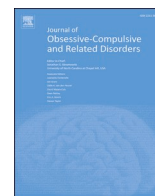




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Obsessive compulsive symptoms severity among children and adolescents during COVID-19 first wave in Israel

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ABSTRACT

Several current publications have considered persons with obsessive compulsive disorder (OCD) as particularly vulnerable during the COVID-19 period, and to require more frequent symptom monitoring. The purpose of this study was to evaluate whether OCD exacerbated during the first wave of COVID-19 in children and adolescents. Twenty-nine children and adolescents with OCD were evaluated in the midst of the first outbreak of the COVID-19 pandemic in Israel (April–May 2020). Obsessive-compulsive symptoms (OCS) were assessed using the Clinical Global Impression Scale (CGI), by means of a functional questionnaire and by the Obsessive-Compulsive Inventory-child version (OCI-CV) questionnaires. Obsessive-compulsive symptoms were not found to have exacerbated during the period investigated, as evident by a lack of change in CGI severity scores and by improvement rather than deterioration among more participants, based on the CGI improvement scores. Additionally, the children and adolescents reported better general functioning during the COVID-19 period and had relatively low scores on the OCI-CV scale. Our findings indicate that Israeli children and adolescents with OCD coped well with COVID-19 during the first two months of the pandemic and mostly did not experience exacerbation of OCS. However, due to the short duration of exposure to the pandemic at the time of the study, social isolation and lockdown might have masked OCS; thus, further longitudinal studies are needed.

1. Introduction

The outbreak of the new coronavirus, discovered in 2019 (COVID-19), was characterized as a pandemic by the World Health Organization in March 2020 (Silva et al., 2020). Obsessive-compulsive symptoms (OCS) during COVID-19 may exacerbate due to increased fear of contamination, and nonspecific factors that increase stress. These include the stress imposed from measures taken to defend the public-imposed social isolation, and the cessation of school and recreational activities. Moreover, people with OCD tend to attribute personal meaning to viruses and germs (Aardema, 2020). This could enhance the development and exacerbation of cleaning/washing compulsions and fear of contamination obsessions, as the virus could be perceived as a threat to an individual's identity. These characteristics could conceivably lead to prolonged distress and anxiety during the current COVID-19

outbreak, especially since the strategies against being infected involve rituals such as increased hand washing. People of all ages with OCD demonstrate impaired goal-directed control and cognitive inflexibility (Apergis-Schoute et al., 2017; Gottwald et al., 2018). Additionally, individuals with OCD often demonstrate inflated responsibility (Salkovskis et al., 1999) and harbor a fear of inner corruption (Aardema, 2020).

In reviewing the literature, we found several studies that examined OCD during the COVID-19 period. In investigations of the first wave of the COVID-19 pandemic, various levels of symptom exacerbation were reported among adults with OCD: 6% (Sharma et al., 2020), 13% (Prestia et al., 2020), and 36% (Benatti et al., 2020). Among children and adolescents diagnosed with OCD in a large tertiary hospital in Turkey, 54% reported an exacerbation in OCS, mainly cleaning/washing compulsion and contamination obsessions (Tanir et al., 2020). In all

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these studies, the most prevalent compulsion was cleaning/washing. The most prevalent obsession was the fear of contamination. An exception is a cohort of individuals with OCD (Benatti et al., 2020) for which aggressive (harm/violence) obsessions were the most prevalent.

In the current study, we aimed to evaluate whether children and adolescents with OCD experienced exacerbation in symptoms during the COVID-19 pandemic. Based on the ideas presented above and on the previous study conducted with children (Tanir et al., 2020), our hypothesis was that children diagnosed with OCD would present worsening of symptoms during the COVID-19 pandemic.

2. Methods

2.1. Participants

We considered for inclusion in this study all the children and adolescents referred to the Child & Adolescent Outpatient Clinic in a large tertiary hospital in the center of Israel during the last year (April 1st, 2019 to March 31, 2020) who received the diagnosis of OCD at referral. Those without psychotic disorders, autism spectrum disorder or intellectual disabilities were approached between April 15, 2020 and May 5, 2020 to participate in the study.

