Comparative Study of Patients with Psychotic and Nonpsychotic Depression on Neurocognitive Impairment and Quality of Life

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ABSTRACT

Introduction: There are certain evidences that depression & Psychotic depression are associated with structural brain abnormalities. Neurocognitive deficit is found in psychotic depression and non psychotic depression. Studies in relation to quality of life of psychotic patients are very scanty. The objective of the current study is to evaluate neurocognitive impairment and quality of life in patients with psychotic and non psychotic depression and to compare quality of life of the patients with psychotic and non psychotic depression groups.
Material and methods: Neurocognitive impairment was measured in 50 consecutive patients of psychotic depression & 50 patients of non psychotic depression meeting diagnostic criteria according to ICD-10 were matched with 30 healthy controls. The patient's socio demographic data were recorded and details regarding illness were obtained. The cases and controls were administered Beck's depression inventory, WHO QOL Bref version and a battery of test to asses their neuro cognitive functions. The performances of cases & controls were compared using appropriate statistics
Results: Patients with Psychotic depression showed greater cognitive impairment than nonpsychotic depression ($p<.01$). The psychotic depressed group performed poorly than non psychotic depressed group who performed poorly than healthy controls on all domains of WHO QOL Bref Version. The results differed significantly on analysis of variance. ($p<.01$)
Conclusion: It was found that Cognitive impairment was present both in psychotic as well as nonpsychotic depression. The scores of WHO QOL Bref Version in psychotic depression group were lower than nonpsychotic depression group on all domain. Scores of nonpsychotic depressive patients were lower on all domain than healthy controls.

Keywords: Psychotic Depression, Non-Psychotic Depression, Neurocognitive Impairment and Quality of Life

INTRODUCTION

Nearly whole brain is involved in the cognitive process and damage to any part of the brain may lead to a compromise in cognitive functioning and there are certain evidences that depression & Psychotic depression are associated with structural brain abnormalities (Simpson et al 1999[1], Solankangas R.K.R. et al 2002[2]) and hypothalamic pituitary adrenal axis activity abnormalities (Anton RF 1987, Schatz berg AF et al 1983).[3,4] So these factors may contribute to cognitive impairment in psychotic and non psychotic depression.

Depression is an illness that involves the body, mood and thoughts. It affects the way a person eats and sleeps, the way one feel about oneself and the way one thinks about things. Severely depressed patients with delusion or hallucination or with depressive stupor are said to have severe depression with psychotic symptoms or psychotic depression.[5] Psychotic depression is clinically and biologically distinct from nonpsychotic depression.

Psychotic depression has been distinguished from Non Psychotic depression by its association with Poorer Premorbid function, longer depressive episodes, less responsiveness to antidepressant medication and worse prognosis.[6,7] Empirical evidence also suggest that, compared with non psychotic depression, psychotic depression is associated with a higher rate of neurobiological alterations, such as structural brain abnormalities[8,9,10] and excessive hypothalamic - pituitary - adrenal axis activity.[3,4] Yet the neuropsychological profile of psychotic depression, especially in early and mid-adulthood, has received little systemic investigation. Existing data are in consistent, often methodologically limited, and potentially confounded by the effect of chronic disease and exposure to antipsychotic treatment.

Neurocognitive deficit in psychotic and non psychotic unipolar depression would indicate a relatively benign pattern of cognitive and brain dysfunction, even when psychotic features accompany unipolar mood disorder. On the other hand, a neuropsychological profile of psychotic depression that is more consistent with that of schizophrenia would suggest common features of pathophysiology across these psychotic disorders.

Research had been done in reference to both chronic mental illnesses as a whole as well as the specific disorders. It had found that chronically mentally ill patients can provide reasonable and reliable information about their QOL, and QOL rating as assessed by patients themselves have concordance with the ratings as assessed by close family members. QOL has been described in terms of

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certain indicators, and components. The indicators include subjective and objective indicators.

Nowadays a lot of emphasis has been paid on Quality of Life of psychiatric patients. There is a growing consensus among psychiatrists that even a subtle impairment in cognitive abilities can lead to impairment in general Quality of life of individuals. Impairment in memory, attention and concentration, executive domain all hinder the normal functioning of an individuals.

