

REVIEW ARTICLE

The COVID-19 Pandemic and the Obsessive-Compulsive Phenomena, in the General Population and among OCD Patients: A Systematic Review

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Introduction: An increase in obsessive-compulsive disorder (OCD) was predicted as a consequence of the COVID-19 pandemic and the measures established for controlling it.

Aims: This review seeks to analyze the relationship between the COVID-19 pandemic and obsessive-compulsive disorder (OCD), and in particular the pandemic's effect on the prevalence of obsessive-compulsive (OC) symptoms, predisposing factors, interventions carried out, their effectiveness and the proposal of interventions in future situations similar to the one studied.

Methods: For this purpose, a systematic review of empirical articles, published from November 2019 to June 2022, is carried out, following the PRISMA methodology. The review was registered in Open Science Forum [10.17605/OSF.IO/DV8GZ].

Results: The studies indicated an increase in the prevalence of OC symptoms in the general population, as well as new obsessions, relapses, and/or worsening of the pre-existing symptoms in patients with OCD mainly related to contamination obsessions and cleaning and hand washing compulsions. Predisposing factors are being younger, low resilience, low social support, the presence of previous contamination symptoms, overexposure to news about COVID-19, the previous severity and aggressiveness of OC symptomatology, and the absence or lack of treatment adherence. The combined use of pharmacological treatment, cognitive-behavioral therapies, teaching skills to reinforce resilience, and training in coping strategies will be recommended.

Conclusions: The data obtained can be used as a basis for future OCD prevention plans in crises similar to the one studied.

Keywords: COVID-19, coronavirus, pandemic, obsessive-compulsive disorders, mental health

Introduction

After the COVID-19 state of pandemic declaration in March 2020, an increase in the prevalence of Obsessive Compulsive Disorder (OCD) was predicted (Capuzzi et al., 2020), similar to what happened during and after the epidemics of Severe Acute Respiratory Syndrome (SARS-COV-1) or Middle East Respiratory Syndrome (MERS) (Banerjee, 2020; Chakraborty and Karmakar, 2020; Cudris-Torres et al., 2020).

For some researchers, the increase would not be related to a specific and objective cause such as the appearance of a new virus (Aardema, 2020; Cudris-Torres et al., 2020), but rather to the lack of mental health care during

epidemic outbreaks (Banerjee, 2020), and with the nature of people suffering OCD, characterized by repeated efforts to avoid dangers by adopting compulsive behaviors (Cai et al., 2020; Fineberg et al., 2020) and their inflexibility to unlearn them at the moment when they become obsolete (Cai et al., 2020). Thus, mobility limitations would prevent patients from continuing with psychological treatments (Fineberg et al., 2020), and the advice of health authorities to perform frequent and ritualized cleaning/hand washing would originate a compulsion that can become disabling (Banerjee, 2020). Other researchers consider that the pandemic will not necessarily negatively affect subjects with OCD, since mobility limitations, and the fact that everyone in their environment takes hygiene measures, can make them feel safer (Cudris-Torres et al., 2020; Littman et al., 2020), reducing their anxiety levels and, consequently, not affecting or even reducing the severity of their symptoms. Under this hypothesis, the expected increase in psychiatric consultations could be due to a subjective assessment linked to the reduction in other types of consultations. In all cases, the researchers postulate an increase in cases or a worsening of those already diagnosed. In order to confirm or discard this postulate, it is proposed to carry out, about three years after the start of the COVID-19 pandemic, a systematic review aimed at updating the existing data on the subject.

There have already been some recent reviews of the effects of COVID-19 on OCD (e.g., Cuning & Hodes, 2022; Grant et al., 2021; Guzick et al., 2021; Liu et al., 2021; Zaccari et al., 2021), but their scope was much more limited than in our current study because they include a small number of studies, look at shorter time ranges, only include articles published in the English language, which adopt a different approach. The present study aims to provide data on a larger scale, for which purpose, it analyzes articles in several languages, in the general and clinical population, published in the last three years, with special emphasis on prevalence, risk factors, interventions carried out, and proposals to increase their effectiveness, thus amplifying key questions that can help inform health policy makers, also helping to improve clinical decision-making.

Methods

Design and Procedure

To select the articles, the PRISMA methodology was followed (Liberati et al., 2009). To collect the information, a review protocol was created and the TIDieR template utilized (Hoffmann et al., 2016). The review was registered in Open Science Forum [10.17605/OSF.IO/DV8GZ]. This protocol was applied simultaneously by two independent researchers. The discordant information was discussed and consolidated, resolving the disagreements through discussion and consensus.

For the research, a systematic search was carried out of articles published from November 2019 to June 2022, in the Scopus, PsycInfo, PsycArticles and Google Scholar databases, using the MeSH search terms: “COVID-19” OR “Coronavirus” AND “Obsessive Compulsive Disorder” OR “Obsessive Compulsive”. Other more specific terms (for example: “washing compulsion”, “treatment”, “diagnosis, etc.) were added to the search, but did not lead to new results. The search was carried out in English and Spanish, but articles in French, Italian and Portuguese were not ruled out.

Since no standardized method exists to measure psychological factors, and because of the great variability found between studies (type of sample, the pandemic phase, measurement instruments, etc.), the protocol did not include meta-analysis, instead focusing on a more narrative than quantitative systematic review.

