

## A Study of Cognitive Deficits In Patients Suffering From Depression In Tertiary Care Center In Eastern India.

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### Abstract

**Background and objectives:** Emotional processing, motivational processing and cognitive processing each require interaction within and among specific brain networks. Major depressive disorder is a common condition with a high rate of recurrence, chronicity and staggering economic burden, including disability in the workforce. In 2010, MDD was the second leading medical cause of burden globally, with highest estimate of disability in people of working age. Major depressive episode is also involves in cognitive changes. Cognition is a mental process of comprehension, judgement, memory and reasoning.

**Methods:** 60 patients of major depressive disorder (MDD) of 1 year and 3 year duration were assessed. Hamilton Rating Scale for depression was applied to each patient. The cognitive status (memory, mental balance, attention and concentration) were assessed by administration of P.G.I Battery of brain dysfunction.

**Results:** Our study showed that positive and significant results between cognitive deficiency and depression at 1 year and 3 year duration in both male and female patients. 3 years depressive patients have more cognitive deficiency than that of one year depressives.

**Conclusion:** There is a positive relation between depression and cognitive deficiency. There is no significant difference in the cognitive level between female and male depressive patients. There is a more cognitive deficiency in severe depression than mild to moderate depressive patients.

**Key words:** Cognitive deficit, depression, duration

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### I. Introduction

Cognitive changes associated with depression likely contribute to the disabilities experienced by the persons with this disorder. Common psychiatric illnesses involve varying degree of dysregulation. Although major depressive episode may be considered primarily an illness of emotional dysregulation.

Cognitive dysfunction refers to deficits in attention, verbal and nonverbal learning, short-term and working memory, visual and auditory processing, problem solving, processing speed, and motor functioning.

Depression is an illness in which there are thought to be changes in the chemistry of brain. In particular, small molecules called neurotransmitters appear to be present in the wrong amounts or to function in correctly, thus provoking a variety of distressing symptoms affecting mood, rational thinking and perception.

A very high percentage of people with depression who are admitted to hospital share many of same symptoms four out of five have loss of appetite or poor concentration while almost all have low energy levels. Taking the severity into consideration, depression can be of three types-mild moderate and severe and to know the severity level, used Hamilton Rating Scale for depression. This is a scale of 24 items.

Cognition refers to the intellect from infancy to adulthood, which was first wined Hippocrates as a meaningful classification of human adaptation but to piaget it is the initial achievement of sensorimotor intelligence. Cognition mainly refers to thought, emotion and behavior. Cognition was generally thought to encompass the mental processes of perceiving, recognizing, conceiving, judging and reasoning. Likewise, both then and now, these cognitive variables were thought to have significant causal implications for the consent, maintenance and revision of disordered states. Indeed, numerous similarities can be found between historical and contemporary perspective on cognition.

Current psychiatric research shows renewed interest in the cognitive Deficiency in depression as well as in Schizophrenia. This forms the basic theme for this study. It is worth-while to briefly review the evaluation of the concept of cognitive deficiency. In sum, cognition (Thoughts, Belief & Expectation) play a significant role in the development and maintenance of depression. Cognitive vulnerability operates to increase risk for

depression. The life time prevalence of major depression varies from 5 – 15%. It is more common in women than men by a ratio of 3 : 2, which may be due to hormonal influences, effects of child birth and differing psychosocial stressors for women and men.

## II. Aims & Objectives

1. To seek positive relation between depression and cognitive deficiency.
2. To assess the level of cognitive deficiency in depressions in between the age group of 20 – 50
3. To make a distinction between the patients with one year depression & the patients with three year depression.
4. To assess the cognitive deficiency level between female depressives & male depressives.
5. To make an assessment of cognitive deficiency in severe, moderate & mild depressive patients.

