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Cognitive Functions and Memory among Alcohol Dependent and Dual Diagnosis Patients: A Cross Sectional Study.

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Abstract

Background: Cognitive and memory impairment are common to both dual diagnosis and alcoholism. Despite increasing recognition that people with both disorders represent a problematic client group, little is known about the possible additive effect of a dual diagnosis and alcoholism upon impaired cognitive function.

Aims/Objectives: The study was conducted with the aim and objectives of exploring the cognitive functions and Memory in dual diagnosis, alcohol dependence syndrome and control group.

Material and Methods: A total of 30 male subjects were taken from the age range of 20 to 40 years, based on purposive sampling technique. For two groups (dual diagnosis and alcohol dependence syndrome) a sample of 10 subjects each were taken from OPD and ward of deparment of psychiatry SKIMS-Medical College & Hospital Bemina Srinagar, Jammu and Kashmir and a sample of 10 normal male subjects were taken from the family members of the patients as control group. Data was collected by adminstering different neuropsychological tests like Wisconsin Card Sorting Test (Milner, 1963), Tower of London (Shallice, 1982), Trail Making Test (Reitan,1958), Verbal Fluency Test, Abstract Ability Test (Rao, 2004) and PGI Memory Scale (Dwarka Pershad & N.N. Wig, 1977).

Results and Conclusion: Results indicate that cognitive deficits were found more in dual diagnosis patients than alcohol dependent syndrome and normal control group. Memory impairment was found in areas of remote memory, immediate memory; verbal retention and visual retention in dual diagnosis and alcohol dependent syndrome than the normal male group and a significant correlation was found between different cognitive functions and social demographic variables

Keywords: Cognitive Function, Memory, Dual Diagnosis & Alcohol Dependent Syndrome.

Introduction

Among all major psychiatric disorders, bipolar disorder is associated with the highest prevalence of substance abuse and dependence.[1] Cognitive and memory impairment are common to both dual diagnosis and alcoholism. Alcohol-related cognitive impairment can include difficulties with memory, new learning, mental flexibility, response inhibition and problem solving.[2] Between 50-80% of

individuals with chronic alcohol problems will experience some degree of cognitive impairment.[3]

In patients with schizophrenia, delusions and hallucinations could arise as a result of deficits in cognitive functions involving perceptual and attribution biases.[4] Schizophrenia is a chronic and debilitating psychiatric illness consisting primarily of positive and negative symptoms. A wide range of cognitive functions are affected; particularly memory, attention, motor skills, executive function, and intelligence.[5]

Operational Definitions

Cognitive functions: Cognitive function is defined as the intellectual process by which one becomes aware of, perceives, or comprehends ideas. Cognitive function embraces the quality of knowing, which includes all aspects of perception; recognition, conception, sensing, thinking, reasoning, remembering and imagining.

Alcohol dependent: ICD-10 defines alcohol dependence usually having a strong desire, difficulties in controlling substance-taking behaviour, physiological withdrawal state when substance use has ceased or been reduced, the characteristic withdrawal syndrome for the substance are there, evidence of tolerance, such that increased doses of the psychoactive substance are required in order to achieve effects originally produced by lower doses and progressive neglect of alternative pleasures or interests.

Dual diagnosis: The term dual diagnosis is used to describe the comorbid condition of a person considered to be suffering from a mental illness and a substance abuse problem. The concept used specifies severe mental illness e.g. psychosis, schizophrenia and substance misuse disorder e.g. Alcohol dependency. But not with substance induced mental illness.

Memory: A process by which sensations, impressions, and ideas are stored and recalled.

Material and Methods

Aims and Objectives: The present study aims to explore and compare the cognitive functions and memory among alcohol dependent, dual diagnosed and normal males.

Sample

The sample for this study comprised of 30 subjects from three groups, consisting of 10 subjects from each group of alcohol dependent, dual diagnosis and normal person respectively. Sample was taken from OPD and ward of deparment of psychiatry SKIMS-Medical College & Hospital Bemina Srinagar. Control group was taken from normal population from the same hospital, from caregivers of the patients.