2.2. Assessment

Diagnoses of OCD and comorbid disorders were established following a thorough clinical assessment conducted by a senior child and adolescent psychiatrist (MSL, DG). Evaluations were based on the Diagnostic and Statistical Manual version 5 (American Psychiatric Association, 2013). Improvement in OCS was assessed by using the Clinical Global Impression- symptom severity (CGI-S) and improvement (CGI-I) scales (Busner & Targum, 2007), independently by two senior child psychiatrists (MSL and DG). In case of disagreement between reviewers, discussions were held and consensus on the scoring was reached. The assessments were based on the well documented summaries from the participants' medical files and from clinical interviews. For each participant, two results of the CGI-S, based on interviews with patients, were compared: one from during the COVID-19 pandemic, and the other was the most recent preceding result. The 7-point CGI-I scale assesses improvement in symptoms relative to baseline, with 1 representing very much improved, 2 much improvement, 3 minimal improvement, 4 no change; and 5–7 representing respectively: minimally, much and very much worsened symptoms.

OCS severity was assessed during the COVID-19 pandemic by using the Obsessive-Compulsive Inventory-child version (OCI-CV). The OCI-CV is a validated self-report questionnaire (Foa et al., 2010) that consists of 21 items scored on a 3-point Likert scale (0 = Never, 1 = Sometimes, and 2 = Always), and provides seven scores: Doubting/Checking, Obsessing, Hoarding, Washing, Ordering, Neutralizing, and a total score. Scores ranging from 0 to 14 indicated no or mild obsession, 15 to 28 moderate obsession, and 29 to 42 severe obsession (Fardin et al., 2018).

To assess patients' subjective feeling of functioning, we modified the items used in Sasson et al. (Sasson et al., 1999). The question was defined- "Compared to your condition before the break of COVID-19, how would you assess your level of functioning?" Scoring ranged between 1 (very much improved) to 7 (very much worsened).

The family's socioeconomic status (SES) was classified by the Israel Index of Deprivation, as published by the Central Bureau of Statistics in Israel. Based on household census data reflecting eight aspects of material and social deprivation, this index classifies municipalities in Israel into 20 clusters (scored 1–20, with 1 being the lowest). (Characterization and Classification of Geographical Units by the Socio-Economic Level of the Population, 2013; Gruber et al., 2015)

2.3. Procedure

The follow-up part of this study was conducted during a period when the number of confirmed COVID-19 cases in Israel increased from 11,868 to 16,567 and the number of deaths attributed to COVID-19 from 117 to 264 (WHO Coronavirus Disease. (COVID-19) dashboard, 2020). Due to quarantine policy applied in Israel at that time, interviews were conducted via phone calls. Participants under age nine years were assisted by their parents in completing the questionnaires. Sociodemographic details and data regarding the patients' psychiatric diagnoses and medication regimen were collected from the patients' electronic chart. The study protocol was approved by the local Institutional Review Board (IRB#7375-20-SMC) and was performed in accordance with the Declaration of Helsinki. Informed consent was waived due to the retrospective study design.

2.4. Statistical analysis

The CGI-S scores before and during the COVID-19 pandemic were compared using repeated-measures ANOVA, with a within-subjects factor of time and between-subjects factor of age, sex, and presence of psychiatric comorbidity. The CGI-I scores were classified as 'improved' (scores between 1 and 4), and 'deteriorated' (scores between 5 and 7). The proportion of participants who improved vs. those who deteriorated, based on the CGI-I scores, was calculated using the Z score test for two population proportions. The proportion of participants who presented with a subjective feeling of improvement in functioning vs. patients who presented with a subjective feeling of decline in functioning, according to the single question delineated above, was calculated using the Z score test for the two population proportions. Demographic characteristics of the study group and non-participants were calculated by independent t-test and chi-square.

