Washing Obsessive-Compulsive Symptoms as Adaptation – Insights from a 3-Year Longitudinal Cohort

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Abstract

Background: Stressful events are one cause for the emergence and/or worsening of obsessive-compulsive symptoms. The public health measures employed to prevent the contraction of the COVID-19 virus overlap with common behaviors adopted by people diagnosed with obsessive-compulsive disorder. Thus, we decided to study the longitudinal impact of the pandemic in the general Portuguese population assessed with the Obsessive-Compulsive Inventory (OCI-R), and the Depressive, Anxiety, and Stress Scale (DASS-21).

Methods: One hundred and eighty nine participants reported their scores at three different time-points of the pandemic in Portugal: March of 2020, March of 2021, and March of 2022. Non-parametric analysis of repeated measures, were performed on the OCI-R and DASS-21 scores to analyze differences in the levels of symptomatology throughout time.

Results: We found statistically significant differences with time in the OCI-R total and washing subscale scores, as well as in the anxiety subscale of DASS-21 score. For OCI-R total, we found significantly higher scores in 2020 compared to 2021 and 2022, and for the washing subscale we found statistically significant decreases with time. In terms of anxiety scores, we found significantly lower symptoms in 2021 compared to the others.

Conclusions: The reliance on the washing-like behaviors to contain the pandemic spreading explains its augmented scores in the acute phases of the pandemic and thus the continuous decrease of symptomatology with time. For anxiety, both the beginning and the end of the pandemic seem to have posed a threat, leading to an increase in worry and hypervigilance. In general, our results demonstrate the adaptative nature of humans and the instrumental role of psychological distress to cope with the world around us.

Background

The COVID-19 pandemic led to a worldwide state of crisis with a significant impact on the mental health of the general population. The literature has been documenting extensively the surfacing of acute mental health responses to this pandemic, expressed mainly through symptoms of anxiety, depression, and stress (1–3). However, stressful events are also one of the possible causes for the onset and/or worsening of obsessive-compulsive (OC) symptoms (4). Coupled with the widespread panic associated with the fear of contracting this new virus, the absence of knowledge about its transmission, the lack of treatment options during the first waves of this pandemic, and the further reliance on public health measures such as washing hands and refraining from touching possible contaminated objects to contain the spreading of the virus, there were particularly vulnerable times to the expression of obsessive-compulsive symptoms in clinical (5) and non-clinical samples (4). Indeed, the literature reveals that the burden posed by this pandemic on people previously diagnosed with mental health disorders affected particularly those people suffering from Obsessive Compulsive Disorder (OCD), given
the overlapping between the public measures and disease symptoms, making the nature of the behaviors and the cognitive bias associated with this psychopathology intricate (6–8).

The intolerance to uncertainty, a trait commonly expressed by people with OCD, may contribute to this additional difficulty when facing such unprecedented times. Moreover, the stakeholders’ messages, constantly covered in media reports, conveying this need for hypervigilance and assurance-seeking behaviors regarding hygiene and precautionary health measures, may explain why within all dimensions of OCD, contamination and checking related symptoms have been demonstrating special relevance and association with poorer outcomes during the pandemic context (7). To deal with the insecurity and the illness unfamiliarity, people may compensate by extreme adherence to public health measures and complete isolation, contributing to the burden on their mental health (9). General public's inexperience with these behaviors may also explain the additional hurdle of adhering to and accepting the changes caused by this novel threat, representing heightened stress responses when comparing with people diagnosed with OCD (10).

To some degree, we can understand the adaptive role of the employment of this type of behavior to fight a pandemic without precedence (6). It seems that greater COVID-related fear and concerns are associated with more prevalence of these obsessive-compulsive symptoms (9). Furthermore, the employment of these contamination preventive measures is also referred to as the cause for more worry and anxiety associated with the pandemic (11), making it difficult to disentangle if the OC-related behaviors are expressed as the result of the insecure context installed worldwide or if they created a mechanism of positive feedback in which both COVID-19 related fear and OC symptoms are mutually exacerbating each other.

