Check for updates

Parental surveillance of OCD and mental health symptoms during COVID-19: A longitudinal study of Australian children, adolescents and families

Rianca Kroon [a], Nicole Bothma [a], Sharna Mathieu [b], Leonardo F. Fontenelle [c,d,e], Lara J. Farrell [a,*]

[a] School of Applied Psychology, Griffith University, Gold Coast Campus, Southport, Qld, 4222, Australia
[b] Australian Institute for Suicide Research and Prevention & WHO Collaborating Centre for Research and Training in Suicide Prevention, School of Applied Psychology, Griffith University, Mt Gravatt Campus, Mt Gravatt, Qld, 4222, Australia
[c] Obsessive, Compulsive, and Anxiety Spectrum Research Program, Institute of Psychiatry of the Federal University of Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil
[d] D'Or Institute for Research and Education (IDOR), Rio de Janeiro, RJ, 21941-901, Brazil
[e] Department of Psychiatry, School of Clinical Sciences, Monash University, Wellington Rd, Clayton, Victoria, 3800, Australia

ARTICLE INFO

ABSTRACT

To ensure the needs of children and families are met for the remainder of the COVID-19 situation and beyond there is a demand for a specific response strategy. This longitudinal study will investigate the impact of COVID-19 on Australian parental and childhood mental health symptoms, particularly OCD symptoms, examining the stability of this relationship over time and the needs and preferences for mental health support in response to child symptoms. A total of 141 parents completed a questionnaire during the lockdown period in Australia (June–September 2020). Thirty-five of them completed a follow-up questionnaire during the post-lockdown period (November 2020–January 2021). The questionnaire assessed COVID-19 experiences/worries/knowledge, child OCD, and child/parental anxiety and depression. Sub-samples of youth were determined based on parent-report of an existing diagnosis of any mental health (n = 24), of OCD (n = 22), or no mental health diagnosis (i.e., healthy, n = 81). Results: Parents reported a significant positive association between increased parental worries regarding COVID-19, and their own as well as their child's mental health symptoms. The current sample of children experienced elevated symptom severity for OCD symptoms during COVID-19. The OCD group reported significant reductions in child OCD symptoms at post-lockdown. The any mental health diagnosed children are at greater risk of developing OCD symptoms and reported strong preferences for increased support as a result. The exploratory nature of this study adds further insight into the impact of the COVID-19 pandemic on child OCD and parent mental health symptoms and the stability of symptoms over time.

Since late 2019, an outbreak of a novel coronavirus disease (COVID-19) has spread from Wuhan, China affecting every continent, with the World Health Organization (WHO) designating pandemic status in early 2020 (Huang et al., 2020; WHO, 2020). Global pandemic disasters are unique and typically prolonged support and recovery is not immediately available. Children, adolescents, and families are a vulnerable group and experience difficult transitions and sudden changes in the face of global events (Guessoum et al., 2020). Therefore, there is a demand for a specific response strategy to ensure the needs of children and families are met for the remainder of the COVID-19 situation and any future pandemic events. Despite this, there is limited research relating to

childhood mental health (MH) in the context of global pandemics.

In times of pandemic and natural disasters, there is an associated increased risk of Post-Traumatic Stress Disorder (PTSD) and depression for children (Kar, 2019; Kar and Bastia, 2006), and lockdown isolation has been linked to increased PTSD symptoms, confusion and anger (Brooks et al., 2020). Regarding COVID-19 specifically, various studies have found that parents, compared to adults without children, reported experiencing increased distress, anxiety, depression and burnout during the pandemic (Waite et al., 2020; Newlove-Delgado et al., 2021). Further, COVID-19 related factors such as lockdown duration, fears or worries of infection, inadequate information, stigma or financial loss

---

related to psychopathology in adults (Bueno-Notivol et al., 2021). This is particularly important as children with a parent in psychological distress during the pandemic have been found to be more likely to also have MH problems (Newlove-Delgado et al., 2021).

For young people themselves, a United Kingdom survey reported that 83% of individuals aged thirteen to twenty-five with a MH history agreed that the COVID-19 pandemic has worsened their MH and 26% said that they were no longer able to access support (Youngminds, 2020). An online study in Australia exploring the impacts of the COVID-19 pandemic on young children (aged one to five years old) and their families found frequent exposure to COVID-19 information; parental worries about COVID-19; parental MH difficulties; child worries about the threat of COVID-19; avoidant or over-protective parenting and parent-child difficulties were risk factors for child MH difficulties (DeYoung et al., 2020). In contrast, routine, warm and responsive caregiving, regularly doing things outside of the home and less confusion about COVID-19 were protective factors for child emotional wellbeing (DeYoung et al., 2020).

Australian adolescents reported increases in depressive symptoms and anxiety and a decrease in life satisfaction during COVID-19 relative to the 12-months prior, with COVID-19 related worries, learning changes and conflict with parents predicting the increase in problems (Magson et al., 2021). Unfortunately, children's social media usage and exposure to COVID-19 related media online increased throughout the early stages of the pandemic and has also been associated with increased levels of depression, anxiety, and psychological distress (Guessoum et al., 2020). Given the rapidly and continually evolving health situation, these emerging studies have identified factors that may exacerbate general MH difficulties in youth and families, however, little evidence exists on the impact of these factors on obsessive compulsive disorder (OCD) symptoms specifically.

OCD is a distressing disorder characterised by unwanted thoughts, images or urges and repetitive behaviours which occur in response to an experienced anxiety (American Psychiatric Association [APA], 2013). Davide et al. (2020) found that during the COVID-19 pandemic, there was a significant increase in the severity of symptoms in adults with OCD. It has been found that children with OCD experienced an exacerbation of contamination related symptoms during the COVID-19 pandemic (Tanir, 2020) and that children with long-term diagnoses of OCD experienced a worsening of symptoms compared to children with recent diagnoses (Nissen et al., 2020). A study investigating the impact of COVID-19 fears on OCD symptoms in adolescents with pre-existing mental disorders found that 90.4% of participants had significant worries and over half of these participants reported indicators of OCD symptoms (Khan et al., 2021). Research is emerging regarding the effects of the COVID-19 pandemic on MH, however, a systematic review conducted in December 2020 found only 19 papers were sufficiently rigorous to measure changes in MH due to COVID-19 and none included child populations (Newlove-Delgado et al., 2021). A recently published systematic review with studies from Denmark, Israel, United States, Turkey found that COVID-19 appears to be associated with worsening of OCD symptoms in children and adolescents (Cunning and Hodes, 2022). Although this is important initial findings, the stability of the impact of COVID-19 on MH over time, during and post-lockdown, have not been studied in young populations. Several large-scale studies have been conducted (Bueno-Notivol et al., 2021; DeYoung et al., 2020; Newlove-Delgado et al., 2021; Waite et al., 2020; Youngminds, 2020), which focussed on the general MH impacts of the COVID-19 pandemic on children. Although valuable findings have been reported in these studies, limited research has explored the paediatric experience of OCD symptoms in the context of the pandemic, particularly from a longitudinal perspective. Given the increase of MH symptoms from the COVID-19 pandemic in children, and studies such as Khan et al. (2021) demonstrating a link between pre-existing general mental health increasing OCD symptoms, not only will the current study focus on OCD diagnosed individuals, but also explore the possible increase of

symptoms across other MH diagnosed groups and healthy groups.