## III. Materials & Methods

1. The study was conducted in the in the Mental Health Institute, SCB Medical College, Cuttack from the period from May,2017 to July 2018.
2. The patients Diagnosed as Major Depressive Disorder(MDD) as the criteria led down on ICD-10
3. Age group of 20-50 years, were taken up for the study.
4. Both the sexes were included.
5. Patients diagnosed as bipolar depression were excluded from the study. Patients during continuation of drugs(anti-depressants) were excluded. Patients receiving Electro Convulsive Therapy (ECT) six months prior to the study were also excluded. Patients taking substances and psychotropic substances and steroids 6 months prior to the study were excluded. Patients with any intra cranial space occupied lesions were excluded.
6. Meeting above criteria 60 patients of major Depressive Disorder (MDD) of any year and 3 year duration were taken.
7. All patients gave written informed consents to participate in the study. Four patients denied participating. Therefore 56 patients (28 each) of one year and 3 year duration were actively interested to participate in the study.
8. Before entering into the study socio-demographic date (name, age, sex etc) were recorded
9. At the baseline Hamilton Rating Scale for depression (M.Hamilton, 1960) was applied to each patient. One H.A.M-D(HRSD) developed by M. Hamilton, is the most widely utilized rating scale to assess symptoms of depression. A review of leading psychiatric journal in 1994 demonstrated that this HAM-D was the Assessment instrument of choice when rating depressive symptoms in 66% of published research studies. The HAM-D is an observer rated scale consisting of 24 items. The HAM-D is used to assess severity of depression. Validity of the scale appears high. It takes 20 – 30 minutes to complete the scale.
10. The cognitive status(memory,mental balance,attention and concentration real visual mention recognition were assessed by administration of P.G.I. BATTERY for brain dysfunction which has been standardized by D.Prashad and S.K Verma(1989). This battery consists of 5 sub tests. They are –P.G.I memory scale, Revised Bhatias short pattern of performance tests of intelligence(BSB-R), Verbal Adult Intelligence scale(VAIS), Nahor Benson Test, Bender visual motor Gestalt test.The dysfunction rating score is above cut off point(20 or more) suggesting that there is significant cognitive dysfunctioning indicating organic brain pathology. This battery is standardized on the adult neuropsychiatric patients in the age range of 20 – 45 years but can be used upto 50 years of age also it need be, irrespective of their educational level and sex. Verbal adult intelligence scale and Bhatia’s shot Battery, however can be used in 5 in the age range Of 20 – 69 and 20 – 59 respectively.
11. Statistical analysis were done from the observations by the formula coefficient of correlation(bi-variate) 2. Tailed), chi-square (2 x 2 fold formula), z test (to know standard error of difference).

## IV. Observation & Discussion

**TABLE-1: BI-VARIATE CORRELATION WAS MADE BETWEEN THE DEPRESSION SCORE & COGNITIVE DEFICIENCY SCORES OF MALE PATIENTS WITH ONE YEAR DEPRESSION**

	HAM-D (M-1)	P.G.I. (M-1)
<b>HAM-D (M-1)</b>		
Pearson Correlation	1.000	*0.594
Sig (2-tailed)		0.025
N	14	14
<b>P.G.I (M-1)</b>		
Pearson Correlation	0.594	1.000
Sig (2-tailed)	0.025	

N	14	14
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M-1= Male patient with one year duration

**Discussion**

From the above table, we know that the correlation in positive (0.594) and significant at O.D.S level. By applying the persons correlation (Bi-Variate, 2 tailed) test got the positive and significant results between cognitive deficiency and depressive male vs 1 yr duration i.e depression and cognitive deficiency go side by side.(1 yr male )

**TABLE-2: BI-VARIATE CORRELATION WAS MADE BETWEEN THE DEPRESSION SCORE & COGNITIVE DEFICIENCY SCORES OF FEMALE PATIENTS WITH ONE YEAR DEPRESSION**

	HAM-D (F-1)	P.G.I. (F-1)
<b>HAD (F-1)</b>		
Pearson Correlation	1.000	**0.865
Sig (2-tailed)		0.000
N	14	14
<b>P.G.I (F-1)</b>		
Pearson Correlation	**0.865	1.000
Sig (2-tailed)	0.000	
N	14	14

F-1= Female patient with one year duration

**Discussion**

From the above table we know that the correlation in positive(0.894) and significant at 0.01 level. assess the relation between cognitive deficiency & depressive score vs female of one year during by applying (Bi-Variate, 2-tailed) got the positive significant result rather it is more exact that of their male counterpart. Here P> 0.01, so I can in that in 99% of cases there is a positive relation and cognitive deficiency but is only 1% we can discard the results

**TABLE-3: BI-VARIATE CORRELATION WAS MADE BETWEEN THE DEPRESSION SCORE & COGNITIVE DEFICIENCY SCORES OF MALE PATIENTS WITH THREE YEAR DEPRESSION**

	HAM-D (M-3)	P.G.I. (M-3)
<b>HAM-D (M-3)</b>		
Pearson Correlation	1.000	*0.614
Sig (2-tailed)		0.019
N	14	14
<b>P.G.I (M-3)</b>		
Pearson Correlation	*0.614	1.000
Sig (2-tailed)	0.019	
N	14	14

M-3= Male patient with 3 year duration

**Discussion**

From the above table we know that the correlation is positive( 0.019) and significant 0.05 level. We assesses the relation between cognitive deficiency & depressives score of male of three year depression , got by applying persons correlation test, got the positive & significant results. That is why I can infer that there is positive relation between depression & cognitive deficiency of side by side.

