ORIGINAL RESEARCH PAPER

Clinical Psychology

A COMPARATIVE STUDY ON NEUROCOGNITIVE DEFICITS AMONG INDIVIDUALS WITH SCHIZOPHRENIA AND AFFECTIVE DISORDER

KEY WORDS: Neurocognitive deficit, schizophrenia, affective disorder

Kasthuri, J.A. Department of Clinical Psychology, Institute of Mental Health, Kilpauk-Chennai

Dr. Smitha Ruckmani Department of Clinical Psychology, Institute of Mental Health, Kilpauk-Chennai

ABSTRACT

Background: Over decades compromised neurocognitive functions in schizophrenia and affective disorder have been substantially documented, with largely similar profiles of deficits, but results are varied between studies. The present study is yet another attempt at such comparison. **Aims and Objective:** The purpose of our study is to compare the neurocognitive deficits among individuals with schizophrenia and affective disorder. **Materials and Method:** The present study is conducted among patients diagnosed with schizophrenia (n=37) and affective disorder (n=37). Their neurocognitive functions were assessed using the Digit Symbol Substitution Test, Color Trails Test, Controlled Oral Word Association Test, and Tower of London Test. The Chi-square test is used to compare the neurocognitive deficits between the two clinical groups. **Results:** Both the clinical groups have performed poor in the neurocognitive test. Comparatively schizophrenic patients have performed poorer than affective disorder. Individuals with schizophrenia have obtained a higher number of deficits on attention, speed of information processing, and planning whereas individuals with the affective disorder had an increased number of deficits in verbal fluency. **Conclusion:** Despite the differences in the degree of neurocognitive deficit between the clinical groups, both schizophrenia and affective disorder has evident neurocognitive deficit.

Neurocognitive deficits are impairment in cognitive ability that impedes an individual's capacity to learn relevant information, initiate appropriate behaviors, and maintain skills to navigate real-world problems. Such compromised neurocognitive functions are found in schizophrenia (Goldberg, T.E., & Green, M.F. 2002) and affective disorder (Thompson, J. M et al., 2005), Over the past decades, research in the area of neurocognition has highly contributed to psychiatric disorders, such as revealing the biological underpinnings, explaining the underlying psychopathology and issues related to the course, outcome, and treatment strategies (Trivedi, 2006). In line with this, research conducted on neurocognitive functions in schizophrenia and affective disorder, has highlighted the critical importance of cognition in understanding the functional status and outcome for a better quality of life. The current study is yet another attempt to assess the neurocognitive deficits among those psychiatric populations.

According to a 2017 estimate schizophrenia and affective disorder (BPAD) are found among 3.5 million (95 % UI 3.0–4.0) and 7 6 million (95% UI 6 6–9 0) respectively (Sagar et al., 2020). Schizophrenia is a severe and debilitating mental disorder involving a range of cognitive, behavioral, and emotional dysfunctions (DSM V). Although the course of schizophrenia varies among individuals, schizophrenia is typically persistent and disabling.

Neuropsychological deficits, ranging from moderate to marked, have been established in schizophrenia across a wide range of cognitive abilities and are recognized as a "generalized deficit." (Bilder RM, et.al., 2000). Dysfunctions in working memory, attention, processing speed, visual and verbal learning, reasoning, planning, abstract thinking, and problem-solving have been extensively documented in schizophrenia (Heinrichs & Zakzanis, 1998). Likewise, Bipolar disorder is also a severe psychiatric disorder characterized by fluctuations in mood. People diagnosed with bipolar disorder experience episodes of mania, depression, or mixed, consisting of a combination of manic and depressive symptoms (American Psychological Association, 2000). Neurocognitive deficits are not only an enduring component of the illness but also represent a core primary characteristic of the illness (Fountoulakis, 2014). Deficits in attention, memory, executive functions, processing speed, working memory, and social cognition (Robinson et al., 2006; Torres et al., 2007; Arts et al., 2008; Raucher-Chéné et al., 2017) are consistently reported in affective disorder.

Previous studies on the comparison of neurocognitive functions in schizophrenia and affective disorder provide mixed evidence with mild (Kremen et al., 2000) to worse cognitive impairment in schizophrenia (Daban et al., 2006). However, despite the evidence of a larger magnitude of cognitive impairment in schizophrenia, the literature suggests that both disorders share a similar cognitive impairment profile (Zihl et al., 1998) with different degrees of deficits. (Vöhringer et al., 2013). The present study is yet another study of such comparision, we focused on comparing the neurocognitive deficits among individuals with schizophrenia and affective disorders, using standardized neuropsychological tests that emphasize speed of information processing, focused attention, verbal fluency, and planning.

