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RESEARCH ARTICLE

“STUDY OF MEMORY DISTURBANCES IN PATIENT OF SCHIZOPHRENIA AND THEIR CARE TAKERS”

Dr. Alpesh Gediya¹, Dr. Vishal Damani², Dr. Rajesh Maniar³, Dr. Harshid Patel⁴

1. Assistant Professor, Department of Psychiatry, GCS Medical College and Research Centre, Ahmedabad, Gujarat.
2. Senior Resident, Department of Psychiatry, AMCMET Medical College, Ahmedabad, Gujarat.
3. Ex-Professor, Department of Psychiatry, Smt. N.H.L. Municipal Medical College, Ahmedabad, Gujarat.
4. Associate Professor, Department of Pathology, GMERS Medical College, Dharpur-Patan, North Gujarat.

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*Corresponding Author

Dr. Alpesh Gedia

Abstract

Background: Schizophrenia is a disorder where there are major disturbances in thought, emotion and behavior, leading to a state of permanent deterioration. Memory is the process whereby what is experienced or learned is established as a record in the CNS. Memory belongs to the cognitive domains which show major impairment in schizophrenia. Schizophrenia does affect cognitive function. Most of the schizophrenic patients are not obviously intellectually impaired.

Aims and Objectives: To study memory function in various domains in patients of schizophrenia and their care takers. To study the association of memory disturbance with the type of schizophrenia, duration of illness, duration of treatment. To find out any co-relation of memory impairment in care takers as per relation with the patient. To compare neurocognitive functions in patients of schizophrenia and their care takers.

Materials and Methods: Present study comprised of two groups of 25 subjects each distributed as schizophrenic patients and their care takers. Patients of schizophrenia confirmed by DSM IV-TR criteria for schizophrenia and their care takers were selected randomly from the patients attending Psychiatry OPD of Sheth V.S. General Hospital attached to Smt. N.H.L. Municipal Medical College, Ahmedabad.

Results: Male are more than females in patients with schizophrenia. The majority of patients are from 30-39 years age group. While in care taker group majority are from 50-59 years age group. Majority of the subjects from both the groups are from urban background. 76% of total subjects were Hindu. In both the groups majority of the subjects were married.

Discussion: There is no difference in all subtests in both the groups. Impaired attention has frequently been observed in studies of unaffected siblings of patients.

Conclusions: There is no significant difference in the memory status of the schizophrenia patients and their care takers except for recent memory and verbal memory. Memory disturbances in patients has not any relation with the type of schizophrenia, duration of illness and total duration of treatment. Irrespective of the biological relation with the patient, care takers also having memory disturbances.

INTRODUCTION

Memory is the process whereby what is experienced or learned is established as a record in the CNS, where it persists with a variable degree of permanence and can be recollected or retrieved from storage at will (recall).¹ There are many types of memories.^{2,3}

- 1) Immediate Memory: Reproduction, recognition or recall of perceived material within seconds after presentation.
- 2) Short Term Memory: Reproduction, recognition, or recall of perceived material within minutes after the initial presentation.
- 3) Working Memory: A related concept, incorporating immediate and recent memory, which is ability to store information for several seconds.
- 4) Long Term Memory: Reproduction, recognition or recall of experiences or information that was experienced in the distant past. (Also known as Remote Memory)
- 5) Declarative Memory: (Memory in everyday language) conscious recollection of facts and events.
- 6) Non-Declarative Memory: Heterogeneous set of preserved abilities like skill learning, habit learning, priming etc.

Schizophrenia is customarily described as a disorder where there are major disturbances in thought, emotion and behavior, leading to a state of permanent deterioration.⁴

Memory belongs to the cognitive domains which show major impairment in schizophrenia (Aleman, 1999). Schizophrenia does not affect cognitive function. Most of the schizophrenic patients are not obviously intellectually impaired in the same way as individuals with brain damage or dementia. Memory impairment has been found to make an important contribution to the pattern of poor performance, and it may be that this is sometimes pure and pronounced enough to constitute a "schizophrenic amnesia".⁵

Calev and co-workers first time worked on detailed exploration of memory in schizophrenia.^{6,7} Patients with schizophrenia performed more poorly than normal individuals on virtually every cognitive task (Chapman & Chapman, 1973).⁸ Concluded that schizophrenic cognitive impairment affects most areas of function and takes the form of a continuum from a mild impairment overlapping with the levels of function seen in many healthy individuals, to the kind of severe dysfunction found in patients with central nervous system disease.⁵

