

The Covid-19 Pandemic and Obsessive-Compulsive Disorder in Young People: Systematic Review

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Abstract

Background: The Covid-19 pandemic has impacted the world since the first cases were reported in China in January 2020. The secondary mental health impacts of the pandemic are thought to be significant. Obsessive-compulsive disorder (OCD) is a condition defined by recurrent obsessions and compulsions. It has been hypothesised that the focus on hygiene and contamination during the pandemic could exacerbate obsessive-compulsive symptoms in young people. **Method:** A systematic literature review was conducted. Papers were sought looking at the effect of the pandemic on OCD in young people. **Results:** Six published cross-sectional and longitudinal studies were identified, of which four papers investigated clinic samples with a diagnosis of OCD, and two looked at community adolescent populations. Five out of the six papers found that obsessive-compulsive symptoms were exacerbated during the Covid-19 pandemic. **Conclusion:** The Covid-19 pandemic appears to be associated with a worsening of obsessive-compulsive symptoms in young people. Being in treatment seems to have a protective effect. Maintaining mental health services during a pandemic is vital. It is important to be aware of the implications of pandemic on obsessive-compulsive symptoms in young people in order to allow them to access appropriate treatments. More research is needed in this area.

Keywords: Obsessive-Compulsive Disorder; Obsessive-Compulsive Symptoms; Covid-19; Pandemic; Child Health; Adolescent Health

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Introduction

Over the past year the world has been struggling with the outbreak of Coronavirus, a novel and evolving virus, SARS-COV2. The virus originated in Wuhan, China with the first cases of an atypical pneumonia being reported in January 2020(*The World Health Organisation: Novel Coronavirus 2019 Interactive Timeline*, n.d.). The World Health Organisation declared a public health emergency of international concern on 30th January 2020. As of January 2021, there have been over 93,000,000 cases of coronavirus reported to the World Health Organisation, including over 2,000,000 deaths(*The World Health Organisation: Novel Coronavirus 2019 Interactive Timeline*, n.d.).

Across the world lockdowns of varying severity were implemented. Schools were often shut and 'Stay at Home' orders were put in place. The effect of the lockdowns on young people's social contact and their mental health has been evaluated and thought to be significant (Brooks et al., 2020)(Chen et al., 2020). In addition to lockdowns and social distancing, hygiene measures such as handwashing and prevention of contamination was encouraged and there was significant coverage of this in the media.

The societal changes that have occurred during the pandemic have been shown to have impacted the mental health of children and adolescents (Chen et al., 2020). We can hypothesise that a potential increase in anxiety and distress in young people may have an impact on those young people with obsessive-compulsive disorder.

Obsessive-compulsive disorder (OCD) is a relapsing remitting disorder, that may become chronic, defined by recurrent obsessions and compulsions (Samhsa & CBHSQ, 2016). It has a prevalence of 1-3% in children and adolescents (Walitza et al., 2011). Some of the most frequently observed features of OCD are an obsession with contamination and a compulsion to clean (Bloch et al., 2008).

Obsessive-compulsive symptoms lie on a continuum with OCD and are widespread but variable in severity in the population. It is when symptoms worsen and become impairing in function that OCD is recognised (American Psychiatric Association, 2013). It was hypothesised by several studies that hygiene measures, as well as the increased stress caused by the pandemic, would likely exacerbate OCD symptoms in young people(Darvishi et al., 2020) (Tanir et al., 2020) (Nissen et al., 2020).The aim of this study was to review the literature available and assess the effect of the Covid-19 pandemic on OCD and obsessive-compulsive symptoms in young people.

Methods:

Search Strategy:

The search was divided into two main areas, to look for obsessive-compulsive disorder and pandemic. These were used as the search terms in 9 databases on 11th January 2021. The search terms included 'OCD' in place of obsessive-compulsive disorder and 'epidemic' and 'disease outbreak' in place of pandemic.

Databases searched: Pubmed, Medline, PsychInfo, AMED, BNI, CINAHL, EMBASE, EMCARE, HMIL

Inclusion/Exclusion Criteria:

Only papers published in English were sought. The search generated 315 papers. Titles and abstracts were screened. The review included papers assessing the effect of pandemic on obsessive-compulsive disorder symptoms in children and young people, under the age of 21. Papers on pandemic in general were sought, but only papers relating to the COVID-19 pandemic were found during the literature search.

