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## Exacerbation of obsessive compulsive disorder symptoms in children and adolescents during COVID-19 pandemic

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### ABSTRACT

**Objective:** To investigate the effects of COVID-19 pandemic and related home confinement on symptom profile, symptom severity and exacerbation of obsessive compulsive disorder (OCD) symptoms and related factors among young subjects with OCD.

**Method:** Young subjects who have been followed up with a primary diagnosis of OCD in a university hospital were reached by telephone or online programs to assess symptom profile, symptom severity and exacerbation during pandemic. Children's Yale-Brown Obsessive Compulsive (CY-BOCS) and Clinical Global Impression-Severity (CGI-S) Scales were used to rate symptom profile and severity before pandemic and during pandemic periods.

**Results:** There was a significant increase in the frequency of contamination obsessions ( $p = 0.008$ ) and cleaning/washing compulsions ( $p = 0.039$ ) during pandemic period. CY-BOCS obsessions ( $p < 0.001$ ), compulsions subscales ( $p < 0.001$ ) and total scores ( $p < 0.001$ ), and CGI-S scores ( $p < 0.001$ ) during pandemic period were statistically higher than before pandemic period. There was a significant relationship between the change in CY-BOCS scores with talking/searching in the social environment about COVID-19, daily preoccupation about COVID-19, duration of OCD diagnosis and diagnosis of COVID-19 in someone familiar.

**Conclusions:** Young subjects with OCD may develop additional symptoms and worsen already existing symptoms of OCD during COVID-19 pandemic.

### 1. Introduction

The world is struggling with the threat of the coronavirus (COVID-19) outbreak caused by the newly developed and evolving virus SARS-CoV-2. This infectious disease, which originated in the Wuhan province of China, spread rapidly to affect more than 7 million people worldwide; approximately 406,000 people have died so far (World Health Organization, 2020). In Turkey, the first cases of COVID-19 were reported on March 11, 2020. As of June 9, 2020, 172,000 cases and 4,729 deaths had been reported (Republic of Turkey Ministry of Health, 2020). Training in schools stopped on March 16, 2020, in Turkey, and on April 3, 2020, curfews for children and adolescents were imposed and home quarantine began (Republic of Turkey Ministry of Interior, 2020).

It is thought that the quarantine environment may contribute to stress in children and adolescents due the deterioration of daily routines, restrictions to social lives, the inability to attend school, and the uncertainty of the disease (Brooks et al., 2020a; Brooks et al., 2020b). Prolonged lockdown has been shown to have negative effects on the mental health of children and adolescents and can induce stress, anxiety, and depression (Chen et al., 2020; Wang et al., 2020). Another

study reported that children isolated or quarantined during pandemic outbreaks were more likely to develop acute stress disorder, adjustment disorder, and grief (Sprang and Silman, 2013). In a review of the psychological effects and consequences of restraint and quarantine as a result of the COVID-19 pandemic, most studies reported negative psychological effects, such as post-traumatic stress symptoms, confusion, and anger (Brooks et al., 2020b). Pandemics have serious psychological and social effects along with their biological effects. Those with mental health problems are especially sensitive to these negative effects and are prone to worsen because of a pandemic (Davide et al., 2020; Özdin and Bayrak Özdin, 2020). Although studies are increasingly focusing on the mental health effects of pandemics on adult patients (Gao et al., 2020; Wang et al., 2020), relatively few studies focus on the effects of pandemics on children and adolescents (Chen et al., 2020). Chen et al. demonstrated that COVID-19 influenced symptoms of mental disorders, including OCD, fear, hypochondria, depression, and neurasthenia, in college students (Chen et al., 2020).

