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Symptom Changes in Patients with Obsessive-Compulsive Disorder During the COVID-19 Pandemic: The Impact of Cognitive Flexibility

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ABSTRACT

Objective: The course of patients with obsessive-compulsive disorder (OCD) has attracted particular concern during the COVID-19 pandemic because measures to prevent the spread of COVID-19 coincide with OCD symptoms. Cognitive flexibility, which refers to the ability to adapt to changing conditions, may be a possible mechanism explaining the impact of the pandemic, considering it has been shown to be an executive function abnormality in OCD. We aimed to explore the course of OCD during the COVID-19 pandemic and the impact of cognitive flexibility on the changes in patients' symptomatology.

Methods: The course of symptoms in 81 OCD patients during the pandemic was evaluated retrospectively with a clinician-developed data form. The Cognitive Flexibility Scale was used to assess cognitive flexibility. The Yale-Brown Obsessive-Compulsive Scale, the Fear of COVID-19 Scale, the Hamilton Anxiety Scale, and the Hamilton Depression Scale were also administered.

Results: We found that 68.1% of patients reported worsening. Patients with worsening symptoms had a higher fear of COVID-19. Levels of cognitive flexibility, anxiety, or depression did not differ between the patients with and without worsening. However, patients who reported more severe worsening had lower cognitive flexibility and greater levels of anxiety and depression than those with milder ones.

Conclusion: Our study reveals the deterioration in OCD patients during the COVID-19 pandemic and indicates the role of cognitive inflexibility in worsening symptoms.

Keywords: Cognitive flexibility, COVID-19, obsessive-compulsive disorder, pandemic

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INTRODUCTION

The novel coronavirus (COVID-19) infection was first reported in Wuhan, China, in December 2019 and then spread rapidly worldwide. In a short time, it resulted in high death rates and was declared a pandemic by the World Health Organization. Although it was known that the virus is transmitted through respiratory tract secretions, there was still uncertainty about many issues, such as the potential harm of the virus, the incubation period, and the way and speed of transmission, especially at the beginning of the pandemic. Hence, strict and extraordinary measures such as lockdowns, travel bans, quarantines, and the use of face masks had to be taken rapidly all over the world in order to prevent the spread of the virus. In addition to the high mortality rates and physical complications due to infection, the unusual changes in daily life have affected mental health remarkably. Psychological aspects related to the pandemic, such as uncertainty, unpredictability, the threat of contagion, and fear of death, as well as social difficulties, such as quarantine, social isolation, and not working during the lockdown, were potential factors that could negatively affect mental health. Research has revealed that anxiety, depressive mood, insomnia, and alcohol use were increasingly observed in the general population and psychiatric patients during the pandemic.[1,2]

Obsessive-compulsive disorder (OCD) has attracted particular concern since the fear of contamination by the coronavirus was seen in many people during the pandemic and recommended precautions to prevent the COVID-19 spread, like avoiding potential contaminants (such as not touching certain surfaces or decreasing social contacts) and handwashing, overlap with OCD contamination symptoms.[3,4] Obsessive-compulsive disorder is characterized by obsessions, including intrusive and unwanted thoughts, images, or urges that cause distress, and compulsions, which are repetitive behaviors intended to relieve distress due to obsessions. In clinical practice, some patients have been observed to have worsened OCD symptoms after the pandemic, whereas some patients have had relief, especially in the early stages of the COVID-19 outbreak. Studies regarding the relationship between the COVID-19 pandemic and OCD onset or exacerbation have also yielded different results. Some studies have indicated a deterioration in OCD patients during the pandemic, whereas others have not.[3-8]