Many of the various neurocognitive deficits in schizophrenia have been shown to be associated with functional outcome such as difficulty with community functioning, with instrumental and problem solving skills, reduced success in psychosocial rehabilitation programs, the inability to maintain successful employment. Cognitive deficits and functional impairment manifest a specific pattern of relationship schizophrenia.⁹

There are no U.S. Food and Drug Administration approved treatment for neurocognition in schizophrenia. Patient recovering from an acute exacerbation of illness do not appear to demonstrate substantial changes in the severity of their neurocognitive impairment, despite clear improvement in symptoms with treatment. Inability of patient to reduce smoking and such habits has been correlated with deficits in memory and attention, so it affects new-onset medical problem in older patients.¹⁰

First degree relatives of individuals with schizophrenia are impaired on a variety of neurocognitive measures, with effect sizes ranging from small to medium.¹⁰ Gottesman and Gould summarize 5 criteria for identifying useful endophenotypes in psychiatry: (1) the endophenotype should be associated with illness in the population; (2) the endophenotype should be heritable; (3) the endophenotype should be primarily state independent; (4) within families, the endophenotype and the illness should co-segregate; and (5) the endophenotype should be found in nonaffected family members at a higher rate than in the general population.¹¹

The meta-analyses conducted by Heinrichs and Zakzanis report moderate to large effect sizes in patient versus control differences in global and selective verbal memory, nonverbal memory, bilateral and unilateral motor performance, visual and auditory attention, general intelligence, spatial ability, executive function, language, and interhemispheric tactile transfer. None of the confidence intervals for mean effect sizes in the above domains included zero, which is to say, no behavioral domain tested is spared by the illness. Generally, findings indicate that relatives are also impaired, albeit to a lesser degree than patients, on a wide array of cognitive tasks.^{12,13}

Cognitive deficits found in patients with schizophrenia are also found in non-affected relatives. This finding is consistent with the idea that certain cognitive deficiencies in relatives are caused by familial predisposition to schizophrenia and that these deficiencies might be putative endophenotypes for schizophrenia.¹⁴

Unselected siblings of patients with schizophrenia have impairments in several cognitive domains. Thus cognitive phenotypes identify distinct, familial traits associated with schizophrenia. Using this dimensional approach to subdividing schizophrenia may reduce the clinical and genetic heterogeneity of schizophrenia and improve the power of genetic studies.¹⁵ The nonpsychotic relatives showed no impairment on the forward digit span task, a

measure of general attention, but did show impairment on the backward digit span task, a measure of verbal working memory.¹⁶

Impaired attention has frequently been observed in studies of unaffected siblings of patients with schizophrenia. Poor performance on the Continuous Performance Test appears to be familial and, possibly, genetic. Relative risk estimates were in the moderate range. Given the ease of administering the Continuous Performance Test, the use of impaired attention as an intermediate phenotype could increase the power of genetic studies of schizophrenia.¹⁵

AIMS AND OBJECTIVES:

- (1) To study memory function in various domains in patients of schizophrenia and their care takers.
- (2) To study the association of memory disturbance with the type of schizophrenia, duration of illness, duration of treatment.
- (3) To find out any co-relation of memory impairment in care takers as per relation with the patient.
- (4) To compare neurocognitive functions in patients of schizophrenia and their care takers.

MATERIALS AND METHODS :

Present study comprised of two groups of 25 subjects each distributed as schizophrenic patients and their care takers. Patients of schizophrenia confirmed by DSM IV-TR criteria for schizophrenia (American Psychiatry Association)¹⁷ and their care takers were selected randomly from the patients attending Psychiatry OPD of Sheth V.S. General Hospital attached to Smt. N.H.L. Municipal Medical College, Ahmedabad and patients were diagnosed according to DSM-IV-TR and care takers having considered normal person, who were selected as they had come with the patient and residing with them, who do not have any history of present psychiatric illness. Any patient / care takers having significant physical / neurological illness or mental subnormality, who were not co-operative for participation in interview and who refuses to give consent were excluded from this study.

Informed consent were obtained from the patient and their care takers. Patient and care taker's demographic, specific illness etc. details were taken according to proforma in Department of Psychiatry. Patients and care takers were assessed by using the same tests for the memory and cognition in the same order in department of psychiatry. No incentives were paid to the patients as the care takers. No invasive procedures were done on the patients of the care takers.