Inclusion Criteria

Alcohol Dependent and Dual Diagnosis Group

- Males with the diagnosis of alcohol dependent syndrome as per ICD-10.
- Diagnosis of alcohol dependent along with comorbid psychiatric illness (bipolar disorder and Schizophrenia) as per ICD-10.
- Age range of subject between among 20-40 years.

Control Group

- Male with age group of between 20-40 years.
- Education qualification to be above 5th standard.

Exclusion Criteria

Alcohol Dependent and Dual Diagnosis Group

- DSM IV-TR criteria Axis II disorders.
- Multidrug users or Substance-induced psychosis.
- Presence of Neurological and medical conditions.

Control Group

- Presence of any medical, psychiatry and neurological illness or mental retardation.
- Thoses who have negative history of alcohol or any substance abuse.

Tools

Memory: The memory was measured by PGI Memory Scale.[6] This scale provides a comprehensive and simple scale to measure verbal and nonverbal memories on the basis of neurological theory. There are 10 subtests i.e. Remote, Recent memory, Mental balance, Attention concentration, Delayed Recall, Immediate Recall, Verbal retention, Visual retention and recognition which are standardized on adult subjects in the age range of 20- 40 years.

Sustained Attention/ Focussed Attention: It was measure by Trail Making Test.[7] The test has two parts consist of 25 circles distributed over a sheet of paper. In Part A, the circles are numbered 1 – 25, and the patient had drawn lines to connect the numbers in ascending order. In Part B, the circles include both numbers (1 – 13) and letters (A – L). The patients are instructed to connect the circles as quickly as possible, without lifting the pen or pencil from the paper.

Planning: It was measured by Tower of London.[8] Test consists of two identical wooden boards. Each board consists of three pegs of different sizes. There are three wooden balls, painted red, green and blue respectively. The subject is presented with a goal state of the arrangement of the three balls on one of the boards. The arrangement of the balls in the other board is the initial state. The subject has to arrive at the goal state in the board placed on his side.

Concept Formation/ Abstract Reasoning: It was measured by Wisconsin Card Sorting Test.[9] The test consists of 128 cards. The stimuli vary in terms of three attributes: colour, forms and number. The stimuli are geometrical figures of different forms (triangle, star, cross, circle) in different Colour (red, green, blue) and in different numbers (1, 2, 3, 4) which are presented on each card. The pack of 128 cards consists of two set of 64 cards each. In addition to these 128 cards, there are 4stimulus cards. Out of those four stimulus cards, the first card consists of 1 red triangle, the 2nd consist of 2 green stars, 3rd consists of 3 yellow cross and 4th consists of 4 blue circles.

Abstraction Ability: It was measured by Abstraction Ability.[10] This test measures the abstraction ability in the subject by giving the almost two similarities and two differences of different 12 pairing objects (e.g. Stone-Potato, Fly- Butterfly etc.). In this test there is no time limit, the subject can takes time as much as he can.

Verbal Fluency: It was measured by Verbal Fluency Tests.[10] Spontaneity and ideation are the key factors in this test. The test measuressemantic fluency by instructing the subject to name objects that are “round” and objects which are made of “wood”. It is suitable for all subjects. Subject has to name “round things” and “wooden things” for two minutes each and the number of items so named is the score on each.

Procedure

The sample was collected from OPD and ward of deparment of psychiatry SKIMS-Medical College & Hospital Bemina Srinagar and control group was taken from normal population from the same hospital, from caregivers of the patients. The purposive sampling method was used. An initial history taking session was conducted to determine whether they met the inclusion, exclusion criteria or not, if the criteria was met then the subject were explained the nature and objectives of the research work and an voluntary written informed consent was taken in which nature of the illness, rational for current study, number of visits, confidentiality issues including voluntary contur was explained to the subject and all related queries were clarified. Then the demographic questionnaire sheet and other tools were administered

individually by the researcher and finally the scales were scored according to instructions given on manual.