3. Results

From a total of 50 children and adolescents with OCD followed in our clinic during the year prior to the COVID-19 outbreak, three were excluded because of a comorbid diagnosis of autism spectrum disorder ($n = 2$) and a not otherwise specified psychotic disorder ($n = 1$). Three of those who were eligible to participate chose not to participate and 15 did not respond to our calls. Thus, a total of 29 children and adolescents participated in the study.

All the participants were of Jewish descent. Among the children and adolescents treated at our center, no differences in SES, age, or sex were observed between those who did and did not participate in our study. Nor were any significant differences observed between those who were currently being treated with SSRI and those who were not, in regard to SES, age, sex, and OCS, as measured by the OCI-CV and the CGI-S.

Demographic and clinical characteristics of the study population are presented in Table 1. Repeated-measures ANOVA showed no significant time effect on CGI-S scores ($F(df = 1,25) = 1.32, P = 0.26$). There was also no significant effect of age ($F(df = 1,25) = 0.58, P = 0.45$), sex ($F(df = 1,25) = 2.00, P = 0.17$), and the presence of any anxiety disorder ($F(df = 1,25) = 0.88, P = 0.36$) on CGI-S. 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 ($Z = 2.23, p = 0.02$). 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 ($Z = 4.20, p < 0.0001$). 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) (see Table 2) (Table 3).

All the study participants were receiving treatment (psychiatric and/or psychotherapeutic) at follow up. Ten (35%) of them did not qualify

Table 1
Demographic and clinical characteristics of the study sample.

Age y, mean (SD), range	14.2 (3.0), 8.2–18.9
Males/females, n (%)	19/10, (65%/35%)
Anxiety, n (%)	12 (41%)
OCI-CV score, mean (SD), range	
Total	12.75 (7.66), 2-31
Doubting/Checking	3.48 0–10,(2.92)
Obsessing	3.65 0–8,(2.12)
Washing	1.82 (2.07), 0-6
Hoarding	1.03 0,(1.61)-6
Ordering	2.24 0–6,(1.88)
Neutralizing	0.79,(0.98)0-6
Psychiatric medications,n (%)	SSRIs 19 (65%)
Stimulants	4 (14)
Antipsychotics	5 (17%)
Psychotherapy n (%)	12 (42%)
Symptom improvement in response to pharmacotherapy	18 (62%)

Note. Abbreviations: SSRI=Serotonin Specific Reuptake Inhibitor, Stimulants = Methylphenidate/Mixed Amphetamine Salts/Lisdexamfetamine/Selective Norepinephrine Reuptake Inhibitor, Antipsychotics = Risperdal, Aripiprazole, Zyprexa
OCI-CV= Obsessive-Compulsive Inventory-child version.

Table 2
Evaluations of changes in symptoms.

	Statistics	
CGI-I, mean (SD), range	3.4 (4.10), 1-7	Z = 2.23, p = 0.02
Distribution, n (%)		
CGI-I>4 (worsened)	6 (21%)	
CGI-I<4 (improved)	13 (45%)	
CGI-I = 4 (no change)	10 (34%)	
CGI-S pre COVID-19, mean (SD), Range	3.6 (14.2) 1–7	F _(1,25) = 1.32, p = 0.26
CGI-S during COVID-19, mean (SD), Range	3.21 (1.42) 1–7	
General functioning score, mean (SD), range	4.83 (1.53) 2.0–7.0	Z = 4.20, p < 0.0001
distribution		
score<4 (function deteriorated)	6 (21%)	
score>4 (function improved)	16 (55%)	
score = 4 (no change)	7 (24%)	

Note. Abbreviations: CGI-I= Clinical Global Impression –improvement, CGI-S= Clinical Global Impression –symptom.

Table 3
Comparison of demographic characteristics between participants and non-participants.