Although a lot of work related to quality of life in other various psychiatric disorders has been reported but studies in relation to quality of life in psychotic depression are scanty. Keeping this issue in mind this study was planned to evaluate quality of life in patient with psychotic depression.

Study aimed to evaluate neurocognitive impairment and quality of life in patients with psychotic and non psychotic depression and to compare quality of life of the patients with psychotic and non psychotic depression groups.

MATERIAL AND METHODS

Before implementing the plan to the practical work we had to think whether we should design this study cross sectional or longitudinal. However due to limited time available and shorter period of study, we had to stick ourselves to the cross sectional design.

The sample was drawn from the patient attending OPD of Psychiatric centre, Jaipur and Psychiatric out door in SMS hospital, Jaipur. The controls were drawn from the general population. The cases as well as controls were enrolled after taking informed consent from them. To enter in the study, Patients were screened with a specially designed proforma which encompassed the entire inclusion and exclusion criterion. 50 consecutive patients of psychotic depression & 50 patients of non psychotic depression meeting diagnostic criteria according to ICD-10 were matched with 30 healthy controls. Patients of severe depression were taken in study in non psychotic depressions group also to make both case groups comparable.

Matching of cases and controls was done on the basis of age, gender, socio-economic status and educational standards. Patients of both groups fulfilling the ICD-10 criteria for psychotic and nonpsychotic depression (Moderate to severe category - Score on Beck depression inventory > 16) were enrolled for the study. Age group was between 18-50 years in both index and control group. There was no evidence of any psychiatric or physical illness in normal healthy controls.

Patients with any significant physical or neurological illnesses, history of stroke or head trauma, substance abuse, evidence of co-morbid major psychiatric disorder, neurodegenerative disorder, learning disability, endocrinal disabilities and those with colour blindness were also excluded in the study.

The patient's socio demographic data were recorded and details regarding illness were obtained. The cases and controls were administered Beck's depression inventory, WHO QOL Bref version and a battery of test to asses their neuro cognitive functions.

Instruments used in the study:

1. Consent form: This form was written in Hindi language & it was given, once the patient was included in the study. The written consent was taken from patients individually in the presence of their relatives to make them feel that the tests were not the routine one & they had to be sincere in their effort.
2. Screening Performa: This included a few basic questions regarding the patients. Determining the inclusion & exclusion criterion and beck depression inventory to asses the severity of depression. A cut off score of 16 was taken as an indicator of severity of depression and patient with score below 18 on HMMSE were excluded form the study.
3. Demographic Date Sheet: Recording the socio demographic details viz. age, sex, occupation, Income level, educational beck group, marital status, family type, religion & locality and details of illness (viz. duration, number of episodes, type of treatment receiving etc.)
4. Beck Depression Inventory (BDI)[11]: The BDI was developed in the early 1960 to rate depression severity, with on behavioural and cognitive dimension of depression.

   Patient is asked to answer each item based on past week. The scale gives here and now assessment and in easy to use for frequent repetition. It has been reported to correlate 0.62 with global judgements -

   a) A score of 0-9 would be considered normal range.
   b) A score of 10-15 would indicate mild depression.
   c) A score of 16-23 would indicate moderate depression.
   d) A score of 24 or more would be considered severe depression
5. Neuropsychological tests: We gave the patient eight test which are described below in the same order in which they were presented to the subjects.

   a.. Hindi Mental Status Examination (HMSE)[12]: Hindi Mental State Examination scale devised to test diffuse cognitive functioning. Total possible score on Hindi Minimental state examination scale is 30.

   b. Digit Span Test[13]: This test measures short term memory and concentration. This test is from the Wechsler adult intelligence scale (1981). It has two parts - digit forward test and Digit backward test.

   c. Verbal Learning & Memory Test[14]: This is a verbal complex memory test. In this test subject is asked to pay attention to the story that is being read by Examiner. In our study we have given a score out of 23 to facilitate comparison between the groups..

