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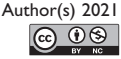

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Investigating the Association Between Obsessive-Compulsive Disorder Symptom Subtypes and Health Anxiety as Impacted by the COVID-19 Pandemic: A Cross-Sectional Study

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Abstract

Background: Since the COVID-19 outbreak was declared a global pandemic, public health messages have emphasised the importance of frequent handwashing in limiting the transmission of the virus. Whilst crucial in controlling transmission, such messaging may have an adverse effect on individuals with OCD.

Methods: A cross-sectional study was conducted, with a total of 332 participants recruited. Participants who scored above the optimal cut-off score on the Obsessive-Compulsive Inventory Revised edition (OCI-R) were included in the analysis ($n = 254$). Scores on the six subscales of the OCI-R were correlated with responses to a COVID-19 Impact measure.

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Results: Factor analysis of the COVID-19 Impact measure revealed that items loaded on two components of the measure (handwashing and distress-avoidance). Canonical correlation analyses revealed significant associations between the OCI-R subscales and COVID-19 Impact measure, $F\ (12, 490) = 8.14$, $p = 0.001$, and the SHAI subscales with the COVID-19 Impact Measure, $F\ (4, 498) = 8.18$, $p = 0.001$). Specifically, washing and checking OCI-R subscales correlated with both components of the COVID-19 Impact measure, as did the health anxiety and beliefs SHAI subscales. Content analysis revealed disruption to treatment delivery and worsening symptom severity in participants with contamination-related OCD.
Discussion: Contamination and checking OCD subtypes have been associated with increased hand-washing behaviour and avoidance of distress-inducing cues. Consideration should be given to targeted support tailored to patients with these subtypes of OCD.

Keywords
Obsessive-compulsive disorder, COVID-19 anxiety, contamination anxiety, cross-sectional, OCD subtypes, adult

Introduction

The novel coronavirus (COVID-19) outbreak has triggered an unprecedented global public health response in an effort to limit the transmission of a highly contagious pathogenic viral disease (Liu et al., 2020). The guidance issued by the World Health Organization (2020), as well as public health organisations around the world, has focused on educating the general public in relation to how the virus is spread. It is anticipated that educating the public on how best to limit the transmission of the virus will result in modified hygiene-related behaviours and social interactions (Bavel et al., 2020). Mass behaviour change of this nature, however, does present a rather unique challenge for certain members of the public. Whilst emphasising personal hygiene behaviour has been pivotal to limiting the spread of the virus, there have been concerns raised regarding the impact that public health messages may be having on individuals with Obsessive-Compulsive Disorder (OCD) and obsessive-compulsive traits (e.g. Shafran et al., 2020).

With a worldwide prevalence of 2–3%, OCD is a debilitating psychiatric condition that usually presents during adolescence or early adulthood (American Psychiatric Association, 2013; Kessler et al., 2005; World Health Organization, 2018). Aversive and persistent obsessions and/or compulsions are characteristic of the condition. Obsessions refer to the presence of intrusive and repetitive thoughts, images or urges that cause significant distress.

Compulsions relate to ritualistic behaviours or mental acts that are performed to provide brief relief from the distress triggered by the obsession(s). The time-consuming nature of the obsessions and compulsions, as well as the impairment caused to important areas of functioning, are key contributing factors to reaching a diagnosis of OCD (American Psychiatric Association, 2013; World Health Organization, 2018).

Mataix-Cols et al. (2005) have proposed a multidimensional account of OCD, with the condition conceptualised as a spectrum consisting of multiple symptom dimensions. These include washing/cleaning, checking, pure obsessional, and hoarding. Obsessions and compulsions are therefore considered to manifest slightly differently across these sub-types of the condition (Leckman et al., 2007). Furthermore, various obsessive-compulsive traits have been identified in a significant proportion of the general population who do not meet the diagnostic criteria for OCD (Leckman et al., 2009). Specifically, Leckman et al. (2009) estimated that the prevalence of subclinical OCD can be as high as 15% in adults and may interfere with activities of daily living.

Since the novel coronavirus outbreak was declared a public health emergency of international concern (PHEIC) by the World Health Organization in early 2020, COVID-19 has infiltrated and disrupted every aspect of daily life. The uncertainty surrounding the pandemic is a constant source of anxiety for many people. Feelings of anxiety are exacerbated in those with pre-existing medical conditions, as well as in those individuals exhibiting subclinical traits. For instance, Wheaton et al. (2021a) identified *intolerance of uncertainty* as a key factor mediating the relationship between OCD symptom severity and health anxiety. The media coverage of the outbreak, the emphasis on frequent and thorough hand washing, as well as the stocking up on essentials household items during periods of lockdown have potentially also caused further distress to individuals with obsessional, cleaning and hoarding sub-types of OCD (Banerjee, 2020). Furthermore, previous research has demonstrated an association between worsening OCD symptoms and health anxiety during global pandemics, such as the H1N1 'Swine Flu' influenza (Brand et al., 2013), the Zika virus outbreak (Blakey & Abramowitz, 2017), and Ebola (Blakey et al., 2015).

There is a growing body of research reporting an increase in anxiety and depression during the pandemic (Assari & Habibzadeh, 2020; Pfefferbaum & North, 2020). Specific to OCD, Davide et al. (2020) conducted a preliminary study investigating the impact of the COVID-19 pandemic on a sample of 30 patients in Italy with an existing diagnosis of OCD. Symptom severity was assessed before lockdown was enforced, and then again six weeks into lockdown. A significant worsening in symptom severity was reported, specifically in relation to contamination symptoms. Similarly, a case study of a patient with contamination-type OCD revealed a worsening in symptom severity due to the frequent-accessed media coverage of the pandemic (French & Lyne, 2020). Jelinek et al. (2021) recruited a sample of 394 individuals who met the clinical

threshold for OCD, of whom 223 were classified as 'washers'. Overall, 72% of participants reported a worsening in OCD symptoms due to reduced mobility and an increase in interpersonal conflict, with the worsening of symptoms being marked in the 'washers' group.