Obsessive-compulsive disorder (OCD) is a chronic disorder characterized by recurrent obsessions and compulsions which affects about 0.5%–3% of children and adolescents (American Psychiatric Association, 2013; Heyman et al., 2003). The most common OCD

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symptoms are an obsession with contamination and the compulsion to clean (Bloch et al., 2008; Stein et al., 2019). Davide et al. stated that during the COVID-19 pandemic, there was a significant increase in the severity of obsession and compulsion in adult cases with OCD (Davide et al., 2020). Since the strategies that combat infectious diseases contain repetitive behaviors by nature, these strategies can worsen OCD (Banerjee, 2020). OCD symptoms may worsen due to additional emphasis on self-hygiene in the current health advice for preventing COVID-19 contamination. Although there are case reports of adult patients with worsening OCD symptoms during the COVID-19 pandemic (Kumar and Somani, 2020; French and Lyne, 2020), the effects of the COVID-19 pandemic on OCD symptomatology, symptom severity and exacerbation, and other related factors have not been studied in young populations.

This study investigates the effects of the COVID-19 pandemic and related home confinement on symptom profiles and the possible exacerbation of OCD symptoms among young subjects who have been diagnosed with OCD in the Istanbul Medical Faculty, Istanbul University, child and adolescent psychiatry department. We expected that a significant portion of subjects would show symptomatic exacerbation during the pandemic and the lockdown period compared to the period before the pandemic. We also aimed to investigate possible related factors if symptomatic exacerbation was present.

## 2. Methods

### 2.1. Eligibility criteria and procedure

This study was conducted in the child and adolescent psychiatry department of the Istanbul Medical Faculty, Istanbul University. Participants for this study included subjects aged 6–18 years who had diagnosed with OCD. Either experienced child psychiatrists or child psychiatry residents under the supervision of faculty members in the department diagnosed OCD in these subjects. Ninety subjects were identified according to their medical records as candidates for inclusion in the study, and 61 subjects met eligibility criteria and were included in the study. Thus, 29 subjects were excluded from the study, either because they lacked a Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS) score from before the pandemic period ( $n=11$ ), because they could not be reached ( $n=10$ ), or because they did not consent to participating in the study ( $n=8$ ). Eligibility criteria included the following: a) an OCD diagnosis according to DSM-5 criteria; b) Scores from the Clinical Global Impression (CGI-S) scale and CY-BOCS scores from before the pandemic; c) no diagnoses of autism or schizophrenia spectrum disorders, intellectual disabilities, or substance use disorders; and d) verbal informed consent and assent to participate in the study. Of the study participants, 53 subjects continued medicated treatment and seven subjects completed their medicated treatment during the pandemic (See Table 1 for additional information on patients' treatments). Subjects who underwent cognitive behavioral therapy (i.e., exposure-response prevention) before the pandemic discontinued their therapy during the pandemic. Remission status was defined as a CY-BOCS score  $\leq 12$  (Mataix-Cols et al., 2016), and 55.7% ( $n=34$ ) of individuals comprising the sample had demonstrated remission before the pandemic.

Due to home confinement for this age group, participants and their parents were interviewed via telephone or online programs from April 20 to April 30, 2020, to collect data for the study. Parents and subjects were first informed about the details of the study, then several points of sociodemographic information were gathered. Then subjects were assessed for their during-pandemic condition (lasting 6 weeks, starting from March 11, 2020, when the first COVID-19 case was reported in Turkey) using the CY-BOCS and the CGI-S scale to assess symptom profiles and rate OCD severity. CY-BOCS and CGI scores from the six months prior to the first confirmed case of COVID-19 in Turkey (i.e., September 2019 to March 2020) were considered participants' pre-

