10th International Conference on Recent Development in Engineering Science, Humanities and Management
The Indian Council of Social Science Research (ICSSR) North West Regional Centre, Punjab University Campus, Chandigarh (India) RDESHM-17
24th December 2017, www.conferenceworld.in ISBN: 978-93-86171-89-4

RELATIONSHIP BETWEEN VERBAL MEMORY AND PSYCHOPATHOLOGY IN SCHIZOPHRENIA

Manglesh Kumar Manglam[1], D. Ram[2]

[1]*Centre for Psychological Sciences, Central University of South Bihar,*

Patna,Campus, (India)

[2]*Central institute of Psychiatry, Ranchi, (India)*

ABSTRACT

***Background**: Deficit in cognitive functionis a main feature of schizophrenia. Verbal memory is the most impaired cognitive function found in schizophrenia. Positive and negative symptoms is constantly correlated with verbal memory in schizophrenia patients.*

***Aim**: The aim of the study was to compare verbal memory and psychopathology in first episode of schizophrenia and normal healthy controls and find its association between positive symptoms, negative symptoms, general psychopathology and verbal memory of schizophrenia.*

***Material and Methods**: A sample of 60 first episode of schizophrenia patients, aged between 18 and 45 years were assessed at baseline with Logical memory (from Wechsler Memory Scale- III), and for positive, negative and general psychopathology. Thereafter, 28 normal controls were matched on age and education and were assessed for Logical Memory. Informed consent was obtained from all the participants. The study was approved by the Ethical Committee of the Institute.*

***Results and Conclusion:** The schizophrenia patients group performed significantly poorly on verbal memory as compared to normal healthy controls. Positive and negative symptoms of schizophrenia negatively correlated with verbal memory.*

Keywords:Psychopathology, schizophrenia, verbal memory

I.INTRODUCTION

Schizophreniais a severe mental disorder characterized by disturbances in thought, emotion, perception, cognition and behavior. People with schizophrenia may withdraw from other people and from everyday reality, often into a life of odd beliefs (delusions) and hallucinations. The lifetime prevalence of schizophrenia is slightly less than 1 percent, and it affects men slightly more often than women [1,2].

Deficit in cognitive functionis a main feature of schizophrenia. Patients with schizophrenia showed a broad range of cognitive deficits. Specifically, performance on executive functions, verbal fluency, verbal memory and non-verbal memory, visuospatial ability, fluency, attention and working memory, but not psychomotor speed

was significantly impaired in the patients groups [3, 4, 5].In a meta-analysis of 204 studies [6] reported a greater degree of impairment on measure of verbal memory than any other domain.Majority of patients with schizophrenia show cognitive impairments in comparison to healthy persons matched for age and education [7].

Verbal memory is a rather broad concept that refers to memory for verbally presented information. Study done by [8] with 107 first episode- early onset psychosis patients (36 schizophrenia, 19 bipolar disorder and 52 other psychosis and 98 healthy controls) were assessed on the following cognitive domains: attention, working memory, executive functioning, and verbal learning and memory. Three diagnostic categories were established in the patient sample: Patients performed significantly worse than controls in all cognitive domains.Patients of schizophrenia had persistent cognitive deficits in all the domains, i.e., verbal memory, working memory, motor speed, verbal fluency, attention, and executive function even during the stable phase when compared with the healthy controls [9].

Severity of negative symptoms dimension was related to impairment in the structure of semantic knowledge systems, verbal memory and auditory attention. Severity of positive symptom dimension correlated only with impairment in the structure of the semantic knowledge system and psychomotor speed. Severity of depressive and excitement symptom dimension was not associated with cognition. Severity of cognitive and negative symptoms was mainly correlated with deficits on executive functions, semantic memory and verbal fluency, while positive symptoms only with semantic memory [10]. A study done by [11]and found that the severity of negative symptoms at the time of assessment was associated with deficits in memory, verbal fluency, psychomotor speed and executive functions. Positive symptoms were not associated with cognitive deficits.[12] assessed neurocognitive profile in patients with chronic schizophrenia and reported that the symptom cluster reflecting disorganization was associated most strongly with neurocognitive dysfunction, while negative symptoms were associated less strongly with poor cognitive performance, and positive psychotic symptoms had minimal relationships.

