



## Cognition in Schizophrenia and Bipolar Disorder: Effects of Gender Difference.

### KEYWORDS

schizophrenia, bipolar disorder, cognition, gender.

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**ABSTRACT** A study was conducted to observe differences in the cognitive abilities of patients of paranoid schizophrenia and bipolar disorder with respect to their gender. Two verbal and two non verbal neurocognitive tests were administered on 60 males and 60 females suffering from both of these disorders. Females suffering from paranoid schizophrenia were found to have better cognitive abilities than those of males whereas males of manic depression were found to have better cognition as compared to female manic depressives. When the difference was observed in all the male and female patients irrespective of the disorder, there was significant difference observed in the scores of trail making test A and clock drawing test. It was then concluded that there are differences in the cognitive functioning of male and female schizophrenic or manic depressive patients, though not all at the significant level. The hypotheses were partially proved. Larger samples may be required for generalizing the results.

### Introduction

During non-specific era, mental disorders were believed to be caused due to the possession of evil spirits. This view was discarded by several medical professionals such as Pinel in France, Tuke in England, Dix in U.S.A. and Kraepelin in Europe.

One of these disorders is Schizophrenia. 'Schizo' from Greek roots- *Schizen* (to split) and *phren* (mind) is a psychiatric diagnosis that describes a mental disorder characterized by abnormalities in the perception or expression of reality (Murray et al., 2012). Schizophrenia is traced to old Egypt as far back as second millennium before Christ, and then in 1887, Dr. Kraepelin named it Dementia Praecox (Kraepelin, 1907). Eugen Bleuler coined the term 'Schizophrenia' in 1911 and was also first to describe symptoms as positive or negative (Stotz-Ingenlath, 2000).

Another mental disorder known as Manic depressive illness or bipolar disorder is a brain disorder that causes unusual shifts in a person's mood, energy, and ability to function. They can result in damaged relationships, poor job or school performance, and even suicide. The idea of relationship between mania and melancholia (an old word for depression) is traced to at least 2<sup>nd</sup> century A.D. (Liddell et al., 1980). On 31<sup>st</sup> January 1854, Julius Baillanger described this to French academy of medicine. The term Manic-depressive reaction appeared in 1<sup>st</sup> American Psychiatric Association's Diagnostic Manual by Adolf Mayer, 1968, as a disorder came into force (Goodwin & Jamison, 1990).

As these disorders were diagnosed by the psychiatrists, it was also observed that there are certain differences in these disorders with respect to the type of gender of the patients.

Some studies have found a higher incidence of schizophrenia in men than in women. Schizophrenia tends to strike women 3-4 years later than men i.e., schizophrenia tends to begin in men/boys at an earlier age than women/girls; men who have schizophrenia generally begin showing signs of the illness between ages 15 and 20, compared to age 20 to 25 for women.. Males are found to be less

responsive to medications also as compared with woman and schizophrenia also tends to have a larger impact on men than on women - the long term outcome tends to be worse for men than women (Hofner, 2003).

Recent research also tends to suggest that schizophrenia is more prevalent in men than women - with women developing schizophrenia at a rate of approximately 50% to 75% that of men, overall. It has also been hypothesized that estrogen may play a protective role in women against schizophrenia. Women schizophrenics are more likely to marry, hold a job and live relatively normal lives. According to the research, the gender differences in IPL (Inferior Parietal Lobe) size and asymmetry could underlie clinical differences seem in men and women with schizophrenia (Pearlson, 2008).

In the context of manic depression, according to recent researches on gender differences in bipolar disorder it has been found that occurrence of bipolar disorder II is more in females than in males. Females are more likely to be rapid cyclers (Austin et al, 2005).

Proposed explanation for this is that effects of gonadal steroids as estrogen and progesterone act as depressants. Hypothyroidism and greater use of antidepressants in women are also considered as a reason for this (Jamison, 1995).

Thus, the available literature shows that there are certain cognitive impairments in people suffering from schizophrenia or manic depression and there are also certain gender differences in these disorders.

### Objectives

- To determine the difference between the performance of paranoid Schizophrenics (male and female) and bipolar disorder patients (male and female) on verbal and non-verbal cognitive tasks.
- To ascertain the difference between the level of performance of males and females suffering from the two disorders on all the cognitive tasks.