	Participants	Non-participants	p value
Age y, mean (SD), range	14.18 (2.97) 8.2–18.9	14.94 (3.48) 9.0–19.5	NS
Males/females, n (%)	19/10 (65%/35%)	/85 (62%/38%)	NS
SES, n (%)			NS
1-5	4.25 (1.5)	2 (0.5)	
6-10	7.64 (0.9)	7.82 (0.6)	

SES, socioeconomic status; NS, non-significant.

for an OCD diagnosis (CGI ≤ 2) at follow up. The majority of participants (n = 19, 65%) were treated with an SSRI at follow-up and 18 (62%) were regarded as responders based on the data from the electronic medical records. Twelve participants (42%) received psychotherapeutic intervention during the study period.

4. Discussion

In the present study, we compared severity of OCS in children and adolescents with a diagnosis of OCD before and during the first two months of the outbreak of COVID-19 in Israel. Contrary to our hypothesis, we did not find exacerbation in OCS during the COVID-19 pandemic. There was no significant difference in disease severity, as measured by CGI-S scores, in the year preceding the pandemic compared with the period of the pandemic. OCS severity during the pandemic, as measured by the OCI-CV total score, was also on the low end of the scale. Based on the CGI-I and functioning scales, we found that more participants reported improvement rather than deterioration in symptoms and functioning during the COVID-19.

Our findings contrast with a study from Turkey (Tanir et al., 2020) that assessed OCS among children and adolescents diagnosed with OCD, by using the Children’s Yale-Brown Obsessive Compulsive Scale (CY-BOCS) questionnaire. They found a significant increase in the frequency of contamination obsessions and cleaning/washing compulsions during the pandemic period. The difference in results obtained by Tanir et al. and our own results may be explained in part by the different types of assessment instruments used. The OCI-CV is a self-report questionnaire that measures OCS quantitatively. In contrast, the CY-BOCS is a semi-structured interviewer rated questionnaire, and thus, participants’ responses are more open to rater interpretations than in the OCI-CV. Among Tanir et al.’s patients, the strongest contributors to the CGI-S worsening were contamination obsessions and cleaning/washing compulsions, while other OCS were not significantly exacerbated. These items in the CY-BOCS questionnaire bear resemblance to public health guidelines during COVID-19 (frequent hand washing and surface cleaning). Thus, we suggest that distinguishing between OCD-related cleaning compulsions and obsessions may be difficult, due to public health instructions regarding avoidance of contamination with COVID-19 (Jassi et al., 2020). The latter could yield over-representation of these symptoms among persons with OCD, as part of a general increase in practicing health protective cleaning habits in the general population, and not necessarily as OCS behavior. Another difference between the studies is that 42% of our participants received online psychotherapeutic treatment during the pandemic, in contrast to 12% in Tanir et al.’s study, due to treatment discontinuation under COVID-19. The tele-psychotherapeutic sessions we conducted with our patients during the challenging period of the COVID-19 pandemic and lockdown might have helped them to remain relatively stable. Notably, since our study was conducted during complete lockdown and social distancing in Israel, the high degree of avoidance and need for accommodations observed in individuals with OCD was left unnoticed.

Several studies were conducted among adults with OCD during the COVID-19 period (Banerjee, 2020; Benatti et al., 2020; Prestia et al., 2020; French & Lyne, 2020; Kumar & Somani, 2020; Sharma et al., 2020; Sheu et al., 2020). Sharma et al. (Sharma et al., 2020) assessed adults with OCD two months after the COVID-19 outbreak in India, by using the Y-BOCS. A small proportion of their participants (6%) reported exacerbation in obsessive-compulsive symptoms. The relatively minor proportion of patients with OCS exacerbation was attributed to the protective effect of SSRIs, which were highly used. Among adults with OCD in northern Italy, 36% of patients presented with clinical worsening of OCS during the COVID-19 outbreak (Benatti et al., 2020). However, that study did not use validated assessment instruments and did not present baseline status of the study population. This precluded distinguishing between the normal course of OCS and exacerbation of symptoms attributed to COVID-19. Among 30 adults with OCD who were examined six weeks after complete lockdown was declared in Italy, OCS were exacerbated among 13%, particularly among those with contamination symptoms (Prestia et al., 2020). Two case reports that examined OCS dynamics during the COVID-19 period, among adults with OCD that was stabilized prior to the COVID-19 outbreak, found exacerbation in cleaning compulsions (French & Lyne, 2020; Kumar &

Somani, 2020). A case report by Sheu et al. (Sheu et al., 2020) found that exposure and response prevention (ERP) therapy for a patient with contamination obsessions effective in reducing OCS and recommends continuation of ERP treatment during the current pandemic.