Patients with schizophrenia performed significantly below normal controls on all measures. Working memory, executive function, visual memory and verbal memory were selectively impaired areas in schizophrenia group. More than 40% of schizophrenia patients showed deficits in working memory, visual memory or verbal memory, 62% of schizophrenia patient showed impairments within two or more domains. Deficits in above cognitive functions in schizophrenia group correlated moderately with the total BPRS score as well as all the PANSS Scores: total score, positive symptom score, negative symptom scores and general symptom score[13].Increasing severity of negative symptoms was related to general memory, attention, concentration, verbal, visual and delayed memory deficits [14]. [15]found that impaired verbal memory is moderately correlated with positive symptoms of schizophrenia. In addition several studies indicate an apparent contradiction to the notion of reliable cognitive deficits in schizophrenia. Some studies have found that a group of schizophrenia patients with cognitive functioning within normal limits [16, 17, 18, 19].

II.METHODS

Aim

The aim of the study was to compare verbal memory in first episode of schizophrenia patients and normal controls and find its association between positive symptoms, negative symptoms, general psychopathology and verbal memory of schizophrenia patients.

Objectives

To find the verbal memory in patients with first episode of schizophrenia as compared to normal control population.

To find the correlation between psychopathology (positive symptoms, negative symptoms and general psychopathology) with verbal memory in schizophrenia.

Hypotheses

There would be difference in verbal memory of patients with first episode of schizophrenia as compared to normal control population.

There would be negative correlation between psychopathology (positive, negative symptoms and general psychopathology) with verbal memory in schizophrenia.

Participants

The schizophrenia patients were selected from Central Institute of Psychiatry (CIP), Ranchi who had come seeking psychiatric treatment. Sixty drug naive schizophrenia patients according to ICD- 10 Diagnostic Criteria for Research [20]were selected through purposive sampling method aged between 18-45 years, either sex, illness duration less than two years, and studied at least till 6th standard. Exclusion criteria of the schizophrenia patients were: any co-morbid psychiatric disorders, substance abuse and dependence, history of neurological disorder or history of electroconvulsive therapy in the past 6 months. 28 normal control persons from general population matched for age, sex and education with respect to schizophrenia group and General Health Questionnaire [21]score less than three were selected. Exclusion criteria of normal control group were: history of psychiatric disorders in the past or current according to ICD-10 Diagnostic Criteria for Research [20], history of significant head trauma, history of significant mental illness, and alcohol or drug use disorder in first-degree relatives.

III.TOOLS

Socio-Demographic and Clinical Data Sheet

A socio-demographic and clinical data sheet was specially designed for the present study to record socio-demographic and clinical variables such as age, sex, education, marital status, occupation, age at onset of illness, duration of illness, course of illness and final diagnosis.

Scale for the Assessment of Positive Symptoms: Scale for the Assessment of Positive Symptoms (SAPS) is a 34-item scale developed by [22] in 1984 for the assessment of positive symptoms in schizophrenia. Items are scored on a scale of 0 to 5 (0= no abnormality, 5= severe). Inter-rater reliability for the SAPS is generally good. Weighted kappa for most items has been reported to range from 0.7 to 1.00.

Scale for the Assessment of Negative Symptoms: Scale for the Assessment of Negative Symptoms(SANS) is a 25 item scale, developed by [23]. The scale is rated on a 0 to 5 points (0= not present, 5= severe). The SANS has been demonstrated to have good internal consistency, with Cronbach's alpha value from 0.67 to 0.90.

Brief Psychiatric Rating Scale (BPRS): It was first developed as 16-item interview based rating scale by [24] and later expanded to its present 18- item form [25]. The assessor rates each of the 18 symptoms on a 0-7 point scale of severity. It was developed primarily for in-patient population. It has well-accepted reliability and validity (with reliability coefficients of 0.56 to 0.87)

General Health Questionnaire-12: [21]This scale is administered on normal controls to rule out any psychiatric morbidity. GHQ-12 is a shorter version of the General Health Questionnaire, which consists of 12 items, the cut-off score being 3 or less.

Logical Memory: (From Wechsler Memory Scale):[26]Verbal memory was measured by Logical Memory- I and II, a subtest of Wechsler Memory Scale-III (WMS-III). Logical Memory- I measures subject's ability to recall story themes. Two short stories are orally presented. The second story is presented twice. The examinee is asked to recall the stories from memory. Logical Memory II:Administered after Logical Memory I. For recall, the examinee is asked to retell stories A and B from Logical Memory I. The stories are not reread to the examinee.