The current longitudinal study will explore parent reported OCD symptomatology, anxiety and depressive symptoms during the initial COVID-19 lockdown and post lockdown. There will be a particular focus on how COVID-19 factors and prior MH difficulties impact on Australian children and families' MH symptoms, specifically OCD, and the stability of this relationship over time, according to parental perspectives. This study will aim to investigate these impacts on children at various levels of risk for mental health, and therefore there will be a comparison of healthy, OCD diagnosed, and any MH diagnosed children. It is expected that the current sample of parents will report higher than previous community rates of clinical anxiety, depression and OCD symptoms during COVID-19 lockdown in Australia (June–September 2020), which will be associated with COVID-19 risk/impact factors, such as loss of employment or COVID-19 diagnosis. More specifically, this study aimed to determine whether child MH difficulties, as well as parental symptoms were significantly higher among families where the child has a pre-existing diagnosis of any MH disorder, or OCD specifically, relative to healthy children and whether they remained stable/increased at time 2, 3 months following baseline survey (post-lockdown). In contrast, MH symptoms of children in the healthy group were expected to remain steady at the second (post-lockdown) time point. This study also sought to determine the service needs of young people during the lockdown period. It was hypothesised that there would be a greater need for services as reported by parents among clinical sub-groups relative to healthy children. Preferences for service delivery were examined.

1. Method

1.1. Participants

A total of 141 parents of children ranging in age from 4 to 17 years ($M = 9.21$, $SD = 4.23$) were recruited from an Australian university undergraduate sample and through social media community pages for the first data collection timepoint (during lockdown June–September 2021). Recruitment campaigns advertised that the study was investigating OCD symptoms in the face of COVID-19 and that participants did not need to have any diagnosis to be eligible to participate. Participants had to be parents of children aged four to seventeen years old and living anywhere in Australia and were requested to complete the survey based on one of their children. Parents in the undergraduate sample received partial course credit for participating and community participants were given the opportunity to enter a draw to win a gift voucher as reimbursement. 106 participants did not provide data for the second time point (post lockdown November 2020–January 2021; attrition rate of 75%), therefore resulting in a sample of 35 parents, children ranging in age from 4 to 17 years (M = 10.20 SD = 3.89) for the post lockdown analysis.

1.2. Materials

Consenting participants completed a battery of questionnaires, commencing with items requesting age, gender, ethnicity, income, relationship with child, location, education, medical conditions, education needs, OCD diagnoses, symptoms and prior treatment.

COVID-19 Experiences Questionnaire. The COVID-19 experiences questionnaire is an assessment of experiences, losses and impacts (negative and positive) on families as a result of COVID-19 (Waite et al., 2020). This is comprised of 10 items of various Likert scales requesting participants to rate their current isolation status, employment and schooling changes and COVID-19 diagnosis status. Categorical items were transformed to create item variables reflective of impact. Items were utilised to create a *Total Impact of COVID-19 score.* Cronbach's alpha of the impact scale for the current sample was .91.

Parent COVID-19 worries. The parent COVID-19 worries questionnaire assessed parental worries and concerns regarding COVID-19

(Waite et al., 2020). A five-point Likert scale was utilised on 13 items, with participants rating their level of agreement on each of the statements, 0 = *strongly disagree* to 4 = *strongly agree*. Responses were summed, with a higher score indicative of higher severity of parental worries (Waite et al., 2020). For the current sample, parent COVID-19 worries Cronbach's alpha was .92.

Mental health service provision preferences. Preferences for MH services were assessed across three items, utilising both Likert and multiple-choice scales (Waite et al., 2020). Participants were asked whether they feel they would benefit from support and participants who agreed were requested to indicate which areas would be helpful and how they would like to receive the support (Waite et al., 2020). Items were adapted from Waite et al. (2020) for the purposes of the current study to reflect OCD specific support required.

Coronavirus Stressful and Traumatic Events Scale. The Coronavirus Traumatic and Stressful Life Events Scale (COROTRAS) is a self-report inventory which contains 16 potential life events related to COVID-19 (Fontenelle et al., 2021). Participants were requested to indicate whether they have experienced these events, whether they found the event stressful, and rate the intensity of emotions experienced (Fontenelle et al., 2021). Intensity of emotions were measured on a five-point Likert scale, ranging from 0 = *absent* to 4 = *extreme*. The COROTRAS is considered a reliable assessment measure (α = 0.917) and demonstrates acceptable convergent validity (Fontenelle et al., 2021). For the current sample Cronbach's alpha was .82.

Modification to a parent version of the Obsessive-Compulsive Inventory – Child Version (OCI–P). A modified parent report version of the established Obsessive-Compulsive Inventory – Child Version (OCI-CV) was generated for the purposes of the current study to facilitate parent report. This instrument was administered at both baseline and follow-up. The OCI–P is a 21-item parental report questionnaire to assess the presence of OCD symptoms in children (Foa et al., 2010). The symptoms are assessed across six different dimensions: 1) doubting/checking, 2) obsessing, 3) hoarding, 4) washing, 5) ordering, and 6) neutralising symptoms. The presence of symptoms was rated on a 3-point Likert scale 0 = *never* to 2 = *always*. Evidence supports good psychometric properties for the original child-report version, including internal consistency, retest reliability and convergent validity (Foa et al., 2010). For the current sample, Cronbach's alpha of the total scale was 0.94, and subscales doubting/checking (0.81), obsessing (0.81), hoarding (0.84), washing (0.88), ordering (0.88), and neutralising (0.73).

Revised Children's Anxiety and Depression Scale – Parent report. Participants completed the revised (25 item) parent report children's anxiety and depression scale at both baseline and follow-up (RCADS; Ebesutani et al., 2017). The questionnaire requests participants to indicate how often each applies to the child on a four-point Likert scale 0 = *never* to 3 = *always*. The RCADS has demonstrated significant correlations with both anxiety and depressive diagnostic groups and acceptable reliability (depression: α = 0.72; anxiety: α = 0.82 (Ebesutani et al., 2017). Current sample's Cronbach's alpha of total scale was 0.95, anxiety subscale, 0.90, and depression subscale, 0.93.

Depression, Anxiety and Stress Scale. As an assessment of parental MH symptoms, the depression, anxiety and stress scale-21 items (DASS-21) was administered at baseline and follow-up (Lovibond and Lovibond, 1995). Items were rated on a four-point Likert scale 0 = *did not apply to me at all* to 3 = *applied to me very much or most of the time*. The DASS-21 has high internal consistency (α = 0.94 for depression, 0.87 for anxiety) adequate construct validity, and has been validated across populations and settings (Antony, 1998). Current sample's Cronbach's alpha = .93 for depression, 0.89 for anxiety, 0.91 for stress.

