

A Comparative Study on the Function of Right and Left Hemisphere between Bipolar Patients and Normal Individuals

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ABSTRACT

Bipolar disorder is accompanied with various cognitive deficits, among which is the right hemisphere deficiency. To investigate these deficiencies, 35 bipolar male patients were selected using available sampling. They were matched with 35 normal individuals in terms of age, gender, educational level. The participants were asked to fill out Wechsler's Adult verbal and performance IQ tests. T-test was used for analyzing the results. The findings show that there is a significant difference between verbal and performance IQ of bipolar patients and normal individuals. Furthermore, the difference between verbal and performance IQ of bipolar patients is >15 which indicates a damage in the right hemisphere of bipolar patients.

KEYWORDS: right and left hemisphere function, bipolar disorder.

INTRODUCTION

The recent studies on the cognitive disorders focused mainly on depressed patients with unipolar and schizophrenic syndromes. However, few studies have investigated bipolar (henceforth BP) patients and their cognitive performance. According to Krappin (1913) cognitive deficits pertain to schizophrenic rather than BP disorder. In the past recent years, this claim has been criticized sharply. The recent researches show that almost 30-50% of BP patients suffer from psychiatric and social performance disorder due to cognitive deficits (Goodwin, Jamison 1990). Since 1951 there have been studies that prove the existence of cognitive deficits among BP patients. The primary theories emphasized on the difference between verbal vs. practical performance in IQ tests. They focused mainly on the right hemisphere disorder among patients with emotional disorders (Valed Fogel & Guy, 1951). Some primary reports of the use of Floor and Henry's suggested verbal IQ test show that the right hemisphere of patients with emotional disorders damaged (Floor & Henry, 1976; 1983). These theories led to extra studies to evaluate and diagnose the patients with emotional disorders. The primary findings show a relationship between cognitive deficits and right hemisphere damage among bipolar and unipolar patients (Tailor, Rodfield, Abramez, 1981; Valed Fogol & Guy, 1951; Wechsler, 1980). The Visual-Spatial evaluation tests were used to detect verbal IQ and its relationship with performance IQ among BP patients and to support the assumption that the right hemisphere of BP patients has damages (Dalby & Williams, 1986; Valed Fogol & Guy, 1951). In contrast to previous findings some studies do not support the theory of 'right hemisphere damage' of BP patients. A study by Kaloo et al. (1986) investigated verbal and non verbal intelligence of major depressed patients. The results of their study showed no significant difference between their verbal and non verbal intelligence during the cure and depression phases (Kaloo, Korin, Shapira, Coglemes & Lerer, 1986). Likewise, the results of study by Newman and Silverstain (1987) showed that there is no difference between bipolar and unipolar patients lateralization. Most of the current studies provide evidence of deficits in visual-spatial intelligence. However, there is not perfect agreement among scholars about the existence of disorder in the right hemisphere (Birden, Hoffman, & Knon, 2001). Though the theory of 'damage in right hemisphere' has been affected by the recent researches, the results of the simple and complex visual-spatial tests as well as visual-structural tests show that neural systems are engaged in BP disorder (Birden et al. 2001). In the neurological comparison of BP disorder and other psychiatric cognitive deficit disorders which is exclusively the symbol of this kind of disorder the focus has mainly been on right brain damage. The present study is an attempt to investigate the cognitive deficits of BP patients as it focuses on the patients with right brain damage. It seems that right hemisphere is more sensitive to emotional stimulus than left one. For example, listening to crying sound activates right amygdala more than left one (Sandi 2000). As one looks at people's facial expression, his/her attention to the emotional manifestation increases the activity of the right temple. The study by Ruth et al (1994) on 11 patients with inactive right hemisphere showed that people can recall sad and sorrowful events having felt no excitement.

Davidson and Ervin believe that while the induction of negative emotion increases the activity of the prefrontal cortex and temple region, the induction of positive excitement causes different patterns. Another study by Omri et al (2006) indicates that negative emotion increases the metabolism in the right socket prefrontal and the middle wrinkle upper forehead whereas positive emotion causes reverse correspondence. In a similar vein, the results of the study by Ternel et al (2008) on patients with right and left middle abdomen impairment show that emotional processing, decision-making, social conduct and personality of the patients with right region damage are more than patients with left region damage. They believe that processing negative emotions plays much more role in right region than left one (Ternel et al 2008).