Results

Table 1: Frequency and percentage of Age, Domicile, Education, Marital Status and Family type.

Socio-demographic characteristics		Dual		Alcoholic		Normal	
		Frequency	%	Frequency	%	Frequency	%
Age	20-30 years	5	16.6	0	0	8	26.6
	31-40 years	5	16.6	10	33.3	2	6.6
Domicile	Urban	7	23.3	6	20	6	20
	Rural	3	10	4	13.3	4	13.3
Education	5^{th}-8^{th}	2	6.6	4	13.3	0	0
	9^{th}-12^{th}	6	20	2	6.6	4	13.3
	Above 12^{th}	2	6.6	4	13.3	6	20
Marital status	Married	7	23.3	8	26.6	2	6.6
	Unmarried	1	3.3	2	6.6	7	23.3
	Divorced	2	6.6	0	0	1	3.3
Family type	Joint	5	16.6	6	20	5	16.6
	Nuclear	5	16.6	4	13.3	5	16.6

As shown in the table 1, the age of the subjects ranged between 20 years to 40 years. Maximum number of subjects (33.3%) in the age range of 31-40 years belong to alcoholic group, whereas there were 16.6% & 6.6% respectively from dual and control groups. The maximum percentage of subjects (23.3%) with urban domicile belong to dual group where as there were 20% & 20% representation from alcoholic and control group. With respect to their education, out of 10 dual subjects 2 (6.6%) had 5^{th}- 8^{th}, 6 (20%) had 9^{th}-12^{th}, 2 (6.6%) had above 12^{th} class of education.. In alcoholic group out of 10 subjects 4 (13.3%) had 5^{th}-8^{th}, 2 (6.6%) 9^{th}-12^{th}, 4 (13.3%) above 12^{th} class of education. Similarly in the control group out of 10 subjects 4 (13.3%) had 9^{th}-12^{th}, and 6 (20%) had above 12^{th} class of education. In the marital status variable, out of 10 Dual subjects 7 (23.3%) are married, 1 (3.3%) are unmarried and 2 (6.6%) are divorced. In alcoholic group out of 10 subjects 8 (26.6%) are married and 2 (6.6%) are unmarried. similarly in the control group out of 10 subjects 2 (6.6%) are married, 7 (23.6%) are unmarried and 1(3.3%) are divorced. In the family type variable, the maximum percentage of subjects was from alcoholic

(20%) which belonged to joint family followed by dual and control group with similar percentage (16.6%).

Table 2: Comparision of the findings on Abstraction Reasoning (Wisconsin Card Sorting Test) in the Dual diagnosis, Alcohol dependent and Control groups.

	Groups	Mean Rank		Sig.
NCR	Dual	10.20		
	Alcoholic	17.40	5.61	0.030
	Normal	18.90		
PPR	Dual	17.60		
	Alcoholic	16.60	2.05	0.358
	Normal	12.30		
PPE	Dual	17.65		
	Alcoholic	15.95	1.47	0.473
	Normal	12.90		
PNPE	Dual	18.55		
	Alcoholic	13.60	1.82	0.398
	Normal	12.90		
PCLR	Dual	11.25		
	Alcoholic	15.95	4.22	0.021
	Normal	19.30		
NCC	Dual	11.10		
	Alcoholic	16.40	4.4	0.031
	Normal	19.00		
FMS	Dual	12.30		
	Alcoholic	16.75	2.24	0.32
	Normal	17.45		

NCR= No. of Correct Response

PNPE=Percentage of Non Perseverative Error

NCC=No. of Categories Completed

PCLR=Percentage of Conceptual Level Response

FMS=Failure to Maintain Set

PPR=Percentage of Perseverative Response;

PPE=Percentage of Perseverative Error

Table 2 shows that there is significant difference in three groups (Dual diagnosis, Alcohol dependent and control groups) at 0.05 level of significance in number of Correct Response, Percentage of Conceptual Level Response and number of Categories Completed.

