Role of comorbid depressive symptoms on the cognitive deficits in obsessive compulsive disorder

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Background: Obsessive compulsive disorder (OCD) is a chronic distressing condition that is marked with impairment in daily functioning including social, family, and occupational areas of life. Depression is the most common comorbidity among patients with OCD. The presence of co-occurring depressive symptoms adds to the burden of the OCD. Previous studies with neuropsychological testing reveals a pattern of cognitive deficits among patients with OCD. Few studies have also shown that the cognitive deficits in OCD are mediated by comorbid depressive symptoms. Objective: The objective of this study was to assess whether the comorbid depressive symptoms have any role on the cognitive deficits in OCD. Methodology: Forty patients diagnosed with OCD with an elevated rating in Beck Depression Inventory (BDI) and 20 normal controls were chosen for the study. The forty patients were split according to the severity scores of BDI as per one group consisting of patients with only mild depression and other group consisting of patients with moderate and severe depression. Yale–Brown Obsessive Compulsive Scale has been administered to assess the severity and symptoms of the disorder. Digit Vigilance Test and Triads Test have been administered to assess attention; Comprehensive Trial Making Test (CTMT) and Rey Complex Figure Test have been administered to assess attention, executive function, and memory. Results: OCD patients have significantly performed poor than the normal controls. On further analysis, OCD patients with moderate and severe depressive features have performed poor than the patients with mild depressive features on the tests administered for attention, executive function, and memory. On assessing the role of comorbid depressive features on cognitive deficits, having mild depressive features were not found to be significantly correlated to the cognitive deficits, whereas patients having moderate and severe depressive features were found to be significantly correlated to the cognitive deficits among OCD patients. Conclusion: The findings suggest that the higher level of depressive symptoms is associated with cognitive deficits in OCD patients. It can be suggested that the comorbid moderate-to-severe depressive symptoms play an important role in the cognitive deficits found among the OCD patients.

Keywords: Cognitive deficits, depression, obsessive compulsive disorder

Obsdessive-compulsive disorder (OCD) is a common mental disorder where people has intrusive, repetitive, uncontrollable, reoccurring thoughts (obsessions), and behaviors (compulsions) that a person feels the urge to repeat over and over. People are unable to control either the thoughts or the activities for more than a short period of time. People with OCD may have symptoms of obsessions, compulsions, or both. These symptoms can interfere with all aspects of life, such as work, school, and personal relationships.

Obsessions are repeated thoughts, urges, or mental images that cause anxiety. The common symptoms include
• Fear of germs or contamination

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Compulsions are repetitive behaviors that a person with OCD feels the urge to do in response to an obsessive thought. The common compulsions include:

- Unwanted forbidden thoughts involving sex, religion, and harm
- Aggressive thoughts toward others or self
- Having things symmetrical or in a perfect order.

Not all rituals or habits are compulsions. Everyone double checks things sometimes. However, a person with OCD generally cannot control his or her thoughts or behaviors, even when those thoughts or behaviors are recognized as excessive, spends maximum hours a day on these thoughts or behaviors, and feels relief from the anxiety on performing the behavior. The thoughts cause and experiences significant problems in their daily life.

A complicating factor in delineation of the specific neuropsychological deficits of OCD is the high prevalence of comorbid psychiatric conditions, in particular depression. OCD is often complicated by depression comorbidity. Comorbidity studies indicate that as many as 75% of adults and 52% of children with OCD have a history of major depressive episodes. Epidemiologic studies have documented the naturally occurring high rates of concurrent major depression in those presenting to treatment clinics with OCD which have been in the range of 28%–38%. In one such study, 31.7% of OCD patients were diagnosed with a concurrent comorbid major depressive disorder (MDD). In addition to categorical assessment of diagnosable comorbid major depression, it has been estimated that upward of 75% of patients with OCD experience subclinical depressive states. Studies have also linked depression to greater chronicity and severity of the course of OCD. In the National Collaborative Group study, the lifetime comorbidity of MDD and OCD extended to 60.3%, depending on the country.

A study was conducted on neuropsychological functioning in patients suffering from OCD, where it was found that OCD patients did not demonstrate impaired performance on tests of executive function. However, other researchers have documented performance deficits among OCD patients on the measures of executive function. Patients with OCD also exhibit performance deficits on tests of visual/spatial memory and verbal memory. Again in some studies, OCD patients did not demonstrate impaired performance on tests of memory function. One possibility for this conflicting result is that performance deficits on tests of cognitive function among patients with OCD are associated with comorbid depressive symptoms.