Given the fact that the performance of the right hemisphere is measured by Wechsler's performance IQ and the performance of the left hemisphere is measured by Wechsler's verbal IQ, this study aims to investigate the hemispheric performance of BP patients.

METHOD

Participants and Research Design

To accomplish the objectives of the study, the practical-comparative method of post event type was used.

The statistical population of the study included all the patients who suffered from BP disorder in Tabriz during the year 1389 (2010) and were hospitalized at Razi Psychiatric Hospital, from among which 35 patients with BP disorder were selected on the basis of available sampling. The specified criteria of DSMINTR were used as diagnostic criteria for selecting patients. They were selected after being interviewed by a psychiatrist and a clinical psychology master to meet the criteria which pertain to the disorder. While the inclusion criteria included; age, gender, educational level and intelligence, the exclusion criteria included; lack of drug abuse, having no vision deficit, lack of agnosia and having no psychiatric record. The normal individuals were matched with the patients in terms of age, gender, educational level and intelligence.

Instruments

Wechsler Adult Intelligence Scale

Wechsler Adult Intelligence Scale (WAIS), a test designed to measure adults' intelligence, has been used since 40 years ago. Various resources refer to the use of Wechsler's scale to measure brain damages, mental retardation and the individuals who need specific training courses. The number of researches in which Wechsler scales was used to diagnose the clinical disease increased and the reports of the rehabilitation of these patients emerged in the late 1960s. The results of the studies carried out by neuropsychologists such as Filskof & Leli 1981, Mc Fie and Lezac 1982 supports the great contribution of Wechsler test. Furthermore, overwhelming studies clarified the role of Wechsler test in diagnosing brain damages by providing data on the lateralization and localization of the damages. Lezak (1983) acknowledges Wechsler's test as a significant portion of his neuropsychological examinations. He furthermore believes that some Wechsler's subtests have specific role in measuring particular capabilities. Wechsler's trilogy scales have high reliability and validity. According to Wechsler the validity of two half tests were recorded as; full-scale IQ 97%, verbal IQ 97% and performance IQ 93%. The distribution of coefficient validity for core subtests was reported higher ($r = 83\%$). Whereas the highest validity for two half of tests was reported for vocabulary knowledge (96%), the lowest was reported for picture completion (52%). The validity coefficient of retest with 1-7 weeks interval was reported high as well. The reported average validity coefficient for full-scale was 97%, for verbal IQ was 97% and for performance IQ was 93%.

When WAIS -R, a revised version of the WAIS, was released for the first time, ample number of studies which were carried out to measure the validity of the first edition were used to confirm the validity of this revised version. It seems quite reasonable because both versions follow similar concepts and have many subjects in common. As it was expected the correlation coefficient between the first and revised editions was high. As Setteler (1992) reports the estimated middle coefficient for the first and revised forms of WAIS for full-scale IQ was 94%, for verbal IQ was 94% and for performance IQ was 86%

Findings

	Levenes Test for Equality of Variance		t-test for Equality of Means				
	F	Sig	t	df	Sig(2-tailed)	Mean	Std. Error Difference
Full-Scale IQ	1.139	0.290	0.169	68	0.866	-15.54	0.88910
Performance IQ	1.136	0.290	8.354	68	0.000	-11.66832	1.39678
Verbal IQ	0.003	0.953	2.759	68	0.007	-6.17287	2.23741

The results of t-test analysis between verbal and performance IQ of BP patients and normal individuals show a meaningful difference. In the case of normal people the difference between verbal and performance IQ is recorded less than 15 whereas this difference for BP patients is 20 which indicate the difference between verbal and performance IQ of BP patients. Thus, the findings of the present study validate the results of the previous reports.

RESULTS AND DISCUSSION

The results of the current study show that there is a significant difference between the left and right hemisphere of BP patients. It backs up the findings of other scholars who opine that BP patients suffer from cognitive deficit (Goodwin & Jameson, 1990; Ternel et al. 2008; Tailor, Rodfield & Abramez, 1981; Valed Fogol & Guy, 1951; Wechsler, 1980; Fokoshima, 2008)). Furthermore, the results show that there is a difference between verbal and performance IQ of BP patients. While the difference between verbal and performance IQ in normal people is less than 15, according to the findings of the present study this difference for BP patients was estimated at 20 which indicate deficiency in performance IQ and the function of right hemisphere among BP patients.

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