The current study aimed to contribute to the growing body of literature by specifically investigating the association between OCD symptom sub-types and health anxiety during the COVID-19 pandemic, within a British sample of participants with obsessive-compulsive symptoms. As such, symptom severity was assessed across six sub-types (or symptom dimensions) of OCD, which included washing, checking, obsessing, hoarding, neutralising and ordering. Self-reported health anxiety and health beliefs were also measured.

Methods

Study design and participants

A cross-sectional survey study design was selected to investigate the impact of the COVID-19 pandemic on individuals with established sub-types, or symptom dimensions, of OCD. Recruitment took place between the months of April and July 2020, which coincided with the first national lockdown of 2020 in the United Kingdom. Participants were primarily recruited through targeted OCD charities and organisations. These included OCD Action, OCD UK, and the International OCD Foundation. Ethical approval was granted by the Cardiff University School of Medicine Ethics Committee (SoMREC reference code 20/53).

Participants were screened for obsessive-compulsive symptoms using the Obsessive-Compulsive Inventory – Revised Edition (OCI-R). A total of 332 participants completed the three measures, with 254 participants scoring above the recommended cut-off on the OCI-R (Foa et al., 2002).

Measures

Three questionnaires were administered electronically using an online platform.

The Obsessive-Compulsive Inventory – Revised edition (OCI-R) is a valid self-report measure of obsessive-compulsive traits and symptoms (Foa et al., 2002). It is considered to be a useful OCD screening and diagnostic tool (e.g. Belloch et al., 2013). The measure consists of 18 Likert scale items that assess symptom severity across six subscales, or subtypes, of OCD. With an overall internal consistency of $\alpha = 0.88$ and a test-retest reliability of $r = 0.70$, the OCI-R is widely reported in the literature on subclinical and clinical obsessive-compulsive traits. Furthermore, good internal consistency has been reported on the six subscales of the measure. These include checking ($\alpha = 0.76$), washing ($\alpha = 0.76$), obsessional ($\alpha = 0.77$), order symmetry ($\alpha = 0.84$), hoarding

($\alpha = 0.68$), and neutralising ($\alpha = 0.61$). Scores range between 0 and 72 on the OCI-R, with an optimal cut-off score of 21 (sensitivity: 65.6%; specificity: 63.9%) (Foa et al., 2002). Abramovitch et al. (2020) have reported excellent internal consistency for the total and subscale scores on the OCI-R ($\alpha = 0.83$).

The Short Health Anxiety Inventory (SHAI) consists of 18 Likert scale items that assesses health anxiety and health beliefs, with good criterion validity and reliability (Salkovskis et al., 2002). Specifically, the measure assesses the degree of self-reported awareness of bodily sensations, ruminating over health and illness, fearing the outcome of certain events, and personal beliefs regarding one's health. The short version of the measure is divided into two sections; namely a 14-item health-anxiety section and a 4-item section that focuses on health beliefs in relation to illness. Scores range between 0 and 54 on the SHAI, with the score on each item ranging between 0 and 3. The SHAI has also been used to assess health anxiety in a recent study by Wheaton et al. (2021a), investigating the role of uncertainty in OCD symptom severity and health anxiety during the COVID-19 pandemic. A systematic review by Alberts et al. (2013) found the SHAI to have good-to-excellent internal consistency, with Cronbach alpha coefficients ranging between $\alpha = 0.74$ and $\alpha = 0.96$.

To assess the impact of the current pandemic on activities of daily living, we introduced a brief COVID-19 Impact measure (see Appendix) that consists of 12 self-report items (9 Likert scale and 3 open-ended items). The open-ended items focused on the impact that the pandemic has had on daily life, on treatment or therapy that participants may have been receiving prior to lockdown, as well as on the impact that social distancing and isolation may have had on mental and physical wellbeing.

Procedure

Due to restrictions on recruitment as a result of lockdown legislature in the United Kingdom, the study was administered remotely using the Online Surveys (previously Bristol Online Surveys) platform. Participants were provided with information about the study, as well as what participation entailed, prior to consent being sought. Once consent was provided, participants gained access to the three separate measures (i.e. OCI-R, SHAI, and COVID-19 Impact measure, respectively), and were required to complete all sections in order for responses to be captured.

Upon completion of the three measures, participants received a comprehensive study debrief. Participants were informed of their right to withdraw from the study. The survey was set up to ensure that all responses captured were anonymised and that confidentiality was upheld. Access to the responses stored within the Online Surveys platform was restricted only to the primary researcher. Response data was exported to an excel file, with the primary research scanning data to ensure that all identifiable information had been

removed. The excel file was subsequently password protected and stored data prepared for analysis.

Statistical analysis

A mixed methods design was used, with the integration of quantitative and qualitative survey data providing greater granularity and rigour in comparison to monomethod survey designs (e.g. Creswell & Hirose, 2019). Scores on each of the six OCI-R sub-scales and on each of the two SHAI sub-scales were considered in relation to scores on the COVID Impact measure.

Data collated from the OCI-R, SHAI and the COVID-19 Impact measure were analysed using SPSS for Windows version 25. Responses from participants who scored below the optimal OCI-R cut-off score of 21 ($n = 78$) were excluded from the analysis. The analysis therefore included responses from participants with an overall OCI-R score of ≥ 21 ($n = 254$).

Factor analysis of the Likert scale items on the COVID-19 Impact measure was performed to identify any sub-scales of this newly generated instrument. Two canonical correlation analyses were then performed, with the first one including the six OCI-R sub-scales and the second one the two SHAI sub-scales as predictors of the two COVID-19 Impact measure sub-scales that had established using factor analysis ("hand-washing", "distress avoidance").