Given that all people have been implementing in their routines behaviors typically employed by people with OCD in response to this new stressor, we would like to understand whether the COVID-19 pandemic had such a deleterious impact on people's mental health status as to influence not only the behaviors but also the beliefs associated with them, leading to the emergence of OC-related symptoms in the general population, and consequently, to lasting changes in the way their world is perceived. Therefore, our study aims to analyze the presence of psychological distress and OCD-related symptoms in the general population, as well as their trajectory during three years of living with COVID-19 restrictions. We expect to find higher levels of OCD-related symptoms in the first waves/acute phases of the pandemic as compared to later times, reflecting the instrumental role that those types of symptoms may have represented in the safety of people. Similarly, the same pattern is hypothesized to occur for depression, anxiety, and stress, considering an acute response to the novelty of the stressor, followed by an adaptation through time.

Methods
From an initial Portuguese sample of 2040 adult subjects (detailed methods described in (1,2)), 219 participants responded to the Obsessive Compulsive Inventory-Revised (OCI-R; 12,13) and the Depression, Anxiety and Stress Scale (DASS-21; 14,15) at three time points (2020, 2021, and 2022).

The OCI-R is a self-report scale consisting of 18 items that assess the severity of the OC symptoms in the previous month on a 5-point Likert scale ranging from “Not at all” (0) to “Extremely” (4). It has a Total score (Cronbach's $\alpha^* = 0.888$) and six subscales that represent different symptom dimensions, namely Washing (Cronbach's $\alpha^* = 0.770$), Checking (Cronbach's $\alpha^* = 0.713$), Obsessing (Cronbach's $\alpha^* = 0.798$), Neutralizing (Cronbach's $\alpha^* = 0.692$), Ordering (Cronbach's $\alpha^* = 0.817$), and Hoarding (Cronbach's $\alpha^* = 0.747$).

DASS-21 is a psychometric scale comprising 21 items designed for assessing three types of psychological symptoms: depression, anxiety, and stress. It also provides a total score, with higher scores indicating more severe symptomatology experienced in the preceding week.

In this study, the OCI-R and DASS-21 were applied through an online survey using Google Forms and were used as repeated measures to assess the psychological impact of COVID-19. The initial data collection occurred in March 2020, shortly after the beginning of the first mandatory confinement in Portugal. Subsequent data points were collected during two periods of 2021, about one month after the implementation of a new period of confinement in our country: February and March. In February of 2022, as public health measures in Portugal began to gradually ease, we decided to conduct a new data collection approximately one month later. For the purposes of this study, one-year intervals were considered for repeated measures since the onset of the pandemic in Portugal (i.e., March 2020, March 2021, and March 2022).

Due to the non-normality of the data, Friedman tests, non-parametric analysis of repeated measures, were performed on the OCI-R and DASS-21 scores to analyze differences in the levels of symptomatology throughout time. These were followed by post hoc analyzes to understand the specific time points driving the statistical differences. All statistical analyzes were performed with the JASP software (Version 0.18.3; 16). P values under .05 were considered statistically significant.

All the study procedures here described followed the ethical requirements for human research in agreement with the Declaration of Helsinki, and were accordingly approved by the Ethical Committee for Life Sciences of the University of Minho.

**Results**

Two hundred and nineteen participants responded to our online forms reporting their psychological symptoms measured by OCI-R and DASS-21 in all three timepoints, namely March 2020, March 2021, and March 2022. However, 30 of them reported the existence of a psychiatric diagnosis and thus were excluded from the analysis. A final sample of 189 was considered for the purpose of this study. The
subsample (N = 189, 85.81% female) had a mean age of 39.06 (SD = 11.53) years old and 18.16 (SD = 3.27) mean education years.

Upon examining Figure 1, we observe that, for the OCI-R total and washing subscales, the highest score was registered in 2020, showing a consistent decrease in the symptomatology each subsequent year. For the checking and neutralizing subscale, the highest scores were also in 2020, but the symptomatology decrease in 2021 was followed by a further increase in 2022. In the case of ordering and hoarding symptoms, an inverted V shape was registered, with the highest score observed in 2021. In contrast, the obsessing subscale recorded its highest score in 2022.