24 studies were found in these databases. When duplicates were excluded this left 7 studies. The full text of these seven studies were reviewed. 1 was excluded as it was not published in English. See Figure 1.

Figure 1 here

Study Quality Assessment

The Newcastle Ottawa scale adapted for Cross-Sectional Studies was used to assess study quality (Wells et al., n.d.). The scale scores studies on three categories: the selection process, the comparability between groups and how the outcome is measured. This scale was adapted from the Newcastle-Ottawa Quality Assessment Scale for non-randomised studies in meta-analyses (Herzog et al., 2013). The scores range from 1 to 10.

Results:

The results are summarised in Table 1.

Table 1 here

Due to the heterogeneity of study characteristics and instruments used, no study estimate or meta-analysis could be completed.

Four of the selected papers studied clinical populations with an established diagnosis of OCD. The two other papers looked at populations of young people and assessed prevalence of obsessive-compulsive symptoms. All but one of the papers studied only young people, with Storch et al (2021) looking at all age ranges.

The Newcastle-Ottawa scale adapted for Cross-Sectional Studies was used to assess study quality. Overall the quality of the studies was rather poor. Two of the studies had a Newcastle-Ottawa score of 5, with the remaining studies receiving scores of 4 (Table 2).

Table 2 here

In the four papers studying clinic populations with a diagnosis of OCD, three studies found the pandemic appeared to cause an exacerbation of OCD symptoms, while one found the pandemic caused a decrease in OCD symptoms. In Nissen et al (2020) 29/65 (44.6%) young people in the clinical group and 27/37 (73%) in the survey group (not currently in treatment, but linked to an OCD association) studied reported a worsening of their symptoms. However, this difference may just reflect sample ascertainment bias, in view of the low response rate in the survey group (37 of 600, 6%, responded, compared with 65 of 101, 64% of the clinic sample). In the clinical group 10/65 (15.4%) described thoughts of COVID-19 becoming an integral part of their OCD. In Storch et al (2021) on average clinicians estimated that 38% of their patients had symptoms worsen due to COVID-19 pandemic, 47% had symptoms stay the same, and 10% had symptoms improve (Storch et al., 2021). In Tanir et al (2020) 33 (54%) of 61 adolescents assessed with instruments, including the reliable CY-BOCS, reported an increase in symptom severity. Results showed mean CY-BOCS scores of 14.24 ± 5.05 before the pandemic and 19.0 ± 6.89 during the pandemic. In contrast to these findings, Schwartz-Lifshitz et al (2021) observed that the proportion of children and adolescents with OCD who showed improvement during the COVID-19 period was higher than the proportion that showed deterioration. It must be noted that the data presented by Schwartz-Lifshitz et al (2021) is from a small study population (29 subjects), which lowers the study quality (Table 2). The difference in findings may therefore be attributed to the sample size.

None of the studies reported that the researchers were blinded to the clinical status of the patients or their previous rating scale scores.

Two papers looked at general populations of adolescents. Darvishi et al (2020) found that 67.3% of their population studied may have demonstrated OCD symptomatology (the numerator and denominator were not specified). However, the researchers did not use an instrument that can assign a diagnosis. The MOCI is used as a screening tool for obsessive-compulsive symptoms in

clinical and non-clinical populations (Sanchez-Meca et al., 2011). Darvishi et al (2020) did not report the score at which they assigned people into the 'OCD group.'. Seçer et al (2020) found that fear of COVID-19 positively predicts emotional reactivity which then positively predicts experiential avoidance and depression-anxiety. They found that experiential avoidance has positive and significant predictive effects on OCD (Seçer & Ulaş, 2020).

The papers also studied specific obsessive-compulsive symptoms. Tanir et al (2020) observed that contamination obsessions and cleaning/washing compulsions were the most frequent OCD symptoms both before and during the pandemic. It was also noted that there was a significant increase in the frequency of contamination obsessions and cleaning/washing compulsions during the pandemic, with 40/61 (65.6 %) participants displaying contamination obsessions before the pandemic and 48/61 (78.6%) participants displaying these obsessions during the pandemic. 38/61 (62.3%) participants showed cleaning compulsions before the pandemic, with 46/61 (75.4%) participants showing cleaning compulsions during the pandemic. From the descriptive findings in Darvishi et al's (2020) study it was found that the most frequent obsessive-compulsive symptom was washing compulsions. Nissen et al (2020) found that there was a significant positive correlation between total OCD severity scores and the occurrence of OCD aggressive and sexual symptoms (2.62, 95%CI (0.43-4.82), $p=0.02$). These three studies did look at particular obsessive-compulsive symptoms. However, they did not distinguish further when looking at endogenous obsessions vs reactive obsessions (i.e. internally originating obsessions vs. contamination obsessions relating to the pandemic).

