

## Attention Impairment in Patients of Schizophrenia

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### ABSTRACT

**Background:** Cognitive impairment has a high prevalence in Schizophrenia and has been linked to functional outcome. To date statistically significant effects of medication on cognition in mood disorder trials and in schizophrenia do not necessarily translate to clinically meaningful effects. **Objectives:** To study the socio-demographic profiles of Schizophrenic patients and normal control and to assess and compare cognitive functions among patients of Schizophrenia disorder and normal control. **Material and Methods:** 100 schizophrenic patients as per ICD 10 who came to Psychiatry OPD and 100 normal controls of Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, India were recruited for the study. **Results:** Schizophrenic patients were found to be having significant level of cognitive impairment as compared to normal controls.

**Keywords:** *Impairment in Patients, Cognition, Impairment, Schizophrenia*

Cognitive impairment has become an important focus for psychiatric research in major psychiatric disorders. Any group of psychiatrically disordered patients may be found to have cognitive impairment in comparison to control population (Weiser et al, 2004; Mortensen et al, 2005). It is well established that Schizophrenia patients show deficits on a wide range of cognitive domains including verbal memory, working memory, executive functions, and attention and processing speed on a background of general intellectual impairment (Reichenberg and Harvey, 2007; Seidman et al. 1997). Cognitive deficits are core features of many patients with Schizophrenia as they are present already at the onset of the illness (Addington and addington, 2002; Elvevag and Goldberg, 2000; Heinrichs and Zakzanis, 1998; MacCabe et al).

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Schizophrenia is characterized by deficits in attention (Bleuler, 1911) and it has been claimed that these attention deficits are related to dysfunctional brain systems that underlie the pathophysiology of disease (Robbins, 1990). Attention deficits are a main neurocognitive feature of schizophrenia. These disorders have been observed in children with high genetic risk of schizophrenia and in the direct relatives of patients. Moreover, attention seems to be the neurocognitive predictor of motor skill ability and social problem solving. Impairments in attention can result in difficulty following social conversations and an inability to follow important instructions; simple activities such as reading or watching television become labored or impossible. Attention deficits in patients with schizophrenia are related to various aspects of outcome, including social deficits, community functioning, and skills acquisition (Green 1996; Green et al. 2000). It is reasonable to conclude that cognitive impairment reliably occurs at very high rates in Schizophrenia, typically approaching 75% of the patient's population which equals or exceeds the prevalence of impairment in many neuropsychological disorders.

Based on this contradictory background regarding the importance of the different components of attention in schizophrenic patients, the objectives of the present study were set. Our main hypothesis was that patients with schizophrenia show general attention alterations.

### *Objectives*

1. To study the socio-demographic data of Schizophrenic patients.
2. To assess and compare cognitive functions among patients of Schizophrenia disorder and normal control.

## **MATERIAL AND METHODS**

### *Place of the study*

The present study was conducted in department of Psychiatry, Jawaharlal Nehru Medical College & Hospital, Aligarh Muslim University, Aligarh, India.

### *Sample and Sampling procedure*

Based on purposive sampling technique participants who attended Psychiatry OPD of J.N. Medical College & Hospital, A.M.U., India during the study period and were fulfilling the inclusion and exclusion criteria were recruited for the study. The sample of present study consisted of 100 patients of Schizophrenia (F20.0 to F20.9) and 100 Normal control taken from JNMC, A.M.U.

### *Inclusion Criteria*

Both genders, Age range between 18 to 60 years, Patients of Schizophrenia as per criteria of ICD- 10, First episode of illness, Duration of illness less than 2 years, Patients speaking English or Hindi fluently, Patient having education of at least primary level (minimum 8<sup>th</sup> standard), On the maintenance doses of anti-psychotic medication, Having moderate grade of illness severity, Who gave written consent

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### *Exclusion Criteria*

Patients with severe psychopathology who had problem in comprehending instructions, Patients with Sensory and motor deficit, Clinical evidence of mental retardation, organic pathology, substance abuse or significant physical illness, History of significant head injury , Non-cooperative patients, Patients having mild or very severe grade of illness, Patients/patient's family member who did not gave the consent, Patients with other co morbidity of physical or mental illness, Patients those who had undergone electroconvulsive therapy in the past 6 month

### *Tools*

The following tools were used in the present study.