Qualitative data collated from the free-text items in the COVID-19 Impact measure were explored using content analysis. Three coders classified the data independently, following a coding protocol. Non-study content was initially classified in order to establish intercoder reliability before access was provided to anonymised free-text data. The coding protocol consisted of 1) familiarisation with free-text study data, 2) generation of initial codes, 3) identification of emerging themes, 4) review of themes, and 5) labelling of themes (Anderson, 2010; Vaismoradi et al., 2013). The consistent categorisation of study content was assessed through intercoder reliability (Cavanagh, 1997). A frequency distribution of terms, concepts, and behaviours was conducted.

Results

Descriptive data

Data analysis was restricted to participants scoring at or above the optimal total OCI-R cut-off score of 21 ($N = 254$), with the age ranges and gender split of the sample provided in Table 1. Descriptive statistics for the total OCI-R and SHAI scores, as well as their respective subscales (OCI-R: washing, checking, ordering, neutralising, obsessional, hoarding; SHAI: health anxiety, health beliefs) as provided in Table 2. Additionally, this table contains the descriptive statistics for two COVID-19 Impact measure sub-scores, which are based on the four (i.e.

Table 1. Participants by age and gender ratio.

	18–29 years of age	30–49 years of age	>50 years of age
Number of participants recruited (n = 332)	175	132	25
Number of participants scoring above OCI-R cut-off (n = 254)	137	99	18
Male: Female Ratio of participants scoring above OCI-R cut-off (n = 254)	1:12	1:9	1:2.6

Table 2. OCI-R, SHAI and COVID-19 impact measure descriptive statistics.

	Minimum	Maximum	Mean	Standard deviation
OCI-R				
Total	21	69	36.01	10.64
Washing	0	12	7.18	3.91
Checking	0	12	6.04	3.18
Ordering	0	12	6.08	3.60
Neutralising	0	12	4.05	3.62
Obsessional	0	12	8.72	3.07
Hoarding	0	12	3.93	3.07
SHAI				
Total	3	52	27.31	10.38
Health anxiety	2	40	22.09	8.39
Health beliefs	0	12	5.22	2.95
COVID-19 impact measure				
Hand-washing behaviour (items 1, 2, 3, and 4)	4	14	10.84	2.11
Distress avoidance (item 6, inverted items 5 and 7)	1	10	5.47	1.91

Data are reported for a sample of N = 254 individuals with no missing values. OCI-R=Obsessive-Compulsive Inventory – Revised edition, SHAI= Short Health Anxiety Inventory.

items 1, 2, 3 and 4) and three (i.e. items 5, 6 and 7) Likert scale items of the questionnaire. These two components explained 38.3% and 16.8% of the variance, respectively, as determined by a factor analysis.

Whilst the first four items all loaded positively on the first component ("hand-washing behaviour"), items 5 and 7 loaded negatively on the second component and were therefore inverted to match the direction of item 6, which loaded positively on this component ("distress avoidance"). Hand-washing behaviour was therefore defined as the frequency of hand washing,

and thoughts about hand washing, as well as the amount of time spent washing hands. Distress avoidance was defined as the avoidance of pandemic-related media coverage and actively thinking about the pandemic, in order to minimise the distress experienced by environmental and internal triggers.

One outlier was identified for the COVID-19 Impact measure hand-washing behaviour component. Data from this participant were excluded from any correlational analyses. No further outliers were present in the other measures.

Canonical correlation analysis to investigate the association between OCD-subtypes and the impact of COVID-19

Six OCI-R sub-scale scores and two COVID-19 Impact measure component scores per participant were included in a canonical correlation analysis investigating the multivariate shared associations between the two sets of sub-scale scores. Two functions were found with squared canonical correlations (R_c^2) of .28 and .03, respectively. The full model was evaluated using a Wilk's lambda test and found to be statistically significant, $F(12,490) = 8.14$, $p = 0.001$. The dimension reduction analysis established that function 2 did not explain a statistically significant amount of variance between the OCI-R and COVID-19 Impact measure sub-scale scores, $F(5, 246) = 1.71$, $p = 0.13$. Therefore, only function 1 is considered in the following. Table 3 shows the standardised canonical function coefficients and structure coefficients for function 1 in relation to the OCI-R and COVID-19 Impact measure sub-scales.

Table 3. Canonical Solution for OCI-R predicting COVID-19 Impact Measure for Function 1.

	Function 1		
Variable	Coef	r_s	r_s^2 (%)
OCI-R			
Washing	−.92	−.95	90.25
Checking	−.26	−.36	12.96
Ordering	−.06	−.05	0.25
Neutralising	.01	−.13	1.69
Obsessional	.03	−.05	0.25
Hoarding	.19	.17	2.89
R_c^2			28.07
COVID-19 Impact Measure			
Hand-washing	−.96	−.99	98.01
Distress avoidance	.11	.45	20.25

Structure coefficients (r_s) $>|.3|$ indicating a moderate or large correlation are underlined.
Coef = standardised canonical function coefficient; r_s = structure coefficient; r_s^2 = squared structure coefficient.

Relevant OCI-R sub-scales were mainly washing and checking with the structure coefficients indicating a large and moderate negative relationship with function 1. Both COVID-19 sub-scales showed an association with function 1, with hand-washing and distress avoidance exhibiting a strong negative and moderate positive relationship with function 1 respectively. Overall, the results indicate a positive association of OCI-R washing and checking with the hand-washing sub-scale of the COVID-19 Impact Measure and a negative relationship of OCI-R washing and checking with the distress avoidance sub-scale of the COVID-19 Impact Measure.

