MEMORY IMPAIRMENT IN PATIENTS OF SCHIZOPHRENIA

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ABSTRACT:
Background: Cognitive deficits have become an important focus for psychiatric research in major psychiatric disorders. There has been a great interest in the patients with Schizophrenia on a broad range of neuropsychological tests in the last two decades. These deficits involve usually memory, attention and executive function.

Objectives: To study the socio-demographic profiles of Schizophrenic patients and normal control and to assess and compare cognitive functions among the 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.

Introduction

It is well established that Schizophrenia patients show deficits on a wide range of cognitive domains including verbal memory, working memory, executive functions, attention and processing speed on a background of general intellectual impairment (Reichenberg, & Harvey, 2007; Seidman, Biederman, Faraone, Weber, & Ouellette, 1997). It is also acknowledged that cognitive impairments are not just a consequence of symptoms, treatment, or the course of the disease. Cognitive deficits are core features of many patients with Schizophrenia as they are present already at the onset of the illness (Addington, & addington, 2002; Elvevag, & Goldberg,2000; Heinrichs, & Zakzanis, 1998; MacCabe, Lambe, Cnattingius, Torrang, Bjork, Sham, & Hultman, 2008; Woodberry, Giuliano, & Seidman, 2008). It has been demonstrated that there is likely a genetic susceptibility to cognitive impairment in Schizophrenia as evident by the presence of cognitive deficits, although not prominent, in non affected relatives of Schizophrenia patients (Dickinson, Ramsey, & Gold, 2007; Keefe, Silverman, Roitman, Harvey, Duncan, Alroy, & Mohs,1994, Toulopoulou, Picchioni, Rijsdijk, Hua-Hall, Etinger, Sham, & Murray, 2007).

Leison –based approach in neuropsychology is referred to inferring regional brain dysfunction based on poor performance on putatively localizing neuropsychological tests. This traditional approach has lead various authors to conclude that Schizophrenia is characterized by cognitive tests profiles indicative of dysfunction of the frontal lobe, temporal lobe, left or right hemisphere, basal ganglia etc (Blanchard, &Neale,1994). Although there appears to be a group of patients who are impaired only minimally, most patients are characterized as having at least some impairment across a number of domains. Several studies identify selective impairments of a greater magnitude against a background of global impairment.

In general, the strongest camps to emerge have been those that claim a disproportionate impairment of memory functioning, executive functioning and attention. Memory impairment is one of the common cognitive problems in Schizophrenia patients (Gourovitch, Goldberg, & Weinberger, 1996; Mc Kenna, 1991; Saykin,Shtasel, Gur, Kester, Mozley, Stafiniak, & Gur, 1994). Schizophrenia patients have been found to be impaired on their ability to recall, recognize and learn but verbal and visual material (Gold, 1992; Paulspon,1995). These findings results from neuropathological abnormalities in the temporal hippocampal areas (Goldman-Rakic, 1996)

Based on this contradictory background regarding the importance of the different components of Memory 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 at 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 8th standard), On the maintenance doses of anti-psychotic medication, Having moderate grade of illness severity, Who gave written consent

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 alchohol 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. PGI-Memory Scale (PGI-MS)

PGI-MS initially developed by Prashad (1977, Pershad and Wig, 1988) is based on the conceptualization of memory as the ability to retain and reproduce impressions once learned intentionally. It includes 10 subtests standardized on adult subjects in the age range of 20-45 years. Separate norms are available for three educational levels i.e. 0 to 5th, 6th to 9th and above 10th years of schooling. The test material consists of 10 subtests i.e Remote Memory, Recent Memory, Mental Balance, Attention and Concentration, Delayed Recall, Immediate Recall, Verbal Retention for similar pairs, Verbal Retention for dissimilar pairs, Visual retention and Recognition. Scoring is based on different norms are used for different items. Test-retest reliability for the ten subtests ranges from 0.69 to 0.85. Construct validity was established by correlating the test with Bostono Memory scale (0.71) and the Wechsler Memory scale (0.85) (Fujii D.E. 2011)

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%)	χ^2	p value
Age				χ^2
20-29	44 (44)	41 (41)		
30-39	20 (20)	20 (20)		
40-49	23 (23)	23(23)	.416	.937
50-60	13 (13)	16 (16)		
Gender				χ^2
Male	66 (66)	60 (60)	.772	.380
Female	34 (34)	40 (40)		
Marital Status				χ^2
Married	59 (59)	62 (62)		
Unmarried	39 (39)	36 (36)	.194	.856
Widowed	02 (02)	02 (02)		
Religion				χ^2
Hindu	49 (49)	51 (51)		
Muslim	46 (46)	47 (47)	1.27	.619
Christian	15 (15)	12 (12)		

Residence				χ^2
Urban	45 (45)	40 (40)	.512	.474
Rural	55 (55)	60 (60)		
Family Type				χ^2
Nuclear	35 (35)	42 (42)		
Joint	47 (47)	34 (34)	3.58	.167
Extended	18 (18)	24 (24)		
***SES**				χ^2
Upper	41 (41)	40 (40)		
Lower Middle	56 (56)	54 (54)	2.96	.431
Upper Lower	03 (03)	04 (04)		

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

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 memory impairment in Schizophrenic patients

