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Original Article

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The Comparison of Sustained Attention and Cognitive Deficits in Patients with Schizophrenia and Bipolar Disorder Type II

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Abstract

Objective: The purpose of this study was to compare the sustained attention and cognitive deficits in patients with schizophrenia and bipolar disorder type II. **Methods:** The research method was causal-comparative (case-control) type. Statistical population was all the patients with bipolar disorder type II and schizophrenia at Isar and Fatemi hospitals in 2015 in Ardabil, Iran. 50 patients (25 cases per group) were selected by available sampling. Wisconsin Card Sorting Test (WCST) and Attention Test (D2) were used for collecting data. Data analysis was performed by multivariate analysis of variance (MANOVA). **Results:** The results showed that the performance of schizophrenic patients in both attention and cognitive deficits tests was lower than bipolar patients. These findings can be effective in improving cognitive deficits and attention performance as well as cause significant changes in community based rehabilitation ways.

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Keywords: Sustained attention, Cognitive deficits Schizophrenia, Bipolar disorder type II.

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1. Introduction

Schizophrenia is considered sometimes as the most devastating mental disease. Schizophrenia is not a unit disorder, but it is a set of psychosis (Rosenhan and Sylgman, 2007), which is characterized by a series of different symptoms, including extreme poverty in perception, thinking, action, self-concept and how to interact with others. This debilitating disorder usually appears in late adolescence or early adulthood, and disrupts social trends and developing life skills as well as leads to social isolation and failure in social roles (Sadok and Sadok, 2010). The disorder is associated with increased and high costs in the mental health system because of the early prevalence of the disease and disrupting in lifelong and requires continuous care so that patients with schizophrenia often occupy half the beds in mental hospitals (Lee, 2008). The prevalence of this disease is approximately 0.3% to 0.7% during lifetime (DSM-5, translated by Seyyed Mohammadi, 2014).

Although the disease has been always characterized by positive and negative symptoms such as hallucinations and delusions, thought disorder, superficial or inappropriate emotion, but recent studies have emphasized on the importance of cognitive deficits such as memory and attention problems. Cognitive deficit is a variable that seems to be associated with symptoms of schizophrenia. A cognitive deficit is the inability of the individual to complete tasks that would normally be able to do so. Cognitive deficits include the distraction that is the inability to concentration and attention, the inability of the memory for learning disabilities and failure to recall names as well as unintended and maintenance mistakes. Schizophrenia disorder and associated cognitive problems create a lot of confusions in everyday life, which affect not only them, but home, school and community. The ratio of inability to better cognitive performance about clinical symptoms is effective in determining the pre-knowledge of the disorder. Among cognitive deficits in schizophrenia, it seems working memory impairment can affect other symptoms and is also effective in creating them. In most of the studies, working memory deficits are the main characteristics of schizophrenia (Sim, Chua, Chan, 2006). Several experimental studies have shown that patients with schizophrenia have problems in sustained attention and memory (Korenbalt et al., 2004). Cognitive deficit is a core of schizophrenia; there are also problems with attention and memory, especially memory performance in patients with schizophrenia who have average intelligence or those who have experienced a first attack of the disease (Sadeghi, 2003). The onset of schizophrenia in comparison with other mental illness is associated with greater cognitive decline, deficits in attention, perception, motor skills and understanding of language as well as memory deficits in several aspects such as working memory and executive planning (Sadok and Sadok, 2010; translated by Rezaee and Arjmand, 2011). These damages are distinguished and impressive in the field of language and verbal skills and perception, vocabulary, memory and reminding are disrupted in patients (Firoozabadi, 2006). Ribakovsky et al (2010) showed that schizophrenic patients compared to normal subjects in a series of neuropsychological tests have lower performance and more preservative error. This indicates a general deficit in information processing and cognitive performance in schizophrenic patients. Eddington and Eddington (2007) indicated that patients with schizophrenia (with positive symptoms) show symptoms such as attention deficit and hyperactivity disorder due to increased brain dopamine and also the sustained attention deficits and disinhibition shocks. Buchan et al (2010) found in a study, schizophrenic patients with negative symptoms than patients with positive symptoms and the normal group have lower performance in sustained attention.

Another disorder examined in this study is mood disorders. Mood disorders are the most common psychiatric disorders can be seen as low mood during periods of depression or high mood during periods of mania (Sadok and Sadok, 2010). Mood disorders are divided into depressive disorders (unipolar depression), bipolar disorders, and two disorders based on etiology, mood disorder due to a general medical condition and drug-induced mood disorder. Bipolar disorder is a complex chronic disease characterized by recurrent periods of depression and mania or hypomania (Akis Gall, 2009). The prevalence of bipolar disorder type I have been reported 6.0 percent and 8.0 percent for Type II at 12-month period in the United States (DSM-5, translated by Seyyed Mohammadi, 2014).