   d. Visual Learning & Memory Test[14,15]: This is a visual complex figure test with consist of a complex rectangular drawing with 23 small details in it. This test investigates both visuo perceptual organization and visual learning and memory. This test is scored qualitatively in terms of confabulatory responses, spatial, perseveratory and organizational errors and

quantitatively in terms of number of details/facts reported.

e. Stroop Colour Test[16,17]: Susceptibility to interference and inability to inhibit inappropriate automatic responses are assessed more specifically by tasks that provoke competing responses, such as Stroop procedure.
This test is a sensitive measure of visuomotor coordination psychomotor speed, memory, concentration & attention.

6. WHO - Quality of Life Scale (Bref Hindi Version)[18]: It contains 26-items that looks at domain level profiles and is self-administered. Higher scores mean higher quality of life.

The performances of cases & controls were compared using appropriate statistics. The results were drawn & discussed in light of various national & international literature.

RESULTS

Based on studies reviewed there is evidence that psychotic depression has been distinguished from of non psychotic depression by its association with poorer pre morbid function, longer depressive episode, less responsiveness to anti depressant medication & worse prognosis (Sand JR et al 1994[7]; Mayer BS et al, 1995[6]).

There is increasing evidence that compared to non psychotic depression, psychotic depression is associated with a higher rate of neuro- cognitive impairments and higher rate of biological alterations, such as structural brain abnormalities (Rothschild AJ et al 1989[9], IRAM Lesser et al 1991) and excessive hypothalamic pituitary adrenal axis activity (Anton AF et al 1987[8], Schatzberg AF 1993[8]).

Studies exploring quality of life in psychiatric disorders have shown that quality of life in depression is related with severity of depression, hopelessness, global functioning & cognition (McCall et al 2003[19], Margaret Moore 2005[20]).

Table 1 compares the experimental (Non-psychotic depression & Psychotic depression) and control groups on demographical variables of age, gender, duration of illness and treatment taken. As in all these groups P >.05 on Chi square test thus the experimental & control groups do not differ significantly on these variables. Hence our samples are comparable on Demographic variables.

Table 2 shows distribution of experimental groups on the basis of type of treatment taken. In non-psychotic depression

Variables	Non-Psychotic Depression (N =50)	Psychotic Depression (N = 50)	Control (N = 30)	Total (N = 130)	
Age					
20 and below	Nil	Nil	Nil	Nil	X^2 - 0.092
21 - 30	23 (46%)	23 (46%)	14 (46.66%)	60	df - 4
31 - 40	21 (42%)	21 (42%)	13 (43.33%)	55	P > .05
41 - 50	6 (12%)	6 (12%)	3 (10%)	15	
Gender					X^2 - 0.439
Male	38 (76%)	38 (76%)	21 (70%)	97	df - 2
Female	12 (24%)	12 (24%)	9 (30%)	33	P > .05
Duration of Illness					
< 6 months	6 (12%)	4 (8%)			X^2 - 0.617
> 6 months - 1 Years	5 (10%)	5 (10%)			df - 4
> 1 Year - 2 Years	7 (14%)	8 (16%)			P > .05
> 2 Years - 5 Years	16 (32%)	15 (30%)			
> 5 Years	16 (32%)	18 (36%)			
Treatment					
No Treatment	9 (18%)	5 (10%)			
Treatment	41 (82%)	45 (90%)			

Table-1: Demographic Details of Cases and Controls

Non-psychotic depressed patients (N = 50)		Psychotic depressed patients (N = 50)	
No Treatment	9 (18%)	No Treatment	5 (10%)
Tricyclic anti depressant	14 (28%)	Anti depressant alone	13 (26%)
SSRI & Newer anti depressant	24 (48%)	Anti depressant + Antipsychotic	25 (50%)
Combinations of 2 + 3	3 (6%)	Anti Psychotic alone	7 (14%)

Table-2: Type of Treatment taken

Cases	Mean BDI Score	N (100)
Non-psychotic Depression	38.68	50
Psychotic Depression	40.92	50

Table-3: Mean Score on Beck Depression Inventory (BDI)

group 24 patient were on SSRI or newer antidepressants (48%). 14 were on Tricyclic antidepressants (28%), 3 were on combination of SSRI and TCA (6%) and 9 were not taking any medicines (18%). In Psychotic depression group 13 patients were on antidepressants alone (26%), 25 were on antidepressant and antipsychotic combination (50%), 7 were on antipsychotic alone (14%) and 5 were not taking any treatment (10%).