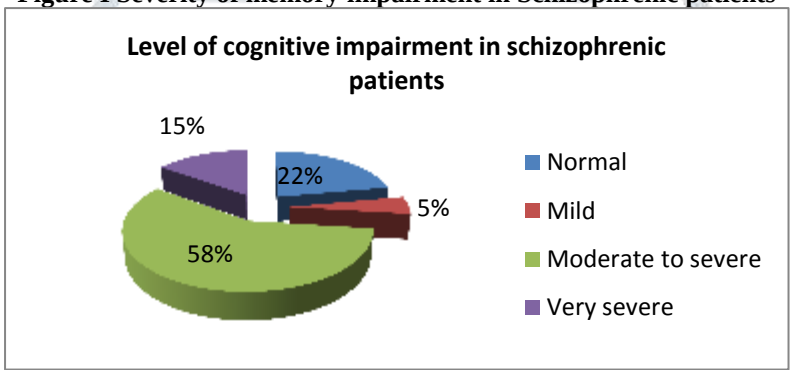

Figure I shows level of memory impairment in schizophrenic patients. 58 % of Schizophrenic patients were having moderate to severe level of attention impairment which was followed by 22% of very severe level of attention impairment patients and 5% of patient reported of having mild level of cognitive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

Figure II Severity of memory impairment in normal control

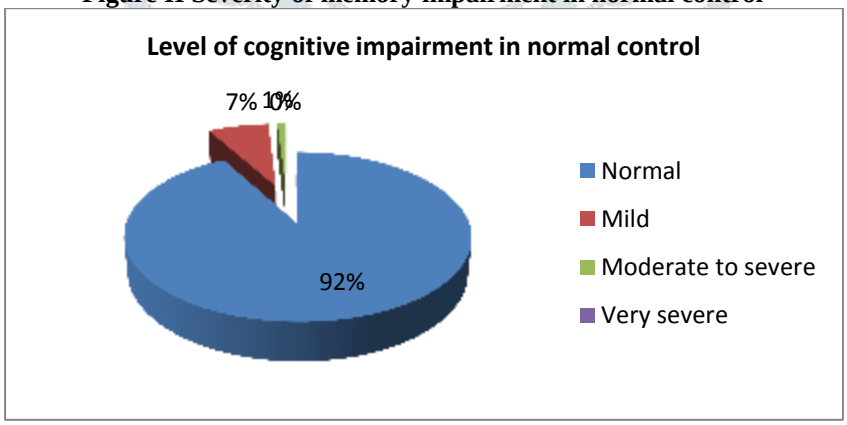

Figure II shows level of memory impairment in schizophrenic patients. 92 % of Normal control were having no memory impairment, 7% were having mild attention impairment whereas 1% were having moderate to severe level of attention impairment.

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

Category	**Schizophrenic N (n%)**	**Healthy Control N (n%)**	χ^2	**p**
Normal	22 (22)	92 (92)		
Mild	5 (5)	7 (7)		

Moderate to severe	58 (58)	1 (1)	4.243	.031*
Very Severe	15 (15)	0 (0)		

Table 2 : shows severity of cognitive impairment in Schizophrenic patients. 22% schcizophrenic 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 memory tasks for schizophrenia patients (N=100) and healthy control (N=100)

Memory task	**Schizophrenic patients (N=100)**	**Health Control (N=100)**	**Mann Whitney U test**		
	Mean Rank	**Mean Rank**	**u**	**z**	**P**
PGI Memory Test **Total Score**	40.78	32.22	519.5	-1.73	.082

Table 3 shows memory 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 memory.

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 billon: 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 & Jocobsen,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 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 Memory. Memory function plays a crucial role in many cognitive tasks, such as reasoning learning and understanding. The PGI-Memory Scale was used for measuring Memory.

Memory has been regarded as one of the major areas of cognitive deficit in schizophrenia (McKenna et al,1995). Although the pioneers of schizophrenia research, Kraepelin (1919) and Bleuler (1911), considered memory functions to be relatively preserved in schizophrenia, numerous studies conducted in the second half of this century have shown that patients with schizophrenia perform poorly on a wide range of memory tasks (Goldberg &Gold, 1995; Landro, 1994; Stip, 1996). Studies indicate memory impairment in schizophrenia to be common and disproportionate to the overall level of intellectual impairment (Gold et al,1992; Rund, 1989). McKenna and colleagues (McKenna et al, 1990;) have even suggested existence of a schizophrenic amnesia. However, other authors consider the memory impairment to be relatively small in magnitude or secondary to attentional dysfunction (Cutting, 1985; Nuechterlein et al, 1984; Gjerd ,1986). In addition, the specificity of memory impairment in schizophrenia is unclear. It has been suggested that, in schizophrenia, some aspects of memory may be affected to a greater extent than others. This would be the case, for example, in active retrieval (free recall) of declarative information from long-term memory, which would be significantly more impaired in individuals with schizophrenia than retrieval from short-term memory—e.g., digit span (Koh, Marusarz, & Rosen, 1980). Also, some authors have proposed that encoding of information may be more affected than memory processes such as retrieval and recognition (Heaton, 1994; McClain, 1983). In contrast, other studies report that the memory deficit in schizophrenia encompasses a broad range of memory processes, as evidenced by poor scores in multiple task paradigms (Calev et al,1983; Saykin et al, 1991)

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

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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