1.3. Design and procedure

The current study utilised a cross-sectional and longitudinal survey design. Prior to completing the initial online survey, parents provided informed consent. Parents were given the opportunity to volunteer to participate in the follow-up survey and were subsequently asked three months following to complete a shortened version of the initial survey. The investigation was carried out in accordance with the latest version of the Declaration of Helsinki and the study design was reviewed by Griffith University ethical committee.

2. Results

2.1. Statistical analyses

Bivariate Pearson's correlations were utilised to conduct exploratory analyses. A series of one-way between groups Welch ANOVAs (MH status (3 levels): OCD, any diagnosis, healthy) were conducted to explore the impact of COVID-19 across groups on the dependent variables of child MH symptoms.[1] A mixed-factorial 3 (group: OCD, any diagnosis, healthy) X 2 (time: baseline, 3 months later) design was used to examine changes in symptoms over time across the three groups of children. MH status subgroups were determined by parent reported history of child diagnoses and/or clinical symptoms of a MH diagnosis. Participants within the any MH diagnosis group did not identify OCD symptoms/diagnoses, rather symptoms of other MH problems experienced during childhood, most often anxiety, depression, and neurodevelopmental disorders. A descriptive analysis exploring frequencies and chi-square analyses was utilised to establish differences across groups in service needs.

2.2. Baseline findings

2.2.1. Frequency of OCD symptoms

During the COVID-19 lockdown survey, 7.1% (10 parents) of parents reported their child had a previous diagnosis of OCD, and of these parents, 100% (10 parents) reported a worsening of their child's symptoms during the pandemic. Further, 22% (28 parents) of parents of healthy children reported an onset of OCD symptoms during COVID-19. Overall, regardless of MH status prior to COVID-19, 40% of parents reported an increase in OCD-like symptoms since COVID-19. At the second survey following the lockdown period, 43% (15 parents) of parents reported that their child had new onset of OCD symptoms since completing the previous survey, and 67% of these parents believed that this was due to COVID-19.

2.2.2. Associations between COVID-19 impact and symptoms during lockdown

Results of the bivariate correlations based on the lockdown are presented in Table 1. Parental worries about COVID-19 were significantly and positively associated with all MH symptoms. A significant positive correlation between parent reported number of COVID-19 related stressful events experienced and child OCD symptoms was found. A significant positive relationship was also found between parents' subjective knowledge of COVID-19 and both parental depression and stress. The intensity of parental emotions reported as a direct result of experiencing a stressful COVID-19 related event were significantly and positively associated with a variety of child and parent reported clinical symptoms (Table 1).

2.2.3. Comparing mental health symptoms across clinical subgroups

To aid in interpretation of young people's symptom levels in this study, we refer to previously published normative data, which although is based on a general population, provides a comparative benchmark to the level of symptoms being reported in the current study. When

---

[1] The assumption of homogeneity of variances was violated, as assessed by Levene's test for equality of variances, hence the Welch test was used to analyse results.

Table 1

Associations between COVID-19 impact on Child and Parental Mental Health Symptoms.

	OCI–P							RCADS		DASS		
	Total	Obsessions	Washing	Hoarding	Doubting/ Checking	Neutralising	Ordering	Anxiety	Depression	Depression	Stress	Anxiety
COVID-19 Impact Score	-.03	-.06	-.01	-.00	.020	-.00	-.08	-.06	-.06	.08	.14	.06
COROTRAS Stress Events	.11	.11	.07	.11	.064	-.07	.18*	.11	.17	.11	.17	.08
COROTRAS Fear/ horror	.24*	.27*	.18	.17	.21	.07	.21	.19	.18	.20	.23*	.25*
COROTRAS Helplessness	.37**	.30*	.31*	.22*	.29*	.36**	.32*	.34*	.25*	.31*	.34*	.34*
COROTRAS Disgust	.29*	.26*	.37**	.17	.25*	.21	.13	.29*	.25*	.49**	.54**	.51**
COROTRAS Anger	.36**	.33*	.37**	.17	.32*	.21	.31*	.35**	.33*	.44**	.47**	.38**
COROTRAS Guilt	.18	.17	.14	.15	.12	.11	.18	.21	.26*	.39**	.43**	.35*
COROTRAS Shame	.19	.23*	.13	.11	.22*	.18	.04	.15	.12	.31*	.30*	.28*
COROTRAS Sadness	.38**	.34*	.36*	.21	.32*	.36**	.27*	.28*	.25*	.48**	.42**	.41**
COVID-19 Parent Knowledge	.00	-.08	-.03	.15	-.04	-.04	.05	.01	-.05	.20*	.19*	.05
COVID-19 Child Knowledge	.10	.08	.16	.08	.11	.04	.02	.09	-.07	.14	.16	.09
COVID-19 Parent Recommendations	.06	.05	.08	.10	.03	-.11	.11	.11	.08	.09	.10	-.01
COVID-19 Child Recommendations	.04	-.01	.12	.00	.06	-.01	.04	.05	-.06	.11	.14	.08
COVID-19 Parental Worries	.36**	.29*	.32**	.24*	.34**	.19*	.32**	.28*	.26*	.43**	.45**	.31**

Note. COVID-19 = Coronavirus disease; OCD = Obsessive Compulsive Disorder; OCI–P = Obsessive-Compulsive Inventory Parent Version; RCADS = Revised Child Anxiety and Depression Scale Parent Report; DASS = Depression, Anxiety and Stress Scale; COROTRAS = Coronavirus Stressful and Traumatic Events Scale; *$p < .05$, **$p < .001$.

compared to published normative data (Rough et al., 2020), the overall sample of parents reported higher symptom severity (>1 SD above normative mean) for total OCD symptoms within their children, and for obsessing, washing, and neutralising OCD symptom sub-types on the OCI–P (see Table 2). In contrast, there were no observable elevations in parent reported child anxiety and depression (Ebesutani et al., 2017) and/or parental depression, anxiety, and stress (Henry and Crawford, 2005) when compared to published normative data (i.e., within 1 SD of normative means).

Based on the Welch test, a significant difference between groups was found for total child OCD symptoms, and on subscales of obsessing, hoarding, doubting/checking and ordering symptom subtypes; as well as across RCADS subscales, and parent depression and stress (see

Table 2

Descriptive Statistics of Child OCD symptoms, Child Depression and Anxiety and Parental Depression, Anxiety and Stress and Published Normative Data.