Discussion:

This review found that the Covid-19 pandemic had a significant impact on OCD and obsessive-compulsive symptoms in young people. All but one of the papers showed Covid-19 causing an increase in obsessive-compulsive symptoms in young people. The one paper which showed an improvement in symptomatology was from a smaller sample size of only 29 subjects (Schwartz-Lifshitz et al., 2021).

Various hypotheses have been put forward as to why the Covid-19 pandemic would cause an exacerbation in obsessive-compulsive symptoms. The emphasis on handwashing and the cleaning of surfaces in government guidelines, the media and in day-to-day life may have increased perceptions of threat and responsibility in people with OCD, therefore exacerbating cleaning compulsions and fear of contamination (Tanir et al., 2020). Tanir et al (2020) did find that contamination obsessions and cleaning compulsions were the most common symptoms in their sample both before and during

the pandemic. They also found that there was a significant increase in the frequency of these symptoms. This was similar to Darvishi et al (2020), who found that the most common OCD sign in their study sample was a washing compulsion. However, Nissen et al (2020) were unable to show an association with baseline OCD contamination/cleaning symptoms. They hypothesised that the reduced contact with the outside world and everyone around them increasing their handwashing and cleaning actions may have been a sort of 'inflicted avoidance' for these young people.

On the basis of our clinical impressions we can see that many young people will have been affected by the Covid-19 pandemic. Considering the stress and fear associated with the pandemic, it seems clear that the level of distress in society would impact on young people's mental health. If anxiety and distress increase across the population of young people, they will also increase in those with OCD. OCD symptoms in particular would appear likely to be affected by this increased stress. Partially because there is evidence that stress can play a significant role in both aetiology and maintenance of OCD symptoms (Adams et al., 2018). It would also seem likely that those patients with predominantly contamination obsessions and compulsions, would find the focus on an unknown virus spreading across the world a trigger to further anxieties about contamination.

Nissen et al (2020) considered that trauma may be a trigger for OCD symptoms beginning, or be a factor in a worsening of symptoms already present. Although they acknowledge that fear of Covid-19 may not be fully comparable with established childhood traumas, they suggested that fear of Covid-19 may exacerbate existing psychological disorders. It should also be noted that trauma from serious illness, or even deaths, within young people's families may have occurred during the Covid-19 pandemic. Seçer et al (2020) also considered this and found that the fear of Covid-19 is a significant positive predictor of depression-anxiety symptoms in adolescents and depression-anxiety has an exacerbating effect on OCD symptoms. They also discuss secondary effects caused by the fear of Covid-19, such as loneliness, sleep problems and anger worsening obsessive-compulsive symptoms.

In each of the countries where these studies were based there were lockdown measures in place to try and manage the spread of Covid-19. Although it was hypothesised that reduced contact with the outside world might actually be helpful in alleviating contamination/cleaning symptoms (Schwartz-Lifshitz et al., 2021) (Nissen et al., 2020), it has also been considered that the quarantine environment could contribute to stress. Restrictions to social activities, not attending school, the disruption of a daily routine and the uncertainty of Covid-19 may all contribute to increased stress which in turn can exacerbate psychological disorders (Tanir et al., 2020) (Adams et al., 2018; Chen et al., 2020). Storch et al (2021) noted that under-18's appeared to experience less of an impact from

Covid-19 on their obsessive-compulsive symptoms than adults. They hypothesised that the stay-at-home orders may have allowed young people to continue to focus on their Exposure Response Prevention (ERP) exercises and may have had less exposure to real-world triggers. Being away from school, often a considerable stressor for young people, could also have a positive impact on stress and anxiety levels. This might especially be the case if young people were not directly impacted by Covid-19, by either bereavement or familial illness.