Canonical correlation analysis to investigate the association between health anxiety/beliefs and the impact of COVID-19

An analogous canonical correlation analysis approach as described in the previous section was adopted to investigate the multivariate shared associations between the two sub-scales of the SHAI and the two COVID-19 Impact measure component scores. Two functions were found with squared canonical correlations (R_c^2) of .12 and .01, respectively. The full model was evaluated using a Wilk's lambda test and found to be statistically significant, $F\ (4, 498) = 8.18$, $p = 0.001$. The dimension reduction analysis established that function 2 did not explain a statistically significant amount of variance between the SHAI and COVID-19 Impact measure sub-scale scores, $F\ (1, 250) = 1.4$, $p = .24$. Therefore, only function 1 is considered in the following. Table 4 shows the standardised canonical function coefficients and structure coefficients for function 1 in relation to the SHAI and COVID-19 Impact measure sub-scales.

Both SHAI sub-scales' structure coefficients indicated a large positive relationship with function 1. Both COVID-19 sub-scales showed an association with

Table 4. Canonical Solution for SHAI predicting COVID-19 Impact Measure for Function 1.

	Function 1		
Variable	Coef	r_s	r_s^2 (%)
SHAI			
Health anxiety	.74	<u>.95</u>	90.25
Health beliefs	.37	<u>.8</u>	64
R_c^2			11.46
COVID-19 Impact Measure			
Hand-washing	.57	<u>.79</u>	62.41
Distress avoidance	−.65	<u>−.85</u>	72.25

Structure coefficients (r_s) $>|.3|$ indicating a moderate or large correlation are underlined.
Coef = standardised canonical function coefficient; r_s = structure coefficient; r_s^2 = squared structure coefficient.

function 1, with hand-washing and distress avoidance exhibiting a strong positive and negative relationship with function 1 respectively. Overall, the results indicate a positive association of SHAI health anxiety and health beliefs with the hand-washing sub-scale of the COVID-19 Impact Measure and a negative relationship of SHAI health anxiety and health beliefs with the distress avoidance sub-scale of the COVID-19 Impact Measure. This suggests that the greater the health anxiety and perception of the negative consequences of becoming ill individuals experience, the more likely they are to score higher on hand-washing behaviour but lower on distress avoidance (i.e. they are better at avoiding cues that trigger distress).

Content analysis: Exploring the impact of the pandemic

Qualitative data collated from the COVID-19 Impact measure (items 8, 9 and 10) were explored using content analysis. To establish intercoder reliability (ICR), three independent coders analysed the data using a double-coding approach, enhancing the rigor and validity of the analysis (O'Connor & Joffe, 2020). Percentage agreement between the coders at two separate intervals revealed reliability coefficients of 0.62 and 0.60, suggesting substantial intercoder agreement (Landis & Koch, 1977). Identification of themes that emerged from the data illustrated the negative impact that the pandemic has had on mental and physical wellbeing, as well as the degree of disruption to maintenance treatment during this time.

Content analysis: Impact of the pandemic on health, lifestyle and work. Items 8 and 10 on the COVID-19 Impact measure explored participants' accounts of the effect that the pandemic had on activities of daily living, as well as on mental and physical wellbeing, respectively. Upon identification of the initial codes and emerging themes, there was substantial agreement between the coders of the significant overlap between the codes identified for items 8 and 10, with the three coders subsequently unanimously agreeing to merge the codes for these two items when generating themes that related to the impact of the pandemic on wellbeing and lifestyle. As such, coding of responses across both items resulted in the generation of four themes, and a further 5 sub-themes (Table 3).

As illustrated in Table 5, the majority of participants with symptoms of OCD reported that their mental health was affected by the pandemic. Specifically, 57% reported that the pandemic and the government restrictions had a negative impact on their mental wellbeing. Common responses include reference to experiences of fear and anxiety (e.g. *"My contamination fears are worse"*, *"The pandemic has brought a lot of my fears to life. Because of this, I find it harder to resist compulsions"*, and *"Completely overwhelmed by feelings of fear and anxiety"*).

In addition, 22% reported that the pandemic and restrictions had a noticeable negative impact on their physical health. Common responses made

Table 5. Quantitative content analysis of items 8 and 10 (n = 251 per item): frequency of terms describing the impact of the pandemic, and of government restrictions, on daily life.

Theme (sub-theme)	Frequency	Percentage
Impact on mental health (negative impact) (positive impact)	312 (287) (25)	62.15% (57.17%) (4.98%)
Impact on physical health (negative impact) (positive impact)	133 (109) (24)	26.49% (21.71%) (4.78%)
Impact on social life (isolation)	32 (23)	6.38% (4.58%)
Financial and occupational impact	25	4.98%
Total	502	100%

reference to the impact of the restrictions during lockdown on participants' physical wellbeing and, by extension, mental health (e.g. *"Physically not as active as I would normally be, mentally feeling locked, much more anxious about OCD and depression"*, *"I'm not exercising due to my OCD"*, and *"I stay physically active but I've been drinking more not in an extreme or worrying way but doing it to quash anxiety and worried this is a slippery slope"*).

Fewer than one in ten responses referred specifically to social isolation. Whilst unexpected, this may be explained by the history of social withdrawal in response to debilitating anxiety reported by individuals with OCD (e.g. Grisham et al., 2011). Responses made reference to such a history of isolation but with increasing loneliness during the pandemic (e.g. *"OCD has meant I was already pretty much isolated and completely socially distant so hasn't had that much change, feel a bit more isolated and lonely"*, and *"Social distancing has made my compulsions a lot worse because people who are usually there to help discourage my behaviours aren't there anymore"*).

Approximately 5% of responses made reference to the occupational and financial impact that the pandemic and restrictions have had. Specifically, participants reported feeling more anxious about having to go to work where this was required (e.g. healthcare, teaching), as well as feeling anxious for the future (e.g. loss of work or income). Responses also made reference to feeling responsible for the wellbeing of others (e.g. *"I work as a teacher and haven't been able to make it to my place of work because I am so fearful of doing something wrong or perceiving that I have done something wrong. My main concern is the health of others not mine!"*, *"I fear what the long-term fallout will be when the pandemic subsides"*, and *"I've been signed off work with OCD and GAD for fear of causing illness to colleagues and children I work with"*).