One way to better understand how the changes in the symptomatology of psychiatric patients are shaped by the impact of environmental stressors such as pandemics is to explore the psychological processes that facilitate the emergence of symptoms. Adaptation to changing circumstances and coping strategies could be influential on psychological well-being during the pandemic period. Cognitive flexibility, an executive function that refers to the ability to adjust thoughts and behaviors according to changing demands, could be suggested as a plausible mechanism for explaining the impact of a pandemic on mental health.[9] It has been previously shown that cognitive flexibility is impaired in various psychiatric conditions, including suicidal behavior, anorexia nervosa, trichotillomania, and OCD.[9-12] Obsessive-compulsive disorder is clinically characterized by persistent, repetitive thoughts and behaviors despite negative feedback and consequences. Given these clinical features, impaired cognitive flexibility has been suggested to be associated with OCD symptoms, and numerous neurocognitive studies have supported the presence of abnormalities in cognitive flexibility in individuals with OCD.[9,13] In the literature, components of cognitive flexibility have been investigated using various tasks, including set-shifting, reversal learning, cued task switching, and tests of cognitive or motor inhibition.[9] For instance, impaired set-shifting, a common cognitive impairment in OCD, has been linked to compulsions.[14] Neuroimaging studies in patients with OCD have revealed structural and functional abnormalities in cortico-striato-thalamo-cortical circuits, with the most frequent alterations occurring in the orbitofrontal cortex (OFC). The OFC, along with the lateral prefrontal cortex, has also been associated with cognitive flexibility.[15] Additionally, impairments in cognitive flexibility and abnormally reduced activation in the lateral orbitofrontal cortex during reversal learning have been demonstrated in first-degree relatives of OCD patients, suggesting that cognitive flexibility may serve as an endophenotype for OCD.[13,16]

To our knowledge, there were no studies exploring the association between cognitive flexibility and OCD during the pandemic. On the other hand, a few studies have shown the impact of cognitive flexibility levels on mental health. Previous research has reported that people with lower psychological flexibility experienced more COVID-19-related depression or anxiety, whereas higher psychological flexibility was associated with mental well-being.[17,18] A study also revealed that psychological symptoms were positively associated with intolerance of uncertainty (IU) and negatively associated with cognitive flexibility, and the association between IU and psychological symptoms was moderated by cognitive flexibility during the COVID-19 pandemic.[1] In this cross-sectional study, we aimed to explore the course of OCD during the COVID-19 pandemic and the impact of cognitive flexibility on the changes in OCD patients' symptomatology. We hypothesized that lower cognitive flexibility is associated with pandemic-related deterioration in OCD symptoms.

MATERIAL AND METHODS

Sample and Study Procedure

Patients who were diagnosed with obsessive-compulsive disorder according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5, APA 2013) at the psychiatry outpatient clinic between June 2021 and July 2022 were recruited for this study. Patients were informed about the study during their routine examination, and those who agreed to participate in the study were referred to the research psychiatrist. Written informed consent was obtained from the patients. Patients with ages <18 years and > 65 years, with a history of alcohol or substance addiction or current regular usage of them, and having any axis I psychiatric disorder comorbidity according to the DSM-5, were not included in the study. The study was carried out in accordance with the latest version of the Declaration of Helsinki and approved by the ethics committee of Bezmialem Vakıf University (Approval no: 2021/154, Date: June 15, 2021).

Data Collection Tools

A clinician-developed sociodemographic and clinical data form was filled out. The form included sociodemographic data, pandemic and COVID-19-related information, clinical characteristics of OCD, and the change in OCD symptomatology. Two items were prepared in the sociodemographic form in order to assess the change in symptoms of OCD patients compared to before the pandemic. Participants were asked if their symptom severity improved, worsened, or had no change after the pandemic. Subsequently, participants who declared worsening symptoms were asked to evaluate the worsening level as mild, moderate, or severe.

The Yale-Brown Obsessive-Compulsive Scale (Y-BOCS) was administered by trained psychiatrists to measure the type and severity of symptoms in OCD patients. It is a semi-structured interview and consists of 10 items assessing obsessions and compulsions separately, with the total score ranging from 0 to 40.[19]

The validated Turkish version of the Cognitive Flexibility Scale (CFS) was used to measure cognitive flexibility. The scale consists of 12 items rated on a 6-point Likert-type format (1 = strongly disagree, 6 = strongly agree). Total scores range from 12 to 72, with higher scores indicating greater cognitive flexibility.[20,21]

The Fear of COVID-19 Scale (FCV-19S) was used to measure the level of COVID-19 fear in patients. The FCV-19S consists of 7 Likert-type (1 = strongly disagree; 5 = strongly agree) items, and higher scores indicate a high fear of COVID-19.[22,23]

The validated Turkish version of the Hamilton anxiety (HAM-A) and depression (HAM-D) rating scales were used to measure the level of anxiety and depression.[24,25]

Statistical Analysis

The Statistical Package for Social Sciences version 23.0 software (IBM Corp.; Armonk, NY, USA) was used for statistical analyses. All standardized skewness and kurtosis coefficients were within the bounds of ±2.0, thus satisfying normality assumption.[26] Independent sample *t*-tests were utilized for group comparisons. Pearson correlation was used to analyze the relationship between variables. The level of statistical significance was accepted as $P < .05$.