METHOD

Participants

The present study was conducted at the Institute of Mental Health located in Kilpauk, Chennai. Consecutive sampling over a 6-month period was used to recruit patients from outpatient and inpatient units. Based on the case sheet of the patient, individuals who were diagnosed with Schizophrenia (n=37) and Affective disorder (BPAD, n=37) according to International Classification of Diseases (ICD 10) were selected for the study considering the inclusion and exclusion criteria.

Inclusion criteria

1. Individuals diagnosed with schizophrenia and affective disorder according to ICD-10
2. Age group between 18 to 40 years.
3. Onset of illness after 18 years.
4. Minimum five years of formal education

Exclusion criteria

1. Neurological or medical illness that can cause neuropsychological deterioration
2. History of alcohol or other substance abuse or dependence during the previous 2 years
3. History of head injury with any documented cognitive

sequel or with loss of consciousness.
4. Mental retardation.

Instruments

Socio-demographic data sheet: To record the subject's age, gender, education, occupation, marital status, family type, social status and domicile.

Clinical profile:

Information on the following variables was recorded. a) Age of onset. b) Duration of illness. e) Treatment details. f) Family history of psychiatric illness. g) History of substance abuse h) Current treatment.

Neuropsychological measures:

NIMHANS Neuropsychological Battery (Rao et al., 2004) was used in this study to assess a comprehensive neuro psychological profile of the participants. The battery comprises globally recognized neuropsychological tests which have been standardized on a normative sample of Indian adults between the age ranges of 16–65 years. The normative data is in the form of percentiles and cut-off which are an objective index of brain dysfunction and impairment. Two major neuropsychological domains were assessed namely:

Speed and Attention

a) Speed of Information Processing was assessed using the Digit Symbol Substitution Test (Wechsler, 1981).
b) Attention was assessed using the Color Trails test (CT) (D' Elia et al., 1996).

Executive Function

a) Phonemic fluency was assessed using The Controlled Oral Word Association Test (Benton & Hamsher, 1989)
b) Planning was assessed using the Tower of London Test (TOL) (Shallice, 1982).

Procedure

The study comprises patients with the diagnoses of schizophrenia and affective disorder (as per ICD-10 criteria) seeking treatment (outpatient and inpatient basis) from Institute of Mental Health, Chennai. The patients were interviewed for their willingness and suitability to participate in the test, each participant and the caregiver were explained about the purpose of the study, further evaluation was initiated after getting the written informed consent to participation. Demographic data sheet and clinical profile was filled by obtaining information from various sources, namely patients, relatives, treating doctors and medical records, and weighed against the inclusion and exclusion criteria. Further a detailed mental status examination was done to obtain a comprehensive, cross-sectional description of the patient's mental state. Patients who are clinically stable and co-operative were selected and administered with the NIMHANS neuropsychological battery. The tests were administered in a balanced manner and adequate breaks were provided to the participants during the administration.

Data analysis

Descriptive statistics like mean, standard deviation, frequency, and percentage were calculated for the demographic variables and chi- square test was used to compare the neurocognitive deficit between schizophrenia and affective disorder.

Ethical considerations

1. Ethical Procedure:

The study followed the APA format of ethical consideration and was approved by the Institutional Ethics Committee of the Institute of Mental Health, Madras Medical College.

2. Consent form:

The participants were given a consent form which will include the details about the study before participating in the research.

RESULT

Table 1 demonstrates the socio-demographic and clinical characteristics of the two participant groups: 37 schizophrenia patients (mean age: 34.5 years of 20 males and 17 females) and 37 patients diagnosed with affective disorder such as BPAD-mania and BPAD-depression (mean age: 28 years of 12 males and 25 females). The level of education and the number of people employed are remarkably high among patients with affective disorder.

Comparatively, individuals with the affective disorder have the youngest onset of illness (25.16 years) however; the schizophrenic group has a high number of individuals with a family history of mental illness and the longest duration of illness.

The table 2 shows the neurocognitive profile of the clinical groups, which is obtained by assessing the NIMHANS Neuropsychological Battery (Rao et al., 2004). The scores are interpreted in percentile, 15th and 85th percentiles were taken as the cut-off scores to identify deficits.

The result indicates that both the clinical groups have significant cognitive deficits but comparatively schizophrenic patients have performed poorer on digit symbol Substitution test (χ2:16.388), Color Trails1 (χ2: 8.073), Color trails 2 (χ2: 14.352), and Tower of London Test (χ2: 25.716) except controlled oral word association test (χ2: 4.593) where individuals with the affective disorder had increased number of deficits than schizophrenia. The same has been illustrated in figure 1.