- A. Socio- demographic and Clinical Data Sheet:** It is a semi structure Performa especially designed for this study. It contains information about Socio demographic variables like age, sex, religion, marital status, domicile and occupation, family type, monthly income. Clinical details like age of onset, mode of onset, course, duration, medication and side effects, history of alcohol or substance abuse, any history of significant head injury, seizure, mental retardation and family history of mental illness along with it pre morbid and Personal history.
- B. Positive and Negative Syndrome Scale (PANSS)** PANSS is a severity symptom scale for Schizophrenia. It is a 30-item, seven point rating instrument for assessing positive, negative and other symptoms in Schizophrenia (Kay 1987). Each item on the PANSS is accompanied by a complete definition as well as detailed anchoring criteria for all seven rating points, which represent increasing levels of psychopathology : 1= absent, 2= minimal, 3= mild, 4= moderate, 5 = moderately severe, 6 = severe, and 7 = extreme. It has high internal reliability, homogeneity among items (.73-.83 for each scale), good spit –half reliability for general pathology scale (.80) (Rector N.A,2011).
- C. Stroop Neuropsychological Screening Test (SNST)** Stroop neuro-psychological screening test by Max. R. Trenury and Colleges briefly assesses cognitive processing and provides valuable information on brain dysfunction. SNST consist of form C and form C-W stimulus sheets. The form C stimulus sheet consists of 112 colour names (red, green, blue, tan) arranged in 4 columns of 28 names. The names are printed in one of four different colours of ink but no name is printed in its matching colour. The form C-W stimulus sheet is the same as the form C stimulus sheet, except for the order of the colour names. In the colour task, the individual reads aloud a list of colour names in which no name is printed in its matching colour. In the colour-word task, the individual names the ink colour in which the colour names are printed. Scoring is based on norms provided in manual. The test-retest reliability co-efficient of 0.90-0.83 in two parts of the test has been reported (Spreen & Strauss, 1998)
- D. Comprehensive Trail Making Test (CTMT)** The CTMT comprises of a standardized set of five visual search and sequencing tasks that are heavily influenced by attention, concentration, resistance to distraction and cognitive flexibility (or set sifting). The basic task of trail making, and thus of CTMT is to connect a series of stimuli (numbers, expressed as numerical or in word form, and letter) in a specified order as rapidly as

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possible. Test-retest values for the five trials of CTMT ranges from 0.70 to 0.98. Inter rater reliabilities are exceptionally high for the five trails of the CTMT (range 0.96-0.98) (Reynolds C.R, 2002).

### *Statistical Analysis*

The data obtained from this study was analyzed with the help of statistical package for social science- 20 (SPSS-20), by using following statistical methods. For socio- demographic variables, chi-square test was applied. Series of Non-parametric test were used for analysing the data as it was not normally distributed. Mann Whitney test was applied to data for between group analysis for neurocognitive measures of schizophrenia and normal control.

## RESULTS

**Table 1: Showing Socio demographic profiles of Schizophrenic patients in Experimental and Control groups**

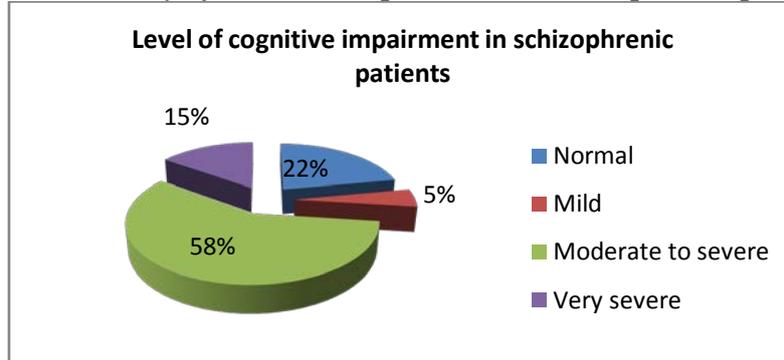
Variables	Schizophrenic N=100 N (n%)	Normal Control N=100 N (n%)	$\chi^2$	p value
<b>Age</b>				
20-29	44 (44)	41 (41)	.416	.937
30-39	20 (20)	20 (20)		
40-49	23 (23)	23 (23)		
50-60	13 (13)	16 (16)		
<b>Gender</b>				
Male	66 (66)	60 (60)	.772	.380
Female	34 (34)	40 (40)		
<b>Marital Status</b>				
Married	59 (59)	62 (62)	.194	.856
Unmarried	39 (39)	36 (36)		
Widowed	02 (02)	02 (02)		
<b>Religion</b>				
Hindu	49 (49)	51 (51)	1.27	.619
Muslim	46 (46)	47 (47)		
Christian	15 (15)	12 (12)		
<b>Residence</b>				
Urban	45 (45)	40 (40)	.512	.474
Rural	55 (55)	60 (60)		
<b>Family Type</b>				
Nuclear	35 (35)	42 (42)	3.58	.167
Joint	47 (47)	34 (34)		
Extended	18 (18)	24 (24)		
<b>*SES</b>				
Upper	41 (41)	40 (40)	2.96	.431
Lower Middle	56 (56)	54 (54)		
Upper Lower	03 (03)	04 (04)		

