

## Cognitive Impairment in Schizophrenia Patients

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### ABSTRACT

**Background:** Schizophrenia patients have been determined a variety of cognitive impairment such as inability to pay proper attention, impaired information processing, inability to recall information and respond to information quickly, inability to think critically, problems of the plan and organized, inability to solve a simple problem and make the decision, impaired speech, and language, etc. **Aim:** The present study was undertaken with the aim to determine the effects of age on cognitive impairment in schizophrenia patients. **Method:** The sample consists of 50 schizophrenia patients and 50 normal control subjects, age range from 20-50 years based on a purposive sampling technique. The cognitive Symptoms Checklist was used to identify the problems in daily living skills under the heading of attention, concentration, memory, visual process, language, and execution. **Result:** Schizophrenia patients determined cognitive impairment as a comparison to normal control subjects on the Cognitive Symptoms Checklist. Patients with schizophrenia exhibited poor attention and concentration, impaired memory, language problems, impaired visual processing, and executive impairment.

**Keywords:** Cognitive Impairment, memory, Attention and Concentration, Schizophrenia, CSC

Schizophrenia is a unique and severe mental disorder in any psychological disorder. Schizophrenia patients used to live in fantasy, dreamy, and unique worlds, and create an atmosphere where they get less interference from the external environment. Most of the time, they don't know what happening around them. Along with these, they don't have any awareness about the orientation of time, day-night, months, year, place, etc and they don't have an orientation about their past, present, and future. They are enjoying their unique thoughts, feelings, ideas, and dreams (McCleery et al 2019). Due to this, they are expressing smiling to self, talking to self, enjoying and dancing-like behavior, they are also showing suspiciousness, hallucination, and hallucinatory behaviour and getting different kinds of delusion. This behaviour of schizophrenia patients is recognized as a core symptom of schizophrenia (Carter et al. 2010, Hill et al. 2013). They start to show irritating and irrelevant behavior when they are getting any interference from the external environment. At this condition, they start to show abusive and assaultive behavior towards anyone (Dalal et al., 2010; Haatveit, et al. 2021, North, et al. 2021).

In Schizophrenia patients, the most common characteristics of cognitive impairment (Bloom et al., 1995) such as problems in sensory processing and information processing, impaired

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## Cognitive Impairment in Schizophrenia Patients

perception, inability to think properly, difficulty in focusing or paying attention and concentration (Palmer et al., 1997) and working memory, difficulty in expressing thoughts and formulate ideas, disorganized thinking, difficulty in understanding information, difficulty in integrating thoughts, feelings, and behavior, impaired memory (Choudhury et al. 2009, Shen et al. 2014, Ragland et al. 2015), the problem of remember and recall information, difficulty in organize and solve problems, problem in respond to information quickly, problem in visual scanning, disorganized speech and language, impaired executive functioning, impaired decision making, impaired motor functioning, poverty of speech, etc. (Bhattacharya, 2015; Aich et al, 2016, García-Laredo 2018, Uppinkudru, et al. 2023, Chan, et al. 2023, Goonathilake, et al. 2022, Javitt , 2023, John, et al. 2023, Uppinkudru, et al. 2023).

### **METHODOLOGY**

#### *Sample*

In the present study, the sample comprises 50 schizophrenia patients and 50 normal controls with age ranges between 20-50 years. Only male subjects were taken as samples. Schizophrenia patients were selected from different wards of Ranchi Institute of Neuro-Psychiatry and Allied Sciences (RINPAS), Kanke, Ranchi, Jharkhand diagnosed with schizophrenia according to ICD-10 DCR criteria and normal controls were selected from different localities of Jharkhand state by using purposive sampling technique.

#### *Materials*

A self-prepared Performa mainly designed for this study was used for the purpose of socio-demographic and clinical details of the subjects. GHQ-12 developed by Goldberg and Miller (1979) was administered as a screening tool for the normal control subjects. BPRS developed by Overall et al (1962) was used to screen the severity of psychopathology in schizophrenia patients. Cognitive Symptoms Checklist developed by O'Hara et al. (1993). It has been used to identify the problems in daily living skills under the heading of attention, concentration, memory, visual process, language, and execution. These cognitive domains are further subdivided into various components. The domain of attention and concentration is further subdivided into the areas of internal distracters (physical, emotional), external distracters (visual, auditory, and environmental), sustained attention, divided attention, and simultaneous attention. The domain of memory is further subdivided into activities of daily living (medication, nutrition/food preparation sequence, safety, routines, money management, spatial relationships) time, and receptive language.

#### *Procedure*

All the participants included in the present study were interviewed after having informed consent and then a self-prepared semi-structured socio-demographic and clinical data sheet was used. Then GHQ-12 was administered as a screening tool for normal controls, cutoff point 2 signifies the sound mental health of an individual. Participants scoring more than 2 on GHQ were screened out. BPRS was used as a screening tool for schizophrenia patients. The Cognitive Symptoms Checklist (CSC) was administered to schizophrenia patients and normal control subjects individually to evaluate cognitive impairment. Mean, SD and t-test have been computed by using SPSS 16.00.