Neuropsychological Tests	Psychotic depression	Non psychotic depression	Control
Hindi Mental Status Examination	26.44 ± 0.99	28.28 ± 0.88	29.33 ± 0.76
Digit Span Test	6.82 ± 0.85	7.72 ± 0.71	9.47 ± 0.97
Verbal Learning Memory	9.83 ± 1.215	11.460±1.615	16.500±1.799
Visual Learning and Memory	8.905±1.565	10.55±1.259	13.74±1.911
Stroop Colour Test	140.44±16.87	97.16±7.63	79.27±13.96
Trail Making Test			
Test A	88.64 ± 16.03	69.50 ± 12.57	49.83 ± 11.56
Test B	137.92±17.93	114.74±15.94	72.17±18.94
Clock drawing Test	7.90 ± 1.45	8.46 ± 0.86	9.60 ± 0.67
Digit Symbol Substitution	30.48 ± 7.4	33.70 ± 4.79	47.70 ± 12.09

Table-4: Scores obtained on Neuropsychological tests by the three groups (Mean ± SD)

	ANOVA					
Neuropsychological Tests	**Source of Variations**	**df**	**Sum of Squares**	**Mean Squares**	**F**	**p**
Hindi Mental Status Examination	Between groups	2	174.50	87.251	107.512	<.01
	Within groups	127	103.06	.812		
	Total	129	277.56			
Digit Span Test	Between groups	2	131.604	65.80	89.93	<.01
	Within groups	127	92.92	.732		
	Total	129	224.53			
Verbal Learning Memory	Between groups	2	857.523	428.76	185.229	<.01
	Within groups	127	293.975	2.315		
	Total	129	1151.49			
Visual Learning and Memory	Between groups	2	452.181	226.09	94.58	<.01
	Within groups	127	303.583	2.39		
	Total	129	755.764			
Stroop Colour Test	Between groups	2	82895.52	41447.76	234.44	<.01
	Within groups	127	22452.907	176.795		
	Total	129	105348.43			
Trail Making Test						
Test A	Between groups	2	28884.244	14442.122	75.778	<.01
	Within groups	127	24204.187	190.584		
	Total	129	53088.431			
Test B	Between groups	2	81132.810	40566.405	133.458	<.01
	Within groups	127	38603.467	303.964		
	Total	129	119736.277			
Clock drawing Test	Between groups	2	54.372	27.186	22.697	<.01
	Within groups	127	152.120	1.198		
	Total	129	206.492			
Digit Symbol Substitution	Between groups	2	5882.412	2941.206	46.417	<.01
	Within groups	127	8047.28	63.364		
	Total	129	13929.692			

Table-5: Analysis of Variance (ANOVA) between scores obtained on Neuropsychological tests by the three groups

Domain	Psychotic depression	Non psychotic depression	Control
Physical Health	9.90 ± 1.68	14.38 ± 3.74	29.73 ± 5.74
Psychological Health	8.72 ± 1.67	12.62 ± 2.35	24.20 ± 2.68
Social Health	4.06 ± .98	6.08 ± 1.28	11.77 ± 1.25
Environmental Health	14.26 ± 1.74	18.06 ± 2.60	28.77 ± 3.06
Overall perception of QOL and Health Domain	3.28 ± 0.73	4.78 ± 1.09	8.27 ± 0.94

Table-6: Scores obtained on WHO Quality of Life (QOL) Bref version by the three groups (Mean ± SD)