Table.3: Comparision of the findings on Planning (Tower Of London) in the Dual diagnosis, Alcohol dependent and Control groups.

	Groups	Mean Rank		Sig.
2 MT	Dual	17.95		
	Alcoholic	17.45	3.83	0.147
	Normal	11.10		
2 MM	Dual	17.85		
	Alcoholic	15.15	3.56	0.168
	Normal	13.50		
3 MT	Dual	18.65		
	Alcoholic	15.25	2.38	0.303
	Normal	12.60		
3 MM	Dual	19.80		
	Alcoholic	14.80	4.64	0.098
	Normal	11.90		
4 MT	Dual	17.30		
	Alcoholic	18.80	5.19	0.044
	Normal	10.40		
4 MM	Dual	15.35		
	Alcoholic	18.15	1.81	0.023
	Normal	13.00		
5 MT	Dual	18.75		
	Alcoholic	17.10	4.74	0.043
	Normal	10.65		
5 MM	Dual	18.15		
	Alcoholic	15.10	1.66	0.035
	Normal	13.25		

MT= Mean Time; MM= Mean Moves

Table 3 shows that there is significant difference in three groups (Dual diagnosis, Alcohol dependent and Control group) at the 0.05 level of significance in the 4 moves and 5 moves of trials.

Table.4: Summary of chi- square results on cognitive functions (Attention, Verbal Fluency) and Dual diagnosis & Alcohol dependent.

Measure		Groups			Sig.
		Dual diagnosis	Alcohol dependent	X^2	
Focused attention	Deficit	9	4	5.49	0.02*
	No deficit	1	6		
Verbal fluency	Deficit	8	4	0.95	0.32
	No deficit	2	6		

* Significant at 0.05 level

As shown in the table 4 that there is significant difference on 0.05 level of significance, in Dual diagnosis and Alcohol dependent on the Focused Attention and no significant difference resulted on verbal Fluency.

Table.5: Sub-test wise comparison in the performance of Dual diagnosis, Alcohol dependent and Control group on PGI-Memory scale.

Sub-Test	Groups	N	Mean Rank	X^2	Sig.
Remote	Dual	10	8.75		
	Alochol	10	15.25	13.65	.001**
	Control	10	22.50		
Recent	Dual	10	11.90		
	Alochol	10	13.70	6.44	.040*
	Control	10	20.90		
Mental	Dual	10	13.85		
	Alochol	10	13.00	3.70	.157
	Control	10	19.65		
Attention	Dual	10	15.45		
	Alochol	10	16.95	.58	.746
	Control	10	14.10		
Delayed	Dual	10	14.00		
	Alochol	10	15.45	2.21	.330
	Control	10	17.05		
Imm. Recall	Dual	10	13.20		
	Alochol	10	14.45	3.32	.190
	Control	10	18.75		
Retention	Dual	10	13.25		
	Alochol	10	15.65	1.46	.481

	Control	10	17.60		
Dissimilar	Dual	10	9.75		
	Alochol	10	15.60	9.44	.009**
	Control	10	21.15		
Visual	Dual	10	8.61		
	Alochol	10	15.75	10.27	.006**
	Control	10	20.00		
Recognition	Dual	10	13.95		
	Alochol	10	13.15	3.87	.144
	Control	10	19.40		
Total	Dual	10	9.50		
	Alochol	10	14.20	15.16	.001**
	Control	10	22.80		

* Significant at 0.05 level, ** Significant at 0.01 level

Table 5 shows that there is significant difference at 0.01 level of significance, in the three groups (Dual diagnosis, Alcohol dependent and Control group) on the Remote Memory, Retention for Dissimilar pairs, Visual Retention and also at Total memory score and it is also shown in the table that there is significant difference at 0.05 level of significance on Recent memory.