	Current Sample		Published Normative Data	
	Mean	SD	Mean	SD
OCI–P ($n = 127$)			Rough et al. (2020)	
Obsession	1.97	1.89	0.6	1.1
Washing	1.00	1.53	0.3	0.7
Hoarding	2.03	1.73	0.9	1.1
Doubting/Checking	1.83	2.12	0.8	1.2
Neutralising	0.84	1.28	0.2	0.5
Ordering	1.81	1.72	0.9	1.3
Total	9.48	8.26	3.6	3.8
RCADS ($n = 125$)			Ebesutani et al. (2017)	
Anxiety	9.16	7.57	6.22	4.58
Depression	6.21	6.04	3.93	3.38
Total	15.37	12.79	10.15	7.09
DASS ($n = 123$)			Henry & Crawford (2005)	
Depression	4.40	4.59	2.83	3.87
Stress	6.37	4.48	4.73	4.20
Anxiety	3.37	3.88	1.88	2.95

Note. OCI–P = Obsessive-Compulsive Inventory Parent Version; RCADS = Revised Child Anxiety and Depression Scale Parent Report; DASS = Depression, Anxiety and Stress Scale.

Table 3). To detect specific group differences a series of Games-Howell post-hoc analyses were conducted. Interestingly, the any MH diagnosis group reported significantly higher obsessing symptoms ($MD = 1.91, \sigma_{\overline{X}} = 0.40$, 95% CI = 0.91–2.90) and hoarding symptoms than the healthy group ($MD = 1.23, \sigma_{\overline{X}} = 0.42$, 95% CI = 0.21–2.26), with no significant differences between the OCD and healthy groups ($p > .05$).

Total OCD symptoms (OCD - healthy: $MD = 7.29, \sigma_{\overline{X}} = 2.36$, 95% CI = 1.41–13.16; Any MH diagnosis - healthy: $MD = 6.51, \sigma_{\overline{X}} = 1.77$, 95% CI = 2.17–10.86), doubting/checking (OCD - healthy: $MD = 1.97, \sigma_{\overline{X}} = 0.58$, 95% CI = 0.56–3.39; Any MH diagnosis - healthy: $MD = 1.46, \sigma_{\overline{X}} = 0.47$, 95% CI = 0.31–2.60), and ordering (OCD - healthy: $MD = 1.22, \sigma_{\overline{X}} = 0.45$, 95% CI = 0.10–2.34; Any MH diagnosis - healthy: $MD = 1.21, \sigma_{\overline{X}} = 0.42$, 95% CI = 0.19–2.24) on the OCI–P, and child anxiety (OCD - healthy: $MD = 6.12, \sigma_{\overline{X}} = 2.22$, 95% CI = 0.58–11.66; Any MH diagnosis - healthy: $MD = 9.49, \sigma_{\overline{X}} = 1.68$, 95% CI = 5.32–13.65), and depression symptoms (OCD - healthy: $MD = 5.16, \sigma_{\overline{X}} = 1.81$, 95% CI = 0.63–9.70; Any MH diagnosis - healthy: $MD = 7.20, \sigma_{\overline{X}} = 1.44$, 95% CI = 3.62 10.78), on the RCADS were reported to be significantly higher in both the OCD and any MH diagnosis group than healthy controls, with no significant differences between the OCD and any MH diagnosis groups ($p > .05$). No significant differences were found across groups on the DASS-21 depression, stress and anxiety scales ($p > .05$).

2.2.4. Need for child/parent supports in response to child symptoms during COVID-19

A Fisher-Freeman-Halton Exact test was conducted between groups and post lockdown treatment due to violation of assumptions. Majority of participants across groups indicated that they did not receive OCD support for their child during the lockdown period, with a non-significant ($p > .05$) difference across groups. Chi-square tests were conducted between groups and need for support. Majority of participants in the healthy and OCD groups indicated that they would not benefit from further support, however, the any MH diagnosis group reported that they would, this is a significant difference in proportions, $p = .043$. Post hoc analysis involved pairwise comparisons using the z-test of two proportions with a Bonferroni correction. There was a

Table 3

Descriptive Statistics and Welch ANOVA of Child OCD symptoms, Child Depression and Anxiety and Parental Depression, Anxiety and Stress categorised by healthy group, OCD group or Any Mental Health Diagnosis group.

	Healthy Group				Any MH Group				OCD Group				ANOVA	
	n	Mean (*SD*)	Min	Max	n	Mean (*SD*)	Min	Max	n	Mean (*SD*)	Min	Max	Welch's *F*	η^2
OCI–P														
Obsession	81	1.38 (1.41)	0.00	5.00	24	3.29 (1.83)	0.00	7.00	22	2.69 (2.50)	0.00	7.00	12.57**	0.18
Washing	81	0.74 (1.20)	0.00	5.00	24	1.04 (1.49)	0.00	5.00	22	1.91 (2.24)	0.00	6.00	2.93	0.08
Hoarding	81	1.64 (1.49)	0.00	6.00	24	2.88 (1.87)	0.00	6.00	22	2.55 (1.99)	0.00	6.00	5.51*	0.09
Doubting/Checking	81	1.21 (1.77)	0.00	8.00	24	2.67 (2.08)	0.00	7.00	22	3.18 (2.52)	0.00	8.00	9.29**	0.16
Neutralising	81	0.64 (1.10)	0.00	4.00	24	1.04 (1.30)	0.00	5.00	22	1.36 (1.68)	0.00	6.00	2.41	0.05
Ordering	81	1.37 (1.43)	0.00	6.00	24	2.58 (1.89)	0.00	6.00	22	2.59 (1.99)	0.00	6.00	6.82*	0.12
Total	81	6.99 (6.54)	0.00	24.00	24	13.50 (7.91)	3.00	33.00	22	14.27 (10.54)	0.00	38.00	10.07**	0.16
RCADS														
OCD	80	0.81 (1.27)	0.00	6.00	23	2.35 (1.97)	0.00	7.00	22	2.55 (2.79)	0.00	8.00	9.36**	0.17
Anxiety	80	6.34 (4.74)	0.00	23.00	23	15.83 (7.64)	0.00	34.00	22	12.45 (10.09)	0.00	35.00	18.32**	0.27
Depression	80	3.98 (3.47)	0.00	14.00	23	11.17 (6.64)	0.00	26.00	22	9.14 (8.30)	0.00	26.00	15.49**	0.26
Total	80	10.31 (7.83)	0.00	37.00	23	27.00 (12.23)	0.00	50.00	22	21.59 (17.09)	0.00	52.00	20.93**	0.30
DASS														
Depression	79	3.56 (3.91)	0.00	20.00	23	5.61 (5.74)	0.00	19.00	21	6.24 (4.97)	0.00	18.00	3.44*	0.06
Stress	79	5.43 (3.51)	0.00	18.00	23	7.65 (4.89)	0.00	19.00	21	8.48 (6.16)	0.00	20.00	3.94*	0.08
Anxiety	79	2.81 (3.24)	0.00	14.00	23	4.04 (4.56)	0.00	13.00	21	4.76 (4.94)	0.00	15.00	1.96	0.04

Note. OCD = Obsessive Compulsive Disorder; MH = Mental Health; OCI–P = Obsessive-Compulsive Inventory Parent Version; RCADS = Revised Child Anxiety and Depression Scale Parent Report; DASS = Depression, Anxiety and Stress Scale; F = Welch ANOVA F Statistic; η^2 = Eta Squared; *p < .05; **p < .001.

significant difference in proportions between the healthy and any MH diagnosis group, $p < .05$, but no significant difference in proportions between the OCD group and both healthy and any MH diagnosis groups, $p > .05$.

