COGNITIVE DYSFUNCTION IN DEPRESSION

I. SHARMA, M. D. (Psychiat.), Dip. Yoga
P. SINGH, M. A.
S. S. AGNIHOTRI, M. D. (Psychiat.)

SUMMARY

Thirty patients of primary depression were assessed for their cognitive functions initially in the depressed state and on complete recovery. The results indicate presence of definite cognitive impairment during the depressed state (as measured by the Bhatia's Battery test and PGI memory scale) which is restored to normal after recovery from depression. The intensity of depression as indicated by the Hamilton Rating Scale for depression was directly related to the degree of cognitive impairment.

Defining the structure of depression related cognitive functions is important for the understanding of the psychobiology of cognition in the depressed state and its role in the expression of depressive symptomatology and have implications for the development of effective treatment strategies. Manic depressives show poor memory for recent events because of misperception/misinterpretation of stimuli (Kraeplin, 1921). Some authors consider that poor memory of depressives is related to difficulty in transformation of information from short-term to long-term storage (Henry et al., 1973). Studies pertaining to this area are few. Besides, they report widely differing findings and suffer from definite methodological pitfalls. The present study was therefore undertaken with the following aims:

1. To study cognitive functions of depressed patients.
2. To find out whether there is any association between the degree of cognitive dysfunction and severity of depression.

MATERIAL AND METHODS

The sample consisted of patients suffering from primary affective disorder (depressed type) selected according to the following criteria:

1. Diagnosed as per Feighner's Diagnostic Criteria (Feighner et al., 1972).
2. Absence of any concurrent physical illness.
3. Age between 20-45 years.
4. Did not receive any ECT in the past six months.

These patients were subjected to detailed evaluation twice, pretreatment and then post-treatment assessment. The latter was done one week after depression was completely lifted by treatment with imipramine hydrochloride which was withdrawn twenty hours before assessment. Tools utilized for evaluation were, Hamilton Rating Scale for Depression (Hamilton, 1960) to assess the intensity of depression and Bhatia's Battery of Performance Tests of Intelligence (Bhatia, 1955), PGI Memory Scale (Pershad, 1977) and Bender-Gestalt Test (Bender, 1938) for assessing the cognitive functions. Scoring of BGT (Bender-Gestalt Test) was done according to Hain's method (Hain, 1964). Out of the 40 patients initially selected 10 patients had to be dropped. Three patients were so severely depressed that they could not participate in the psychological testing.
and seven showed only partial response to treatment at the end of six weeks. Thus only 30 patients were available for detailed study.

**OBSERVATION AND RESULTS**

1. Almost two-thirds of the patients were aged 20-40 years, educated up to 10th class and had rural domicile. Two patients were females and the rest were males. Eight patients were mildly depressed, 12 patients were moderately depressed and 10 were severely depressed.

2. There was statistically significant increase in the total score and the scores on all the subtests of the Bhatia's Battery Test after treatment (Table 1).

3. There was statistically significant increase in the total score and the scores on eight subjects (mental balance, attention and concentration, delayed recall, immediate recall, verbal retention for similar pairs, verbal retention for dissimilar pairs, visual retention and recognition) of PGI memory scale (Table 2) after treatment.

**Table 1. Mean scores on Bhatia battery tests of intelligence**

|                          | Koh's Block Design | Alex. Pass-a-long | Pattern Drawing | Immediate Memory | Picture Completion | Total     |
|--------------------------|-------------------|------------------|-----------------|------------------|-------------------|-----------|
| Pre-treat (N=30)         |                   |                  |                 |                  |                   |           |
| X                        | 5.67              | 6.67             | 5.93            | 9.53             | 4.67              | 32.8      |
| S. D.                    | 2.62              | 2.88             | 1.20            | 2.18             | 1.75              | 9.92      |
| Post-treat (N=30)        |                   |                  |                 |                  |                   |           |
| X                        | 10.00             | 10.86            | 8.93            | 11.00            | 6.4               | 47.13     |
| S. D.                    | 5.02              | 3.26             | 3.24            | 1.66             | 2.49              | 13.09     |
| 't'                      | 5.22              | 6.58             | 5.15            | 5.31             | 4.83              | 7.05      |
| 'p'                      | <0.001            | <0.001           | <0.001          | <0.001           | <0.001            | <0.001    |