Another study was conducted to see how depression accounts for the executive function deficits in OCD patients. Data were analyzed using a regression model where it was seen that patients with OCD demonstrated a pattern of executive function and sensory-motor deficits, similar to those shown in previous research. However, using self-reported depressive symptom severity as a predictor, it was found that depression accounted for some executive function deficits, whereas the presence of OCD only predicted performance on measures of sensory-motor function. These data suggest that abnormalities involving executive function in OCD are related to co-morbid depressive severity.

Previous studies have also shown the significant differences between OCD patients and the non-patient comparison group on neuropsychological functioning. As far as working memory concerns, there was a significant difference between the OCD depressed and non-depressed groups. However, no evidence was found that the neuropsychological functions such as cognitive flexibility, problem-solving, and spatial perception in OCD to be attributable to comorbid depression.

Nonetheless, few studies have accounted for the effects of depression, which is a common concurrent symptom among those with OCD. Taken together, the results of these studies raise the possibility that executive and other cognitive function deficits found in OCD patients may be attributable in part to comorbid depression.

Keeping in view of this existing literature and dearth of more studies in this area, this present study was conducted to assess whether the comorbid depressive symptoms present in OCD patients has any effect on the cognitive deficits found in OCD patients.

**METHODOLOGY**

**Sample**
The present study was a hospital-based, cross-sectional study. A sample of 40 patients diagnosed with OCD
with comorbid mild and moderate, severe depressive symptoms as per International Classification of Diseases (ICD)-10-Diagnostic Criteria for Research have been selected from five private clinics situated in Kolkata, West Bengal, through the purposive sampling. Patients were selected in the age range of 20–45 years who have given consent to participate in the study. Both male and female patients were included having an educational qualification of 10th class. Patients belonging to both urban and rural settings were selected. The minimum duration of the patients suffering from OCD is taken 1 year and is under medication. The patients with other general medical conditions, neurological disorder, mental retardation, substance-related disorders, personality disorders, eating disorders, and psychotic conditions were excluded from the study. Twenty normal controls were also chosen for the study, aged 20–45 years, both male and female, both from urban and rural settings, having an educational qualification of 10th class with no history of general medical conditions, neurological disorder, mental retardation, substance-related disorders, personality disorders, eating disorders, and psychotic conditions. The normal control group was screened with General Health Questionnaire (GHQ) 12.

**Tools used**

*Sociodemographic datasheet and clinical details*

A semistructured sociodemographic data sheet was made to collect the information about the demographics and the clinical details of each patient.

*Yale-brown obsessive compulsive disorder scale*

The Yale–Brown Obsessive Compulsive Scale (Y-BOCS)[20-22] is a test to rate the severity of OCD symptoms and to monitor improvement during treatment. This scale, which measures obsessions separately from compulsions, specifically measures the severity of symptoms of OCD without being biased towards the type of content of obsessions or compulsions present. There are total of the 19 items, which are rated in the following manner; 0 = none; 1 = mild, <1 h/day or occasional intrusion; 2 = moderate, 1–3 h/day or frequent intrusion; 3 = severe, >3 and up to 8 h/day or very frequent intrusion; 4 = extreme, >8 h/day or near constant intrusion. All 19 items are rated, but only items 1–10 (excluding items 1b and 6b) are used to determine the total score. The total Y-BOCS score is the sum of items 1–10 (excluding 1b and 6b). The final score for each item should reflect a composite rating of all of the patient’s obsessions or compulsions.

*Beck depression inventory*

The Beck depression inventory (BDI)[23,24] is a 21-question multiple-choice self-report inventory, one of the most widely used psychometric tests for measuring the detection, assess severity, and monitor the changes of depression by health-care professionals and researchers in a variety of settings. When the test is scored, a value of 0–3 is assigned for each answer, and then, the total score is compared to a key to determine the depression’s severity. The standard cutoff scores were as follows: 0–9: indicates minimal depression; 10–18: indicates mild depression; 19–29: indicates moderate depression; and 30–63: indicates severe depression. Higher total scores indicate more severe depressive symptoms.