Parents of children within the MH groups indicated a need for support within most areas, except for helping children to manage COVID-19 related restrictions and safety guidelines and managing the impact of OCD on the family within the any MH diagnosis group. There was a strong preference for online written materials across both MH groups, regardless of diagnosis. The OCD group did not prefer any of the other treatment options, whereas the any MH diagnosis group indicated a preference for face-to-face therapy for the parent and personalised telephone support.

2.3. Follow-up findings

Descriptive results of the mixed factorial ANOVAs are presented in Table 4.

2.3.1. Child symptoms and behaviours

Total OCD severity (OCI–P). As seen in Fig. 1, total OCD severity appeared to be higher during lockdown than post lockdown, with the decline being stronger in the OCD group. The main effects for time $F(1, 30) = 4.66$, $\eta_p^2 = 0.13$, $p = .039$ and group $F(2, 30) = 7.32$, $\eta_p^2 = 0.33$, $p = .003$ were significant. The any MH diagnosis group reported higher OCD symptoms than the healthy group ($MD = 8.70$, $\sigma_{\bar{X}} = 2.31$, 95% CI =
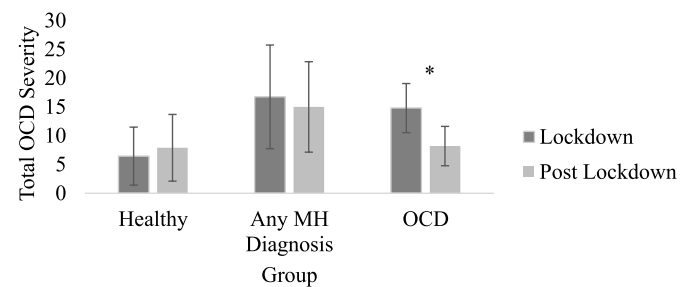

Fig. 1. Interaction of group (healthy, any MH diagnosis and OCD) and time (lockdown and post lockdown) on the mean total OCD severity.

3.98–13.42), however, no significant differences were found between the OCD and both healthy and any MH diagnosis groups ($p > .05$). OCD symptoms, regardless of group, significantly reduced post lockdown, $MD = 2.30$, $\sigma_{\bar{X}} = 1.07$, 95% CI = 0.12–4.48. The different rates of improvement in the groups was confirmed by a time × group interaction, $F(2, 30) = 5.04$, $\eta_p^2 = 0.25$, $p = .013$. The improvement in OCD totals was significant for the OCD group, $t(4) = 3.71$, $p = .021$, $d = 4.00$, but not in the healthy, $t(19) = -1.30$, $p = .2.08$, $d = 5.08$, or any MH diagnosis groups $t(7) = 0.78$, $p = .462$, $d = 6.36$.

Total anxiety and depression severity (RCADS). The main effect of time and interaction of time and group was not significant ($p > .05$). A significant main effect of groups was found, $F(2, 30) = 7.91$, $\eta_p^2 = 0.35$, p

Table 4

Descriptive Statistics of Child OCD symptoms, Child Depression and Anxiety and Parental Depression, Anxiety and Stress by group and time.

	Healthy n = 20		Any MH n = 8		OCD n = 5	
	Lockdown	Post Lockdown	Lockdown	Post Lockdown	Lockdown	Post Lockdown
	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)
OCI–P						
Total	6.45 (5.04)	7.90 (5.79)	16.75 (9.00)	15.00 (7.86)	14.80 (4.27)	8.20 (3.42)
RCADS						
Total	9.90 (6.16)	10.90 (6.12)	32.38 (12.02)	29.25 (19.35)	16.40 (14.47)	10.00 (3.81)
DASS-21						
Depression	3.40 (4.70)	4.10 (4.95)	8.63 (8.16)	5.75 (5.31)	8.00 (3.46)	1.80 (1.30)
Stress	5.25 (3.97)	6.40 (4.54)	9.63 (5.50)	8.13 (4.22)	11.40 (5.13)	6.00 (3.54)
Anxiety	1.95 (2.76)	3.15 (4.57)	5.50 (5.68)	5.63 (4.21)	6.40 (3.05)	2.40 (1.95)

Note. OCD = Obsessive Compulsive Disorder; MH = Mental Health; OCI–P = Obsessive-Compulsive Inventory Parent Version; RCADS = Revised Child Anxiety and Depression Scale Parent Report; DASS-21 = Depression, Anxiety and Stress Scale.

= .004 where any MH diagnosis group reported significantly higher anxiety and depression than both the OCD ($MD = 17.61$, $\sigma_{\overline{X}} = 5.26$, 95% CI = 6.88–28.35) and healthy group ($MD = 20.41$, $\sigma_{\overline{X}} = 3.86$, 95% CI = 12.54–28.35), however, there was no significant difference between the OCD and healthy group ($p > .05$).[2]

2.3.2. Parent symptoms

Anxiety, Depression & Stress (DASS-21). As seen in Fig. 2, parent depression and stress appeared to be higher during lockdown than post lockdown, with the decline being stronger in the OCD group. The overall improvement of parental depression and stress over lockdown was confirmed by a main effect for time, depression: $F(1, 30) = 7.98$, $\eta_p^2 = 0.21$, $p = .003$ ($MD = 2.69$, $\sigma\overline{X} = 0.85$, 95% CI = 0.96–4.42) and stress: $F(1, 30) = 7.61$, $\eta_p^2 = 0.20$, $p = .010$ ($MD = 1.92$, $\sigma\overline{X} = 0.70$, 95% CI = 0.50–3.34). A non-significant difference between groups was found for both depression and stress ($p > .05$). The different rates of improvement was confirmed by a time × group interaction for both depression $F(2, 30) = 8.92$, $\eta_p^2 = 0.37$, $p = .003$ and stress $F(2, 30) = 7.87$, $\eta_p^2 = 0.34$, $p = .002$. The improvement in depression was significant for the OCD group, $t(4) = 3.39$, $p = .027$, $d = 4.09$, but not in the any MH diagnosis groups $t(7) = 1.11$, $p = .302$, $d = 7.30$. The healthy group demonstrated a significant increase in depression, $t(19) = -2.21$, $p = .040$, $d = 2.03$. The improvement in stress was significant for the OCD group, $t(4) = 2.95$, $p = .042$, $d = 4.10$, but not in the any MH diagnosis groups $t(7) = 0.93$, $p = .384$, $d = 4.57$ or the healthy group, $t(19) = -1.93$, $p = .068$, $d = 2.66$.[3] Parent anxiety demonstrated a non-significant main effect of time, groups, and interaction ($p > .05$).

