excusive functions and abstract thinking. Whereby participants are required to shift mental set as they match 64 cards on the basis of color, shapes or numbers with minimal instruction or feedback form the examiner.

Paced auditory serial addition test (PASAT) is measure of cognitive function that specifically assesses auditory information processing speed and flexibility, as well as calculation ability. The subject is presented on audio CD to control of rate of stimulus presentation. Single digit is presented either every 3/2 second, and patient must add each new digit to the one immediately prior to it.

STATISTICALANALYSIS

All case and control data were analyzed by mean, Standard deviation and t test to look for any statistical significance.

RESULTS

Table 1 shows comparison of case group and control group on various demographic parameters based on age, sex and education. The group were not statistically different from each other and thus matched with each other in all variables.

Table 1: socio demographic of study

	Relative of BIMD	Control	Test (t-test or x2)	P value
AGE				
IN YEAR (MEAN)	29.4	31.4	1.746 (T TEST)	0.075
GENDER				
MALE	38	32	3.39(X2)	0.062
FEMALE	22	28		
EDUCATION				
PRIMARY	18	15	3.712(X2)	0.16
SECONDRY	23	20		
HIGHER SECONDRY	7	6		

GRADUATE	2	4		
POST GRADUATE	10	15		

As shown in table 2 there were no significant difference between first degree relative of BIMD and control group in trail A (p value = 0.735) and trail B test (p value = 0.121)

TABLE 2: Comparison of case and control Trail making test

	Mean	Std. Deviation	T test	P value
Trail A				
Case	54.22	15.60	0.339	0.735
Control	55.21	16.41		
Trail B				
Case	104.2	35.103	1.563	0.121
control	115.2	41.720		

As shown in table the performance of first degree relative of BIMD with control show significantly poor performance in WCST total error (p value = 0.0207) and WCST conceptual level response (p value = 0.0012) and not significant in WCST total (p value = 0.392), WCST perseverative response (p value = 0.3065) and perseverative error (p value = 0.0689)

TABLE 3: Comparison of case and control: WCST

	Mean	Std. deviation	T test	P value
WCST				
Case	40.21	7.426	0.8585	0.392
Control	38.98	8.247		
Total error				
Case	23.6	7.921	2.344	0.0207
Control	20.25	7.728		
Perseverative response				
Case	16.21	6.168	1.0271	0.3065
Control	17.4	6.519		
Perseverative error				
Case	14.34	5.549	1.8357	0.0689
Control	12.42	5.903		
Conceptual level				
Case	32.58	10.125	3.3229	0.0012
Control	38.94	10.830		

As shown in table 4 no difference was found in term of performance in PASAT-A (p value 0.0040), PASAT B (p value 0.0516) and PASAT A+B (p value 0.0168) between first degree relative of BIMD and control group.

TABLE 4: Comparison of case and control: PASAT

	Mean	Std. Deviation	T test	P value
Total A				
Case	54.22	7.409	2.9318	0.0040
Control	50.21	7.573		
Total B				
Case	58.7	8.840	1.970	0.0516
control	55.72	7.720		
Total A+B				
Case	112.92	16.25	2.426	0.0168
control	105.93	15.293		

DISCUSSION

In this study, we have used three different neuropsychological tests to explore cognitive function in first degree relative of BIMD and compare them with control group. For this study we prefer the test for cognitive function like executive function, cognitive shifting and visual search, speed of processing mental flexibility, calculation ability, quick assessment preservation and abstract reasoning.[4]

For assessment of cognitive function there are many other test also used like stroop word colour test, Rey Auditory Verbal Learning Test (RAVLT), Auditory Consonant Trigrams (ACT; Lezak, 1995), Letter-Number Sequencing Test (Wechsler, 1997), Conners' Continuous Performance Test-II (CPT; Conners, 2000).[9]

TMT is one of most widely used test for neuropsychological assessment. The first degree relative of BIMD in our sample demonstrated no impairment in trail making test A and B. In previous studies, TMT did not found specific deficit in case and control group. Whereas in other studies, TMT B or B-A impairments in relatives have been reported in previous studies (Zalla et al., 2004).[11] which can be due to sample size and the type of relatives and control selected, accounting for the difference.[4,10]

To this study on WCST-64 first degree relative of BIMD & group performed poorly when compared with the control is statistically not significant (p = 0.392), but conceptual level (p = 0.0012) is statistically significant. which support poor understanding of test, Normative relative of BIMD made more number of errors (p 0.027), further suggest that they had more difficulties in understanding the concept of test. Statistical significant deficit parameters suggest that the normative relative of BIMD had difficulties in trial and error learning, set shifting and understanding of problems as compared to control group. Usually for WCST-64, poor performance in BIMD suggested prefrontal cortical dysfunction.

The PASAT test was developed to measure attention concentration and some extant general intellectual ability. in PASAT A (P= 0.0040) is statistically significant and total PASAT A+B (P= 0.00168) is statistically significant and suggest that difficult in concentrating and cognitive shifting.[10]

CONCLUSION

In conclusion, this study finding may suggest possibility of cognitive impairment in first degree normative relative of BIMD. Nevertheless, it is not clear whether this finding suggest an enduring trait marker or impact of the small sample size as well as nature of case and control design. Further large sample size and further research is required to strengthen our current finding. Early identification of cognitive impairment would provide considerable benefit to patient's 1st degree relatives and suggest ways of coping with cognitive impairment.

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CONFLICT OF INTEREST:

None declared

ETHICAL APPROVAL:

The study was approved by the Institutional Ethics Committee

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