**TABLE-4: BI-VARIATE CORRELATION WAS MADE BETWEEN THE DEPRESSION SCORE & COGNITIVE DEFICIENCY SCORES OF FEMALE PATIENTS WITH 3 YEAR DEPRESSION**

	HAM-D (F-3)	P.G.I. (F-3)
<b>HAM-D (F-3)</b>		
Pearson Correlation	1.000	*0.865
Sig (2-tailed)		0.000
N	14	14
<b>P.G.I (F-3)</b>		
Pearson Correlation	*0.865	1.000

Sig (2-tailed)	0.000	
N	14	14

F-3= Female patient with 3 year duration

**Discussion**

Here if we have a look on the table then can we know that the correlation is 0.865. it is positive correlation because the value stand between 0.00 and 1. It is significant at 0.01 level. (  $P > 0.01$  ). I wanted to assess the relation between cognitive deficiency score & depression score of female 3 year depressives. Here I have applied the person’s correlation formula(Bi-Variate, 2-tailed) test. And I got the positive and significant result. Rather it is more exact that of their male counterparts. I can infer that in 99% of cases there is a positive relation between Depression & cognitive deficiency but in only 1 % we can discard the results

**TABLE-5: COMPARISON BETWEEN THE COGNITIVE DEFICIENCY SCORES OF THREE YEAR DEPRESSIVE WITH THAT OF 1 YEAR DEPRESSIVES**

Depression	Cog. Def. S.>20	Cog. Def. S.>20	Total
1 year	16	12	28
3 year	22	4	28
TOTAL	38	16	56

Cog. Def. S.= Cognitive Deficiency Scores

**Discussion Table-5**

Here to make a comparison between the cognitive deficiency scores of 1 year depressive with that of three years, I have applied the non-parametric chi-square test and got the significant results because ( $P > 0.05$ ). So here we can reject the null hypothesis and came to the conclusion that 3 years depressives have more cognitive deficiency than that of one year depressives in 25% of cases.

**TABLE-6: COMPARISON BETWEEN THE COGNITIVE DEFICIENCY SCORES OBTAINED BY MALE-1 YEAR DEPRESSIVE AND FEMALE 1 YEAR DEPRESSIVES**

SEX	Cog. Def. S.≥20	Cog. Def. S.>20	Total
Male	8	6	14
Female	9	5	14
TOTAL	17	11	56

Cog. Def. S.= Cognitive Deficiency Scores

**Discussion**

In this test I have made one comparison between the cognitive deficiency scores obtained by male 1 year depressives & female 1 year depressives. But the result appeared to be non significant. So here we accept the null hypothesis i.e. there is no significant difference between the cognitive deficiency scores obtained by male 1 year depressives with that of female 1 year depressives.

**Table-7: COMPARISON BETWEEN THE COGNITIVE DEFICIENCY SCORES OBTAINED BY MALE-3 YEAR DEPRESSIVE AND FEMALE 3 YEAR DEPRESSIVES**

SEX	Cog. Def. S.≥20	Cog. Def. S.>20	Total
Male	11	3	14
Female	13	1	14
TOTAL	24	4	28

Cog. Def. S.= Cognitive Deficiency Scores

**Discussion**

In this test I have made one comparison between the cognitive deficiency scores obtained by male 3 year depressives & female 3 year depressives. But the result appeared to be non significant. So here we accept the null hypothesis i.e. there is no significant difference between the cognitive deficiency scores obtained by male 3 year depressives with that of female 3 year depressives

**Table-8:** COMPARISON BETWEEN THE COGNITIVE DEFICIENCY SCORES OBTAINED BY 3 YEAR DEPRESSIVE AND 1 YEAR DEPRESSIVES

SEX	Cog. Def. S.≥20	Cog. Def. S.>20	Total
1 year	16	12	28
3 year	22	4	28
TOTAL	38	16	56

Cog. Def. S.= Cognitive Deficiency Scores

**Discussion**

Here I have put the  $\chi^2$  ( 2 x 2 fold) formula and got the significant result. So here we can reject the null hypotheses and accept the assumed one i.e. there lies a true difference between the cognitive deficiency scores of 3 years and 1 year depressives. It implies that 3 year depressive one more cognitively deficit than 1 year depressives.

**Table-9:** COMPARISON BETWEEN THE COGNITIVE DEFICIENCY SCORES OF MILD AND SEVERE MALE ONE YEAR DEPRESSIVES

Cog. Def. S.	M	S	Total
≥ 20	4	4	8
< 20	6	0	6
Total	10	4	14

Cog. Def. S. = Cognitive Deficiency Scores

**M-Patients under mild to moderate level of depression**

**S- Patients under sever level of depression**

**Discussion**

Here I have put the  $\chi^2$  ( 2 x 2 fold )formula is applied and got the significant result. i.e. there is some true difference between the cognitive deficiency scores obtained by mild and severe (male- 1 year ) depressives. It implies that in male 1 year depressive patients, mild and moderate depressives have less cognitive deficiency scores than severe depressives.