*Digit vigilance test*

This test is a subtest of NIMHANS Neuropsychology Battery (Adult).[25] It consists of numbers 1–9 randomly ordered and placed in rows on a page. The subject has to cancel the digits 6 and 9 as fast as possible. Scoring of this test depends on two scores. One is the total time taken to complete the test. Second, to count the number of omissions—where the digits 6 and 9 have not been cancelled and the number of commissions where the number of digits other than 6 and 9 has been cancelled.

*Triads test*

This test was developed at NIMHANS and is a subtest of NIMHANS Neuropsychological Battery (Adult).[26] This test helps to assess the attention process as well as verbal auditory processing. It combines a verbal task with a tactual number identification task. Both the tasks differ with reference to the stimulus modality and the nature of stimulus processing. Each triad consists of three words where two words belong to one category and the subject names the odd word. Simultaneously, the examiner writes a single or double digit on the subject’s non-dominant hand. The subject has to identify the number. The number of errors is counted like the omission in saying the word and number is counted. The test takes about 7 min.

*Comprehensive trail making test*

Comprehensive trail making test (CTMT)[27] is useful in neuropsychological assessment including problems with psychomotor speed, visual search and sequencing and attention, concentration, impairments in cognitive flexibility (set shifting), resistance to distraction. It comprises of a standardized set of five tasks for use with individuals ranging in age from 11 years through 74 years. The basic task of CTMT is to connect a series of stimuli (numbers, expressed as numerals or in word form, and letters) in a specified order as rapidly as possible. The primary score derived for each trail is the number of seconds required to complete the task.

*Rey complex figure test and recognition trial*

This test has been originally[28,29] to investigate visuospatial constructional ability and visual memory in brain injured
persons which has also been frequently employed as a neuropsychological test of visuospatial constructional ability and visual memory.\textsuperscript{19,21} Rey complex figure test and recognition trial (RCFT) has been standardized and normed for use with adults ranging from 18 years to 89 years of age. This includes a stimulus card which contains a drawing and there is copy trial, immediate recall trial, delayed recall trial, and finally recognition trial. A score of 0, 0.5, 1, or 2 is assigned to each unit of the figure based on accuracy and placement criteria for each trial. The total raw score is then transformed to T score and percentile.

**Procedure**

Forty patients suffering from OCD were selected as per the inclusion criteria and ICD-10 criteria. Initially, the YBOCS was administered to assess the obsessive-compulsive symptoms. OCD patients having a score of moderate and severe level on Y-BOCS have been included in the study. In the next step, BDI was administered to assess the severity of the depressive symptoms present. After that, the selected patients were divided into two groups on the severity of the depressive symptoms—one group consisting of mild depressive symptoms, and the other group consisting of moderate-to-severe depressive symptoms. After that, the specified tests for attention, memory, and executive functions such as Digit Vigilance Test, Triads Test, CTMT, and RCFT have been administered to both groups. Twenty normal controls were selected after screening with GHQ-12. After that, the above specified tests were also administered on them.

**Statistical analysis**

The results were analyzed with SPSS 24 (IBM Corp, NY, USA.\textsuperscript{19} One-way analysis of variance (ANOVA) was used for the continuous variables (for Digit Vigilance Test-Total time taken and number of errors, Triads Test-Number of errors) and Kruskal–Wallis H Test was used for discrete variables (for CTMT-Time taken to complete the test, RCFT-Immediate recall, Delayed recall, Recognition trial) to compare the difference on the performance of the tests administered among the three groups. \textit{Post hoc} comparisons were administered for one-way ANOVA and Tukey HSD test has been used for this purpose. Multiple regression was used to find out the role of comorbid depressive symptoms on the cognitive deficits found among the OCD patient group.

**RESULTS**

The sociodemographic details were assessed for the three groups. The mean age for the OCD group having mild depressive symptoms has been found to be 28.00 with corresponding standard deviation (SD) of 3.76. Among the participants, 60% were female (12) and 40% were male (8). Majority of the participants (95%) were from rural areas (19), and remaining 5% was from urban areas (1). Most of the participants (50%) had 10\textsuperscript{th} level of education (10), 40% had 12\textsuperscript{th} level of education (8), and the remaining 20% were graduate (2). The mean age for the OCD group having moderate and severe depressive symptoms has been found to be 32.20 with corresponding SD of 6.58. Among the participants, 75% were female (15) and 25% were male (5). Majority of the participants (85%) were from the rural area (17) and remaining 15% was from the urban area (3). Most of the participants (65%) had 10\textsuperscript{th} level of education (13), 20% had 12\textsuperscript{th} level of education (4), and the remaining 15% were graduate (3). The mean age for the control group has been found to be 31.05 with corresponding SD of 6.08. Among the participants, 55% were female (11) and 45% were male (9). Majority of the participants (90%) were from the rural area (18) and remaining 10% was from the urban area (2). Most of the participants (25%) had 10\textsuperscript{th} level of education (5), 60% had 12\textsuperscript{th} level of education (12), and the remaining 15% were graduate (3).

