

## COGNITIVE DYSFUNCTION IN DEPRESSION

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*'Cognitive Dysfunction' was assessed in 30 patients diagnosed to have Major Depression (DSM III R), using the PGI memory scale and the Weschler Adult Performance Intelligence Scale, form PR, both of which have been developed and standardised in India. Depressed patients revealed marked impairment on tests of attention and concentration, and immediate and delayed recall on tests of memory (PGI); while tests of performance (WAPIS) revealed global impairment. This impairment reversed with recovery from depression. While improved test scores occurred along with improvement in depression, there was no direct correlation between the two i.e. the degree of improvement in WAPIS/PGI total scores was not directly proportional to the degree of improvement in depression scores.*

Cognitive dysfunction in depression has been well researched with workers demonstrating impairment in attention and concentration, immediate recall, learning of new information and performance speed (Croholm and Ottoson, 1961; Sternberg and Jarvik, 1976, Abrams and Taylor, 1987). This impairment has been shown to be reversible and to correlate with the improvement in depression (Croholm and Ottoson, 1961; Sternberg and Jarvik, 1976; Frith *et al.*, 1983, Henry *et al.*, 1973). The impairment seen on cognitive testing in depressed patients has been attributed to several causes including poor attention and concentration, psychomotor retardation, poor educational status, the effect of normal aging and to side effects of drugs given for depression (Abrams and Taylor, 1987; Henry *et al.*, 1973).

Assessment of cognitive function in patients who are suffering from depression is of great practical importance as these patients may present with features indistinguishable from a primary degenerative dementia, often referred to as depressive pseudo dementia (Mahendra, 1985). Some workers like Wells (1979) claim that the two conditions can be distinguished on the basis of detailed history and examination, with depressed patients complaining about cognitive loss in a remarkably detailed manner, showing memory gaps for specific often emotionally charged events, tending to highlight their failures, revealing a strong sense of distress and help seeking, and showing a marked variability in performance. However, practically a trial of antidepressant therapy is often resorted to, with depressed patients improving and demented patients remaining the same or worsening (Wells, 1979).

The Indian literature in this area is limited. Sharma and Singh (1984) have shown that cognitive dysfunction does occur in depression; the more severe the depression, the greater is the impairment; and that this impairment is reversed with lifting of depression. This study represents an attempt to objectively assess cognitive impairment and changes in it following treatment in a group of depressed patients diagnosed using strict criteria, and tested using scales validated in India.

### MATERIAL AND METHODS

30 patients who met DSM III R (APA, 1987) criteria for Major Depression were selected. Inclusion criteria included being free of all medication for at least one week prior to testing, being in the age group 15-45 years, having had at least 5 years of schooling, absence of 'psychotic' features, an initial Hamilton Depression Rating Scale Score (HDRS, Hamilton 1960) of 15 or more; absence of any physical illness on examination and investigation, and having had no electro convulsive therapy in the 6 months prior to testing. Selected patients were administered the PGI memory scale (Pershad, 1977) and Weschler Adult Performance Intelligence Scale (WAPIS) Form PR (Ramalingaswami, 1974), both of which have been previously used and standardised in India. The PGI memory scale assesses several aspects of memory function and takes approximately 30 minutes to administer. It contains 10 subtests assessing the following aspects of cerebral function-remote memory, recent memory, mental balance, attention and concentration, delayed recall, immediate recall, retention for similar and dissimilar pairs, visual retention and visual recognition. The WAPIS takes approximately one hour to administer and assesses performance using picture completion, digit symbol, block design, picture arrangement and object assembly tests. Following recovery from depression, judged by HDRS score of 5, and brought about by tri-cyclic-anti-depressants, (Amitriptiline, Imipramine and Dothiepin in the dose range of 100-150 mg per day) and supportive psychotherapy, patients were retested using the PGI scale and WAPIS. Each patient therefore functioned as his or her own control. No patient received ECT for treatment of depression. All testing was done by the first author, between 2 and 6 pm, in an effort to decrease the influence of diurnal variation of symptoms, if present. Students 't' test was used to compare sub groups while depressed and to compare changes in scores of the whole group with recovery from depression. The comparison of sub-groups while depressed was carried out to see if these patients differed significantly when compared for sex, location,