In recent studies, a relationship was found between symptoms of mood disorders and cognitive deficits. Research evidences suggest that people with mood disorders suffer from cognitive deficits such as memory, distractibility, attention and emotional problems (Vojta et al., 2001). Scott and Stanton (2000)

demonstrated that the mood and psychotic patients show lower cognitive performance in categorized tests in the field of argument cognitive performance (Similarities and judgments) and also in the area of structural cognitive ability and memory. Chuan and Servent- Gilbert (2007) found that patients with schizophrenia and bipolar show abnormalities in the brain structure, particularly reducing the volume and decreased blood flow in the frontal lobe; frontal lobe performance has been demonstrated in concentration, attention and sustained attention, these patients have low performance in frontal lobe.

Also Zang et al (2000) concluded in a study that there is significant relationship among concentration and attention problems in patients with mood disorders and cognitive processes. Lang et al (2006), to explain the cognitive deficits of patients with mood disorders suggests binary pathway pattern, which the first one is executive dysfunction associated with deficiencies in response inhibition and the second pathway is a motivational dysfunction, which is associated with weak reward processing in these subjects. They also showed that cognitive deficits have a positive relationship with episodic learning, short-term memory capacity, decreased level of consciousness and diverted attention. In addition, cognitive deficits are associated with behavioral outcomes like shoplifting resulting from distractions (Sadok and Sadok, 2010; translated by Rezaee and Arjmand, 2011). With regard to the problems that the patients are faced with cognitive deficits and the impact of these problems on memory, attention and recognition, awareness of the psychological characteristics can be effective in modifying the cognitive deficits, attention and memory performances, can improve the quality of life and can create significant changes in methods of rehabilitation of community. Therefore, the present study was carried out in line with these researches to compare sustained attention and cognitive deficits in patients with schizophrenia and bipolar disorder type I.

2. Materials and Methods

The research method was causal-comparative (case-control) type. Statistical population was all inpatients and outpatients with bipolar disorder type II and schizophrenia at Isar and Fatemi hospitals in 2015 in Ardabil, Iran. 50 patients (25 cases per group) were selected by Available sampling (the samples were randomly chosen according to the psychiatric diagnosis on patient records inserted among patients). By providing a letter of introduction from the university and the necessary arrangements with Fatemi hospital (psychiatric ward) and Isar psychiatric hospital, the participants were psychologically ready and then were tested. Data analysis was performed by multivariate analysis of variance (MANOVA). The data collection instruments were questionnaires as follows:

I) Wisconsin Card Sorting Test (WCST): was used to measure executive performances. The test was developed in 1948 by Grant and Berg for abstract behavior, change a set and executive performances (Falgater et al., 1998). A set of 64 cards, which one to four symbols were on them as red triangle, green star, yellow cross and blue circle, is presented to participants and no two cards were similar or duplicate. Participants are responsible for replacing cards based on inferred from pattern used by examiner. The pattern consists of a red triangle, two green stars, three yellow crosses and four blue circles. The principle of classification and placement of the cards is by the color, shape and number of symbols, which examiner considers without informing the participants (Lizak, 1995). Reliability coefficient of the test in the study conducted by Davoodi et al (2010) on patients with schizophrenia and major depressive disorder were 0.71 and Cronbach's alpha was equal to 0.73.

II) Attention Test (D2): the test was prepared in the fifth decade of the twentieth century, after World War II, by the Institute of Technology Supervision Organization in Essen, Germany. In 1970, the second edition of this test was standardized for age range of 9 to 60 years. Today, the ninth edition of this test has been presented and confirmed by major developments in recent years in terms of psychometric indicators (Bagheri, 2011). The reliability of the test in a study (Gobser, 1973; quoted by Bagheri, 2011) has been reported 0.79. Also, the Cronbach's alpha coefficient has been calculated equal to 0.81 (Bagheri, 2011).

3.Results

The results showed that 6% of respondents, with the lowest frequency, had Master's degree or higher and 35.16 percent, with the highest frequency, had high school education. The average age of respondents was from 26.26 with standard deviation of 2.68 and the variance of 6.36. As well as 6% of the respondents, with the lowest frequency, had the length of disease less than 6 months and 51%, with the highest frequency, had the length of disease 18 months and over. Also, 11.57% of respondents, with the lowest frequency, had a history of hospitalization for the first time and 42%, with the highest frequency, had a history of hospitalization for the second time.

Table 1
Mean and standard deviation of sustained attention

Groups	Mean	Standard Deviation
Schizophrenia	31.15	2.96
Bipolar	25.40	1.04
Total	28.27	2.18

Table 1 indicates that the average sustained attention in schizophrenia and bipolar groups was 31.15 and 25.40, respectively.