**Table 1**  
Clinical and Sociodemographic Characteristics of the Subjects

Variable	N(%) / Mean(SD)
Age (years)	13.62 $\pm$ 2.72
Gender	
Male	34 (55.7)
Female	27 (44.3)
Mean duration of father education (years)	9.3 $\pm$ 3.83
Mean duration of mother education (years)	8.55 $\pm$ 3.58
Family income	
Below minimum wage	10 (16.4)
Above minimum wage	51 (83.6)
Current OCD diagnosis in parent(s)	14 (22.9)
COVID-19 diagnosis in someone familiar	30 (49.2)
Information source about COVID-19	
TV	52 (85.2)
Talking/searching in the social environment	39 (63.9)
Internet	39 (63.9)
Social media	30 (49.2)
Daily preoccupation about COVID-19 (hours/day)	1.59 $\pm$ 1.29
Duration of OCD diagnosis (years)	2.19 $\pm$ 1.78
Treatment status	
Only Selective Serotonin Reuptake Inhibitors (SSRIs)	27 (44.3)
SSRIs + aripiprazole or risperidone	20 (32.8)
Cognitive behavioral therapy (CBT)	1 (1.6)
CBT + SSRIs	6 (9.8)
No current treatment	7 (11.4)

pandemic conditions. Inter-rater reliability was high for CY-BOCS scores [K:0.973 and K:0.975 (95%-confidence interval, 0.82-1)] before and during the pandemic (McHugh, 2012). The study was approved by the ethical committee of Istanbul Medical Faculty (No: 29624016-050.99-961).

### 2.2. Measures

#### 2.2.1. Sociodemographic form

The researchers filled out the sociodemographic information form with the subjects and the subjects' parents. The form consisted of questions related to sociodemographic characteristics such as age, gender, the education level of parents in years, and familial income. The survey also addressed the COVID-19 pandemic, with questions addressing points such as a current OCD diagnoses in either parent, a COVID-19 diagnoses in someone familiar, sources of information about COVID-19, and any daily preoccupations concerning COVID-19.

#### 2.2.2. Clinical Global Impression–Severity Scale (CGI-S)

The Clinical Global Impression (CGI) measures symptoms and has three sub-scales: Severity (CGI-S), Improvement (CGI-I), and Efficacy (CGI-E). In the present study, the CGI-S scale, which ranges from 1 to 7, with 1 = normal or not at all ill while 7 = extremely ill, was used to measure the symptom severity (Busner, 2007).

#### 2.2.3. Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS)

CY-BOCS is a semi-structured clinician-rated measure consisting of 10 items rated on a 5-point Likert scale. Separate scores are computed for obsessions and compulsions, and a total severity score is determined by summing all 10 items (Scahill et al., 1997). The CY-BOCS possesses adequate internal consistency and convergent and discriminant validity (Storch et al., 2004). The psychometric properties of the Turkish version of the CY-BOCS have been previously established (Yucelen et al., 2006).

### 2.3. Statistical analyses

All analyses were carried out using SPSS Statistics, version 21. Percentage, arithmetic mean, and standard deviation were used as descriptive data. The distribution of data was assessed using the

Kolmogorov–Smirnov test. The Wilcoxon test was used for non-normally distributed data. McNemar's test was used for categorical variables that did not fit the normal distribution. Cohen's Kappa coefficient was used to measure the inter-rater agreement for qualitative (numeric) items for CY-BOCS scores both before and during the pandemic (McHugh, 2012). Probability (p) values <0.05 were regarded as statistically significant (two-tailed test). Factors related to CY-BOCS scores were evaluated by linear logistic regression analysis. The variables with p-value <0.05 are included in the analysis.

### 3. Results

The study included 61 subjects with their primary diagnoses as OCD. The sample consisted of 34 males (55.7%) and 27 females (44.3%) (13.62 ± 2.72 years). The duration of participants' OCD diagnoses (i.e., the time since an initial diagnosis) was 2.19 ± 1.78 years. Sources of information about the COVID-19 pandemic included watching TV (85.2%), following news from the internet (63.9%), talking/searching in the social environment about COVID-19 (63.9%), and using social media (49.2%). Daily preoccupation about the COVID-19 pandemic (including TV/internet/social media exposure and talking/searching in the social environment) was 1.59 ± 1.29 hours per day. The clinical and sociodemographic characteristics of subjects are summarized in Table 1.