**Table 2. Mean scores on P. G. I. Memory scale.**

|                           | Rem. Mem. | Rec. Mem. | Men. Bal | Att. Conc. | Del. Rec. | Imm. Rec. | Ret. Sim. | Vis. Dist. | Rec. Total |
|---------------------------|-----------|-----------|----------|------------|-----------|-----------|-----------|------------|------------|
| Pre-treat N=30            |           |           |          |            |           |           |           |            |            |
| X                        | 3.87      | 4.80      | 5.67     | 8.93       | 7.40      | 8.10      | 3.67      | 9.33       | 6.13       | 8.57       | 66.90     |
| S. D.                    | 0.51      | 0.61      | 2.80     | 1.98       | 1.85      | 2.19      | 0.80      | 2.44       | 3.15       | 1.91       | 15.69     |
| Post-treat N=30           |           |           |          |            |           |           |           |            |            |            |
| X                        | 6.00      | 5.00      | 7.00     | 10.60      | 8.60      | 9.87      | 4.40      | 11.60      | 9.97       | 9.33       | 82.10     |
| S. D.                    | 0.00      | 0.00      | 2.52     | 1.94       | 1.43      | 1.66      | 0.72      | 2.11       | 3.18       | 1.27       | 15.69     |
| 't'                      | 1.44      | 1.80      | 3.97     | 5.47       | 3.42      | 4.13      | 4.63      | 6.16       | 9.16       | 2.98       | 3.99      |
| 'p'                      | NS        | NS        | <0.001   | <0.001     | <0.001    | <0.001    | <0.001    | <0.001     | <0.001     | <0.001     | <0.001    |
(4) BGT of patients did not show signs of organicity before or after treatment.

(5) Moderately depressed patients showed a greater increase in the total score on both Bhatia’s Battery and PGI memory scale after treatment than mildly depressed patients. Severely depressed patients showed a greater increase in the total score on both Bhatia’s Battery and PGI memory scale after treatment than moderately depressed patients (Table 3).

**Table 3. Relationship of severity of depression to cognitive dysfunction**

| Severity       | N  | Bhatia Battery | PGI Memory scale |
|----------------|----|----------------|------------------|
|                |    | (Change in score) | (Change in score) |
| Mild Dep.     | 8  | 3.88           | 6.25             |
| (16—30*)      |    | S.D. 0.99      | 1.16             |
| Mod. Dep.     | 12 | 11.58          | 12.92            |
| (31—45*)      |    | S.D. 4.29      | 2.57             |
| Severe Dep.   | 10 | 27.80          | 23.20            |
| (46—60*)      |    | S.D. 9.72      | 6.96             |

(1) Vs. (2) t = 4.94; t = 6.45;
    d.f. = 18; p < 0.001 d.f. = 18; p < 0.001
(2) Vs. (3) t = 5.23 t = 4.77
    d.f. = 20; p < 0.001 d.f. = 20; p < 0.001
(3) Vs. (3) t = 6.89 t = 6.79
    d.f. = 16; p < 0.001 d.f. = 16; p < 0.001

*Total score on Hamilton Rating Scale for Depression.

**DISCUSSION**

A marked difference in opinion exists in the literature as to whether depression exerts any influence on cognitive functions. A host of workers have reported impaired performance by depressives on a variety of cognitive tasks such as, WAIS performance tests, digit span and Babcock Story Recall test (Rappaport, 1945), immediate reproduction (Cronholm and Ottosson, 1961), word learning tests (Walton et al., 1959; Kendrick et al., 1965; Post, 1966), serial and free recall verbal learning tasks (Henry et al., 1973) and WMS and tests of retention (Stromgren, 1977). Freidman observed only minimal impairment on psychomotor speed tests and tests for short term memory in depressives (Friedman, 1964). Others however, did not observe any cognitive deficit in depressed patients (Vahia, 1964; Colbert, and Harrow, 1967; Kendrick and Post, 1967; Hemsi et al., 1968). Many have called attention to the fact that the intelligence and the attitude towards the patients and their whole external situation are of great importance for their performance and under optimum conditions often severely depressed patients performed just as well as controls (Friedman, 1964; Stromgren, 1977). The wide discrepancies in the findings of various investigators may be attributed to differences in the selection of patients in regard to diagnosis, age and other criteria, inadequate controls and use of more or less detailed methods of examinations and testing, including observer’s attitude towards the patient. Some earlier studies did not take severity of depression into account (Kendrick and Post, 1967; Colbart and Harrow, 1967). Moreover, ECT was used as the standard antidepressant treatment and Post-ECT cognitive status taken as control (Cronholm and Ottosson, 1961; Hemsi et al., 1968; Stromgren, 1977). Since ECT is known to produce cognitive impairment such a control would lead to erroneous results. Others have taken controls which have not been properly matched (Kendrick and Post, 1967). The present en-
I. SHARMA