education, degree of depression and presence of melancholia. The paired 't' test was used to compare pre and post treatment data (table IIA and B). A correlation between improved HDRS and PGI/WAPIS total scores was attempted using a scatter plot and the co-efficient of correlation. A comparison was also made between scores obtained on testing after recovery from depression and the norms given in the PGI/WAPIS booklets, to confirm that their scores had returned to the normal range.

### SAMPLE CHARACTERISTICS

Mean age (total sample) - 32.17 years, male, - 33.86 years, female - 30.69 years; HDRS (average), while depressed - 24.90, after recovery - 3.33; Average time before retesting - 61.43 days (range 35-120 days).

### RESULTS

Comparison of PGI & WAPIS total scores among sub groups while depressed, reveals a trend towards males, non melancholics, the more educated, the less depressed and those from an urban background manifesting less impairment.

Comparison of pre and post treatment values reveals significant impairment in sub tests 1,2,4,5,6, 10 and total scores on the PGI scale; impairment on WAPIS was global.

There was no direct correlation between differences in individual total HDRS scores (DDRS-i.e. change in score between initial and repeat testing) when compared to corresponding difference in PGI/WAPIS total scores (DPGIT/DWAPIST) either on a scatter plot (see scatter plots below), or the correlation co-efficient (DHDRS Vs DPGI total score = 0.2894; DHDRS Vs DWAPIS total score - 0.2341, indicating no significant correlation). That is, based on improvement individual total HDRS scores one could not predict corresponding improvement in individual PGI/WAPIS total scores.

### DISCUSSION

This study specifically excludes the effect of aging, psychotic features, ECT, medication and poor educational status on the dysfunction seen in depression. In addition all patients were diagnosed using strict criteria (DSM III-R) and tested using scales developed and validated in India.

Our findings are similar to several reported earlier, that is the dysfunction is mainly in attention and concentration, immediate and delayed recall and on tests of performance, among others (Table II A & B). While depressed patients have been shown to reveal difficulty in remembering random or unrelated events, impaired subjective memory, and to be prone to make omission and transposition errors but not random and false positive errors (Abrams and Taylor, 1987; Henry *et al.*, 1973; Weckowicz *et al.*, 1972; Weingartner *et al.*, 1982); impaired attention and concentration poor immediate and delayed recall and poor scores on tests of poor performance are common findings in most studies assessing this aspect of depression. It would have been ideal if we could enlarge the scope of this study to include comparisons of lobe function tests, visuo-motor co-ordination and verbal performance discrepancy. These fascinating areas could not be studied due to time and resource constraints. Another area worthy of research would have been the impact of poor attention and concentration and poor immediate and delayed recall on specific areas, like verbal memory for example. There is a lack of literature in these areas.

Secondly we were able to show that test score came back to within the normal range with recovery of depression. We compared the scores obtained after recovery from depression with the norms in the respective test booklets and found no significant changes indicating recovery from depression and further compensating for the absence of a control group. This also shows that try-cyclic antidepressants in conventional doses do not cause significant cognitive changes, a similar finding having been reported earlier (Henry *et al.*, 1973).

Earlier workers have shown that improvement in cognitive dysfunction correlates with improvement in depression (Sternberg and Jarvik, 1976; Henry *et al.*, 1973). While improvement in cognition occurred along with improvement in depression in every case in our study, we are not able to show a positive correlation between the two, using either the co-efficient of correlation or a scatter plot. This seems to indicate that improvement and depression and cognition does not occur in a linear fashion, that is, based on the degree of improvement in depression in a given patient, one cannot predict corresponding improvement in PGI/WAPIS total scores.