Content analysis: Impact of the pandemic on treatment. Responses to item 9 were explored separately by the three coders. Substantial agreement was reported on the codes identified from the data collated for this item. Upon review of the emerging themes, agreement was reached on fourthemes identified by the

Table 6. Quantitative content analysis of item 9 (n = 239): frequency of terms describing the impact of the pandemic on ongoing therapy and maintenance treatment.

Theme (sub-theme)	Frequency	Percentage
Change to delivery (virtual delivery)	80 (61)	33.47% (25.52%)
Disruption to treatment	67	28.03%
New treatment or therapy	18	7.53%
No impact on treatment/therapy	74	30.96%
Total	239	100%

coders, in relation to the impact that the pandemic had on treatment or therapy received, or due to be received (see table 6).

Insert Table 6 here please

Overall, 61.5% of participants reported either disruption to, or a change in, the delivery of treatment as a result of the pandemic. One in four participants, specifically, reported that they had been offered a virtual alternative to face-to-face sessions and consultations. Up to 31% of participants, however, reported that the pandemic did not impact on their ongoing therapy. Common responses either made reference to significant disruption to services or to little impact on maintenance treatment (e.g. *"Ongoing treatment has been stopped due to COVID-19"*, *"My therapy is by phone now, not in person. I find that harder"*, and *"Am following CBT Exposure Therapy as advised last year"*).

Discussion

This study investigated the impact of the COVID-19 pandemic on individuals with obsessive-compulsive symptoms. A total of 332 participants were recruited and completed three separate measures that assessed symptoms and traits of OCD, health anxiety and beliefs, and the impact of the pandemic on specific activities of daily living. Data from participants scoring below the optimal cut-off score on the OCI-R were excluded from the analysis. Of participants scoring at or above the optimal OCI-R cut-off score (n = 254), responses were considered in relation to the six OCI-R symptom dimension subscales. Statistical analysis revealed a significant association between the washing and checking OCI-R sub-scales with hand-washing and distress avoidance on the COVID-19 Impact measure. As such, participants with predominant washing/cleaning, as well as checking, symptoms reported a greater impact of hand washing behaviour (i.e. increase in duration and frequency of handwashing) on activities of daily living.

This finding was consistent with earlier reports of a deterioration in washing-related symptoms during the pandemic in patients with a primary diagnosis of OCD. Specifically, Jelinek et al. (2021) identified a marked worsening in washing/cleaning symptom severity in a sample of German adults with OCD, as

assessed using the OCI-R as well. Tanir et al. (2020) also reported a significant deterioration in washing/cleaning compulsions and contamination obsessions in a Turkish sample of children and adolescents (n = 61). The current study, based on an adult OCD sample in the UK, supports these earlier findings.

The distress-avoidance component of the COVID-19 Impact measure produced a significant negative correlation with both the OCI-R washing and checking subscales. This suggests that participants with predominant washing and checking OCD symptoms demonstrated less distress avoidance. Specifically, these participants reported that the distress experienced by following pandemic-related media coverage influenced how often they engaged with this media coverage. It has previously been established that experiential and behavioural avoidance are associated with ritualistic, compulsive behaviour (Hassoulas et al., 2014; Rachman, 1976). French and Lyne (2020) reported a deterioration in compulsive washing behaviour in a patient with OCD following exposure to pandemic-related media. This is consistent with the current study, where participants with washing and checking OCD symptoms reported that media coverage of the pandemic caused significant distress, which in turn influenced the frequency of media-following. These participants are therefore better at avoiding exposure to aversive stimuli that carry the potential to cause distress. The association between only certain OCI-R subscales (specifically, washing/cleaning and chechking) and the two COVID-19 Impact measure components further demonstrates the heterogenous nature of the condition (Glahn et al., 2015; McKay et al., 2004).

Furthermore, significant correlations were found between both COVID-19 Impact measure components and the two subscales of the SHAI (i.e. health anxiety and beliefs). Once again, a positive correlation was revealed between the COVID-19 Impact measure hand washing component and the two SHAI subscales, whilst a negative correlation was found between the distress avoidance component and the SHAI subscales. The direction of these associations also mirrored the direction of the relationships reported between the respective COVID-19 Impact measure components and the OCI-R washing and checking subscales. Therefore, the higher the health anxiety experienced and the worse the perceived negative consequences of the pandemic were, the greater the hand washing behaviour exhibited and avoidance of cues that may cause distress. Similarly, Wheaton et al. (2021b) revealed that individuals with self-identified OCD reported difficulty differentiating between excessive and reasonable behavioural responses to the threat posed by the pandemic. This is demonstrated further through the findings of the content analysis, with over half of participants with OCD symptoms reporting a deterioration in mental wellbeing as a result of the pandemic.

Participants reported experiencing overwhelming fear and anxiety during the pandemic, leading to a worsening in contamination-related compulsive behaviours. In turn, the fear and anxiety experienced reportedly led to an increase in

distress caused by pandemic-related media coverage, influencing the frequency of engagement with media platforms. The anxiety experienced during the pandemic also had an impact on physical wellbeing, with 1 in 5 participants reporting a deterioration in their physical health due to worsening OCD symptoms. Specifically, participants reported a direct impact of pandemic-related anxiety on their levels of physical activity, as well as an indirect impact of anxiety on physical activity through the acquisition of certain health-compromising behaviours (e.g. increased alcohol consumption).