### **RESULT AND DISCUSSION**

Table- 1 indicates the performance in schizophrenia patients and normal control subjects on subtest of attention and concentration on Cognitive Symptoms Checklist. It is quite obvious from the table that patients with schizophrenia have deficits in attention and concentration. Schizophrenia patients have been performed high on internal distracters

## Cognitive Impairment in Schizophrenia Patients

**Table- 1: Performance of Schizophrenia Patients and Normal Control Subjects on Attention and Concentration subtest of Cognitive Symptoms Checklist**

Subjects Variables	Schizophrenia Patients (N=50)		Normal Controls (N=50)		df	t-Value
	M	S.D	M	S.D		
Internal Distracters (Physical)	2.94	1.09	1.12	0.55	98	10.46**
Internal Distracters (Emotional)	3.56	1.45	1.52	0.76	98	8.76**
External Distracters (Visual)	1.64	0.77	0.44	0.50	98	9.18**
External Distracters (Auditory)	1.70	1.18	0.34	0.47	98	7.54**
External Distracters (Environmental)	1.92	0.89	0.38	0.49	98	10.63**
Sustained Concentration	6.08	2.76	1.74	0.78	98	10.69**
Divided Attention	2.50	0.84	0.46	0.76	98	12.73**
Simultaneous Attention	3.30	1.15	1.10	0.61	98	11.95**

\*\*=Significant at 0.01 Level

(physical) as compared to normal control subjects and difference between these two groups have been found to be significant statistically (Schiz;  $M=2.94\pm 1.09$ , Normals;  $M=1.12\pm 0.55$ ,  $t=10.46$ ,  $p<0.01$ ). Patients with schizophrenia have also performed high on internal distracters (emotional) as compared to normal control subjects (Schiz;  $M=3.56\pm 1.45$ , Normals;  $M=1.52\pm 0.76$ ,  $t=8.76$ ,  $p<0.01$ ). External distracters (visual) were found in schizophrenia patients (Schiz;  $M=1.64\pm 0.77$ , Normal;  $M=0.44\pm 0.50$ ,  $t=9.18$ ,  $p<0.01$ ). Schizophrenia patients have been performed high on external distracters (auditory) of the subtest of Cognitive Symptoms Checklist as compared to normal control subjects and the difference between the two groups have been found to be significant statistically (Schiz;  $M=1.70\pm 1.18$ , Normals;  $M=0.34\pm 0.47$ ,  $t=7.54$ ,  $p<0.01$ ). Similar trends have been seen on external distracters (environmental) in schizophrenia (Schiz;  $M=1.92\pm 0.89$ , Normals;  $M=0.38\pm 0.49$ ,  $t=10.63$ ,  $p<0.01$ ). Patients with schizophrenia have been observed impaired sustained concentration (Schiz;  $M=6.08\pm 2.76$ , Normals;  $M=1.74\pm 0.78$ ,  $t=10.69$ ,  $p<0.01$ ). Divided attention is also impaired in schizophrenia patients (Schiz;  $M=2.50\pm 0.84$ , Normals;  $M=0.46\pm 0.76$ ,  $t=12.73$ ,  $p<0.01$ ). Patients with schizophrenia have been performed high on simultaneous attention as compared to normal control subjects and differences between the two groups have been found to be significant statistically (Schiz;  $M=3.30\pm 1.15$ , Normals;  $M=1.10\pm 0.61$ ,  $t=11.95$ ,  $p<0.01$ ).

The findings of the present study in consistent with the findings of patients with schizophrenia who have attention deficit (Vikash, 2006). Internal emotional distracters have been found high in schizophrenia patients. Schizophrenia patients also have problems with external visual distracters. Egeland, et al. (2003) also found that patients with schizophrenia have attention deficits. External auditory distracters, external environment distracters, simultaneous attention problems, numerous neuropsychological investigations have established that patients with schizophrenia suffer from significant deficits in attention, memory, executive functioning, and general intellectual abilities (Heinrichs, et al., 1998; Reichenberg et al. 2008, Haatveit, et al. 2021, North, et al. 2021). Difficulty of sustained concentration was found high in schizophrenia patients. Problems of divided attention were also found high in comparison to normal control subjects. Their inability to filter out irrelevant stimuli has been explained in terms of sensory gating phenomena (Braff et al.,

## Cognitive Impairment in Schizophrenia Patients

1990). Attention deficit in schizophrenia is manifested in different ways; it includes perseveration, over-switching (Iwanami et al., 1998; Yogev et al., 2003), and inability to ignore irrelevant stimuli (Brébion et al., 2015; Giersch et al., 2015; Hinzen et al., 2015; Walther, 2015, Uppinkudru, et al. 2023, Chan, et al. 2023, Goonathilake, et al. 2022, Javitt , 2023, John, et al. 2023, Uppinkudru, et al. 2023).