	ANOVA					
Domain	**Source of Variations**	**df**	**Sum of Squares**	**Mean Squares**	**F**	**p**
Physical Health	Between groups	2	7644.65	3822.327	272.69	<.01
	Within groups	127	1780.147	14.017		
	Total	129	9424.8			
Psychological Health	Between groups	2	4604.73	2302.366	475.71	<.01
	Within groups	127	614.660	4.84		
	Total	129	5219.39			
Social Health	Between groups	2	1136.903	568.451	420.054	<.01
	Within groups	127	171.867	1.353		
	Total	129	1308.769			
Environmental Health	Between groups	2	4028.570	2014.285	341.174	<.01
	Within groups	127	749.80	5.904		
	Total	129	4778.37			
Overall perception of QOL and Health Domain	Between groups	2	470.466	235.233	270.293	<.01
	Within groups	127	110.527	.870		
	Total	129	580.992			

Table-7: Analysis of Variance (ANOVA) between scores obtained on WHO Quality of Life (QOL) Bref version by the three groups

Table 3 shows mean BDI score in non – psychotic depression group was 38.68 and in psychotic depression group was 40.92.

Psychotic depression group had more cognitive impairment than non psychotic depression group. Statistically significant difference was seen on analysis of variance among three group on different neurocognitive tests as shown by subsets of Table 4 and Table 5. Table 5 show analysis of variance on different cognitive tests by psychotic depression, nonpsychotic depression and control group. It was found that psychotic depression group performed poorly than nonpsychotic depression group on HMSE, Digit Span Test, Verbal Learning and Memory, Visual Learning and Memory Test, Stroop Colour Test, Trail Making Test-A, Trail Making Test-B, Clock Drawing Test and Digit Symbol Substitution Test who performed poorly than control group. The results differed significantly on ANOVA ($P < 0.01$)

DISCUSSION

Results have shown that all parameters were significantly adversely affected in both experimental groups (more in psychotic depression group). Diffuse cognitive decline was evident on HMSE further the impairment was present in domains of attention and working memory (Digit Span Test), verbal learning and memory and delayed recall (verbal learning and memory test) and visual learning and memory, visuo spatial recognition (visual learning and memory test), executive functioning (stroop colour test), visuo conceptual and visuo motor speed, perseverance and shifting attention (trail making A and B test), auditory comprehension and constructional praxis (clock drawing test), visuo motor coordination, psycho motor speed and complex attention (Digit symbol substitution test).

Dilip V. Jeste et al 1996[21] observed that neurocognitive impairment was greater in psychotic depression than non psychotic depression group on domains of psychomotor speed, motor skills, attention & learning. Erik B. Nelson et al 1998[22] found that continuous performance test scores of Psychotic depression patients were worse than non psychotic patients. Alan F. Schatzberg et al 2000[23] demonstrates significantly greater impairment in psychotic depressive patient than non psychiatric depressive patient in attention & response inhibition, as well as in verbal declarative memory. Basso MR et al 1999[24] found that patients with psychotic depression group demonstrated a broad range of cognitive deficits than non psychotic depressive patients. Josheph K. Belanoff et al 2001[25] observed that subjects with psychotic major depression had a higher rate of errors on verbal memory test (incorrectly identified destructors as target) than subjects with non psychotic depression and healthy volunteers.

Politis A. et al 2004[26] detected impairments on Ruff's 2 and 7 selective attention tests in both psychotic and non psychotic depression group in comparison to healthy controls. S. Kristion Hill 2004[27] studied Psychotic, non psychotic & healthy controls on cognitive measure and found that non psychotic depressive had mild dysfunction on tests of attention & psychotic depression group had over all impaired performance on tests of general intelligence, executive function, attention verbal memory, motor skills & visuo spatial perception.