The clinical details of the OCD group were assessed. It was found that the mean of the duration of the illness (in months) was 1.72 with a SD of 0.71. The patients have been on medication, mostly on fluoxetine (60 mg to 80 mg) and clomipramine (100 mg to 150 mg), in few cases, a combination of both the medications were prescribed.

Table 1a shows the comparison of the performance on Digit Vigilance Test and Triads Test among the three groups. On comparing the performance, it has been found that there is a statistically significant difference among the three groups on the performance of digit vigilance test-Total time taken and no of errors ($P = 0.00$ for both). A statistical significant difference has also been found on the performance of Trials Test-No of Errors among the three groups ($P = 0.00$). Table 1b shows the summary of the ANOVA analysis done. Table 1c shows the \textit{Post hoc} comparison, Tukey HSD.

Table 2 shows the comparison of performance on CTMT and RCFT among the three groups. On comparing the performance, it has been found that there is a statistically significant difference among the three groups on the performance of CTMT ($P = 0.00$). A statistically significant difference has also been found on the performance of RCFT-Delayed Recall and Recognition Trail among the three groups ($P = 0.00$). However, no statistically significant difference has been found among the three groups on the performance of RCFT-Immediate Recall.

Table 3 shows the multiple regression analysis between the OCD patients with mild depression scores and the
performance on the psychological tests. The analysis shows that the performance on the tests, deep-vein thrombosis (DVT), TT, CTMT, and RCFT could not be accounted for the underlying mild depressive features found in the OCD patients.

Table 4a and b shows the multiple regression analysis between OCD with moderate and severe depression scores and the performance on the psychological tests. The analysis shows that the poor performance on the tests such as DVT, TT, CTMT, and RCFT could be accounted for the underlying moderate and severe depressive features found in the OCD patients.

**DISCUSSION**

Existing literature suggests that majority of the OCD patients have comorbid depressive features. Deficits in cognitive functions among OCD patients have long been recognized. However, whether comorbid depression has any role in the cognitive deficits has been an area of conflict. This study has been conducted as a step toward understanding the extent to which comorbid depressive symptoms has any role on the cognitive deficits recognized in the OCD patients.

OCD patients have been found to perform poorly on the tests of sustained attention (DVT) and divided attention (Triads Test) in comparison to the normal control group [Table 1]. On further analysis, it has been found that OCD patients with mild depressive features have performed better than patients with moderate and severe depressive features. It reflects that the OCD patients with moderate and severe depressive features find it very difficult to sustain their attention to a task in hand for the required period of time. The difficulty increases with more complex tasks which is closely associated with the mental effort required by the task on hand. OCD patients with moderate and severe depressive features have scored very poorly on performance of divided attention (Triads Test) which implies that these groups of patients find difficulty in dual tasking where two tasks require effort and attention. These findings have been supported by other previous studies.[31]

In terms of the performance on tests of executive function (CTMT), OCD patients scored very poorly than normal control group where patients with moderate and severe depressive features performed worse than patients with mild depressive features [Table 2]. It implies that OCD patients with moderate and severe depressive features find it difficult to
perform on sequencing tasks which are highly influenced by attention, concentration, resistance to distraction, visual search, psychomotor speed and cognitive flexibility, set shifting. On the test of memory, RCFT, patients suffering from OCD with moderate and severe depressive features has performed very poor than the patients with mild depressive features and overall OCD patients performed worse than normal control group [Table 2]. It signifies that OCD patients have difficulty in visuospatial constructional ability and visuospatial memory such as reduced immediate and delayed recall suggests reduced visuospatial recall ability, reduced recognition trial scores suggests difficulty in the ability to retrieve visuospatial material when given retrieval cues. This finding have been in consistent with the previous findings.[32-34]

On assessing the role of comorbid depression in the cognitive deficits of OCD patients with mild depressive features, it has been found that the cognitive deficits found