\*Socio economic status: it was determined using Kuppaswamy's Socio Economic status scale. Education, occupation and income are included in it.

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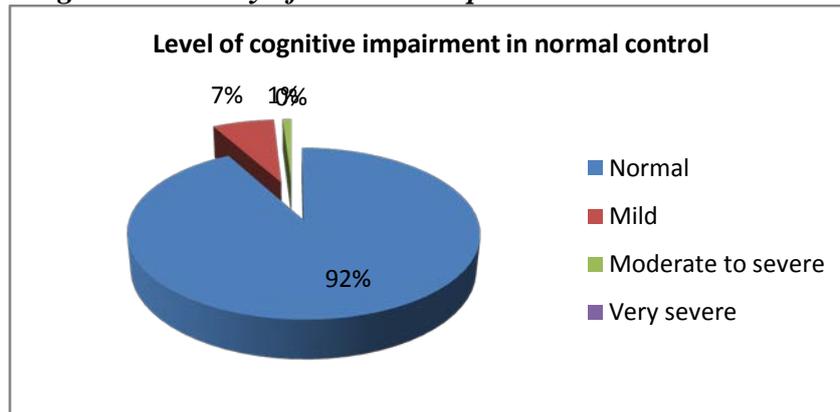
**Table 1:** Compares socio demographic profile of Schizophrenic patients and Normal control. Both the groups were matched on all socio-demographic variables i.e. age, gender, marital status, religion, residence, family type, socio economic status. There was no significant difference found between both the groups on socio-demographic variables at 0.05.

**Figure I** Severity of attention impairment in Schizophrenic patients



**Figure I** shows level of attention impairment in schizophrenic patients. 58 % of Schizophrenic patients were having moderate to severe level of attention impairment which was followed by 22% of very severe level of attention impairment patients and 5% of patient reported of having mild level of cognitive impairment whereas 22% were not having cognitive impairment.

**Figure II** Severity of attention impairment in normal control



**Figure II** shows level of attention impairment in schizophrenic patients. 92 % of Normal control were having no attention impairment, 7% were having mild attention impairment whereas 1% were having moderate to severe level of attention impairment.

**Table 2:** Showing severity of cognitive impairment in schizophrenic patients and normal control.

Category	Schizophrenic N (n%)	Healthy Control N (n%)	$\chi^2$	p
Normal	22 (22)	92 (92)	4.243	.031*
Mild	5 (5)	7 (7)		
Moderate to severe	58 (58)	1 (1)		
Very Severe	15 (15)	0 (0)		

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**Table 2** : shows severity of cognitive impairment in Schizophrenic patients. 22% schizophrenic and 92% of normal control were not having cognitive impairment. 5% of Schizophrenic patients and 7% of normal control were having mild level of cognitive impairment, 58% of schizophrenic and 1% of normal control were having moderate to severe level of cognitive impairment, and 15 % of schizophrenic were having very severe level of cognitive impairment. Significant difference was found on the basis of severity of cognitive impairment.

**Table 3 showing Mean rank score on attention tasks for schizophrenia patients (N=100) and healthy control (N=100)**

Attention task	Schizophrenic patients (N=100)	Health Control (N=100)	Mann Whitney U test		
	Mean Rank	Mean Rank	u	z	P
<b>Stroop test</b>					
<b>ICR</b>	36.34	12.63	299.5	-2.431	.015*
<b>Total Score</b>	16.23	36.67	299.5	-2.458	.014*
<b>CTMT</b>					
<b>Trail I</b>	36.08	15.75	304.5	-2.273	.023*

*ICR : incorrect responses*

**Table 3** shows attention measures in schizophrenic and healthy control. Both the group significantly differentiates from each other. Mean Rank score obtained on Mann Whitney test shows that schizophrenic patients were significantly impaired on attention.