A majority of participants also reported a change or disruption to their treatment due to the pandemic. A quarter of participants reporting a shift to virtual consultations and treatment delivery, with participants also reporting consultations taking place by telephone. The majority of responses also emphasised that participants did not find alternative modalities of delivery to be as beneficial as face-to-face consultations and therapy. Whilst the lack of in-person interaction contributed to an increase in feelings of isolation and feeling "locked-in", participants also reported fearing human contact due to excessive worry over potentially spreading coronavirus to vulnerable people. This highlights the dilemma that many people with OCD face during the pandemic: experiencing excessive fear and anxiety over the possibility of spreading the virus to others whilst reporting a worsening of symptoms and increased social isolation as a result of this very fear and anxiety.

Whilst this study replicated earlier findings in relation to the impact of the pandemic on OCD washing/cleaning symptoms, significant associations were also reported between the OCI-R checking subscale and the COVID-19 Impact measure subscales. This suggests that individuals with checking symptoms are also at an increased risk of experiencing significant disruption to activities of daily living due to a reported increase in hygiene behaviours and avoidance of cues, such as media coverage of the pandemic, that may cause distress.

Rachman (1976) had previously distinguished between two different types of avoidance behaviour in OCD: active and passive avoidance strategies. Active avoidance was defined as being "punished if you don't", whilst passive avoidance was defined as being "punished if you do" (p.271). Certain sub-types of OCD were associated with either active or passive avoidance. For instance, checking was associated mostly with active avoidance (i.e. being punished, or experiencing distress, if a patient does not check the door a certain number of times before going to bed), whilst cleaning was associated mostly with a passive avoidance (i.e. being punished, or experiencing distress, if a patient touches an object that is perceived as being contaminated). It is therefore not surprising that significant associations were revealed between the distress avoidance subscale on the COVID-19 Impact measure, and the OCI-R washing and checking subscales. In the context of the pandemic, it appears that both active and passive

forms of avoiding exposure to distress-inducing cues contribute to the worsening of washing/cleaning and checking symptoms.

The current study included a sample of participants comparable in size to that of Jelinek et al. (2021) and Wheaton et al. (2021b), as well as findings consistent with the results reported by these earlier studies. A limitation of the current study, however, was the gender skew of the sample, with 90% of the participants who scored at or above the optimal OCI-R cut-off score identifying as female. In addition, 93% of participants were below 50 years of age. The participants who met the inclusion criteria were therefore predominantly young females. Previous studies have, however, identified washing/cleaning as the only OCD symptom dimension with a significantly larger proportion of women than men (Labad et al., 2008; Mathis et al., 2011). In addition, further demographic data in relation to ethnicity could have been collated to investigate OCD symptom severity and health anxiety in ethnic minority groups most adversely affected by the pandemic (i.e. BAME community). Future research would also need to consider the generalisability of the current findings to male OCD patients with other predominant OCD symptoms.

A further consideration would be how these results inform the remote delivery of evidence-based interventions that are tailored to the immediate needs of patients with specific OCD symptoms, as a one-size-fits-all approach may not be the most effective approach given the heterogenous nature of the condition. In this regard, Rosa-Alcazar et al. (2021) reported an association between tailored adaptive strategies and symptom severity in those with OCD. In addition, a review by Jalal et al. (2020) focused on the application of indirect exposure procedures using Smartphone therapy tailored specifically to contamination-related OCD. Fineberg et al. (2020), however, considered whether pharmacological intervention should be first-line in the treatment of contamination-related OCD during the pandemic. These considerations, along with the findings reported in this and other related studies, highlight the need for a subtype-tailored and targeted approach in the management of contamination and checking OCD, with a focus on hand-washing and distress avoidance behaviours specifically.

Conclusion

Whilst the COVID-19 pandemic is anticipated to have had an adverse effect on individuals with OCD more generally, the current study highlights the impact of the pandemic on individuals with contamination and checking-related OCD symptoms. These particular subgroups of participants reported an increase in duration and frequency of handwashing during the pandemic, as well as engagement with media outlets being modulated by the degree of distress experienced. Significant associations were also revealed between participants who reported higher levels of health anxiety, across all six OCD subgroups, and both

components of the COVID-19 Impact measure (i.e. handwashing and distress-avoidance) in Appendix. Exacerbated fear and anxiety (due to concerns of transmitting the virus to others), increased social isolation, and disruption to ongoing treatment have also reportedly led to a worsening in OCD symptom severity. The findings of the current study are consistent with the results reported by recent similar studies on OCD during the pandemic and highlight the need for tailored support to be delivered to this patient group.

Appendix

COVID-19 Impact Measure

Please select your age range

18–29 years	30–39 years	40–49 years	50–59 years
60–69 years	70–79 years	≥80 years	

Please select your gender

Female	Male	Other	refer not to say

a. How thoroughly have you been washing your hands since the coronavirus (COVID-19) pandemic was announced?
b. Less than recommended
c. Somewhat less than recommended
d. As recommended (20 seconds each time)
e. More than has been recommended
f. Significantly more than recommended (≥60 seconds)

2. How frequently have you been washing your hands since the coronavirus (COVID-19) pandemic was announced?

a. Not at all
b. Less than usual
c. Same as usual
d. More than usual
e. Much more than usual

3. Over the last two weeks, are you washing your hands more frequently than before the coronavirus (COVID-19) pandemic was announced?

a. Yes
b. No

4. Have you been worried about contamination since the coronavirus (COVID-19) pandemic was announced?
a. Not at all
b. Less than usual
c. Same as usual
d. More than usual
e. Much more than usual

5. How frequently have you been following the news or social media on updates in relation to coronavirus (COVID-19) outbreak?
a. Not at all
b. Once a day
c. A few times a day
d. Often in the day
e. Constantly

6. Is the coverage of the coronavirus (COVID-19) pandemic in the news and on social media causing you distress?
a. No
b. Somewhat
c. Yes

7. How frequently do you find that you are thinking about the coronavirus (COVID-19) pandemic since it was announced?
a. Not at all
b. Once a day
c. A few times a day
d. Often in the day
e. Constantly

8. How specifically has the coronavirus (COVID-19) pandemic influenced your daily life?
9. Has the coronavirus (COVID-19) pandemic influenced any treatment or therapy you may be receiving?
10. How would you describe the impact that lockdown and social distancing have had on your mental and physical wellbeing?