More than half of the subjects (n = 33; 54.09%) reported an increase in symptom severity according to both the CY-BOCS and CGI-S scales, with 22 subjects (36.06%) having at least a 30% increase in total CY-BOCS scores during the pandemic period. Contamination obsessions and cleaning/washing compulsions were the most frequent OCD symptoms both before and during the pandemic. There was a significant increase in the frequency of contamination obsessions (p = 0.008) and cleaning/washing compulsions (p = 0.039) during the pandemic (Table 2). While there was no change in symptom severity in 21 subjects (34.4%), seven subjects (11.4%) reported a decrease in CY-BOCS scores (changing from 1 to 7 scores with a mean of 2.4). Thirty-four patients (55.7%) were remitters of obsessive-compulsive symptoms

**Table 2**  
Types and severity of OCD symptoms during and before pandemic.

Variable	During Pandemic	Before Pandemic	p-value
<i>Type of obsessions, N (%)</i>			
Contamination	48 (78.6)	40 (65.6)	<b>0.008<sup>a</sup></b>
Aggressive	11(18)	10 (16.4)	1 <sup>a</sup>
Sexual	13 (21.3)	13 (21.3)	1 <sup>a</sup>
Hoarding/saving	7 (11.5)	7 (11.5)	1 <sup>a</sup>
Religious	25 (41)	24 (39.3)	1
Magical thinking	12 (19.7)	12 (19.7)	1 <sup>a</sup>
Somatic	12 (19.7)	6 (9.8)	0.109 <sup>a</sup>
<i>Type of compulsions, N (%)</i>			
Cleaning/washing	46 (75.4)	38 (62.3)	<b>0.039<sup>a</sup></b>
Checking	27 (44.3)	30 (49.2)	0.375 <sup>a</sup>
Repeating	18 (29.5)	17 (27.9)	1 <sup>a</sup>
Counting	13 (21.3)	14 (23)	1 <sup>a</sup>
Ordering/arranging	15 (24.6)	14 (23)	1 <sup>a</sup>
Hoarding/collecting	8 (13.1)	7 (11.5)	1 <sup>a</sup>
Superstition	10 (16.4)	10 (16.4)	1 <sup>a</sup>
<b>CY-BOCS Scores</b>			
<i>mean ± SD (min-max)</i>			
Obsession	9.72 ± 3.67 (5-18)	7.18 ± 2.66 (5-15)	<b>&lt;0.001<sup>b</sup></b>
Compulsion	9.27 ± 3.47 (5-17)	7.06 ± 2.51 (5-14)	<b>&lt;0.001<sup>b</sup></b>
Total	19.0 ± 6.89 (10-35)	14.24 ± 5.05 (10-28)	<b>&lt;0.001<sup>b</sup></b>

Notes:

<sup>a</sup> McNemar test,

<sup>b</sup> Wilcoxon test, Bold data, p < 0.05 (significance).

CY-BOCS: Children's Yale-Brown Obsessive Compulsive Scale

before quarantine; of these, 19 patients (31.1%) returned to clinically significant levels of OCD during the pandemic (CY-BOCS total score >16). The Wilcoxon test analysis revealed that CY-BOCS obsessions (z: -4.726, p < 0.001), compulsions subscales (z: -4.348, p < 0.001), and total scores (z: -4.695, p < 0.001) were statistically higher during the pandemic compared to before the pandemic (Table 2).

The Wilcoxon test of CGI-S scores during and before the pandemic revealed that CGI-S scores for contamination obsessions during the pandemic (2.78 ± 1.37) were statistically higher than those before the pandemic (2.22 ± 1.03) (z: -4.339, p < 0.001). For cleaning compulsions, CGI-S scores during the pandemic (2.75 ± 1.42) were also statistically higher than those from before the pandemic (2.18 ± 1.07) (z: -4.196, p < 0.001). Regarding total OCD symptom severity, CGI-S scores during the pandemic (3.55 ± 0.99) were also statistically higher than before the pandemic (2.91 ± 0.75) (z: -4.196, p < 0.001).