In attempting to explain the resilience demonstrated by our patients with OCD during the COVID-19 pandemic, a number of factors should be considered. For one, individuals with OCD are often scrutinized and isolated because of their rigid, repetitive manners (Storch et al., 2006). During the COVID-19 period, social distancing, strict compliance with hygiene rules and repetitive cleaning are the need of the hour. Therefore, individuals with OCD who routinely practice compulsive rituals might feel more similar to the public in their ritualistic practice at the time of the pandemic. This sense of belongingness to a desired group – healthy, non-OCD population, has been described as a powerful and fundamental factor that amplifies resilience and strengthens mental resources (Baumeister & Leary, 1995). This resilience might have protected the children with OCD against clinical exacerbation. However, it is possible that improvement in OCS among children and adolescents during the lockdown is related to reduced expectations and lower engagement with triggers such as school and social interaction, and that once these expectations return to normal, symptoms will worsen again. As a result, the changes observed may reflect temporary adjustments, rather than sustainable changes in the actual severity of the disorder.

Children and adolescents with OCD cope with subjective burdens such as sadness and fear of contamination, but unlike their adult counterparts, are not troubled by objective burdens such as job loss, economic problems and a diminished sense of purpose (Montgomery et al., 1985). In addition, decreased functional, behavioral and social demands, consequent to school closure, might have lowered stress levels and contributed to the favorable course of OCD during the COVID-19 pandemic, found in our study.

4.1. Limitations and strengths

Our study has several limitations. First, the sample size was modest and a larger sample may have provided more power for detecting a smaller effect. While the OCI-CV demonstrated good internal consistency and good to adequate short-term test-retest reliability, its convergent validity with the CY-BOCS is fair to poor, and its diagnostic accuracy has not been examined (Rapp et al., 2016). In addition, we did not have the pre-pandemic status of OCS, as measured by the OCI-CV. OCS were reported by the participants, and as such, subjected to the limitations of self-report measures. However, overall, the OCI-CV scores reported by the participants were relatively low, as were the cleaning/fear of contamination subscale scores. In addition, improvement was observed on the CGI and functioning scale. Thus, we believe that the finding in our study of no exacerbation of OCD symptoms during the COVID-19 pandemic is reliable.

Lastly, our study was conducted during complete lockdown and social distancing in Israel. During this period, schools were closed and recreational activities unavailable; this decreased expectations for social and academic demands. Therefore, it is possible that the high degree of avoidance and need for accommodations usually observed in persons with OCD were more subtle, and thus harder to detect. The longevity of OCS improvement during the COVID-19 crisis is unknown. Further longitudinal studies are needed.

To conclude, our study found that OCS did not exacerbate during the first phase of COVID-19 in Israel, among children and adolescents diagnosed with OCD. To our knowledge, only one other study assessed the course of OCD in children during the COVID-19 pandemic, from a different country, and with contrary results. Therefore, further studies on this age group with OCD, from additional regions, are needed. As studies from past epidemics have demonstrated that the increase in OCS is often not immediate, and might take six to twelve months after cessation of the outbreak to fully manifest (Banerjee, 2020), a follow-up study after the initial phase of the pandemic is also needed. Additionally,

economic difficulties are increasing in the population during this pandemic period, and these are considered a pre-disposing factor to depression among the adult population (Richardson et al., 2017). This highlights the importance of investigating in the pediatric population, the long-term effects on OCS of the measures to avoid contracting the virus, in the context of changing financial status.