Schwartz-Lifschitz et al (2021) was the only study that found the Covid-19 pandemic to have a protective effect on OCD symptoms. As discussed previously this study had a much smaller sample size and potential ascertainment bias, compared with the other studies included in this review. The study did include all referrals to their clinic over 1 year (between April 1st 2019 and March 31st 2020). However, there may have been unknown referral bias leading to ascertainment bias. Schwartz-Lifschitz et al (2021) considered the hypothesis that being in treatment for OCD is a protective factor. In their paper 42% of participants were receiving online psychotherapeutic treatment during the pandemic. This contrasted to only 12% of participants in Tanir et al (2020). The evidence presented in Nissen et al (2020) also supports this idea, noting more intense reactions to the pandemic if the subjects did not have an immediate contact to a psychiatric system.

Clinical implications

The Covid-19 pandemic appears to have significantly affected obsessive-compulsive symptoms in young people. This has implications for clinicians working with young people throughout the current pandemic, and in future pandemics that may occur. It was suggested by several studies that being in treatment for OCD is a protective factor during a pandemic. Ensuring those with symptoms are able to access treatment therefore would appear to be of importance. Screening for obsessive-compulsive symptoms at assessments whether in psychiatric clinics, or by primary care doctors, could identify these young people early on and allow them to access appropriate treatment. Ensuring mental health services continue to remain open and available during Covid-19 restrictions is also vital. There is also the hypothesis that contamination messages and the lockdowns in general have an impact on obsessive-compulsive symptoms. These messages and public health measures are deemed necessary and are unable to be altered. However, raised awareness of their effect on obsessive-compulsive symptoms both in clinical and non-clinical settings (such as education), could enable young people to get the support they need during a pandemic.

Strengths and Limitations

The studies included in this review had various strengths. The pandemic affects countries world-wide and this review was able to include studies from countries across the globe. All but one of the studies showed similar results, with the pandemic causing a significant impact on obsessive-compulsive symptoms.

The studies reviewed did have limitations. Only two of the studies had a Newcastle-Ottawa score of 5, with the remaining studies receiving scores of 4 (Table 2). Four out of the six studies were cross-sectional, with only two longitudinal studies, and cannot confirm a causal association between the pandemic and OCD symptoms. Some studies had small samples and weak measures, with high reliance on self-report. Only one study assessed the young people's attitudes or fear of COVID-19 and how this might have impacted their OCD, and so elucidated psychological mechanisms (Seçer & Ulaş, 2020). No long-term follow up was available, so it is not clear what the long-term implications of the pandemic will be on obsessive-compulsive symptoms. Understandably carrying out research on this topic is challenging given the sudden and unpredicted appearance of the virus and consequences.

The Covid-19 pandemic caused many changes in terms of lockdown, school closures and rapid societal changes. Cross sectional studies are not going to measure the specific, immediate effects of these changes. There are therefore clear methodological challenges for research in this area.

Conclusion:

In conclusion, this review has found that the Covid-19 pandemic appears to have worsened obsessive-compulsive symptoms in young people. Various hypotheses have been put forward regarding this effect, which appears to be somewhat mitigated by current involvement with mental health services. Our knowledge of this raises the importance of keeping mental health services open and well-funded during pandemic. A lot of focus has, understandably, been on the physical health implications of Covid-19. However, the secondary effects of pandemic on mental health cannot be ignored. Improved awareness of the implications of pandemic on obsessive-compulsive symptoms, not just in healthcare settings but in the wider community, will be important to ensure young people receive accurate assessment and treatment for their difficulties.

Further research is needed in this area. Particularly further studies with long-term follow up, more structured interviews and increased sample sizes.

Conflict of Interest Statement:

The Authors declare that there is no conflict of interest

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Figure 1: Covid-19 Pandemic and Obsessive-Compulsive Disorder in Young People - Study Selection Process