RESULTS

Eighty-one OCD patients were included in the study. The characteristics of the sample are presented in Table 1.

Of the patients, 24 (29.0%) reported no change in their OCD symptoms, 55 (68.1%) reported worsening, and 2 reported improvement. The majority of the worsening group reported moderate exacerbation of symptoms (n = 32, 58.2%), while fewer reported mild (n = 18, 32.7%) and 5 reported severe (n = 5, 9.1%) worsening.

Correlation analyses showed a negative correlation between cognitive flexibility levels and FCV-19S, HAM-A, HAM-D, and Y-BOCS scores (Table 2).

There were no differences between group comparisons (worsening/not worsening groups and mild/moderate/severe worsening groups) in terms of age, sex, working status, or duration of the disorder. The fear of COVID-19 ($P < .05$) and the Y-BOCS obsession subscale score ($P < .05$) were found to be higher in the worsening group (mean FCV-19S 15.09 ± 7.62, mean Y-BOCS-obs 11.78 ± 4.45) than in the not worsening group (mean FCV-19S 11.27 ± 6.25, mean Y-BOCS-obs 9.46 ± 3.92). CFS, HAM-D, and HAM-A scores were not significantly different between the worsening and the not worsening groups. However, the comparisons between mild and moderate/severe worsening groups revealed significant differences in CFS, FCV-19S, Y-BOCS, HAM-D, and HAM-A scores. The comparisons between the mild and moderate/severe worsening groups are presented in Table 3.

Table 1. Sociodemographic and Clinical Characteristics of the Research Sample

	n = 81
Mean age (SD)	32.59 (13.05)
Sex, n (%)	
Female	60 (74.1%)
Male	21 (25.9%)
Education, n (%)	
Literate	8 (9.9%)
Elementary school	14 (17.3%)
Secondary school	6 (7.4%)
High school	23 (28.4%)
University	30 (37.0%)
Working situation, n (%)	
Working	31 (38.3%)
Not working	50 (61.7%)
Marital situation, n (%)	
Never married	50 (61.7%)
Married	29 (35.8%)
Divorced/widowed	2 (2.4%)
Living situation, n (%)	
With parents/relatives	39 (48.1%)
With partner/family/children	35 (43.2%)
Alone	7 (8.6%)
Duration of disease (months), mean (SD)	90.22 (88.7)
Y-BOCS scores, mean (SD)	
Total	21.37 (8.66)
Obsession	11.04 (4.4)
Compulsion	10.35 (4.6)

Y-BOCS, Yale-Brown Obsessive-Compulsive Scale.

DISCUSSION

The present study examined the influence of cognitive flexibility on the course of patients with obsessive-compulsive disorders during the COVID-19 pandemic. The majority of our sample reported a worsening of their OCD symptoms since the beginning of the pandemic, and many of them have reported a significant deterioration, whereas fewer have reported a milder worsening. Our results are in line with numerous studies showing the worsening of OCD symptoms after the onset of COVID-19.[7,8] Despite most of studies showing worsening in OCD patients during the pandemic, some studies have reported no change,[5-7] and some have reported improvement.[7] These results may be attributed to the heterogeneity across study designs and differences in the characteristics of samples. Another reason for differences might be related to the sample collection periods of the studies. The implementation of the recommended measures, which are similar to the compulsions of OCD patients, by the general population may have made patients feel more secure and normalized their disorders, thus providing some relief, particularly at the beginning of the pandemic. However, this may be related to a decrease in anxiety rather than an improvement in OCD symptoms. In the long term, restrictions on daily life, ongoing precautions, and continuing fear of contagion may be potential stress factors that