3. Discussion

Given the recency of the pandemic, limited research currently exists in exploring the impact of the COVID-19 pandemic on child and parent MH, specifically on OCD symptoms. In addition, researchers are yet to consider the impact of this relationship over time and how outcomes may differ across various levels of risk for MH in children. The current study therefore aimed to explore how COVID-19 impacted MH symptoms, with a particular focus on OCD symptoms, the stability of this relationship over time and possible variations across symptom groups and the needs and preferences for MH support in response to child symptoms.

The current sample of parents reported elevated rates of clinical symptoms for their children during lockdown, consistent with initial predictions of this study. The overall sample, which included children within the healthy, OCD and any MH diagnosis group, observed elevated total OCD severity and obsessing, washing, and neutralising OCD symptoms compared to previously observed symptoms in a normative

Fig. 2. Interaction of group (healthy, any MH diagnosis and OCD) and time (lockdown and post lockdown) on the mean of DASS-21 depression and stress.

[2] Log10 transformation applied to RCADS total to control for homogeneity of variance violations.
[3] Square root transformation applied to DASS depression scores to accommodate for skew.

sample prior to COVID-19 (Rough et al., 2020). The findings are consistent with existing COVID-19 and paediatric OCD research which has demonstrated an increase in total OCD symptoms and washing and obsessing OCD symptoms during the COVID-19 pandemic (Tanir, 2020). Further, the findings are also consistent with COVID-19 research demonstrating an increase in MH symptoms and exacerbation of pre-existing MH diagnoses during COVID-19, particularly for OCD symptoms (Bueno-Notivol et al., 2021; Fountoulakis et al., 2021; Newlove-Delgado et al., 2021).

The expectation that elevations in symptom variables would be associated with COVID-19 risk/impact factors was partially found. Of note, parental worries about COVID-19 were strongly associated with all MH symptom variables, suggesting that parental worries could be a predictor of the development of MH difficulties within families during pandemics. Further, as parents' self-rated knowledge of COVID-19 increased, the more stress and depressive symptoms they reported for themselves. Given that non-significant associations were found between MH symptom variables and COVID-19 stressful events and COVID-19 impact score, it is likely that COVID-19 worries/knowledge may mediate the association between MH and COVID-19 impacts.

The current study's findings regarding the association between adult worries and MH symptoms is consistent with research during the lockdown stages of COVID-19, where it was found that adults with self-reported MH diagnoses reported higher COVID-19 related worries and subsequent worsening of MH symptoms (Newby et al., 2020). Parents reporting high frequency of worry during past pandemics has been shown to increase child anxiety experiences (Brand et al., 2013). Given the exacerbation of adult MH symptoms due to COVID-19 related worries, it is important to consider the subsequent impacts on children's symptoms.

The prediction that MH difficulties would be greater in families of a child with pre-existing diagnoses/symptoms was found for majority of variables, including total OCD symptoms, and obsessing, hoarding, doubting/checking and ordering symptom subtypes, child anxiety and depression, and parent depression and stress. Although the any MH diagnosis group and OCD group washing symptoms remained significantly higher than previously reported in normative samples prior to COVID-19 (Rough et al., 2020), no significant difference was found between the groups on this variable. Therefore, increased washing symptoms associated with OCD during COVID-19 were observed within the sample of youth with OCD, but also within children with other pre-existing MH diagnoses. The current study is consistent with findings that the impact of COVID-19 has been greater for families with pre-existing diagnoses (Guessoum et al., 2020; Huang et al., 2020; Nissen et al., 2020).

Different rates of improvements and stability of MH variables were found across the groups over the lockdown period. Unexpectedly, improvement in OCD symptoms post-lockdown was found for the OCD group. OCD symptoms remained stable across time for both the healthy and any MH diagnosis groups, which is consistent with predictions. Regardless of lockdown period, the any MH diagnosis group OCD severity was as elevated as the OCD group, however, did not demonstrate the same trend of symptom improvement, and remained elevated (>3 SD above normative means (Rough et al., 2020). The high rates of comorbidity between OCD and other anxiety disorders are well established in the literature and therefore children with anxiety symptoms or diagnoses are generally more likely to develop OCD and in the context of COVID-19, symptoms may have emerged within this study due to the threat of infection for the any MH diagnosis group. More specifically, anxiety is a predictor of the development of OCD beliefs and symptoms within the context of previous pandemics such as Swine Flu (Brand et al., 2013). Further, parents of children with OCD diagnoses may better notice changes in OCD symptoms compared to parents of children without this diagnosis due to limited knowledge or awareness of these signs or symptoms (Tanir, 2020). Further research would be required to better understand the mechanisms behind this relationship.
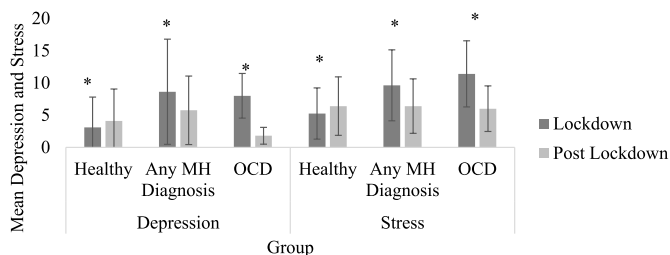
Nevertheless, the current study demonstrates the vulnerability of children with pre-existing MH diagnoses in the development, exacerbation, and persistence of OCD symptoms during COVID-19 lockdowns and recovery.

Child anxiety and depression remained stable over the lockdown period and the stability did not differ across the groups. Regardless of lockdown time-point, the any MH diagnosis participants reported significantly higher anxiety and depression than both OCD and healthy groups, which are likely prevalent MH diagnoses within this clinical subgroup. An improvement in parental depression and stress was found following lockdown for the OCD group, however, the healthy and any MH diagnosis groups remained stable. The healthy group reported a worsening of depressive symptoms amongst parents post lockdown, however, this remained within the "normal" range of depression and is consistent with emerging research of adult experiences during COVID-19 (Fountoulakis et al., 2021).

Finally, it was predicted that a greater need for services would be reported by parents of children in the any MH and OCD groups relative to the healthy children. Findings were consistent with the initial predictions, with the any MH diagnosis group reporting a significantly greater need for support than the healthy group. Further, participants with children within the MH groups reported a strong preference for online written materials, with the OCD group having no preferences for any other treatment options. The any MH diagnosis group preferred face-to-face therapy for the parent and personalised telephone support. The findings could be explained by 40% of the sample reporting recent onset and increases of OCD-like symptoms since COVID-19. If the child has not demonstrated these behaviours previously, parents may be uncertain and confused by their child's presentation and therefore seeking increased personalised support in this context.