**Table 1c: Post hoc comparison; Tukey honestly significant difference test**

| Variable       | (I) Group                    | (J) Group                    | Mean difference (I−J) | SE  | Significant value |
|----------------|------------------------------|------------------------------|-----------------------|-----|-------------------|
| DVT Tot Time   | Mild depressive group        | Moderate severe D group      | −166.00*              | 14.97 | 0.00              |
|                | Control group                |                              | 102.65*               | 14.97 | 0.00              |
|                | Moderate severe D group      | Mild depressive group        | 166.00*               | 14.97 | 0.00              |
|                | Control group                |                              | 268.65*               | 14.97 | 0.00              |
|                | Control group                | Mild depressive group        | −102.65*              | 14.97 | 0.00              |
|                | Moderate severe D group      | Control group                | −168.65*              | 14.97 | 0.00              |
| DVT No errors  | Mild depressive group        | Moderate severe D group      | −8.25*                | 0.60  | 0.00              |
|                | Control group                |                              | 9.55*                 | 0.60  | 0.00              |
|                | Moderate severe D group      | Mild depressive group        | 8.25*                 | 0.60  | 0.00              |
|                | Control group                |                              | 17.80*                | 0.60  | 0.00              |
|                | Control group                | Mild depressive group        | −9.55*                | 0.60  | 0.00              |
|                | Moderate severe D group      | Control group                | −17.80*               | 0.60  | 0.00              |
| Triads T No error | Mild depressive group    | Moderate severe D group      | −2.20*                | 0.38  | 0.00              |
|                | Control group                |                              | 5.55*                 | 0.38  | 0.00              |
|                | Moderate severe D group      | Mild depressive group        | 2.20*                 | 0.38  | 0.00              |
|                | Control group                |                              | 7.75*                 | 0.38  | 0.00              |
|                | Control group                | Mild depressive group        | −5.55*                | 0.38  | 0.00              |
|                | Moderate severe D group      | Control group                | −7.75*                | 0.38  | 0.00              |

*The mean difference is significant at the 0.05 level. SE – Standard error

**Table 2: Differences on tests of executive function and memory (comprehensive trail making test and rey complex figure test) among the obsessive-compulsive disorder patients with mild depressive features and moderate, severe depressive features and normal control group**

| Variables                  | Groups                              | Mean rank | Kruskal-Wallis H-value | df | P      |
|----------------------------|-------------------------------------|-----------|------------------------|----|--------|
| CTMT – time required to    | OCD patients with mild depressive   | 29.25     | 53.25                  | 2  | 0.00** |
| complete the task (s)      | features                            |           |                        |    |        |
|                            | OCD patients with moderate and severe| 11.75     |                        |    |        |
|                            | depressive features                  |           |                        |    |        |
|                            | Normal control group                | 50.50     |                        |    |        |
| RCFT – immediate recall    | OCD patients with mild depressive   | 20.54     | 44.76                  | 2  | 0.10   |
|                            | features                            |           |                        |    |        |
|                            | OCD patients with moderate and severe| 45.23     |                        |    |        |
|                            | depressive features                  |           |                        |    |        |
|                            | Normal control group                | 10.33     |                        |    |        |
| RCFT – delayed recall      | OCD patients with mild depressive   | 30.50     | 54.21                  | 2  | 0.00** |
|                            | features                            |           |                        |    |        |
|                            | OCD patients with moderate and severe| 50.50     |                        |    |        |
|                            | depressive features                  |           |                        |    |        |
|                            | Normal control group                | 10.50     |                        |    |        |
| RCFT – recognition trial   | OCD patients with mild depressive   | 24.55     | 53.98                  | 2  | 0.00** |
|                            | features                            |           |                        |    |        |
|                            | OCD patients with moderate and severe| 41.76     |                        |    |        |
|                            | depressive features                  |           |                        |    |        |
|                            | Normal control group                | 9.49      |                        |    |        |

**P<0.01=statistically significant. OCD – Obsessive-compulsive disorder; CTMT – Comprehensive trial making test; RCFT – Rey complex figure test

**Table 3: Multiple regression analysis between obsessive-compulsive disorder patients with mild depressive features and performance on psychological tests**

| Model (stepwise) | R     | R²    | F change | df 1 | df 2 | Significant F change | Durbin-Watson |
|------------------|-------|-------|----------|------|------|-----------------------|---------------|
| Predictor variables | 0.52  | 0.27  | 3.40     | 1    | 13   | 0.08 (NS)             | 2.40          |