Procedure

Patients and normal controls giving informed consent were selected on the basis of inclusion/exclusion criteria (after administering GHQ-12 on the normal controls). Both inpatients and outpatients were taken up for the study. Details of socio-demographic variables and clinical history were evaluated on interview with the patient and caregivers on first contact. This was followed by a baseline evaluation on SANS-SAPS, BPRS to evaluate current level of psychopathology. Logical memory test was administered in a drug free state.

Statistical analysis

The collected data was analyzed by the statistical software of Statistical Package for Social Sciences (SPSS) version 16.0 (for Windows). In descriptive statistics, mean and standard deviation were calculated for continuous variables while number and percentage were calculated for the discrete or categorical variables. Inferential statistical measures of $\chi 2$ test was used for group comparison of discrete or categorical variables, while independent sample t-test were used for comparing the continuous variables. To see the association among psychopathology and verbal memory, Pearson Correlation-Coefficient (2-tailed) was used. The level of significance was kept at $p<0.05$.

IV.RESULTS

Table 1: Group Comparison of socio demographic characteristics between schizophrenia group and normal control group

Variables		**Schizophrenia Group (N= 60)**	**Normal Control Group (N= 28)**	**T**	**df**	**p**
		Mean ± SD	**Mean ± SD**			
Age (in years)		30.38 ± 6.74	31.82 ± 7.32	.906	86	.367
Variables		**Schizophrenia Group (N= 60) n (%)**	**Normal Control Group (N= 28) n (%)**	**χ2**	**df**	**P**
Gender	Male	58 (96.66)	27 (96.42)	.003	1	.954
	Female	2 (3.33)	1 (3.57)			
Education	6th to 10th	34 (56.66)	15 (53.57)	1.43	2	.489
	10th to 12th	17 (28.33)	6 (21.42)			
	Graduation and Above	9 (15)	7 (25)			
Domicile	Rural	41 (68.33)	9 (32.14)	**10.19****	1	**<.01**
	Urban	19 (31.67)	19 (67.86)			
Occupation	Employed	22 (36.67)	26 (92.85)	**24.31*****	1	**<.001**
	Unemployed	38 (63.33)	2 (7.14)			
Marital Status	Single	24 (40)	7 (25)	1.88	1	.170
	Married	36 (60)	21 (75)			

***p*<.01 level; ****p*<.001

Table 1 shows the comparison of the socio-demographic characteristics (categorical variables) of the schizophrenia and normal control group. Significant difference was found between the schizophrenia and normal control group in terms of domicile ($\chi 2$= 10.19, df=1, p=<.01). In schizophrenia group, most of the sample were from rural areas [n= 41 (68.33%)] whereas in normal control group most of the sample were from urban areas [n=19 (67.86%)]. Significant difference was also found between these two groups in terms of occupation ($\chi 2$= 24.31, df= 1, p= <.001). In schizophrenia group, most of the samples were unemployed [n=38 (63.33)] whereas in normal control group, most of the selected sample were found to be employed [n= 26 (92.85)]. In other socio-demographic parameters, e.g. age, gender, education and marital status no significant difference was found between these two groups.

Table 2: Clinical characteristics of the schizophrenia group (N= 60)

Variables		**n (%)**
Precipitating Factor	Present	7 (11.7)
	Absent	53 (88.3)
Onset of illness	Insidious	58 (96.7)
	Acute	2 (3.3)
Course of illness	Continuous	54 (90)
	Others	6 (10)
Diagnostic subtypes	Paranoid	39 (65)
	Undifferentiated	21 (35)
Variables	**Mean**	**SD**
Duration of illness (in months)	17.88	5.63
Age of onset (in years)	28.75	6.92

Table 2 shows clinical characteristics of the schizophrenia group. Out of 60 patients 7 (11.7%) had precipitating factors for the current illness, 58 (96.7%) had insidious onset of illness and 54 (90%) had continuous course of illness. Relating to current illness the largest number of patients (65%) was of paranoid subtype. The mean duration of illness of the schizophrenia patients was found to be 17.88 ± 5.63 months while the mean age of onset of the illness was 28.75 ± 6.92 years.