Findings of these studies support findings of our study. In this study we found that nonpsychotic depression group had more cognitive impairment as compared to healthy controls. The overall finding showed that male patients in non psychotic depression group performed better than female patient but in psychotic depression group there were mixed findings. We further looked into the probable reasons for this and we found that female patients in nonpsychotic depression group had low educational level, greater severity of depression, more number of episode and more duration of illness which probably lead to poor cognitive performance and sex alone was not a responsible variable in nonpsychotic depression group. In psychotic depression group male and female

patients were comparable on educational level, severity of depression and duration of illness. The male patients in this group performed better than female in domains of verbal learning & memory and delayed recall, visual learning memory and visuo spatial recognition, perseverance, visuo conceptual speed & shifting attention. While female patients performed better on HMSE and in domains of attention and working memory, executive functioning, auditory comprehension and constructional praxis, visuo motor coordination, psycho motor speed and complex attention. Significant difference was only in domain of visuomotor coordination, speed and complex attention. We were not able to find out a plausible explanation of findings in psychotic depression group regarding gender. Despite a lot of efforts we were not able to find any study regarding neurocognitive performance differences according to gender in depression. Hence these findings have to be confirmed by further studies at different centres.

When educational status was taken in consideration we found that patients with higher educational level performed better on neuro cognitive tests in both non psychotic and psychotic depression groups as shown by subsets of Table 5.

Quality of Life: In this study we explored quality of life in patients of psychotic depression, nonpsychotic depression and healthy controls.

We compared the three groups on domains of WHO QOL bref version.

Table 6 and Table 7 shows that psychotic depression group performed poorly than nonpsychotic depression group on Physical Health Domain, Psychological Health Domain, Social Health Domain, Environmental Health Domain and Overall Perception of QOL & Health Domain of WHO QOL Bref Version who performed poorly than control group. The results differed significantly on ANOVA. ($p < 0.01$)

The results demonstrated that psychotic depressed group performed poorly than non psychotic depressed group who performed poorly than healthy controls on all domains of WHO QOL Bref Version. The results differed significantly on analysis of variance.

Our findings were supported by studies done by various researchers. Jeffrey Pyne et al. (1997)[28] observed that depressive patients score lower on QWB Scale than healthy controls and severity of depressive symptoms was inversely related to quality of life as measured by QWB. Antonio Lasalvia (2002)[29] found that BPRs & SCL-90-R were poorly correlated with quality of life scores in patients. Results showed that self rated depressive symptoms and self reported paranoid ideation have highest predictive power for subjective QOL. M.C. Angermeyer et al. (2002)[30] assessed QOL on WHO QOL-100 in depressed patients and found that depression implies a persisting impairment of social functioning and living conditions. Margaret Moore (2005)[20] assessed QOL of depressive patients on SEL QOL and detected that depression and hopelessness were found to be associated with power QOL. Goldberg Joseph et al. (2005)[31] studied patients of psychotic depression, nonpsychotic depression and bipolar mania for assessment of quality of life and he found that in patients with unipolar psychotic depression subjective life satisfaction did not parallel global functioning work performance and social adjustment at follow up at different interval of 2, 4 and 8 years. Their sub-quality of life remained lower, potentially due to demonstrated insight, demoralization or altered life expectation overtime.

CONCLUSION

It was found that Cognitive impairment was present both in psychotic as well as nonpsychotic depression. Psychotic depression showed greater cognitive impairment than nonpsychotic depression. The neurocognitive impairment was present on HMSE and in all cognitive domains viz. attention and working memory (digit span test), verbal learning and delayed recall (verbal learning and memory test), viuso spatial recognition and memory (visual learning and memory test), executive functioning (stroop colour test), visuo constructual and visuo motor speed, shifting attention, perseverance (Trail making A and B test), auditory comprehension and constructional praxis (clock drawing test), visuo motor coordination, psychomotor speed, complex attention (digit symbol substitution test). The scores of WHO QOL Bref Version in psychotic depression group were lower than nonpsychotic depression group on all domain. Scores of nonpsychotic depressive patients were lower on all domain than healthy controls. The results of quality life in three groups differed significantly on ANOVA.

Limitations and Future Research

There were few limitations in our study such as the sample size was relatively small and since this study was cross sectional and we could not find out whether neurocognitive deficits in psychotic or non psychotic depression illnesses are enduring or state variable.

Thus, Future studies are needed to follow up depressed patient with larger sample, longitudinal assessment, sound methodology and concurrent neuroimaging studies to find out the functional correlates of neurocognitive impairment in depressive disorders.

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