Table 1 *Demographic and clinical characteristic of individuals with schizophrenia and affective disorder*

Characteristics		Schizophrenia (n=37)	Affective Disorder (n=37)
Socio-demographic characteristic			
Age (Mean±SD)		34.5±3.36	28±6.08
Gender (Male: Female)		20:17	12:25
Education	School Educated	22(59.5)	12(32.43)
	College Educated	15(40.5)	25(67.56)
Occupation	Employed	10(27)	26(70.27)
	Unemployed	27(73)	11(29.72)
Clinical characteristic			
Age of Onset		28.43±3.70	25.16±5.7
Duration of Illness (Mean±SD)		6.35±3.81	3.08±3.03
Family History of Mental illness	Present	31(83.8)	24(64.9)
	Absent	6(16.2)	13(35.1)

Table 2 *Comparison of neurocognitive deficits among schizophrenia and affective disorder*

Neuropsychological Test		**Schizophrenia (n- 37) % of individuals with deficits**	**Affective disorder (n-37) % of individuals with deficits**	**χ2**	**P value**	**Interpretation**
Digit Symbol Substitution Test		31(83.78)	14(37.83)	16.388	.000	S>A
Color Trails Test	Color trials 1	28(75.67)	16(43.24)	8.073	.004	S>A
	Color trial 2	30(81.08)	14(37.83)	14.352	.000	S>A
Controlled Oral Word Association Test		18(48.64)	27(72.97)	4.593	.032	S<A
Tower of London Test		34(91.89)	13(35.13)	25.716	.000	S>A

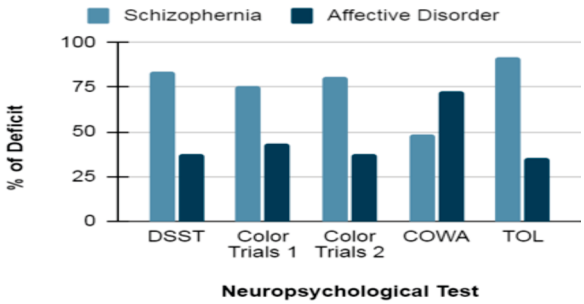

Figure 1: Comparison of neurocognitive deficits among schizophrenia and affective disorder. *DSST- Digit Symbol Substitution Test; COWA- Controlled Oral Word Association Test; TOL-Tower of London*

DISCUSSION

The primary aim of the current study is to compare the neurocognitive deficit among individuals diagnosed with schizophrenia and affective disorder. The results show that (a) both the clinical group has performed poor on all the neurocognitive tests, (b) comparatively individuals with schizophrenia has higher number of deficits on mental speed, focused attention, and planning, (c) individuals with the affective disorder have obtained a high number of deficit scores on verbal fluency.

In line with the previous literatures such as, Schretlen et al., 2007, Pradhan et al., 2008, and Vöhringer et al., 2013 the present study findings also show that patients with schizophrenia and affective disorder exhibit cognitive impairment with different degrees of deficit. Furthermore, the result shows a trend towards worse performance on neurocognitive function in schizophrenia when compared to affective disorder (Heinrichs and Zakzanis 1998; Seidman et al., 2002). Higher number of deficits is seen in schizophrenia in all the tests except the Controlled Oral Word Association Test. The meta analysis conducted by Raucher-Chéné et al., 2017 revealed that bipolar disorder patients present verbal fluency deficit with medium effect size. Besides mood dysregulation, alteration of the structure of language is the main features of affective disorder. From the various previous tests in bipolar patients changes in semantic contents, phonemic fluency, impaired verbal associations, abnormal prosody and abnormal speed of language have been highlighted. Most of the recent studies have shown no differences between schizophrenia and bipolar disorder (Huang et al., 2020; Kim et al., 2019). Though one study shows verbal fluency deficit in bipolar disorder more than in schizophrenia (Ceylan et al., 2020), in line with this study the current study also shows higher deficit scores on verbal fluency in bipolar disorder.

Like neurocognitive deficits being abundantly documented as the core feature of both schizophrenia and affective disorder, functional impairment is also being substantially established among those disorders and is the lead contributor to the burden of mental illness. Neuro psychological course appears to be independently predictive of subjective and objective functional outcomes (RSC Lee et al., 2015).

Research conducted on neurocognitive functions in schizophrenia and affective disorder, has highlighted the critical importance of cognition in understanding the functional status and outcome for a better quality of life. The current study is yet another attempt in understanding the nature of the deficits among those psychiatric populations in the Institute of Mental Health, Chennai.

We conclude that the findings of the current study reiterated the previous literature which states that both schizophrenia and affective disorder have neurocognitive deficits with different degrees, further schizophrenia performed poorer than affective disorder in all the domains such as mental speed, focused attention, and planning except verbal fluency. Finally the limitations of the present study include: the small sample size, the heterogeneity of the patients may have an impact on the results, the severity of clinical symptoms, categories & the dosage of psychotropic drugs were not included, the confounding variables such as premorbid function, intelligence, etc., were not included in the study.

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