Table.6: Correlation between Cognitive Functions, Memory and Socio-demographic variables.

variables	Memory	Planning	Sustained Attention/ Focused Attention	Verbal Fluency	Abstract Ability
Age	-.234	-.170	.202	-.126	.144
Education	.250	.046	-.356	-.339	.696**
Domicile	.065	.085	.208	.120	.397*
Marital status	.263	-.050	.100	-.047	.053
Family type	.116	.163	.134	.339	.205

* Significant at 0.05 level, ** Significant at 0.01 level

Pearson correlation was done to find out the relationship between cognitive functions, memory and Socio-demographic variables and results are presented in the above table. It can be observed from the above table that there is significant correlation between education and Abstract Ability at 0.01 levels of significance. Significant correlation was found between domicile and Abstract Ability at 0.05 levels of significance.

Discussion & Conclusion

The aim of the present study was to explore the cognitive deficits on tests of Attention, Abstract Ability, Verbal Fluency, Planning, Abstract Reasoning and memory in patients with Dual diagnosis (mental illness and alcohol dependent), Alcohol Dependent syndrome patients and also Normal control group on the performance of neuropsychological tests of cognitive function.

The maximum number (33.3%) from alcoholic dependent patients were found 31-40 years of age, whereas there

were only 16.6% & 6.6% respectively from dual diagnosis patients and normal group. Moreover 23.3% with urban domicile belong to Dual were reported whereas there were 20% & 20% representation from Alcoholic and Normal groups who belonged to urban domicile.We found that out of 10 Dual diagnosis patients 2 (6.6%) had 5th- 8th, 6 (20%) had 9th-12th, 2 (6.6%) had above 12th class of education. In Alcoholic dependent patients out of 10 patients 4 (13.3%) had 5th-8th, 2 (6.6%) 9th-12th, 4 (13.3%) above 12th class of education. The current study shows that out of 10 in dual diagnosis patients, 7 were married, 1 was unmarried and 2 were divorced. In Alcoholic group out of 10 subjects 8 (26.6%) were married and 2 (6.6%) were unmarried. Moreover in the normal group out of 10 subjects 2 (6.6%) were married, 7 (23.6%) were unmarried and 1(3.3%) was divorced. Most of the alcoholic dependent patients from our study were from joint family (20%) followed by dual and normal groups with same figures (16.6%). Most of the previous study namely, Michael Herman[11], Singh, Mattoo[12] and Richard Senbanjo[13] had recruited subjects of the almost similar Socio-demographic data.

The present study demonstrated significant deficit on cognitive functions in the patients of dual diagnosis than alcohol dependent syndrome. More number of male patients of dual diagnosis were found having more cognitive deficits than the other two groups. These findings were supported by the study of Boaz.[14] Differences were found in the three groups on the cognitive function of focused Attention, Abstract Ability, Verbal Fluency, planning, Abstract Reasoning. Similar findings were reported by many other investigators Cleghorn[15] and Addington & Addington.[16]

It was found from the current study that there is a difference in memory functions in the three groups. It was found that impairment in memory at Remote memory, immediate memory; verbal Retention and Visual Retention are seen in dual diagnosis and alcohol dependent syndrome than the normal male group. It was confirmed by the study of Sandra Zinn,[17] Rupp[18] and Boaz.[14] The study found a positive relationship between education and abstract ability, moreover a positive relationship was found between domicile and abstract ability. The similar findings were reported by Rani [19] and Darwish.[20]

Implication of the study

- The findings of this study have important implications for treatment and are a further step to providing an empirically-grounded differentiation of the cognitive status and perceptions of life quality between the two groups.
- For service delivery and improving interventions for the dually diagnosed and Alcohol dependent patients. Since cognitive functions have been related to the performance of activities of daily living.
- Moreover it would be reasonable that the dually diagnosed with more impaired in cognitive functions will have intensive utilization of services than Alcohol dependents.

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