Table 2. Pearson Correlation Analyses

		CFS	FCV-19S	Ham-A	Ham-D	Y-BOCS Total	Y-BOCS Obsession	Y-BOCS Compulsion	Age
CFS	r								
FCV-19S	r	−.256*							
Ham-A	r	−.597**	.251*						
Ham-D	r	−.429**	.216	.766**					
Y-BOCS Total	r	−.382**	.354**	.510**	.510**				
Y-BOCS Obsession	r	−.347**	.372**	.466**	.499**	.965**			
Y-BOCS Compulsion	r	−.399**	.320*	.526**	.504**	.969**	.879**		
Age	r	−.087	−.125	.002	.041	−.072	−.079	−.067	
OCD duration	r	−.087	−.062	.080	.074	.004	.009	.001	.516**

CFS, Cognitive Flexibility Scale; FCV-19S, The Fear of COVID-19 Scale; Ham-A, Hamilton Anxiety Rating Scale; Ham-D, Hamilton Depression Rating Scale; Y-BOCS, Yale-Brown Obsessive-Compulsive Scale; OCD, Obsessive-Compulsive Disorder.
**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

cause worsening of symptoms, including increased anxiety in general, in patients.

In our study, levels of cognitive flexibility, anxiety, or depression did not differ between the group that reported worsening and the group that did not. However, patients who reported more severe worsening had a lower level of cognitive flexibility and greater levels of anxiety and depression than those with milder ones. Besides, patients with both severe and mildly worsening symptoms had a higher fear of COVID-19. These findings suggest that the worsening of OCD symptoms occurs regardless of cognitive flexibility, anxiety, or depression levels during the pandemic. On the other hand, higher anxiety and depression and lower cognitive flexibility may be possible factors that influence the degree of worsening symptoms. It has previously been reported that general anxiety levels in OCD patients are higher than in the general population.[27] As mentioned above, the pandemic itself can be considered a stressor because of factors such as substantial changes in daily life and uncertainty and thus may lead to an increase in general anxiety and worsening of symptoms in psychiatric patients, particularly those with a high anxiety predisposition, including OCD.[28] Therefore, all OCD patients may have experienced increased general anxiety related to the pandemic, whether symptoms have worsened or not. On the other hand, higher anxiety levels may be a reasonable predictor of the clinical deterioration degree. In addition to increased general anxiety, concerns about contagion and deaths linked to the pandemic caused COVID-related anxiety in individuals. Cognitive mechanisms such as inflated responsibility, overestimation of threat, and intolerance to uncertainty have been considered to play a role in the deterioration of mental health during the COVID-19 pandemic, and those mechanisms are also thought to be responsible for the etiology and maintenance of OCD.[29] Thus, OCD patients may be more susceptible to COVID-related anxiety than others. In line with this, a study demonstrated that intolerance of uncertainty is a factor that explains the relationships between health anxiety and OCD symptoms and concern about COVID-19.[30] In our study, the fear of COVID-19 was higher in patients who reported worsening, and it was even greater in those with moderate or severe deterioration. Besides, fear of COVID-19, general anxiety, and Y-BOCS scores were positively correlated. Considering these relationships, the fear of COVID-19 may be proposed as a potential contributor to increased anxiety, thus worsening OCD symptoms. Since we were unable to measure Y-BOCS and anxiety scores before the pandemic, we could not suggest a direct causality. Nevertheless, these findings were supported by a previous study that found COVID-related stress was associated with an increase in symptoms in OCD patients during the pandemic compared with pre-pandemic.[31]

Our study demonstrates a significant negative correlation between cognitive flexibility and OCD symptoms. Furthermore, patients who reported more severe worsening had a lower level of cognitive flexibility. The literature presents varying findings on the relationship between OCD symptoms and cognitive flexibility. Similar to our