**Table-10:** COMPARISON BETWEEN THE COGNITIVE DEFICIENCY SCORES OF MILD AND SEVERE MALE ONE YEAR DEPRESSIVES

Cog. Def. S.	M	S	Total
≥20	4	5	9
<20	5	0	5
TOTAL	9	5	14

Cog. Def. S.= Cognitive Deficiency Scores

**M-Patients under mild to moderate level of depression**

**S- Patients under sever level of depression**

**Discussion**

Here I have put the  $\chi^2$  ( 2 x 2 fold )formula is applied and got the significant result. i.e. there is some true difference between the cognitive deficiency scores obtained by mild and severe (female- 1 year ) depressives. It implies that in female 1 year depressive patients, mild and moderate depressives have less cognitive deficiency scores than severe depressives

**Table-11:** COMPARISON BETWEEN THE COGNITIVE DEFICIENCY SCORES OF MILD AND SEVERE MALE THREE YEAR DEPRESSIVES

Cog. Def. S.	M	S	Total
≥20	4	7	11
<20	2	1	3

TOTAL	6	8	14
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**Cog. Def. S.= Cognitive Deficiency Scores**  
**M-Patients under mild to moderate level of depression**  
**S- Patients under sever level of depression**

**Discussion**

Here I have put the  $\chi^2$  ( 2 x 2 fold )formula is applied and I got the significant result. i.e. there is some true difference between the cognitive deficiency scores obtained by mild and severe (male- 3 year ) depressives. It implies that in male 3 year depressive patients, mild and moderate depressives have less cognitive deficiency scores than severe depressives.

**Table-12: COMPARISON BETWEEN THE COGNITIVE DEFICIENCY SCORES OF MILD AND SEVERE FEMALE THREE YEAR DEPRESSIVES**

<b>Cog. Def. S.</b>	<b>M</b>	<b>S</b>	<b>Total</b>
$\geq 20$	5	8	13
$< 20$	0	1	1
TOTAL	5	9	14

**Cog. Def. S.= Cognitive Deficiency Scores**  
**M-Patients under mild to moderate level of depression**  
**S- Patients under sever level of depression**

**Discussion**

Here the  $\chi^2$  ( 2 x 2 fold )formula is applied. But the result is not significant. Though there exist a considerable deference but in my test it could not be proved. Because the sample size is too small to get the appropriate result

**Table-13: COMPARISON BETWEEN THE DEPRESSION SCORES OF MALE AND FEMALE 1 YEAR DEPRESSIVES**

<b>SEX.</b>	<b>M</b>	<b>S</b>	<b>Total</b>
Male	10	4	14
Female	9	5	14
TOTAL	19	9	28

**M-Patients under mild to moderate level of depression**  
**S- Patients under sever level of depression**

**Discussion**

Here I wanted to make one comparison between the depression scores of male & female depressives with one year depression. But I was unable to get the significant result. But there exist a true difference between them i.e female are more depressive than their male counterparts. So here occurred the type-II error because my population is too small to get the appropriate result

**Table-14: TO MAKE ONE COMPARISON BETWEEN THE DEPRESSION SCORES OF MALE AND FEMALE 3 YEAR DEPRESSIVES**

<b>SEX.</b>	<b>M</b>	<b>S</b>	<b>Total</b>
Male	6	8	14
Female	5	9	14
TOTAL	11	17	28

**M-Patients under mild to moderate level of depression**  
**S- Patients under sever level of depression**

**Discussion**

Here I wanted to make one comparison between the depression scores of male & female depressives with three year depression. But I was unable to get the significant result. But there exist a true difference

between them i.e female are more depressive than their male counterparts. So here occurred the type-II error because my population is too small to get the appropriate result

**Table-15: DEFERENCE BETWEEN THE STANDARD ERROR OF MEANS**

	X	Y
N	41	15
$\sum FX$	923	648
MX	22.51	43.2
SD	7.73	8.67

X-The group consisting the frequencies of the cognitive deficiency scores of the patients below age 30.

Y- The group consisting the frequencies of the cognitive deficiency scores of the patients above age 30.

Mx- The mean score

SD= Standard Deviation

Analysis :

Z score is applied to make the difference

SE- 2.54

Z = 8.15

Significance :

The result is highly significant

P > 0.01

### Discussion

Here the sample size is greater than 30. For that I have applied the z score over here to make the comparison. I have got the significant results. That implies there is a significant difference existing between the cognitive deficiency scores of the patients below age 30 & the patients above age 30 i.e. patients below age 30 have less cognitive deficiency than that of patients above age 30.

### V. Conclusion

#### From the study we have concluded that

1. There is a positive relation between depression and cognitive deficiency.
2. There is no significant difference in the cognitive deficiency level between female & male depressives patients.
3. There is more cognitive deficiency in severe depression than mild to moderate depressive patients.

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