**Hypotheses**

- There would be a significant difference between the performance of paranoid Schizophrenics (males and females) and bipolar disorder patients (male and female) on verbal and non-verbal cognitive tasks.
- There would be a significant difference between the performance of males and females suffering from the two disorders on all the cognitive tasks.

**Participants**

The total sample size is of 120 patients, selected on the availability basis. The categorical division was as follows

- Paranoid Schizophrenics – 60 (Male=30, Female=30)
- Manic Depressives- 60(Male=30, Female=30)

**Tools Employed**

1. Identification Data Sheet
2. Sociodemographic Data Sheet
3. Illness Characteristics judged by the following tests by psychiatrist
  - i) Psychiatric Disability Rating Scale (Gautam, 1976)
  - ii) Composite Diagnostic Checklist of Schizophrenia
4. Digit Span Test
5. Trail Making Test (A & B)
6. Verbal Learning and Memory
7. Clock Drawing Test

**Procedure**

Patients were seated comfortably and a good rapport was established with him/her. Digit span test, trail making test A & B, verbal learning and memory test and clock drawing test (two verbal and two non-verbal cognitive tests) were conducted on the subjects. Scoring was done according to the manual of the tests. After the scoring was done, mean, SD, SED and 't' ratio were calculated for the male and female patients of schizophrenia and manic depression both separately and combined in order to obtain the results of gender difference. Interpretation was done.

**Results and Discussions**

**Result tables:**

**Table-1.** Mean, SD, SED, 't'-ratio and Significance of paranoid schizophrenics patients between male (N=30) & female (N=30) in Digit Span, Trail Making A, Trail Making B, Verbal Learning & Memory and Clock Drawing test.

Test	Paranoid Schizophrenics	Mean	SD	SED	't'
Digit Span	Male	7.20	2.27	.76	.52
	Female	7.60	1.88		
Trail Making A	Male	2.33	.26	.17	11.42*
	Female	4.29	.60		
Trail Making B	Male	3.51	.58	.25	6.91*
	Female	5.26	.78		
Verbal Learning & Memory	Male	33.47	12.61	4.55	.51
	Female	35.80	12.32		
Clock Drawing	Male	7.73	3.55	1.31	.71
	Female	6.80	3.64		

\* < 0.01, \*\* < 0.05

**Table-2.** Mean, SD, SED, 't'-ratio and Significance of bipolar disorder patients between male (N=30) & female (N=30) in Digit Span, Trail Making A, Trail Making B, Verbal Learning & Memory and Clock Drawing tests.

Test	Criteria	Mean	SD	SED	't'
Digit Span	Male	6.80	2.04	.76	3.06*
	Female	4.47	2.13		
Trail Making A	Male	4.18	.86	.46	6.37*
	Female	7.15	1.58		
Trail Making B	Male	8.18	11.69	3.05	.04
	Female	8.30	1.86		
Verbal Learning & Memory	Male	31.80	9.42	3.09	1.83
	Female	26.13	7.42		
Clock Drawing	Male	5.93	4.00	1.14	3.54*
	Female	1.87	1.92		

\* < 0.01, \*\* < 0.05

**Table-3.** Mean, SD, SED, 't'ratio and Significance of paranoid schizophrenics and bipolar disorder patients between male (N=60) & female (N=60) in Digit Span, Trail Making A, Trail Making B, Verbal Learning & Memory and Clock Drawing tests.

Test	Criteria	Mean	SD	SED	't'
Digit Span	Male	7.00	2.13	0.60	1.5
	Female	6.03	2.53		
Trail Making A	Male	10.25	2.13	0.39	6.12*
	Female	5.72	1.87		
Trail Making B	Male	5.84	8.47	1.59	.58
	Female	6.78	2.09		
Verbal Learning & Memory	Male	32.63	10.97	2.85	0.58
	Female	30.96	11.14		
Clock Drawing	Male	16.83	5.83	0.98	2.54*
	Female	4.33	3.80		

\* < 0.01, \*\* < 0.05

**Discussion**

The present study investigated the performance of paranoid schizophrenics and manic depressives (males and females) on four cognitive tasks (two verbal and two non-verbal tasks). The hypothesis formed was that there would be a significant difference between the performance of males and females suffering from the two disorders on the cognitive tasks.