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CRedit authorship contribution statement

Maya Schwartz-Lifshitz: Data curation, Formal analysis, Methodology, Writing - original draft, Writing - review & editing. **Dana Basel:** Data curation, Formal analysis, Methodology. **Claudia Lang:** All authors contributed to and have approved the final manuscript. **Nimrod Hertz-Palmor:** All authors contributed to and have approved the final manuscript. **Idit Dekel:** All authors contributed to and have approved the final manuscript. **Joseph Zohar:** All authors contributed to and have approved the final manuscript. **Doron Gothelf:** Methodology, Writing - review & editing.

Declaration of competing interest

The authors have no conflicts of interest to declare.

References

- Aardema, F. (2020). COVID-19, obsessive-compulsive disorder and invisible life forms that threaten the self. *Journal of Obsessive-Compulsive and Related Disorders*, 26, 100558. <https://doi.org/10.1016/j.jocrd.2020.100558>
- Apergis-Schoute, A. M., Gillan, C. M., Fineberg, N. A., Fernandez-Egea, E., Sahakian, B. J., & Robbins, T. W. (2017). Neural basis of impaired safety signaling in Obsessive Compulsive Disorder. *Proceedings of the National Academy of Sciences*, 114 (12). <https://doi.org/10.1073/pnas.1609194114>
- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*. American Psychiatric Pub.
- Banerjee, D. D. (2020). The other side of COVID-19: Impact on obsessive compulsive disorder (OCD) and hoarding. *Psychiatry Research*, 288, 112966. <https://doi.org/10.1016/j.psychres.2020.112966>
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3), 497. <https://doi.org/10.1037/0033-2909.117.3.497>
- Benatti, B., Albert, U., Maina, G., Fiorillo, A., Celebre, L., Gironi, N., Fineberg, N., Bramante, S., Rigardetto, S., & Dell, t B. (2020). What happened to patients with obsessive compulsive disorder during the COVID-19 pandemic? A multicentre report from tertiary clinics in northern Italy. *Frontiers in Psychiatry*, 11. <https://doi.org/10.3389/fpsyt.2020.00720>
- Busner, J., & Targum, S. D. (2007). The clinical global impressions scale. *Psychiatry (Edgmont)*, 4(7), 28. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2880930/>.
- Characterization and Classification of Geographical Units by the Socio-Economic Level of the Population*. (2013) Accessed 01 June 2020.
- Fardin, M. A., Shirazi, M., & Arab, A. (2018). *Symptoms of obsessive - compulsive disorder among primary school children in Zahedan, Iran*. *Annals of Military and Health Sciences Research*. Kowsar.
- Foa, E. B., Coles, M., Huppert, J. D., Pasupuleti, R. V., Franklin, M. E., & March, J. (2010). Development and validation of a child version of the obsessive compulsive inventory. *Behavior Therapy*, 41(1), 121. <https://doi.org/10.1016/j.beth.2009.02.001>
- French, I., & Lyne, J. (2020). Acute exacerbation of OCD symptoms precipitated by media reports of COVID-19. *Irish Journal of Psychological Medicine*. <https://doi.org/10.1017/ipm.2020.61>
- Gottwald, J., de Wit, S., Apergis-Schoute, A. M., Morein-Zamir, S., Kaser, M., Cormack, F., ... Sahakian, B. J. (2018). Impaired cognitive plasticity and goal-directed control in adolescent obsessive-compulsive disorder. *Psychological Medicine*.
- Gruber, N., Reichman, B., Lerner-geva, L., & Pinhas-hamiel, O. (2015). Increased risk of severe diabetic ketoacidosis among Jewish ultra-orthodox children. *Acta Diabetologica; Heidelberg*, 52(2). <https://doi.org/10.1007/s00592-014-0653-4>, 365berga.
- Jassi, A., Shahriyarmolki, K., Taylor, T., Peile, L., Challacombe, F., Clark, B., et al. (2020). OCD and COVID-19: A new frontier. *The Cognitive Behaviour Therapist*, 13, e27. <https://doi.org/10.1017/S1754470X20000318>