A multiple linear regression model was used to identify factors that affected CY-BOCS scores. A significant relation was found between the change in CY-BOCS scores and the model. In the analysis, there was a significant correlation between changes in CY-BOCS scores and talking/searching in the social environment about COVID-19 (B = 3.728 CI: 0.654; 6.802, p = 0.018), daily preoccupation with COVID-19 (B = 1.656 CI: 0.510; 2.801, p = 0.005), duration of OCD diagnosis (B = 0.947 CI: 0.136; 1.758, p = 0.023), and the diagnosis of COVID-19 in someone familiar (B = 3.872 CI: 0.927; 6.817, p = 0.011). The multiple linear regression analysis that identified the factors that predicted changes in CY-BOCS scores is summarized in Table 3.

### 4. Discussion

This study evaluated OCD symptom profiles, changes to symptom severity, and other related factors from both during and before the COVID-19 pandemic in young subjects who had been diagnosed with OCD in a university hospital's child and adolescent psychiatry clinic. Important findings were obtained in our study—the severity of OCD symptoms increased during the pandemic in more than half of the study subjects. Studies have shown that contamination obsessions and compulsive handwashing are among the most common OCD symptoms (Bloch and Storch, 2015; Coskun et al., 2012; Coskun and Zoroglu, 2009; Stein et al., 2019). Little research has concerned adult subjects who report exacerbated OCD symptoms during the COVID-19 pandemic usually presented through the worsening of contamination obsessions and cleaning/washing compulsions (Davide et al., 2020; French and Lyne, 2020; Kumar and Somani, 2020). In their very recent study, Davide et al. reported that a significant increase in obsession and compulsion severity emerged, and both the remission status of OCD symptoms and having contamination symptoms before the quarantine were significantly associated with greater worsening of OCD symptoms during quarantine (Davide et al., 2020). It has been reported that hand washing during pandemic is considered to be one of the safest measures against infection, and since these hygienic measures are emphasized in media sources, it has worsened the symptoms of patients with OCD who

**Table 3**  
Multiple linear regression analysis for predictors of change in YBOCS scores

Variables	OR	95.0% CI for OR		p-value
		Lower	Upper	
Talking/searching in the social environment about COVID-19 *	3.728	0.654	6.802	<b>0.018</b>
Daily preoccupation about COVID-19	1.656	0.510	2.801	<b>0.005</b>
Duration of OCD diagnosis	0.947	0.136	1.758	<b>0.023</b>
Diagnosis of COVID-19 in someone familiar *	3.872	0.927	6.817	<b>0.011</b>

Notes: R = 0.675. R<sup>2</sup> = 0.455; p < 0.001. Bold data, p < 0.05 (significance). CI: Confidence Interval. Standard Error: SE. OR: Odds Ratio;

\* reference, absence (0) presence (1)

have concerns about contamination, hygiene, and cleanliness (Banerjee, 2020; French and Lyne, 2020). Of the four basic dimensions of OCD, the contamination and cleaning-washing dimensions in particular were reported to be associated with exaggerated threat and inflated responsibility (Wheaton et al., 2010). Intensive expression of health problems related to COVID-19 and measures to be taken, as presented in the media and in social life, may increase the perceptions of threat and responsibility in people with OCD. In addition, cleaning compulsions frequently seen in patients with a fear of contamination are directly related to behaviors such as the use of washing and protective equipment due to the outbreak of COVID-19 (Banerjee, 2020). Contamination obsessions and cleaning compulsions were found to be the most common symptoms both before and during the pandemic in the current study. In addition, as expected, there was a significant increase in the frequency of these symptoms, which means that more subjects developed contamination and cleaning/washing symptoms during the pandemic among our sample. This finding is consistent with previous reports regarding adult subjects. However, to date, the researchers were unable to find any study or report that considered the effects of the COVID-19 pandemic on children and adolescents with OCD.