Table 3. The Comparisons Between the Mild and Moderate/Severe Worsening Groups

	Means (SD)					
	Mild	Moderate/Severe	*t*	*df*	*P*	*d**
CFS	51.72 (10.92)	44.24 (10.51)	2.445	53	<.05	.69
FCV-19S	12 (5.26)	16.59 (8.18)	−2.169	53	<.05	.67
Y-BOCS-Obsession	8.11 (4.42)	13.57 (3.23)	−4.669	26.144	<.001	1.41
Y-BOCS-Compulsion	6.78 (5)	12.81 (3.14)	−4.688	23.749	<.001	1.44
Y-BOCS-Total	14.89 (9.03)	26.35 (5.82)	−4.913	24.097	<.001	1.51
Ham-D	6.28 (8.64)	12.84 (9.12)	−2.547	53	<.05	.74
Ham-A	5.56 (5.94)	12.57 (8.64)	−3.098	53	<.01	.95

CFS, Cognitive Flexibility Scale; FCV-19S, The Fear of COVID-19 Scale; Ham-A, Hamilton Anxiety Rating Scale; Ham-D, Hamilton Depression Rating Scale; Y-BOCS, Yale-Brown Obsessive-Compulsive Scale.
*The Cohen's effect size.

results, a study involving a sample of female university students also found a negative correlation between cognitive flexibility and obsessive-compulsive symptoms.[32] Furthermore, a meta-analysis examining the relationship between cognitive function and symptom severity in OCD demonstrated a medium effect size for cognitive flexibility tasks.[33] Additionally, a study on gambling disorder demonstrated a significant relationship between symptom severity and cognitive inflexibility.[34] Conversely, some neurocognitive task studies have not identified a relationship between cognitive flexibility and symptom severity in OCD patients.[11,35] Nevertheless, the role of cognitive inflexibility in the etiopathogenesis and symptomatology of OCD remains unclear. Our results indicate that lower cognitive flexibility may contribute to worsening levels of symptoms in OCD patients during the COVID-19 pandemic. According to our findings, while symptom worsening during the pandemic appears to be independent of cognitive flexibility, the degree of worsening may be influenced by it. This suggests that although major stressors affect all cases, underlying mechanisms such as cognitive flexibility may determine the extent of the impact. Another possible mechanism is that symptom worsening itself may impair cognitive flexibility. However, due to the absence of baseline measures for symptom severity and cognitive levels in our study, a direct causal relationship cannot be established.

To conclude, symptoms in OCD patients may worsen with the activation of those cognitive mechanisms that are thought to be already present in OCD patients and are also associated with the effect of the pandemic period. Moreover, cognitive inflexibility may play a mediating role in this deterioration through its impact on cognitive processes. Since the pandemic lasted longer than expected and the measures continued for a long time, the difficulty of accessing health services due to lockdowns and limited health services caused blocks in OCD patients' follow-ups and treatments. Furthermore, the questioning about exposure treatments during the pandemic may have limited therapeutic interventions. Hence, OCD patients may have had to struggle with unmanaged anxiety and distorted cognitive processes.

Several limitations should be noted while interpreting the results. Firstly, since we could not evaluate patients before the pandemic, the impact of the pandemic was assessed retrospectively based on patient reports. Therefore, our results could not suggest a direct causality. Secondly, results can be influenced by insight levels and recall bias. However, our study sample consisted of patients with relatively good insight and cooperation, which may also limit the generalizability of the results (77.8% of the sample had Y-BOCS insight scores of 0–1, while 6.1% had scores of 3–4). Thirdly, we have a relatively small sample size. Besides, since participation in this study was voluntary, it may have caused self-selection bias. Lastly, we used a self-report scale to measure cognitive flexibility and were unable to use experimental tasks that could provide more objective results.

CONCLUSION

The current study demonstrated the worsening of symptoms in OCD patients during the COVID-19 pandemic and showed that lower cognitive flexibility and higher anxiety are associated with more severe symptomatic worsening. These findings can provide a better understanding of the psychological mechanisms, such as cognitive flexibility, that might underlie the deterioration. In this regard, it can be suggested not only to follow symptomatologic changes and clinical courses but also to explore the psychological processes that lead to them so that we can evaluate the mental health of individuals comprehensively and provide more specific interventions. Psychological interventions such as cognitive restructuring, thought-challenging, implementing mindfulness, and enhancing coping mechanisms that target the improvement of cognitive flexibility could be beneficial for OCD patients, particularly during challenging periods such as pandemics.

Availability of Data and Materials: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Bezmialem Vakıf University (Approval no: 2021/154, Date: June 15, 2021).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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