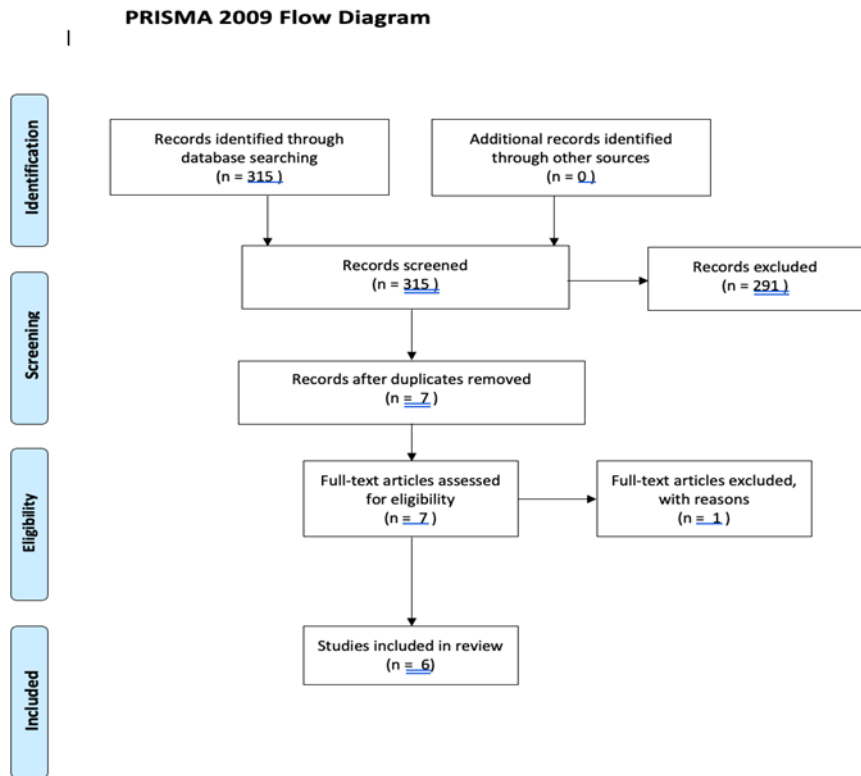


Table 1. Study findings of the effect of Covid-10 on OCD and OC symptoms

Study Characteristics				Results by outcome measured
Author (year)	Location	Study design, sample size, and age range	Outcome measurement method	Results
Clinical Populations				
Nissen et al (2020)	Denmark	<p>Cross-Sectional Study.</p> <p>Two groups identified. Clinical Group (CG) with newly diagnosed OCD in a specialised OCD clinic. Survey Group (SG) identified through the Danish OCD association, diagnosed years ago and primary treatment completed.</p> <p>Aged 7-21 years.</p> <p>Questionnaire sent to Clinical Group (CG) and Survey Group (SG) in April-May 2020. 65 out of 101 participants responded in the CG and 37 out of 600 responded in the SG.</p> <p>For participants in the CG data was collected from patient's files on OCD symptoms, co-occurring psychiatric disorders,</p>	<p>Self-report questionnaire developed for the study.</p> <p>5 questions used to measure the change in OCD severity based on CY-BOCS. Severity measured on a Likert scale</p> <p>Asked to report on worsening of anxiety and depressive symptoms and change in avoidance behaviour.</p>	<p>In the CG 29 (44.6%) reported a worsening of their symptoms. In the SG (27) 73% reported a worsening.</p> <p>In both groups there was a significant positive correlation between aggravation of anxiety and depressive symptoms and the experienced of worsening of OCD.</p> <p>N 10 (15.4%) in the CG experienced new OC symptoms describing thoughts of Covid-19 became an integral part of their OCD. This was also positively correlated to aggravation of OCD. Anxiety and depressive symptoms continued showing a significant positive correlation to worsening of OCD symptoms.</p> <p>There was a significant positive correlation between total OCD severity scores and the occurrence of OCD aggressive and sexual symptoms.</p> <p>In the CG those who experienced a worsening showed a significant inverse relation between OCD severity change and age, age of onset and a trend towards an inverse correlation with a FH of tic disorder. There was a positive correlation with a family history of ADHD and a trend towards a positive relation to OCD aggressive and sexual symptoms, insight at baseline, diagnosis of anxiety and family history of anxiety.</p> <p>The most severe worsening of all parameters was seen in the SG.</p>

		family history and child's tendency to speculate/worry.		
Schwartz-Lifshitz et al (2020)	Israel	<p>Longitudinal Study.</p> <p>29 subjects with a diagnosis of OCD attending a Child and Adolescent Outpatient Clinic. The study included all children and adolescents referred to the Child and Adolescent Outpatient Clinic in a large tertiary hospital in the centre of Israel between April 1st 2019 and March 31st 2020 who received a primary diagnosis of OCD. Those without psychotic disorders, ASD or ID were approached between April 15th 2020 and May 5th 2020 to participate in the study.</p> <p>Age 8-19 years.</p> <p>Participants were assessed based on their notes and clinical interviews. Two results of CGI-S used, one during the pandemic and the other, the most recent preceding result. A further self-</p>	<p>CGI-S</p> <p>CGI-I</p> <p>OCI-CV</p> <p>Subjective functioning was assessed by the question: 'Compared to your condition before the break of COVID-19, how would you assess your functioning?' Scoring ranged from 1 (very much improved) to 7 (very much worsened).</p>	<p>Based on the CGI-I, on the two proportions Z- test, the proportion of children and adolescents with OCD showed improvement during the COVID- 19 period was higher than the proportion that showed deterioration (Z= 2.23, p= 0.02).</p> <p>According to the subjective feeling of functioning scale, on the two proportions Z- test, a higher proportion of children with OCD reported improved functioning level than reported a deterioration in functioning (Z= 4.20, p<0.0001).</p> <p>The mean OCI-CV scores were at the low- medium end of the scale (mean=12.75, SD=7.66). On the General Functioning Scale, the majority of patients (n=16, 55%) reported improvement (mean= 4.83, SD=1.53).</p>