Table-2 projects the performance of schizophrenia patients and normal control subjects on the subtest of memory of the Cognitive Symptoms Checklist. Patients with schizophrenia have been observed difficulty in remembering to take nutrition/food preparation in daily activity as compared to normal control subjects and the difference between the two groups has been found to be significant statistically (Schiz;  $M=4.22\pm 1.45$ , Normals;  $M=1.08\pm 0.75$ ,  $t=13.62$ ,  $p<0.01$ ). Similar trends have been seen in remembering safety difficulty (Schiz;  $M=2.58\pm 1.26$ , Normals;  $M=0.28\pm 0.53$ ,  $t=11.85$ ,  $p<0.01$ ). Schizophrenia patients have been seen remembering difficulty in daily routines in comparison to normal control subjects (Schiz;  $M=2.20\pm 1.75$ , Normals;  $M=0.12\pm 0.43$ ,  $t=8.16$ ,  $p<0.01$ ). Money management is the biggest problem that has been seen in schizophrenia patients (Schiz;  $M=3.18\pm 1.42$ , Normals;  $M=0.54\pm 0.50$ ,  $t=12.36$ ,  $p<0.01$ ). Remembering difficulty has been observed in spatial relationship is the major symptoms in schizophrenia (Schiz;  $M=2.76\pm 1.10$ , Normals;  $M=0.66\pm 0.69$ ,  $t=11.46$ ,  $p<0.01$ ). Patients with schizophrenia have been seen difficulty in the orientation of time (Schiz;  $M=3.56\pm 0.91$ , Normals;  $M=0.54\pm 0.50$ ,  $t=20.58$ ,  $p<0.01$ ). Remembering difficulty in receptive language has been found in schizophrenia patients (Schiz;  $M=3.62\pm 1.55$ , Normals;  $M=1.22\pm 0.51$ ,  $t=10.41$ ,  $p<0.01$ ). Schizophrenia patients have been noticed to remember difficulty in expressive language (Schiz;  $M=2.62\pm 1.07$ , Normals;  $M=1.06\pm 0.62$ ,  $t=8.94$ ,  $p<0.01$ ). Patients with schizophrenia have been observed remembering difficulties in their personal life (Schiz;  $M=1.48\pm 1.01$ , Normals;  $M=0.36\pm 0.48$ ,  $t=7.04$ ,  $p<0.01$ ).

**Table 2: Performance of Schizophrenia Patients and Normal Control Subjects on Memory subtest of Cognitive Symptoms Checklist**

Subjects Variables	Schizophrenia Patients (N=50)		Normal Controls (N=50)		df	t-Value
	M	S.D	M	S.D		
Nutrition/ Food Preparation	4.22	1.45	1.08	0.75	98	13.62**
Safety	2.58	1.26	0.28	0.53	98	11.85**
Daily Routines	2.20	1.75	0.12	0.43	98	8.16**
Money Management	3.18	1.42	0.54	0.50	98	12.36**
Spatial Relationship	2.76	1.10	0.66	0.69	98	11.46**
Time	3.56	0.91	0.54	0.50	98	20.58**
Receptive Language	3.62	1.55	1.22	0.51	98	10.41**
Expressive Language	2.62	1.07	1.06	0.62	98	8.94**
Personal	1.48	1.01	0.36	0.48	98	7.04**

\*\*=Significant at 0.01 Level

The findings of the present study are consistent with findings that memory impairment is one of the most common cognitive problems in schizophrenia patients (Vikash, 2006). Schizophrenia patients have difficulty remembering food/nutrition preparation, difficulty in remembering of safety was high, difficulty in remembering of daily routine, difficulty of money management, difficulty in remembering of spatial relationships, difficulty in remembering time, difficulty in remembering receptive language, difficulty in remembering

## Cognitive Impairment in Schizophrenia Patients

expressive language, difficulty in remembering related personal (Gavilán et al., 2015; Martin et al., 2015). Another study revealed impairment in memory of patients with schizophrenia (Holthausen et al., 2003, Ram et al., 2015; Trampush et al., 2015; Bora et al., 2015). According to Cirillo and Seidman 2003, initial acquisition of the material (encoding) is the mainly affected domain; most studies revealed that schizophrenic patients have difficulties in organizing information to be recalled during encoding (Bhattacharya, 2015, Parlar, et al. 2021, Harvey, et al. 2022, Goonathilake, et al. 2022, Javitt, 2023, John, et al. 2023, Uppinkudru, et al. 2023, Chan, et al. 2023).

### CONCLUSION

Patients with schizophrenia have cognitive impairment in comparison to normal control subjects. Schizophrenia Patients exhibited poor attention and concentration, impaired memory, language problems, impaired visual processing, and executive impairment. Schizophrenia has deficits in internal and external distracters (physical, emotional, visual, and environmental), sustained concentration, and divided attention simultaneous attention. Patients with schizophrenia have also problems with food preparation, safety matters, daily routines, money management, spatial relationships, time, receptive language, expressive language, and personal.

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## Cognitive Impairment in Schizophrenia Patients

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## Cognitive Impairment in Schizophrenia Patients

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## Cognitive Impairment in Schizophrenia Patients

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### ***Conflict of Interest***

The author(s) declared no conflict of interest.

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