Comparison of sub groups while depressed reveal a trend for females, melancholics, the more depressed, the less educated and those from a rural background to show more cognitive impairment while depressed (Table 1). With the exception of the

melancholic Vs non melancholic subgroup, all other sub-groups did not differ significantly on HDRS scores. These differences may be a reflection of smaller changes in depression scores and different educational status among the sub groups compared.

Limitations of the study include a small number of patients (only 30) and the investigator not being blind to the patients condition, though every effort was made

to avoid bias. It is felt that the lack of a control group was compensated for by each patient acting as his or her own control and by finding no difference in scores obtained after recovery from depression and the respective norms for the testing material. It is unlikely that learning played a major role in improved test scores as the average duration before retesting was 62 days (range 35-120 days), enough time for forgetting to occur.

**Table 1. PGI and WAPIS total scores among sub groups while depressed**

Group	No.	PGI total score		WAPIS total score	
		Mean	S.D.	Mean	S.D.
Males	14	69.00	(13.14)	36.57	(9.74)
Females	16	68.00	(14.43)	34.44	(13.21)
		t = 0.20, N.S.		t = 0.50, N.S.	
Urban	14	71.57	(14.94)	36.50	(10.50)
Rural	16	65.75	(12.17)	34.50	(12.71)
		t = 1.18, N.S.		t = 0.74, N.S.	
Non Melancholics	12	73.17	(10.42)	39.17	(8.05)
Melancholics	18	65.33	(14.83)	32.94	(13.05)
		t = 1.58, N.S.		t = 1.47, N.S.	
Less Depr. (HDRS < 21)	7	73.29	(10.55)	39.57	(10.63)
More Depr. (HDRS > 21)	23	67.00	(14.30)	34.17	(11.78)
		t = 1.07, N.S.		t = 1.07, N.S.	
Education > 10 yrs.	22	71.55	(12.64)	37.14	(11.35)
Schooling 5-9 yrs.	8	60.00	(13.31)	30.15	(11.59)
		t = 2.18, p < .05		t = 1.36, N.S.	

**Note:** Melancholics had significantly higher HDRS scores than non Melancholics (26.72 Vs. 22.17;  $t = 3.04$ ,  $p < 0.01$ ). HDRS scores did not differ significantly among the other sub groups above.

**Table 2A and 2B. Comparison of average PGI & WAPIS scores, whole group (Pre Vs. Post Treatment)**

**Table 2A.**

PGI test (N = 30)	Remote Memory	Recent Memory	Mental Balance	Attention & Concentration	Delayed Recall	Immediate Recall	Similar Pairs	Dissimilar Pairs	Visual Retention	Visual Recognition	Total
Pre-treatment (Mean & S.D.)	5.5 .78	4.4 .81	5.7 2.39	7.87 1.68	7.43 1.61	8.73 2.57	3.87 1.36	8.10 4.29	8.57 3.44	8.63 1.97	68.47 13.61
Post-treatment	5.87 .35	4.8 .48	6.7 1.66	9.13 1.19	8.90 1.06	10.77 1.48	4.50 .73	10.07 2.89	10.13 2.87	9.67 .71	80.60 7.05
'p' Value	< 0.05	< 0.05	NS	< 0.002	< 0.001	< 0.001	NS	NS	NS	< 0.005	< 0.001

Table 2B.

WAPIS test (N=30)	Picture Completion	Digit Symbol	Block Design	Picture Arrangement	Object Assembly	Total	I.Q.
Pre-treatment (Mean & S.D.)	6.87 2.71	6.83 2.59	7.37 3.91	6.53 2.52	7.83 3.14	35.43 11.57	79.93 14.83
Post-treatment	9.7 2.53	7.87 1.91	9.37 2.77	8.0 1.51	10.43 2.82	45.50 8.99	91.97 12.35
'p' Value	< 0.001	NS	< 0.05	< 0.01	< 0.005	< 0.001	< 0.001

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