Considering the repeated-measures analyzes, there were statistically significant differences in the OCI-R total ($\chi^2(3) = 16.035, p < .001$, Kendall’s $W = 0.042$) and washing subscale ($\chi^2(3) = 137.953, p < .001$, Kendall’s $W = 0.365$). Regarding the post-hoc tests, in OCI-R total, there were statistically significant differences between 2020 and 2021 ($Z = 3.595, \text{pholm} = .001$), and 2020 and 2022 ($Z = 3.327, \text{pholm} = .002$), while for the washing symptoms, there were statistically significant differences between all time points: 2020 vs 2021 ($Z = 8.414, \text{pholm} < .001$), 2020 vs 2022 ($Z = 11.328, \text{pholm} < .001$), and 2021 vs 2022 ($Z = 2.914, \text{pholm} = .004$). In all other five subscales of the OCI-R no statistically significant effect of time was found.

Considering the psychological symptoms assessed with the DASS-21 scale, looking at Figure 2, we can observe that the highest scores for stress, depression, and total scale were registered in 2022 compared to the other two timepoints. By contrast, for anxiety the highest score was observed in 2020. Furthermore, the global pattern of symptoms resembles a V shape, demonstrating a reduction of psychological symptoms in 2021. However, this was not seen for depression, where the symptoms remained unaltered in 2021 and continued to increment in 2022.

Regarding the repeated-measures analyzes, there were only statistically significant differences in the anxiety subscale ($\chi^2(3) = 7.258, p = .027$, Kendall’s $W = 0.019$). Post-hoc analysis revealed that anxiety symptoms in 2021 were significantly lower than in 2020 ($Z = 2.561, \text{pholm} = .011$) and 2022 ($Z = 2.012, \text{pholm} = .045$).

**Discussion**

At a descriptive level, in the acute phase of the pandemic in Portugal (March 2020) there were higher anxiogenic symptoms (DASS-21), total OC symptoms, as well as higher washing, checking and neutralizing scores compared to the other timepoints. In contrast, for obsessing subscale of OCI-R and for total, depressive, and stress levels of DASS-21, the highest scores were seen in 2022, by the time of the end of restrictive measures in Portugal. Moreover, in 2021, we found a peak for ordering and hoarding symptoms.

Although these fluctuations with time accompanying the alterations in the pandemic context be seen at a descriptive level, we only found statistically significant differences with time on the washing subscale
and total score of OCI-R, and the anxiety subscale of DASS-21. Given the similar pattern of findings for OC symptoms, we can assume that the statistically significant changes found in the total scale are driven by the changes found in the washing subscale. In fact, due to the nature of the public health measures enforced during the acute phases, it was expected that this type of symptoms would be more prevalent than others (7). Given the widespread panic and safety-seeking behaviors observed globally, it was suspected that initial levels of washing-like symptomatology would be significantly inflated even in non-clinical samples (4), explaining our significant decrease over time. The continuous decrease observed in the washing scores demonstrates that the exhaustive employment of contamination preventive-like behaviors that could lead to the emergence of a very chronic form of psychopathology was not further maintained.

Interestingly, other reports from the first year of the pandemic seemed to indicate that OC symptoms did not decrease (17), which did not prove to be the case when analysing cohorts during a longer period, as presented in this study. Moreover, the analysis of the pattern of variation in washing obsessive symptoms seems to highlight their adaptive nature and not necessarily a pathological manifestation of the disease (18).

Furthermore, for the anxiety subscale of DASS-21, there was also a significant decrease from the beginning to 2021, followed by an increase in 2022, demonstrating a normative response of our Portuguese sample to threats. In the acute phase (2020) and during the lifting of the COVID restrictions in Portugal (2022), people evidenced augmented worry and agitation. Therefore, the absence of knowledge about the pandemic is hypothesized to pose the same burden as the return to life previous to COVID, giving the hypervigilance to possible negative health outcomes. However, other complex and devastating crisis events like the beginning of the war in Ukraine (19) may be accounting for the increased distress suffered by the Portuguese population around the time of the lifting of COVID restrictions in 2022.