		report questionnaire was completed during the pandemic.		
Storch et al (2021)	USA	<p>Cross-sectional Study</p> <p>Survey emailed to 595 clinicians registered in the International OCD Foundation database from 2017-2019 and who regularly provide CBT to adults and children with OCD and anxiety.</p> <p>Each clinician was asked for information on 1-5 patients who had begun treatment for OCD prior to the pandemic and are still receiving care.</p> <p>Subset of clinicians also asked about changes to frequency of therapy during the pandemic.</p>	<p>Questionnaire consisted of 4 sections: clinician demographics, client demographics, client characteristics, and qualitative descriptions of client well-being.</p> <p>Questions were adapted from:</p> <p>National Institute of Mental Health Global Obsessive-Compulsive scale (NIMH-GOCS)</p> <p>Yale-Brown Obsessive-Compulsive Scale (Y-BOCS)</p>	<p>Of 595 clinicians 169 completed at least some information about at least one client.</p> <p>The mean number of child/adolescent patients with OCD whom clinicians were treating was 4.9 (7.7). Mean number of adult patients for each clinician was 11.5 (19.3).</p> <p>The average age was 28.5 years, range 4-77 years.</p> <p>On average Clinicians estimated that 38% of their patients had symptoms worsen due to COVID-19 pandemic, 47% had symptoms stay the same, and 10% had symptoms improve.</p> <p>14% described less frequent treatment, 62% described no change in treatment frequency, 12% described more frequent treatment, and 12% reinitiated treatment.</p> <p>Predictors of OCD trajectory during the pandemic included: medical risk from COVID-19 (worsened trajectory), financial strain/new unemployment (worsened trajectory), severity of doubt symptoms (improved trajectory), age (increasing age worsened trajectory) and family accommodation (worsened trajectory).</p> <p>Youth (Those under 18 years) appear to have fared better in ERP during the pandemic relative to adults, with continued improvements in symptoms reported among children and adolescents.</p>
Tanir et al (2020)	Turkey	<p>Longitudinal Study.</p> <p>61 subjects with a primary diagnosis of OCD.</p>	<p>CY-BOCS</p> <p>CGI-S</p>	<p>More than half of the subjects (54%) reported an increase in symptom severity according to both the CY-BOCS and CGI-S scales, with 36% having at least a 30% increase in total CY-BOCS scores during the pandemic period. Contamination obsessions and cleaning/washing compulsions were the most</p>

		Aged 16-18 years. Participants and their parents were interviewed via telephone or online programs from April 20 to April 30 2020.	Scores from the 6 months prior to the first confirmed case of COVID-19 in Turkey were considered the participants pre-pandemic conditions	frequent OCD symptoms both before and during the pandemic. There was a significant increase in the frequency of contamination obsessions and cleaning/washing compulsions during the pandemic. 34% reported no change in symptom severity. 11% reported a decrease in CY-BOCS.
Community Populations				
Darvishi et al (2020)	Iran	Cross-Sectional Study. 150 subjects (high school and pre-university students) randomly sampled. Aged 13-19 All subjects completed two self-reporting questionnaires.	MOCI CET	67.3% may have demonstrated OCD symptomatology. The prevalence of obsessive-compulsive disorder symptoms in women was slightly higher than in men (72.1% compared to 60.3%). The test results displayed that there was a significant difference between the rate of obsession in men and women ($p = .001$). Descriptive findings proved that the highest prevalence of obsessive-compulsive disorder symptom belonged to washing compulsion. All the groups under examination differed in terms of all the components of cognitive errors ($p = .001$). In all the components where there was a significant difference between the means, the mean score for the OCD group was higher than those of the group without symptoms of practical obsessive-compulsive disorder. Also, in OCD subjects, the highest average cognitive error belonged to 'Personalization' and the lowest to 'Sensory argument'.
Seçer et al (2020)	Turkey	Cross-sectional Study. Data was collected from a total of 598 high school students who	OCI-CV Emotional Reactivity Scale	Fear of COVID-19 positively predicts emotional reactivity ($\beta = .50, p < .01$), and emotional reactivity positively predicts experiential avoidance ($\beta = .59, p < .01$) and depression-anxiety ($\beta = .81, p < .01$).