In our study, CY-BOCS ratings of obsessions and compulsions, plus overall CY-BOCS scores as well as CGI-S scores, showed statistically significant increase during the COVID-19 pandemic, with more than one-third of the subjects having an increase of at least 30% in total CY-BOCS scores. In addition, more than half of the subjects identified as remitters before the pandemic relapsed with clinically significant symptoms. Importantly, there was a significant relationship between the changes in CY-BOCS scores with talking/searching in the social environment about COVID-19, daily preoccupation with COVID-19, the duration of OCD diagnosis, and the diagnosis of COVID-19 in someone familiar to patients. Some of these findings are consistent with the limited literature regarding adult subjects who reported exposure in social environments and media as important factors for the exacerbation of OCD symptoms (Banerjee, 2020; Kumar and Somani, 2020; French and Lyne, 2020). Our study confirms that these findings also apply to young subjects with OCD. However, in contrast to the available literature, we also found that the duration of a subject's OCD diagnosis and a COVID-19 diagnosis in someone familiar were both associated with an increase in OCD symptom severity during the pandemic. The reason for the relationship between the duration of OCD diagnosis and the worsening of symptoms may be that these patients and their families better noticed the worsening of OCD symptoms. Moreover, having someone familiar be diagnosed with COVID-19 is a clear source of stress for children and adolescents, which may worsen OCD symptoms. In our study, almost half of the subjects reported having someone familiar to them be diagnosed with COVID-19. The total number of COVID-19 cases in Turkey is 172,000 as of June 9, 2020, but this rate may be unpredictably higher. However, the high rate of COVID-19 diagnoses may signal an exaggerated threat to this particular population, causing increased attention to be paid to COVID-19. All findings from our study may prompt several preventive mental health approaches for young subjects with OCD—limiting or avoiding overexposure to media or social environments concerning the COVID-19 pandemic, encouraging good parenting and communication skills to cope with a child's OCD-related worries or behaviors, anticipating the worsening of any OCD symptoms, and complying with treatments may help children and adolescents with OCD, as well as their parents, during the pandemic (World Health Organization, 2020).

To our knowledge, this is the first study regarding the effects of the COVID-19 pandemic on OCD symptom profiles, symptom severity and exacerbation, and other related factors in children and adolescents. More than half of the subjects showed worsened OCD symptoms possibly related to the COVID-19 pandemic. Mental health professionals working with young subjects should be aware of the conditions of the pandemic or the presence of OCD and should take any possible action to

prevent the worsening of OCD symptoms in young subjects.

Furthermore, this study has several limitations that should be noted. First, this was a cross-sectional study conducted during the pandemic and may not reflect long-term effects of the COVID-19 pandemic on young people with OCD. In addition, subjects were assessed by telephone or via online interviews due to home confinement for this age group. Finally, the worsening of OCD symptoms may be a natural course of an individual's disorder, which may or may not be attributable to COVID-19. Further studies with larger samples, more structured interviews, and long-term follow-ups are needed on this subject.

#### Author disclosure

The authors transfer all copyright ownership of the manuscript entitled "Exacerbation of Obsessive Compulsive Disorder Symptoms in Children and Adolescents During COVID-19 Pandemic" to the *Psychiatric Research Journal*. The authors warrant that the article is original, is not for consideration by another journal, has not been previously published, and has been prepared according to the manuscript rules. The authors warrant that they have no conflict of interests in general or in connection with the submitted article and no financial relationships with any pharmaceutical company.

#### Declaration of Competing Interest

None.

#### CRediT authorship contribution statement

**Yaşar Tanir:** Conceptualization, Funding acquisition, Formal analysis, Writing - original draft, Writing - review & editing. **Ali Karayagmurlu:** Conceptualization, Funding acquisition, Formal analysis, Writing - original draft. **İlyas Kaya:** Conceptualization. **Tuba Bilbay Kaynar:** Funding acquisition, Formal analysis. **Gaye Türkmen:** Funding acquisition, Formal analysis. **Büşra Nur Dambasan:** Funding acquisition, Formal analysis. **Yavuz Meral:** Funding acquisition, Formal analysis. **Murat Coşkun:** Conceptualization, Writing - original draft, Writing - review & editing.

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