Based on the scores obtained from Digit Span Test, Trail Making Test A & B, Verbal Learning, Memory, Clock Drawing Test. After the evaluation of these scores, following interpretations may be drawn:

Table 1 indicates mean, SD, SED, 't'-ratio and level of significance calculated by the scores obtained from the tests conducted on paranoid schizophrenic male and female patients.

It may be clearly seen from the table that there is a significant difference in the Trail Making Test A&B among male and female schizophrenics. However, in all the other tests, the difference between males and females was not significant.

Though some difference may also be observed at the mean level which indicates that in digit span, trail making A&B and verbal memory and learning tests, females were found to have more cognition as compared to

males whereas in clock drawing test male were found to be slightly more in cognitive abilities as compared to the females. Thus, this partially proves the first hypothesis as there was some difference observed in the mean level of some of the tests between male and female paranoid schizophrenics.

Table 2 illustrated mean, SD, SED, 't'-ratio, and level of significance between male and female bipolar disorder patients on Digit Span Test, Trail Making Test A & B, Verbal Learning, Memory and Clock Drawing Tests.

It may be observed from the table that there is a significant difference in the Digit Span Test, Trail Making A and Clock Drawing tests indicating that female manic depressive patients are significantly higher in the cognitive abilities involved in Trail Making Test A as compared to the male patients, whereas, male manic depressive patients were found to be significantly better in Digit Span and Clock Drawing tests.

On observing the mean scores it may be discussed that in Verbal Learning and Memory Test, males have found to have more cognition as compared to females but in Trail Making Test B, female patients were found to have slightly more cognition as compared to the male patients.

This could be due to the reason that male bipolar disorder patients continue to go to work in their external environment which helps them to maintain their cognitive abilities, whereas, most of the manic depressive females stop working and try to be isolated and alone which slowly deteriorated their cognition. Therefore, this partially proves the second hypothesis.

Result table 3 reveals the mean, SD, SED, 't'-ratio and level of significance achieved by the scores obtained from the tests conducted on paranoid schizophrenics and manic depressives between two groups of gender i.e. male and female.

Significant difference may be observed between scores of trail making test A and clock drawing showing the performance of males on these cognitive tasks to be better than the performance of females. It may also be seen that there is no significant difference between three tests namely digit span test, trail making test B and verbal learning and memory test but differences in mean level may be observed.

Therefore, this partially proves the third hypothesis that there would be a significant difference between the performance of male and female suffering from the two disorders on all the tasks as the differences may be seen in the mean level but not on the significant level.

Similar studies in this area has been done where Landro et al. (2001) compared neuropsychological functions in 22 patients with non psychotic unipolar major depression with

30 patients with non psychotic bipolar major depression. The findings suggest that the impairment was independent of the gender differences as no significant difference was observed between deficits of male and female.

Similarly, Porter et al. (2003) examined neurocognitive function in patients with psychotic and non-psychotic depression with respect to gender. Results showed that there was no significant difference found between the performance of male and female on cognitive tasks.

On the contrary, Mondal and Sharma (2007) carried out a study to assess neurocognitive functions in patients of major depression. In this study patient of major depression were compared with minor depression on neurocognitive test battery consisting of letter cancellation test, trail making test A & B, Ruff figure fluency test, digit forward and backward test. Results show that on the basis of gender, there is a significant impairment on all the studied neurocognitive parameters in major depressive in comparison to minor depressive subjects, which demonstrates significant impairment of attention, Visuo motor speed, immediate verbal memory, short term retentive capacity and executive function in patients of major depression.

Therefore, the clear reason of having no significant differences may be that both males and females have the same physiology and anatomy of brain and these two disorders affect brain in a definite process in humans. The test in which there is a significant difference is because males are more prone to outside environment. Another reason could be that they are engaged in jobs, where their cognitive abilities continuously get rehearsed, whereas females very often do not get this opportunity.

### Conclusion

In all it may be concluded that differences due to gender do occur among the patients of schizophrenia and manic disorder. Although in some tests the differences are not significant, but still, differences may be found at the mean level.

### Limitations and Implications

#### The limitations of the study were as follows-

1. The sample size was small to generalize the results.
2. The research work limits itself to state of Rajasthan only.
3. Only certain cognitive abilities were assessed.
4. The effects of treatment on the cognition of the patients were not analyzed.

The present research may help in developing more effective treatments and to empower the person to regain his or her abilities. This will open the new vistas to help and rehabilitate mentally disorder patients; furthermore, it will provide impetus to generate new hypotheses.

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