Table 3: Comparison of verbal memory between schizophrenia group and normal control group

Logical Memory Test	**Schizophrenia group (N= 60)**	**Normal Control group (N= 28)**	**t (df=86)**	**p**
	Mean ± SD	**Mean ± SD**		
Logical Memory 1- 1st recall total score	25.40 ± 7.26	39.46 ± 5.08	**9.23*** **	**<.001**
Logical Memory 1- total recall	41.77 ± 11.02	61.46 ± 6.93	**8.67*** **	**<.001**
Logical Memory 1- total thematic score	13.76 ± 3.67	20.17 ± 2.09	**8.59*** **	**<.001**
Logical Memory 2- total recall	17.15 ± 7.57	34.64 ± 5.27	**11.01*** **	**<.001**
Logical Memory 2- total thematic score	6.38 ± 2.57	11.46 ± 1.68	9.52***	<.001
Logical Memory 2- percent retention	55.01 ± 14.69	80.57 ± 9.17	**8.45*** **	**<.001**

***p<.001 level

Table 3 shows comparison of verbal memory and verbal fluency between schizophrenia group and normal control group. There was significantly lower score in Logical Memory 1- 1st recall total score (t= 9.23, p <.001), total recall (t= 8.67, p <.001), total thematic score (t= 8.59, p<. 001); Logical Memory 2- total recall (t= 11.01, p<.001), Logical Memory 2- total thematic score (t= 9.52, p<.001), percent retention (t= 8.45, p<.001) and COWAT (t= 6.88, p<.001) in schizophrenia group as compared to normal healthy control group.

Table 4: Correlation of verbal memory with scores of SAPS, SANS, and BPRS in schizophrenia group (N= 60)

Verbal Memory Test	SAPS total (N= 60)	SANS total (N= 60)	BPRS total (N= 60)
Logical Memory 1- 1st recall total score	**-.267***	-.186	-.132
Logical Memory 1- total recall	**-.276***	-.186	.073
Logical Memory 1- total thematic score	-.232	-.171	.064
Logical Memory 2- total recall	**-.313***	-.189	.116
Logical Memory 2- total thematic score	-.217	-.164	.046
Logical Memory 2- percent retention	**-.303***	-.168	.091

*P<.05 level; SAPS= Scale for the Assessment of Positive Symptoms; SANS= Scale for the Assessment of Negative Symptoms; BPRS= Brief Psychiatric Rating Scale

Table 4 shows correlation of verbal memory and verbal fluency test with scores of SAPS, SANS and BPRS in schizophrenia group. SAPS total score showed significant negative correlation with Logical Memory 1- 1st recall total score (r= -.267, p<.05), total score (r= -.276, p<.05), Logical Memory 2- total recall (r= -.313, p<.05), Logical Memory 2- percent retention (r= -.303, p<.05).

V.DISCUSSION

Mean age of the schizophrenia patients was found to be 30.38 (± 6.74) years. Patients with educational attainment of at least 6th standard were selected. Education of schizophrenia patients were divided into three categories – between 6th to 10th standard (55.66%), 10th to 12th standard (28.33%) and graduate and above (15%). This indicated that a larger percentage of concentration of schizophrenia patients was found between 6th to 10th standard. These finding are supported by a study [27] where the different educational level of the sample consisted of: 9 to 11 years- 22.8%, 12 years- 43.9%, and 13 to 15 years- 18.7% respectively. Schizophrenia patients in this study were found to be more in rural area (68.33%) as against the urban area (32.34%).

On comparison of the results of performance on verbal memory test between the schizophrenia patients and normal healthy controls, it was found that the schizophrenia sample showed deficits on verbal memory test as compared to healthy controls this showed that schizophrenia patients had difficulty in acquisition or registration of memory. This study also indicates that patients of schizophrenia had difficulty in immediate recall and delayed recall. This findings is similar to other studies [7, 28, 8, 9]where all the patients performed worse in most tests examining the verbal memory as comparative to normal controls. A meta-analysis done by [6]and reported a greater degree of impairment on measure of verbal memory than any other domain.

In the present study it was found that positive symptoms (SAPS total) negatively correlated with some items of verbal memory test and negative symptoms (on SANS total) score was not correlated with any items of verbal memory test. [13]also found working memory, executive function, visual memory and verbal memory were correlated moderately with the total BPRS score as well as all the PANSS Scores: total score, positive symptom score, negative symptom scores and general symptom score. Similar finding were noted in other study [15].

VI.CONCLUSION

Verbal memory is significantly impaired in schizophrenia patients as compared to normal healthy controls. Positive symptoms of schizophrenia patients had negatively correlated with verbal memory. Negative symptoms of schizophrenia patients had not any correlation with verbal memory. Measures of general psychopathology of schizophrenia patients had not any correlation with verbal memory. Limitations of the study include less number of females' participants, lack of psychiatric ill control group and no follow up assessment of schizophrenia group.It can be suggested that in future the findings of this study can be contextualized for neuropsychological rehabilitation for practitioners.

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