Dependent variable: Mild depression scores on BDI. Predictor variables: Scores on the tests-DVT, TT, CTMT, RCFT. CTMT – Comprehensive trial making test; RCFT – Rey complex figure test; NS – Not significant; DVT – Digit vigilance test; TT – Triads test
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Table 4a: Multiple regression analysis between obsessive-compulsive disorder patients with moderate and severe depressive features and performance of psychological tests

| Model (stepwise) | $R$ | $R^2$ | $F$ change | $df_1$ | $df_2$ | Significant $F$ change | Durbin-Watson |
|------------------|-----|-------|------------|--------|--------|------------------------|--------------|
| Predictor variables | 0.88 | 0.77 | 6.97 | 1 | 12 | 0.02* | 3.18 |

Dependent variable: Moderate and severe depression scores on BDI ***$P<0.001$. Predictor variables: Scores on the tests-DVT, TT, CTMT, RCFT. CTMT – Comprehensive trial making test; BDI – Beck depression inventory; RCFT – Rey complex figure test; DVT – Digit vigilance test; TT – Triads test

Table 4b: Multiple regression analysis between obsessive-compulsive disorder patients with moderate and severe depressive features and performance of psychological tests (ANOVA table)

| Model | Sum of squares | df | Mean square | $F$ | Significant |
|-------|----------------|----|-------------|-----|-------------|
| Regression | 1829.63 | 7 | 261.37 | 5.98 | 0.00** |
| Residual | 534.11 | 12 | 43.67 | 19 | |
| Total | 2353.75 | 19 | | | |

Dependent variable: Moderate and severe depression scores on BDI **$P<0.01$. Predictor variables: Scores on the tests-DVT, TT, CTMT, RCFT. CTMT – Comprehensive trial making test; RCFT – Rey complex figure test; DVT – Digit vigilance test; BDI – Beck depression inventory; DVT – Digit vigilance test; TT – Triads test

On investigating the role of comorbid moderate and severe depressive features in the cognitive deficits of OCD patients, it has been found that the deficits found in the area of attention, executive functions, and memory can be explained quite a large amount to the comorbid moderate and severe depressive features (77%), where adding each of the cognitive deficits cause a difference which has been found to be statistically significant ($P = 0.02$), [Table 4a]. Further analyses such as ANOVA suggest that the stepwise multiple regression model using all the cognitive deficits is significantly better at predicting the outcome ($F = 5.98$; $P = 0.00$) that the cognitive deficits, particularly difficulty in sustaining and divided attention (Triads Test), executive functioning (CTMT) and performing poorly on these tests found in the OCD patients has been the significant variables which can be explained due to the presence of comorbid moderate and severe depressive features [Table 4b]. Previous studies[^30] found similar results.

Regarding the role of depression in cognitive aspects of OCD, it is possible that memory biases for negative information result from comorbid depression. That is, because depression is associated with memory biases for negative information. OCD patients with comorbid depression may be responsible for overall group differences meaning that memory biases for negative information may be largely present in OCD patients. It has also been found that executive function deficits among patients with OCD are associated with comorbid depressive symptoms and in turn have a negative impact on OCD patients’ cognitive functioning indicating that comorbid depressive symptoms present in OCD patients often deepens the executive dysfunction[^30].

**CONCLUSION**

OCD patients always call for careful attention to the potential impact of comorbid depressive symptoms on cognitive abilities. The findings of this current study are similar with past research which reported an association between depressive symptoms and cognitive deficits in OCD patients and suggest that these deficits may be genuinely related to the OCD psychopathology. However, these study have a few limitations. First, whether there is any difference in the cognitive deficits and the role of comorbid depression on cognitive deficits in terms of gender difference has not been taken into account. Second, the severity of the OCD symptoms has not been taken into account. Future studies can be conducted keeping in mind how the symptomatology of OCD plays any role in the comorbid depressive features and cognitive deficits. The sample size can also be increased in future studies.

In view of the high prevalence of comorbid depression in OCD, there is a need to examine in detail, the contribution of depression to cognitive deficits of OCD patient group. Moving in this direction not only may help to develop a new conceptualization of the nature, psychopathology and symptomatology of OCD with depression, but new findings may provide with some criteria useful for the diagnosis and treatment.

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**Conflicts of interest**

There are no conflicts of interest.

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