	<p>could be reached using a convenience sampling method. Aimed to reach all 7 regions of Turkey. The students included in the sample were determined by school principals and school psychological counsellors, with the support from R+D Units within the 7 directorates.</p> <p>Between 14 and 18 years.</p> <p>Data collected by sending an online data collection link to the students' smartphones or via mail.</p>	<p>Depression and Anxiety Scale for Children</p> <p>The Fear of COVID-19 Scale</p> <p>Experiential Avoidance Questionnaire</p>	<p>Experiential avoidance has positive and significant predictive effects on OCD ($\beta = .12, p < .01$) and depression-anxiety on OCD ($\beta = .82, p < .01$), and in this model, the fear of COVID-19 is a stronger predictor of OCD compared with the findings obtained</p>
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Key:

CY-BOCS:

CGI-S: Clinical Global Impression -Symptom Severity Scale

CGI-I: Clinical Global Impression -Improvement Scale

OCI-CV: Obsessive Compulsive Inventory -child version

MOCI: Maudsley Obsessive Compulsive Inventory Questionnaire

CET: Cognitive Errors Questionnaire

Table 2: Study Quality based on Newcastle-Ottawa Scale for Cross-Sectional Studies (Herzog et al., 2013; Wells et al., n.d.)

Author	Selection					Comparability			Outcome			Total score across all measures
	Representativeness of the sample	Sample size	Non-respondents	Ascertainment of the exposure (risk factor)	Total	Study controls for the most important factor	Study controls for an additional factor	Total	Assessment of outcome	Statistical test	Total	
Tanir et al	Somewhat representative of the average in the target population (non-random sampling) 1	Not justified 0	The response rate is unsatisfactory, or the comparability between respondents and non-respondents is unsatisfactory. 0	No description of the measurement tool 0	1	The study controls for the most important factor 1	The study controls for an additional factor 1	2	No blind assessment 1	The statistical test used to analyse the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level (p value) 1	2	5

Nissen et al	Selected group of users 0	Not justified 0	No description of the response rate or the characteristics of the responders and the non-responders 0	No description of the measurement tool 0	0	The study controls for the most important factor 1	The study controls for an additional factor 1	2	Self-report questionnaires 1	The statistical test used to analyse the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level (p value) 1	2	4
Schwartz-Lifshitz et al	Selected group of users 0	Not justified 0	Comparability between respondents and non-respondents' characteristics is established, and the response rate is satisfactory. 1	No description of the measurement tool 0	1	The study controls for the most important factor 1	The study controls for an additional factor 1	2	Self-report 1	The statistical test used to analyse the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and	2	5

										the probability level (p value) 1		
Storch et al	Selected response from clinicians about patients unclear how the patients reported on were selected 0	Not justified 0	No description of the response rate or the characteristics of the responders and the non-responders 0	No description of the measurement tool 0	0	The study controls for the most important factor	The study controls for an additional factor	2	Or self-report 1	The statistical test used to analyse the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level (p value) 1	2	4
Darvishi et al	Truly representative of the average in the target population. (all subjects or random sampling) 1	Justified and satisfactory 1	The response rate is unsatisfactory, or the comparability between respondents and non-respondents is	No description of the measurement tool 0	2	0	0	0	Self-report	The statistical test used to analyse the data is clearly described and appropriate, and the measurement of the association	2	4

			unsatisfactory. 0							is presented, including confidence intervals and the probability level (p value)		
Seçer et al	Somewhat representative of the average in the target population. (non-random sampling) 1	Justified and satisfactory 1	No description of the response rate or the characteristics of the responders and the non-responders. 0	No description of the measurement tool	2	0	0	0	Self-report 1	The statistical test used to analyse the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level (p value) 1	2	4