This study has several limitations that should be noted. Firstly, the recruitment method of the current sample advertised that the study was investigating OCD symptoms in the context of COVID-19. As such, the results must be interpreted from the perspective of parental surveillance of OCD symptoms, rather than a representation of the general population of Australian children. Indeed, our study aimed to examine the impact of COVID-19 on children at various levels of risk for mental health, hence the comparison across symptom groups. Given the aim to have a mix of youth across the spectrum of vulnerability for MH, recruitment was aimed at both youth with OCD/any MH diagnoses and a normative sample (through an undergraduate sample of parents).

Secondly, the differences between MH symptoms before (normative means) and during COVID-19 lockdown were attributed to the COVID-19 pandemic, however, there could be several other factors that may have influenced these differences. This could be explained by the current sample recruiting a potentially more vulnerable population or individual factors relevant to each participant. Further, the differences between symptoms during and post lockdown were classified according to broader national Australian lockdown trends, however, several locations in the country may have been under a government or personally enforced lockdown during the second time point. The prevalence and impact of COVID-19 in Australia within the data collection period (June–September 2020 and November 2020–January 2021), according to Ritchie et al. (2020), appeared significantly less severe when compared to other countries such as United States, United Kingdom, Canada, Germany, and India. Australia demonstrated significantly less deaths, fewer confirmed cases, and lower hospital patients/admission including ICU at a population level. However, despite this difference in disease impact of COVID-19, similar findings on mental health outcomes have been observed within the current study compared with other countries. A systematic review from various countries found that the COVID-19 was associated with worsening of OCD symptoms in children and adolescents (Cunning and Hodes, 2022) and a literature review, incorporating research from various countries, identified that children and adolescents with existing MH disorders are a vulnerable population, with increased exacerbation of MH symptoms within the COVID-19 context (Palacio-Ortiz et al., 2020).

Thirdly, the methodological limitation of unequal groups must be considered when interpreting the study's conclusions. The small sample size in the MH groups may have reduced statistical power, which has a potential explanation for the lack of significant findings within the mixed factorial ANOVA (Sheps, 1993). Fourthly, limits of the OCD symptoms questionnaires resulted in difficulties to separate symptoms related to COVID-19 or general OCD symptoms. For example, the findings that the any MH diagnosis group reported higher obsessing and hoarding symptoms than the healthy group, could be explained by COVID-19 specific symptoms, such as obsessing over COVID-19 or hoarding cleaning supplies, however, limits within the questionnaire does not allow for this distinction. Future research should aim to assess both general OCD symptoms and symptoms specifically elicited by COVID-19 to promote greater understanding of the mechanisms of the relationships between OCD in children and COVID-19. Finally, given that this study only included Australian families and the COVID-19 pandemic severity within Australia currently differs greatly to other regions of the world, the findings may not be generalisable to other countries or samples.

The findings from the current study may prompt several MH approaches for the prevention of the onset or worsening of MH symptoms in children and their parents in the current and future pandemics. Such approaches could target families with existing child and parent MH symptoms, encouraging parents to seek help for children with COVID-19 worries and offering interventions to families with emerging OCD symptoms in the early stages of a pandemic, possibly through public health awareness campaigns and dissemination of psychoeducation materials. Based on the findings of the current study, interventions could include accessible approaches such as online self-guided early intervention/prevention programs for OCD, based on evidence-based cognitive-behavioural therapy (CBT) principles, and/or personalised individual therapy through telehealth or phone consultation. Such interventions were favoured by parents of children with mental health concerns and are highly accessible in times of social distancing restrictions. Several research studies have demonstrated the efficacy of online or telehealth CBT child and parent focussed treatment programs for internalising, externalising and neurodevelopmental disorders (Conaughton et al., 2017; Ros-DeMarize et al., 2021). The present study is important as it investigated the impact of COVID-19 on parental and childhood MH symptoms and is one of the first to evaluate the stability of this relationship over time and the needs and preferences for MH support in response to child symptoms. A novel finding in this area included the strong association between symptom variables and parental worry regarding COVID-19, elevated scores of OCD during COVID-19 compared to normative samples, and the vulnerability of children with pre-existing MH in developing OCD symptoms and its persistence over the lockdown period. Although several important discoveries were made, it is valuable to continue longitudinal research in this area across regions in the world to better understand long-term effects of the COVID-19 pandemic on young people and their families.

Author statement

All authors of this manuscript were involved in the development of the research questions, designing the study methodologies, developing the survey question and preparation of the manuscript for publication. First author RK drafted the first version of the manuscript and oversaw the data analyses under supervision of LJF and SM.

Funding

Declaration of competing interest

none.

References

American Psychiatric Association, 2013. Diagnostic and Statistical Manual of Mental Disorders, fifth ed. American Psychiatric Publishing, Arlington, VA.

Antony, M.M., 1998. Psychometric properties of the 42-item and 21-item versions of the depression anxiety stress scales in clinical groups and a community sample. Psychol. Assess. 10 (2), 176–181. https://doi.org/10.1037/1040-3590.10.2.176.

Brand, J., McKay, D., Wheaton, M.G., Abramowitz, J.S., 2013. The relationship between obsessive compulsive beliefs and symptoms, anxiety and disgust sensitivity, and Swine Flu fears. J. Obsessive Compulsive. Related Disorder. 2 (2), 200–206. https://doi.org/10.1016/j.jocrd.2013.01.007.

Brooks, S.K., Webster, R.K., Smith, L.E., Woodland, L., Wessely, S., Greenberg, N., Rubin, G.J., 2020. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. Lancet 395 (10227), 912–920. https://doi.org/10.1016/S0140-6736(20)30460-8.

Bueno-Notivol, J., Gracia-García, P., Olaya, B., Lasheras, I., López-Antón, R., Santabárbara, J., 2021. Prevalence of depression during the COVID-19 outbreak: a meta-analysis of community-based studies. Int. J. Clin. Health Psychol. 21 (1), 1–11. https://doi.org/10.1016/j.ijchp.2020.07.007.

Conaughton, R.J., Donovan, C.L., March, S., 2017. Efficacy of an internet-based CBT program for children with comorbid High Functioning Autism Spectrum Disorder and anxiety: a randomised controlled trial. J. Affect. Disord. 218, 260–268. https://doi.org/10.1016/j.jad.2017.04.032.

Cunning, C., Hodes, M., 2022. The COVID-19 pandemic and obsessive–compulsive disorder in young people: systematic review. Clin. Child Psychol. Psychiatr. 27 (1), 18–34. https://doi.org/10.1177/13591045211028169.

Davide, P., Andrea, P., Martina, O., Andrea, E., Davide, D., Mario, A., 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. Psychiatr. Res. 291, 1–5. https://doi.org/10.1016/j.psychres.2020.113213.

DeYoung, Paterson, March, Hoehn, Alisic, Cobham, Vasileva, 2020. COVID-19 Unmasked Young Children – Report 1: Early Findings and Recommendations. https://www.childrens.health.qld.gov.au/wp-content/uploads/PDF/COVID-19/COVID19-Unmasked-Survey-Progress-Report-01.pdf.