## DISCUSSION

The sample for the study was drawn from the psychiatry department of Jawaharlal Nehru Medical College and Hospital, a tertiary care hospital of Aligarh district in Uttar Pradesh, India. This was a time bound study and more over many centers around Aligarh were not having trained therapist. Hence the study was carried out in single center. Single center study in this context have an upper hand of meeting better control over homogeneity of setting, sample and the intervention being carried out by the single therapist.

### *Demographic characteristics of the sample*

The present study showed that majority of the sample were in 20-29 years of age, were males, married, hailing from rural and belonged to upper middle class in Schizophrenic and control group. India has the world's largest youth population despite having a smaller population than china. The report titled 'the power of 1.8 billion: 2017' reported that 28% of India's population i.e. 356 million are youth population. Females were found to be less as compared to males; India being male dominant society, where females are still underprivileged and are given less priority possibly explains this ratio (Lynge & Jacobsen, 1995; Sulehri et al, Arroll et al). Majority of patients in our study were married and it can be attributed to the age range, as in India the mean age of female marriage varies from 18 years

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to 24 years while among male it varies from 21 years to 29 years as reported by Census, 2001. Present study reported maximum patients were hailing from urban area and were from upper middle class. The reason could be because the hospital where this study was conducted is in district head quarter hence greater number of urban patients visited here. In other socio-demographic character no significant findings was found.

### *Cognitive Measure of the sample*

The cognitive measure which was assessed in our study was attention. Attention refers to the ability to identify relevant stimuli focus on these stimuli rather than others (selective attention), ability to perform a task in the presence of distracting stimuli (focused attention), sustain focus on the stimuli to higher level process. The STROOP neuropsychological screening test and CTMT trial is commonly used for measuring attention.

The results of the present study confirm the hypothesis that patients with chronic schizophrenia have a general attention deficiency. These results are in accordance with consistent evidence of attention disorders in this clinical population (Filbey FM, Russell T, Morris RG, Murray RM, McDonald C, 2008; Kurtz MM, Moberg PJ, Gur RC, Gur RE, 2001; Nieuwenstein MR, Aleman A, de Haan EH, 2001; Luck SJ, Gold JM, 2008). The importance of these results is based on the fact that attention is a central cognitive function enabling precision, rapidity and continuity to information processing (La Berge D, 1995) and interacts with other cognitive functions such as sensory perception, memory, language, executive functions, among others. This could explain the existence of generalized failures in different cognitive functions.

The present study specifically focused on the function of different components of attention and found that inhibitory attentional control and sustained attention were the most affected in patients with schizophrenia. These observations are partly supported by other studies that found significant alterations in both these components of attention (Breton F, 2011; Filbey FM, Russell T, Morris RG, Murray RM, McDonald C, 2008; Breton *et al*, 2011, Bozikas VP, Andreou C, Giannakou M, Tonia T, Anezoulaki D, Karavatos A, et al, 2005; Chen WJ, Faraone SV, 2000. Harris JG, Minassian A, Perry W, 2007) recently found that patients had a specific attention deficient and a significantly worse performance in tests involving the executive attention network, while the alertness and orientating attentional networks remained intact.

It has been shown that the deficiency in the attention network of schizophrenia patients is related to an abnormal function in tasks involving executive processes and some of the characteristic symptoms of the disorder such as formal thought disorder and weak associations (Breton F, Planté A, Legauffre C, Morel N, Adès J, Gorwood P, et al, 2011). The problems patients have in the Stroop Colour-Word test could be associated with an attenuated activation in the cingulate cortex and left inferior frontal gyrus, as changes in the positive symptoms appear to be correlated with the activation of these areas (Krabbendam L, O'Daly O, Morley LA, van Os J, Murray RM, Shergill SS, 2009).

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### *Limitation*

The current study was relatively modest in terms of sample size so future studies should use larger samples. No relation between clinical symptoms and neuro-cognitive measures were evaluated.

### *Future Duration and Suggestion*

Future studies should also examine the factors that lead to cognitive impairment, relation between cognitive impairment and clinical symptoms, which was not currently conducted because of the restrictive sample size.

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***Conflict of Interests:*** The author declared no conflict of interests.

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