- Kumar, A., & Somani, A. (2020). Dealing with Corona virus anxiety and OCD. *Asian Journal of Psychiatry*, 51, 102053. <https://doi.org/10.1016/j.ajp.2020.102053>
- Montgomery, R. J. V., Gonyea, J. G., & Hooyman, N. R. (1985). Caregiving and the experience of subjective and objective burden. *Family Relations*, 34(1). <https://doi.org/10.2307/583753>, 19RelatJSTOR.
- Prestia, D., Pozza, A., Olcese, M., Escelsior, A., Dettore, D., Amore, M., et al. (2020). The impact of the COVID-19 pandemic on patients with OCD: Effects of contamination symptoms and remission state before the quarantine in a preliminary naturalistic study. *Psychiatry research*.
- Rapp, A. M., Bergman, R. L., Piacentini, J., McGuire, J. F., et al. (2016). Evidence-Based Assessment of Obsessive-Compulsive Disorder. *Journal of Central Nervous System Disease*.
- Richardson, T., Elliott, P., Roberts, R., & Jansen, M. (2017). A longitudinal study of financial difficulties and mental health in a national sample of British undergraduate students. *Community Mental Health Journal*, 53(3). <https://doi.org/10.1007/s10597-016-0052-0>, 344y Mental Health.
- Salkovskis, P., Shafran, R., Rachman, S., & Freeston, M. H. (1999). Multiple pathways to inflated responsibility beliefs in obsessional problems: Possible origins and implications for therapy and research. *Behaviour Research and Therapy*, 37(11). [https://doi.org/10.1016/S0005-7967\(99\)00063-7](https://doi.org/10.1016/S0005-7967(99)00063-7), 1055and.
- Sasson, Y., Zohar, J., Gross, R., Taub, M., & Fux, M. (1999). Response to missile attacks on civilian targets in patients with panic disorder. *The Journal of Clinical Psychiatry*, 60(6). <https://doi.org/10.4088/jcp.v60n0607>, 385nal of Clinica.
- Sharma, L. P., Balachander, S., Thamby, A., Bhattacharya, M., Kishore, C., Shanbhag, V., et al. (2020). Impact of the COVID-19 pandemic on the short-term course of obsessive-compulsive disorder. MedRxiv. <https://doi.org/10.1101/2020.07.26.20162495>, 2020.07.26.20162495.
- Sheu, J. C., McKay, D., & Storch, E. A. (2020). COVID-19 and OCD: Potential impact of exposure and response prevention therapy. *Journal of Anxiety Disorders*, 76, 102314. <https://doi.org/10.1016/j.janxdis.2020.102314>
- Silva, R. M., Shavitt, R. G., & Costa, D. L. (2020). Obsessive-compulsive disorder during the COVID-19 pandemic. Sao Paulo, Brazil: Revista Brasileira De Psiquiatria. <https://doi.org/10.1590/1516-4446-2020-1189>, 1999.
- Storch, E. A., Ledley, D. R., Lewin, A. B., Murphy, T. K., Johns, N. B., Goodman, W. K., et al. (2006). Peer Victimization in Children with Obsessivesessiveith Obsessivention therapy. rapy. e prevention therapy. py. *Journal of Clinical Child & Adolescent Psychology*, 35(3). https://doi.org/10.1207/s15374424jccp3503_10, 446of Clinical Ch.
- Tanir, Y., Karayagmurlu, A., Kaya, A., Kaynar, T. B., G, T. T. B., Dambasan, B. N., et al. (2020). Exacerbation of obsessive compulsive disorder symptoms in children and adolescents during COVID-19 pandemic. *Psychiatry Research*, 293, 113363. <https://doi.org/10.1016/j.psychres.2020.113363>
- WHO Coronavirus Disease. (COVID-19) dashboard. (2020) <https://covid19.who.int/table>. (Accessed 27 May 2020).