The PGIMS was constructed by the Department of Psychiatry, PGIMER, Chandigarh and standardized in 1977.¹⁸ It contain 10 sub tests like Remote Memory, Recent Memory, Mental Balance, Attention and concentration measured by digit forward and digit backward tests, Delayed recall, Immediate recall, Verbal retention for similar pairs, Verbal retention for dissimilar pairs, Visual retention and Recognition.

RESULTS :

Table : 1 : Sex wise distribution

Gender	Patient of Schizophrenia	Care Takers	Total
Male	16 (64%)	12 (48%)	28 (56%)
Female	9 (36%)	13 (52%)	22 (44%)
Total	25	25	50

This table shows that majority of subjects are male, while male are more than females in patients with schizophrenia and male and female almost equal in care taker group.

Table : 2 : Age wise distribution

Age Groups	Patients of Schizophrenia	Care Taker
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10-19	0	0
20-29	2	1
30-39	14	5
40-49	4	5
50-59	4	8
60-69	1	3
70-79	0	3
TOTAL	25	25

This table shows that majority of patients are from 30-39 years age group and no patients of having age 10-19 years or 79-79 years, so majority are of middle age years. While in care taker group majority are from 50-59 years age group, as in care taker group majority are parents of the patients, so justifying the data. In all the other age groups subjects are almost equally present.

Table : 3 : Domicile wise distribution

Domicile	Patients Schizophrenia of	Care Takers
Rural	6	6
Urban	19	19
Total	25	25

This table shows that majority of the subjects from both the groups are from urban background. That goes with the observation that as more social stressed present in urban setting may affect the development of schizophrenia in person at risk.

Table : 4 : Religion wise distribution

Religion	Patients Schizophrenia of	Care Takers
Hindu	19	19
Muslims	6	6
Christians	0	0
Others	0	0

Total	25	25
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This table shows that 76% of total subjects are of Hindu religion, as compared to 24% of total subject are from Muslim religion, no subject is from Christian or any other religion.

Table : 5 : Education wise distribution

Education	Patients of Schizophrenia	Care Takers
Illiterate	2	7
Primary	5	4
Middle	9	6
SSC	5	3
HSC	1	3
Graduate	2	2
Post Graduate	1	0
Total	25	25

This table shows that education status of patient group shows that majority having education upto middle, but in other category also patients are almost equally present. In care takers majority are illiterate, primary or educated upto middle school only.

Table : 6 : Occupation wise distribution

Occupation	Patients of Schizophrenia	Care Takers
Unemployed	6	3
Unskilled	9	6
Skilled	2	4
House Hold	8	12
Professional	0	0
Total	25	25

In patients of schizophrenia group majority of patients are doing unskilled or Household work. Only 2 subjects are doing skilled work, but no one was doing professional work. In care takers group also majority are doing household or unskilled work.

Table : 7 : Marital Status wise distribution

Marital Status	Patients of Schizophrenia	Care Takers
Unmarried	4	0
Married	16	23
Divorced	5	0
Widow	0	2
Total	25	25

In both the groups majority of the subjects were married. But on the contrary unmarried and divorced 4 and 5 respectively in patient group compared to care takers. In care takers no subject was unmarried or divorced.

Table : 8 : Family type wise distribution

Family Type	Patients of Schizophrenia	Care Takers
Nuclear	6	4
Joint	19	21
Total	25	25

60% of total subjects are residing in Joint family setup.

Table – 9 Group-wise comparison of PGI subtests score and total score of patients and their care takers.

Sr. No.	Subtest	Group	Mean Rank	Mann Whitney 'U'	'p' value	Sign
1)	Remote Memory	1 2	22.66 28.34	241.500	.154	NS
2)	Recent Memory	1 2	21.6 29.40	215.00	.045	S
3)	Mental Balance	1 2	24.98 26.02	299.500	.792	NS
4)	Attention and Concentration	1 2	23.58 27.42	264.500	.342	NS
5)	Delayed Recall	1 2	23.92 27.08	273.000	.438	NS
6)	Immediate	1	24.60	290.000	.659	NS

	Recall	2	26.40			
7)	Verbal Retention For similar pairs	1 2	21.44 29.56	211.000	.034	S
8)	Verbal retention for dissimilar pairs	1 2	24.30 26.70	282.500	.559	NS
9)	Visual Retention	1 2	22.64 28.36	241.000	.162	NS
10)	Recognition	1 2	23.48 27.52	262.000	.317	NS
	Total	1 2	23.26 27.74	256.500	.277	NS

This table compares the different memory domains results of schizophrenia patients and their care takers. There was no significant difference found between two groups except for recent memory and verbal retention for similar pairs, so both the groups are a like except for 2 domains.