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Ethical standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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References

Abramovitch, A., Abramowitz, J. S., Riemann, B. C., & McKay, D. (2020). Severity benchmarks and contemporary clinical norms for the Obsessive-Compulsive Inventory-Revised (OCIR). *Journal of Obsessive-Compulsive and Related Disorders, 27*, (100557). https://doi.org/10.1016/j.jocrd.2020.100557

Alberts, N. M., Hadjistavropoulos, H. D., Jones, S. L., & Sharpe, D. (2013). The short health anxiety inventory: A systematic review and meta-analysis. *Journal of Anxiety Disorders*, *27*(1), 68–78. https://doi.org/10.1016/j.janxdis.2012.10.009

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed).

Anderson, C. (2010). Presenting and evaluating qualitative research. *American Journal of Pharmaceutical Education*, *74*(8), 141. https://doi.org/10.5688/aj7408141

Assari, S., & Habibzadeh, P. (2020). The COVID-19 emergency response should include a mental health component. *Archives of Iranian Medicine*, *23*(4), 281–282. https://doi.org/10.34172/aim.2020.12.

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

Bavel, J. J. V., Baicker, K., Boggio, P. S., Capraro, V., Cichocka, A., Cikara, M., Crockett, M. J., Crum, A. J., Douglas, K. M., Druckman, J. N., Drury, J., Dube, O., Ellemers, N., Finkel, E. J., Fowler, J. H., Gelfand, M., Han, S., Haslam, S. A., Jetten, J., . . . Willer, R. (2020). Using social and behavioural science to support COVID-19 pandemic response. *Nature Human Behaviour*, *4*(5), 460–471. https://doi.org/10.1038/s41562-020-0884-z

Belloch, A., Roncero, M., García-Soriano, G., Carrió, C., Cabedo, E., & Fernández-Álvarez, H. (2013). The Spanish version of the Obsessive-Compulsive Inventory-Revised (OCI-R): reliability, validity, diagnostic accuracy, and sensitivity to treatment

effects in clinical samples. *Journal of Obsessive-Compulsive and Related Disorders*, *2*(3), 249–256. https://doi.org/10.1016/j.jocrd.2013.05.001.

Blakey, S. M., & Abramowitz, J. S. (2017). Psychological predictors of health anxiety in response to the zika virus. *Journal of Clinical Psychology in Medical Settings*, *24*(3–4), 270–278. https://doi.org/10.1007/s10880-017-9514-y

Blakey, S. M., Reuman, L., Jacoby, R. J., & Abramowitz, J. S. (2015). Tracing "fearbola": Psychological predictors of anxious responding to the threat of ebola. *Cognitive Therapy and Research*, *39*(6), 816–825. https://doi.org/10.1007/s10608-015-9701-9

Brand, J., McKay, D., Wheaton, M. G., & Abramowitz, S. (2013). The relationship between obsessive compulsive beliefs and symptoms, anxiety and disgust sensitivity, and swine flu fears. *Journal of Obsessive-Compulsive and Related Disorders*, *2*(2), 200–206. https://doi.org/10.1016/j.jocrd.2013.01.007

Cavanagh, S. (1997). Content analysis: Concepts, methods and applications. *Nurse Researcher*, *4*(3), 5–16.

Creswell, J. W., & Hirose, M. (2019). Mixed methods and survey research in family medicine and community health. *Family Medicine and Community Health*, *7*(2), e000086. https://doi.org/10.1136/fmch-2018-000086

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. *Psychiatry Research*, *291*, 113213. https://doi.org/10.1016/j.psychres.2020.113213

Fineberg, N. A., Van Ameringen, M., Drummond, L., Hollander, E., Stein, D. J., Geller, D., Walitza, S., Pallanti, S., Pellegrini, L., Zohar, J., Rodriguez, C. I., Menchon, J. M., Morgado, P., Mpavaenda, D., Fontenelle, L. F., Feusner, J. D., Grassi, G., Lochner, C., Veltman, D. J., . . . Dell'Osso, B. (2020). How to manage obsessive-compulsive disorder (OCD) under COVID-19: A clinician's guide from the international college of obsessive compulsive spectrum disorders (ICOCS) and the Obsessive-Compulsive and related disorders research network (OCRN) of the European College of Neuropsychopharmacology. *Comprehensive Psychiatry*, *100*, 152174. https://doi.org/10.1016/j.comppsych.2020.152174

Foa, E. B., Huppert, J. D., Leiberg, S., Langner, R., Kichic, R., Hajcak, G., & Salkovskis, P. M. (2002). The obsessive-compulsive inventory: Development and validation of a short version. *Psychological Assessment*, *14*(4), 485–496.