Table 2
Mean and standard deviation of cognitive deficits

Groups	Mean	Standard Deviation
Schizophrenia	9.25	3.53
Bipolar	19.80	1.36
Total	14.52	2.44

As Table 2 shows, the average cognitive deficits in schizophrenia and bipolar groups were 9.25 and 19.28, respectively.

Table 3
The results of multivariate analysis of variance (MANOVA) on sustained attention

The source of changes	Sum of squares	Degrees of freedom	Mean of squares	F	The significance level	Eta-squared
Model	64222.817	1	64222.817	16331.477	0.000	0.997
Group	2698.033	2	1349.017	343.047	0.000	0.923
Error	224.150	57	3.932			

According to the results in Table 3 and considering F value (343.04) as well as given that significant level of error for confidence level of 0.99 is less than 0.01, it can be stated that there is a difference among patients with schizophrenia and bipolar disorder in sustained attention.

Table 4
The results of multivariate analysis of variance (MANOVA) on cognitive deficits

The source of changes	Sum of squares	Degrees of freedom	Mean of squares	F	The significance level	Eta-squared
Model	20056.817	1	20056.817	2322.947	0.000	0.976
Group	2808.033	2	1404.017	162.611	0.000	0.851
Error	492.150	57	8.634			

Given to data in Table 4 and regarding F value (162.61) as well as given that significant level of error for confidence level of 0.99 is less than 0.01, it can be stated that there is a difference among patients with schizophrenia and bipolar disorder in cognitive deficits.

4. Discussion and Conclusion

This research was conducted to compare the sustained attention and cognitive deficits in patients with schizophrenia and bipolar disorder type II. According to the results obtained, there was a significant difference among patients with schizophrenia and bipolar disorder in sustained attention ($P < 0.01$). So that patients with schizophrenia compared with other group had lower performance on test of sustained attention. The results of this work were in line with the findings of Buchan et al (2010) and Kurtz et al (2012). Buchan et al (2010) in a study found that schizophrenic patients with negative symptoms than patients with positive symptoms and depressed patients had lower performance on test of sustained attention. Also Kurtz et al (2012) in a meta-analysis of neuropsychological studies of bipolar disorder and schizophrenia concluded that these disorders with the balance status at the intermediate and overall levels of neuropsychological damages in sustained attention, memory and learning have certain damages. They also showed that the level of performance in schizophrenic patients compared to bipolar patients is lower in all three variables.

The explanation of the results obtained, it is likely that there are several factors in the etiology of these two diseases (schizophrenia and bipolar) and the different nature of the disease is triggered that the performance of attention and sustained attention in these patients had more damages than bipolar patients. Some researchers about lower performance of attention and cognitive performance in schizophrenic patients believe that these variables are the main focus of the disease that appear early in the disease and unrelated to disease progression or assumption (Waldo et al., 2004).

Other parts of the results showed significant difference in cognitive deficits among patients with schizophrenia and bipolar disorders ($P < 0.01$). So that patients with schizophrenia compared with other group had lower performance on the test. The results obtained were consistent with the findings of Dolatshahi (2004), Maralani et al (2008), Scott and Stanton (2000), Dickerson et al (2001), Rebia et al (2010), Davoodi et al (2010) and Gruber et al (2011). Dickerson et al in 2001 in a research demonstrated that schizophrenic patients compared with patients with bipolar disorders had more cognitive deficits and similar pattern of cognitive performance degradation was observed in both groups. Maralani et al in 2008 showed statistically significant difference between two groups. Schizophrenic patients had different and lower cognitive performance than patients with bipolar. Davoodi et al in 2010 stated that schizophrenic patients than patients with major depressive disorder had more cognitive deficits.

On the interpretation of these findings should be noted that in accordance with neurodevelopmental point of view, schizophrenia is created as an organic disease in the process of growth and has mainly cognitive symptoms related to brain structures damaged. The disease appears gradually; therefore, cognitive performance deteriorates progressively with the development of the individual (Chuan et al., 2007). As well as several factors such as the length of the disease, interpersonal and social dysfunction, reduction of sensory stimulants and other items have an important role in the decline of cognitive performance of patients. In addition, the type of medications of patients may be involved in the creation of cognitive (Dobson and Kendall, 2004).

In conclusion, these findings can be effective in improving cognitive deficits and attention functions as well as cause significant changes in ways of rehabilitation of community. Using the available sampling and also lack of clinical interviews were research limitations. Therefore it is recommended that in the future researches clinical evaluation should be performed in addition to random sampling. Also, according to the efficacy of cognitive deficits and attention tests to determine the cognitive disorders in mental patients, especially schizophrenic patients, it is recommended that this test should be done at the beginning of the diagnosis in order to appropriate and timely pharmacotherapy and psychotherapy.

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