Table – 10 Group-wise comparison of First degree relatives and Schizophrenia patients on various sub tests of PGIMS.

Sr. No.	Subtest	Group	Mean Rank	Mann Whitney 'U'	'p' value	Sign
1)	Remote Memory	1 2	18.36 22.93	134.00	.215	NS
2)	Recent Memory	1 2	17.82 23.89	120.500	.093	S
3)	Mental Balance	1 2	20.90 18.39	152.500	.493	NS
4)	Attention and Concentration	1 2	19.22 21.39	155.500	.562	NS
5)	Delayed Recall	1 2	19.46 20.96	161.500	.689	NS
6)	Immediate Recall	1 2	19.24 21.36	156.000	.574	NS
7)	Verbal Retention For similar pairs	1 2	17.68 24.14	117.000	.069	S
8)	Verbal retention for dissimilar pairs	1 2	19.14 21.54	153.500	.527	NS
9)	Visual Retention	1 2	17.68 24.14	117.000	.086	NS
10)	Recognition	1 2	18.52 22.64	138.000	.266	NS
	Total	1 2	18.42 22.82	135.500	.247	NS

This table compares the schizophrenia patients and their first degree relatives in various domain of PGIMS, also shows that there is no significant difference between two groups except for recent memory and verbal retention for similar pairs.

Table – 11 Group-wise comparison of Non 1st degree relatives (spouse) of schizophrenia patients and schizophrenia patients in various sub tests of PGIMS

Sr. No.	Subtest	Group	Mean Rank	Mann Whitney 'U'	'p' value	Sign
1)	Remote Memory	1 2	17.30 21.23	107.500	.287	NS
2)	Recent Memory	1 2	16.78 22.41	94.500	.121	NS
3)	Mental Balance	1 2	17.08 21.73	102.000	.200	NS
4)	Attention and Concentration	1 2	17.36 21.09	109.000	.317	NS
5)	Delayed Recall	1 2	17.46 20.86	111.500	.364	NS
6)	Immediate Recall	1 2	18.36 18.82	134.000	.903	NS
7)	Verbal Retention For similar pairs	1 2	16.76 22.45	94.000	.113	NS
8)	Verbal retention for dissimilar patch	1 2	18.16 19.27	129.000	.769	NS
9)	Visual Retention	1 2	17.96 19.73	124.000	.640	NS
10)	Recognition	1 2	17.96 19.73	124.000	.636	NS
	Total	1 2	17.84 20.00	121.000	.571	NS

This table compares the schizophrenia patients with their non blood relatives (spouses) in various domains of memories, results show no significant difference between two groups in all the domains.

DISCUSSION :

Present study was done on the patients attending Psychiatry OPD of Sheth V.S. General Hospital attached to Smt. N.H.L. Municipal Medical College, Ahmedabad. Schizophrenia patients had showed more severe deficits in recent memory that was component of working memory, has been described by various authors as a core component of the neurocognitive (e.g. memory) impairment in schizophrenia. Also schizophrenia patients show larger deficit in the verbal retention that is in accordance with the finding that they are impaired in their ability to immediately recalled verbal material and learn over time, that has role in social and occupational deficit in patients.¹⁰

Table 9 and 10 show no difference in all the subtest (domains) in both the groups, that is not in accordance to the metanalysis done by Heinrichs and Zankzanis¹⁹ who reported moderate to large effect sizes in patient versus control differences in global. Also similar finding reported by the Whyte, McIntosh, Clawrie et al²⁰ that unaffected relatives showed poorer performance relative to controls (normal person) on all tests of memory examined. On the contrary studies of Strata P, Duneluzzo et al, Beswnstein J. et al^{21,22} also found no impairment at all (which is in accordance to the above table results).

From the above tables it is clear that schizophrenia patients mean rank for the each and every subtest and total is quite lower than the care taker group indicates that patients having more memory disturbance compared to their care takers, that is in accordance to the study done by Chapman and Chapman et al⁸ and Gruzelier et al.²³

CONCLUSION :

- 1) There is no significant difference in the memory status of the schizophrenia patients and their care takers except for recent memory and verbal memory for similar pairs. So, it indicates that care takers also having subtle memory disturbance as like patient group.
- 2) Memory disturbances in patients has not any relation with the type of schizophrenia, duration of illness and total duration of treatment.
- 3) There is neurocognition deterioration in schizophrenia patients compared to care takers showed by quite low score of MMSE compared to care taker group.
- 4) Irrespective of the biological relation with the patient, care takers also having memory disturbances.

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