Ebesutani, C., Korathu-Larson, P., Nakamura, B.J., Higa-McMillan, C., Chorpita, B., 2017. The revised child anxiety and depression scale 25–parent version: scale development and validation in a school-based and clinical sample. Assessment 24 (6), 712–728. https://doi.org/10.1177/1073191115627012.

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. Behav. Ther. 41 (1), 121–132. https://doi.org/10.1016/j.beth.2009.02.001.

Fontenelle, L.F., Albertella, L., Brierley, M.-E., Thompson, E.M., Destrée, L., Chamberlain, S.R., Yücel, M., 2021. Correlates of obsessive-compulsive and related disorders symptom severity during the COVID-19 pandemic. J. Psychiatr. Res. https://doi.org/10.1016/j.jpsychires.2021.03.046.

Fountoulakis, K.N., Apostolidou, M.K., Atsiova, M.B., Filippidou, A.K., Florou, A.K., Gousiou, D.S., Chrousos, G.P., 2021. Self-reported changes in anxiety, depression and suicidality during the COVID-19 lockdown in Greece. J. Affect. Disord. 279, 624–629. https://doi.org/10.1016/j.jad.2020.10.061.

Guessoum, S.B., Lachal, J., Radjack, R., Carretier, E., Minassian, S., Benoit, L., Moro, M. R., 2020. Adolescent psychiatric disorders during the COVID-19 pandemic and lockdown. Psychiatr. Res. 291, 1–6. https://doi.org/10.1016/j.psychres.2020.113264.

Henry, J.D., Crawford, J.R., 2005. The short-form version of the Depression Anxiety Stress Scales (DASS-21): construct validity and normative data in a large non-clinical sample. Br. J. Clin. Psychol. 44 (2), 227–239. https://doi.org/10.1348/014466505X29657.

Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., Cao, B., 2020. Clinical features of patients infected with 2019 novel Coronavirus in Wuhan, China. Lancet 395 (10223), 497–506. https://doi.org/10.1016/S0140-6736(20)30183-5.

Kar, N., 2019. Depression in youth exposed to disasters, terrorism and political violence. Curr. Psychiatr. Rep. 21 (8), 1–11. https://doi.org/10.1007/s11920-019-1061-9.

Kar, N., Bastia, B.K., 2006. Post-traumatic stress disorder, depression and generalised anxiety disorder in adolescents after a natural disaster: a study of comorbidity. Clin. Pract. Epidemiol. Ment. Health 2 (17), 1–7. https://doi.org/10.1186/1745-0179-2-17.

Khan, Y.S., Jouda, M., Albobali, Y., Osman Abouelseoud, M., Souid, A., AlMeraisi, M.J., Alabdulla, M., 2021. COVID-19 pandemic fears and obsessive-compulsive symptoms in adolescents with pre-existing mental disorders: an exploratory cross-sectional study. Clin. Child Psychol. Psychiatr. 27 (1), 89–103. https://doi.org/10.1177/13591045211017606.

Lovibond, P.F., Lovibond, S.H., 1995. The structure of negative emotional states: comparison of the depression anxiety stress scales (dass) with the beck depression and anxiety inventories. Behav. Res. Ther. 33 (3), 335–343. https://doi.org/10.1016/0005-7967(94)00075-U.

Magson, N.R., Freeman, J.Y.A., Rapee, R.M., Richardson, C.E., Oar, E.L., Fardouly, J., 2021. Risk and protective factors for prospective changes in adolescent mental health during the COVID-19 pandemic. J. Youth Adolesc. 50 (1), 44–57. https://doi.org/10.1007/s10964-020-01332-9.

Newby, J.M., O'Moore, K., Tang, S., Christensen, H., Faasse, K., 2020. Acute mental health responses during the COVID-19 pandemic in Australia. PLoS One 15 (7), 1–21. https://doi.org/10.1371/journal.pone.0236562.

Newlove-Delgado, T., McManus, S., Sadler, K., Thandi, S., Vizard, T., Cartwright, C., Ford, T., 2021. Child mental health in England before and during the COVID-19 lockdown. Lancet Psychiatry. 8 (5), 353–354. https://doi.org/10.1016/S2215-0366(20)30570-8.

Nissen, J.B., Højgaard, D., Thomsen, P.H., 2020. The immediate effect of COVID-19 pandemic on children and adolescents with Obsessive Compulsive Disorder. BMC Psychiatr. 511 (20), 1–10. https://doi.org/10.1186/s12888-020-02905-5.

Palacio-Ortiz, J.D., Londoño-Herrera, J.P., Nanclares-Márquez, A., Robledo-Rengifo, P., Quintero-Cadavid, C.P., 2020. Psychiatric disorders in children and adolescents during the COVID-19 pandemic. Rev. Colomb. Psiquiatr. 49 (4), 279–288. https://doi.org/10.1016/j.rcpeng.2020.11.003.

Ritchie, H., Mathieu, E., Rodés-Guirao, L., Appel, C., Giattino, C., Ortiz-Ospina, E., Hasell, J., Macdonald, B., Beltekian, D., Roser, M., 2020. Coronavirus pandemic (COVID-19). *Published online at OurWorldInData.org.* Retrieved from: https://ourworldindata.org/coronavirus.

Ros-DeMarize, R., Chung, P., Stewart, R., 2021. Pediatric behavioral telehealth in the age of COVID-19: brief evidence review and practice considerations. Curr. Probl. Pediatr. Adolesc. Health Care 51, 100949. https://doi.org/10.1016/j.cppeds.2021.100949.

Rough, H.E., Hanna, B.S., Gillett, C.B., Rosenberg, D.R., Gehring, W.J., Arnold, P.D., Hanna, G.L., 2020. Screening for pediatric obsessive–compulsive disorder using the obsessive–compulsive inventory-child version. Child Psychiatr. Hum. Dev. 51 (6), 888–899. https://doi.org/10.1007/s10578-020-00966-x.

Sheps, S., 1993. Sample size and power. J. Invest. Surg. 6 (6), 469–475. https://doi.org/10.3109/08941939309141636.

Tanir, Y., 2020. Exacerbation of Obsessive Compulsive Disorder symptoms in children and adolescents during COVID-19 pandemic. Psychiatr. Res. 293, 1–5. https://doi.org/10.1016/j.psychres.2020.113363.

Waite, P., Patalay, P., Moltrecht, B., McElroy, E., Creswell, C., 2020. Report 02: COVID-19 Worries, Parent/carer Stress and Support Needs, by Child Special Educational Needs and Parent/carer Work Status. https://emergingminds.org.uk/wp-content/uploads/2020/05/Co-SPACE-report-02_03-05-20.pdf.

WHO, 2020. Weekly Operational Update on COVID-19 - 16 October 2020. Retrieved from: https://www.who.int/publications/m/item/weekly-update-on-covid-19—16-october-2020.

Youngminds, 2020. Coronavirus: Impact on Young People with Mental Health Needs. *Youngminds.org.uk.* https://youngminds.org.uk/media/3708/coronavirusreport_march2020.pdf.