French, I., & Lyne, J. (2020). Acute exacerbation of OCD symptoms precipitated by media reports of COVID-19. *Irish Journal of Psychological Medicine*, *37*(4), 291–294. https://doi.org/10.1017/ipm.2020.61

Glahn, A., Prell, T., Grosskreutz, J., Peschel, T., & Müller-Vahl, K. R. (2015). Obsessive-compulsive disorder is a heterogeneous disorder: Evidence from diffusion tensor imaging and magnetization transfer imagine. *BMC Psychiatry*, *15*, 135. https://doi.org/10.1186/s12888-015-0535-5

Grisham, J. R., Fullana, M. A., Mataix-Cols, D., Moffitt, T. E., Caspi, A., & Poulton, R. (2011). Risk factors prospectively associated with adult obsessive-compulsive symptom dimensions and obsessive-compulsive disorder. *Psychological Medicine*, *41*(12), 2495–2506. https://doi.org/10.1017/S0033291711000894

Hassoulas, A., McHugh, L., & Reed, P. (2013). Avoidance and behavioural flexibility in obsessive compulsive disorder. *Journal of Anxiety Disorders, 28*, 148–153. 26 https://doi.org/10.1016/j.janxdis.2013.05.002

Jalal, B., Chamberlain, S., Robbin, T., & Sahakian, B. (2020). Obsessive-compulsive disorder—Contamination fears, features and treatment: Novel smartphone therapies in light of global mental health and pandemic (COVID-19). CNS Spectrums, 1–9. https://doi.org/10.1017/S1092852920001947

Jelinek, L., Moritz, S., Miegel, F., & Voderholzer, U. (2021). Obsessive-compulsive disorder during COVID-19: Turning a problem into an opportunity? *Journal of Anxiety Disorders*, *77*, 102329. https://doi.org/10.1016/j.janxdis.2020.

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the national comorbidity survey replication. *Archives of General Psychiatry*, *62*(6), 593–602.

Labad, J., Menchon, M. J., Alonso, O., Segala, C., Jimenez, S., Jaurrieta, N., Leckman, J. F., & Vallejo, J. (2008). Gender differences in obsessive-compulsive symptom dimensions. *Depression and Anxiety*, *25*(10), 832–838.

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, *33*(1), 159–174.

Leckman, J. F., Rauch, S. L., & Mataix-Cols, D. (2007). Symptom dimensions in obsessive-compulsive disorder: Implications for the DSM-V. *CMS Spectrums*, *12*(5), 376–387.

Leckman, J. F., Bloch, M. H., & King, R. A. (2009). Symptom dimensions and subtypes of obsessive-compulsive disorder: A developmental perspective. *Dialogues in Clinical Neuroscience*, *11*(1), 21–33.

Liu, Y., Gu, Z., Xia, S., Shi, B., Zhou, X.-N., Shi, Y., & Liu, J. (2020). What are the underlying transmission patterns of COVID-19 outbreak? An age-specific social contact characterization. *EClinicalMedicine*, *22*, 100354. https://doi.org/10.1016/j.eclinm.2020

Mataix-Cols, D., Rosario-Campos, M. C., & Leckman, J. F. (2005). A multidimensional model of obsessive-compulsive disorder. *The American Journal of Psychiatry*, *162*(2), 228–238.

Mathis, M. A., Alvarenga, P. D., Funaro, G., Torresan, R. C., Moraes, I., Torres, A. R., Zilberman, M. L., & Hounie, A. G. (2011). Gender differences in obsessive-compulsive disorder: A literature review. *Revista Brasileira de Psiquiatria (Sao Paulo, Brazil: 1999)*, *33*(4), 390–399. https://doi.org/10.1590/s1516-44462011000400014

McKay, D., Abramowitz, J. S., Calamari, J. E., Kyrios, M., Radomsky, A., Sookman, D., Taylor, S., & Wilhelm, S. (2004). A critical evaluation of obsessive-compulsive disorder subtypes: Symptoms versus mechanisms. *Clinical Psychology Review*, *24*(3), 283–313.

O'Connor, C., & Joffe, H. (2020). Intercoder reliability in qualitative research: Debates and practical guidelines. *International Journal of Qualitative Methods*, *19*, 1609406919899220.

Pfefferbaum, B., & North, C. S. (2020). Mental health and the covid-19 pandemic. *The New England Journal of Medicine*, *383*(6), 510–512. https://doi.org/10.1056/NEJMp2008017.

Rachman, S. (1976). Obsessional-compulsive checking. *Behaviour Research and Therapy*, *14*(4), 269–277.

Rosa-Alcazar, A., Garcia-Hernandez, M. D., Parada-Navas, J. L., Olivares-Olivares, P. J., Martinez-Murillo, S., & Rosa-Alcazar, A. I. (2021). Coping strategies in obsessive-compulsive patients during COVID-19 lockdown. *International Journal of Clinical and Health Psychology*, *21*(2), 100223. https://doi.org/10.1016/j.ijchp.2021.

Salkovskis, P. M., Rimes, K. A., Warwick, H. M., & Clark, D. M. (2002). The health anxiety inventory: Development and validation of scales for the measurement of health anxiety and hypochondriasis. *Psychological Medicine*, *32*(5), 843–853.

Shafran, R., Coughtrey, A., & Whittal, M. (2020). Recognising and addressing the impact of COVID-19 on obsessive-compulsive disorder. *The Lancet Psychiatry*, *7*(7), 570–572.

Tanir, Y., Karayagmurlu, A., Kaya, İ., Kaynar, T. B., Türkmen, G., Dambasan, B. N., Meral, Y., & Coşkun, M. (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

Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing & Health Sciences*, *15*(3), 398–405.

Wheaton, M. G., Messner, G. R., & Marks, J. B. (2021a). Intolerance of uncertainty as a factor linking obsessive-compulsive symptoms, health anxiety and concerns about the spread of novel coronavirus (COVID-19) in the United States. *Journal of Obsessive-Compulsive and Related Disorders*, *28*, 100605. https://doi.org/10.1016/j.jocrd.2020

Wheaton, M. G., Ward, H. E., Silber, A., McIngvale, E., & Björgvinsson, T. (2021b). How is the COVID-19 pandemic affecting individuals with obsessive-compulsive disorder (OCD) symptoms? *Journal of Anxiety Disorders*, *81*, 102410. https://doi.org/10.1016/j.janxdis.2021.102410

World Health Organization. (2018). *International classification of diseases for mortality and morbidity statistics* (11th revision). https://icd.who.int/browse11/l-m/en

World Health Organization. (2020). Novel coronavirus (2019-nCoV): Situation report, 19.

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