Chandra and Agarwal (1982) also observed memory scores of depression to be significantly poorer than those of controls and of their own after recovery. Contrariwise, Henry et al. (1973) observed that improvement in cognitive functions may be independent of clinical improvement. Imipramine and lithium which clearly produced an improvement in the depressed state, were not associated significantly improved learning. However, treatment with L-dopa and L-tryptophan did not significantly change depression ratings but produced significant improvements in learning.

It appears that depression by virtue of psychomotor retardation chiefly affects those tests which require speed. Thus BGT remains unaffected. It was further observed that there was a direct relationship between severity of depression (as measured by the Hamilton Rating Scale for depression) and cognitive dysfunction. Likewise, Stromgren (1977) observed in his study of depressed patients a significant correlation between memory impairment and degree of depression and certain components of depression namely, agitation and depressive appearance.

REFERENCES

Bender, L. (1938). A Visual Motor Gestalt test and its Clinical use. Res. Monograph, No. 3, New York: Amer. Orthopsychiatry Association.

Bhatia, C. M. (1953). Performance tests of intelligence under Indian Conditions. Bombay: Oxford University & Press.

Chandra, S. and Agarwal, A. (1982). Memory in Depression. Ind. J. Psychiat., 24(4), 339.

Colbert, J. and Harrow, M. (1967). Psychomotor retardation in depressive syndromes. J. Neurol. Med. Dis., 145, 405.

Cronholm, B. and Ottenson, J. O. (1961). Memory functions in endogenous depression. Before and after electroconvulsive therapy. Arch. Gen. Psychiat., 5, 193.

Feighner, J. P.; Robins, E.; Guze, S. B.; Woodruff, R. A.; Winokur, G. and Munoz, R. (1972). Diagnostic Criteria for use in Psychiatric research. Arch. Gen. Psychiat., 26, 37.

Friedman, A. S. (1964). Minimal effects of severe depression on cognitive functioning. Abnorm. Soc. Psychol., 69, 237.

Hain, J. D. (1964). The Bender Gestalt Test: A Scoring method for identifying brain damage. J. Consult. Psychol., 28, 34.

Hamilton, M. (1960). A rating scale for depression. J. Neurol., Neurosurg. and Psychiat. 23, 56.

Henry, K. K.; Whitehead, A. and Post, F. (1968). Cognitive functioning and cerebral arousal in elderly depressives and deviants. J. Psychosom. Res., 12, 145.

Henry, G. M.; Weingartner, H. and Murphy, D. L. (1973). Influence of affective states and psychoactive drugs on verbal learning and memory. Amer. J. Psychiat., 130, 966.

Kendrick, D. C. and Post, F. (1967). Differences in cognitive status between healthy, psychiatrically ill and diffusely brain damaged elderly subjects. Brit. J. Psychiat., 113, 75.

Kendrick, D. C.; Parboosing, R. and Post, F. (1963). A Symonmn learning test for use with elderly psychiatric subjects. A validation study. Brit. J. Soc. and Clin. Psychol., 4, 63.

Kraepelin, E. (1921). Manic depressive insanity and paranoia. In: Max Hamilton (Ed.) Abnorm. Psychol. Penguin Books, Middlesex, 1967.

Pershad, D. (1977). Construction and standardization of a clinical test of memory in simple Hindi. Agra: National Psychological Corporation.

Post, F. (1966). Somatic and Psychiatric factors in the treatment of elderly psychiatric patients. J. Psychosom., 10, 13.

Rappaport, D. (1945). Diagnostic Psychological Testing. Vol. I, Chicago : Year Book Publishers.

Stromgren, L. S. (1977). The influence of depression on memory. Acta Psychiat. Scand., 56, 106.

Vahia, N. S. (1964). Dementia like Syndrome. Neurology India, 12, 111.

Walton, D.; White, J. C.; Black, D. A. and Young, A. J. (1959). The modified Word-learning test: A cross validation study. British J. Med. Psychol., 32, 213.