The longitudinal design of our study made it possible to describe the continous effect of the COVID-19 pandemic on the portuguese population mental health. The pattern observed in this sample is consistent with the adaptation to a new reality, in which people were overall confined to their houses and informed to rely on repetitive and restrictive hygiene rituals to ensure their safety (9). The behavioral and mental health status' changes observed in the general public throughout these three years living within a pandemic framework seem to have been maintained only due to their instrumental role. The obsessive-like coping mechanisms reinforced by the governments and public health specialists did not appear to have become problematic after the removal of the threat. Contrary to what was found with previous epidemics, there did not seem to appear a delayed development of psychopathology (8). It seems that although people engaged in OC-like behaviors, the cognitive bias that typically accompanies the compulsions in OCD was not developed, being the actions seen as a real need to a very real threat, rather than an overestimation of control over events or a biased interpretation of mainstream situations as dangerous (20). Additionally, the increased focus on cleanliness during the pandemic might have
provided a sense of validation or acceptance for individuals with contamination-like symptoms. This normalization could have potentially led to a decrease in distress associated with such symptoms.

In general, the results of this study yield some positive outcomes related to the pandemic. In a 3-year longitudinal framework, there were no observed nefarious and pervasive alterations in the mental health of the general Portuguese population. Although our work captures a general longitudinal trajectory of symptoms displayed by our sample, it does not reflect the heterogeneity of the mental health implications of facing a pandemic. It is possible that some people may have increased vulnerability to developing mental health disorders in response to stressors, thus, possibly still expressing an intense response to COVID-19 in 2022. Future studies could employ a data-driven approach (21), to identify vulnerability profiles and portray a more comprehensive description of the psychological impact of the COVID-19 pandemic. Despite the growing body of literature pertaining to the pandemic, many lessons and topics were brought to the attention of the world governators, demonstrating the relevance of continuing to publish articles on the subject. The globalized experience of undergoing such stressful events resulted in a greater valorization of one's mental health, highlighting the need to consider the psychosocial dimension of health, which had been disregarded in public health policies and speeches.

**Conclusion**

This study was designed analyze the longitudinal impact of the COVID-19 pandemic on the mental health of the Portuguese population. Our results evidenced statistically significant differences with time for the washing subscale and total score of OCI-R, as well as the anxiety subscale of DASS-21. The decrease in washing scores may indicate the increased knowledge about COVID and less perceived danger of contracting the disease, leading to a shift away from excessive contamination preventive behaviors. The fluctuation in anxiety levels reflects a normative response to threats, with increased worry and agitation during critical phases of the pandemic. Our findings demonstrate the potential role of psychological distress, evidenced in the form of OC symptoms or anxiety, in the adaptation to relevant cues of the external world, preparing humans to change their behavior accordingly to ensure their safety. Overall, this demonstrates positive coping of the general population, that didn't evidence pervasive negative effects on their mental health. However, some individuals may still evidence a different response pandemic related stressors and thus, future research should explore in depth all profiles and provide a more comprehensive understanding of the psychological impact of COVID-19.

**Abbreviations**

Depressive, Anxiety, and Stress Scale (DASS-21);

Obsessive-Compulsive Inventory – Revised (OCI-R);

Obsessive-compulsive (OC);

Obsessive Compulsive Disorder (OCD).
Declarations

Ethics approval and consent to participate: Electronic informed consent was given by all the participants. The Ethical Committee for Life Sciences of the University of Minho approved the study - code CEICVS 014/2020 obtained on the 23rd March 2020.

Consent for publication: Not applicable.

Availability of data and materials: The dataset analyzed during the current study is available from the corresponding author on reasonable request.

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**Figures**

![Figure 1](image.png)

*Figure 1. Plots representing the mean values and standard error of the OCI-R subscales on the three timepoints studied. *Significant difference in the Conover’s post-hoc test in comparison to 2020. §Significant difference in the Conover’s post-hoc test in comparison to 2021. OCI-R: Obsessive-Compulsive Inventory – Revised*

**Figure 1**

See image above for figure legend.
**Figure 2**

See image above for figure legend.