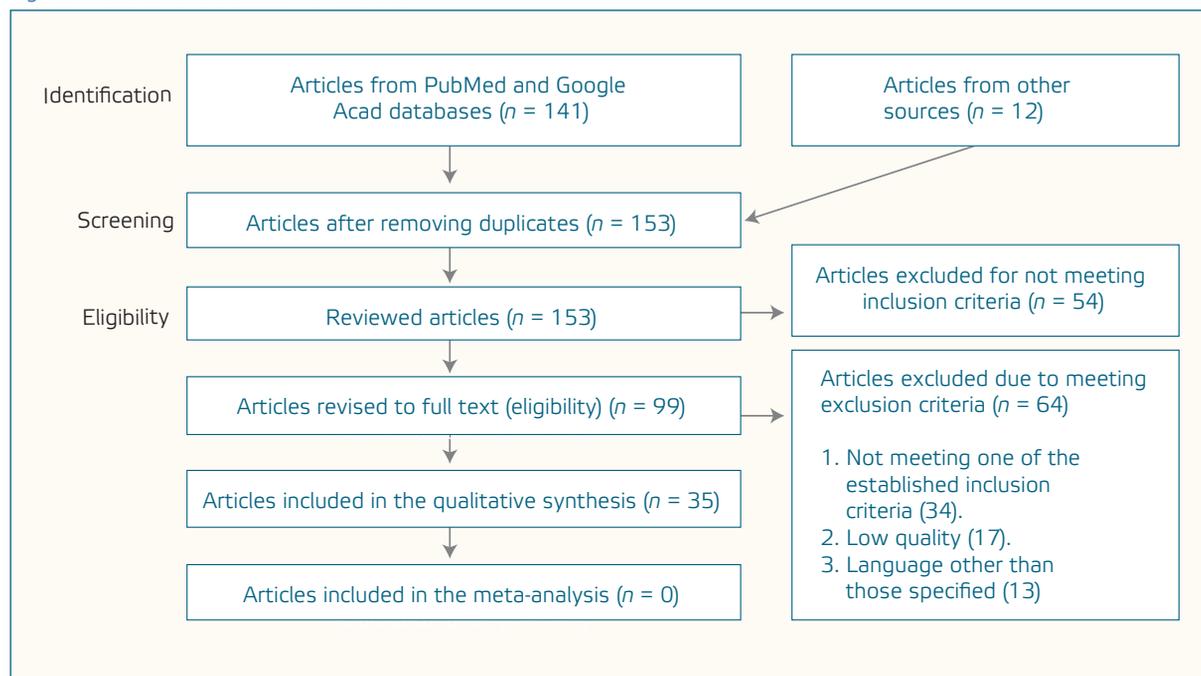
Eligibility Criteria

To be eligible, articles had to be original prospective investigations of an empirical nature, analyzing OCD or OC symptoms, published in the proposed range of data. Publications were excluded if they did not meet any one of the following established inclusion criteria: low methodological quality (inadequate description of the sample, study date, methodology or results); or written in a language other than English, Spanish, French, Italian or Portuguese.

Risk of Bias and Coding Reliability

The methodological quality of the studies was assessed using the Cochrane Risk of Bias tool RoB2 (Higgins et al., 2019). In any case, the risk of bias proved significant in all the studies analyzed, so only articles with a high risk of bias were discarded.

Figure 1. Search and Selection of Studies



The coding of the articles was carried out by the two researchers independently, at two different times, and following the adjustment recommendations indicated in Cochrane's Risk of Bias (Higgins et al., 2019). Its agreement was made by determining the true *kappa* statistic ($\kappa \geq 0,80$). Following the technique of categorical content analysis, and applying the statistical solution of Fariña et al. (2002), the coding was evaluated with the true kappa in terms of inter-coder and intra-coder agreement (κ). For this, it was recorded as 1-agreement if there was an agreement between coders and at all times; 1-disagreement if there was a lack of agreement in any of the records; and 2-disagreements if the records between coders and times were different. In this study, a $\kappa > 0.857$ was obtained, which allows us to conclude that the encoding is reliable and that another encoder trained in the encoding technique would have created a similar database.

Results

Following the PRISMA methodology (see selection flow and discard reasons in Figure 1), 35 articles were selected. Of these, 11 studies are in the general population (27,579 subjects), and 24 in samples with OCD (1,789 subjects with OCD, and 1,388 with psychiatric illnesses including OCD).

The information obtained from the selected articles can be seen in Table 1 and Table 2.

The studies found are few and very heterogeneous, considering both the demographic characteristics of the sample used, and the methodology, and design of the studies. Sample size ranges from very large samples (e.g., Abba-Aji, et al., 2020) to smaller samples (e.g., Mazza et al., 2020), or even single case studies (e.g., French & Lyne, 2020) whose results should be taken with caution. The age of the sample ranges from the adult population (e.g., Cudris-Torres et al., 2020; Littman et al., 2020) to the young population (e.g., Nissen et al., 2020), including populations without symptoms or with mild symptoms and without treatment (e.g., Abba-Aji et al., 2020; Fernández et al., 2020) as well as people with previously diagnosed OCD (e.g., Benatti et al., 2020; Jelinek et al., 2021; Hezel et al., 2022) of a different nature. The studies in turn will have been carried out at different phases of the pandemic: at the beginning (e.g., Abba-Aji et al., 2020; AlHusseini et al., 2021; Jelinek et al., 2021) or after the first wave, when few cases were recorded (Ji et al., 2020). Only Hezel et al. (2022) provides data obtained in a study with a longitudinal design, although the sample analysed is relatively small, observing a clear effect of the pandemic's severity on patients' perception of OCD symptoms. Furthermore, some of the studies apply quantitative methodologies (e.g., Capuzzi et al., 2020), while others apply qualitative methodologies (e.g., French & Lyne, 2020). Therefore, it was not considered appropriate to apply meta-analysis to the results.

Table 1. COVID-19 Pandemic and OC Symptoms in the General Population not OCD Diagnosed

References	Sample	Origin	Gender and age	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors
Abba-Aji, et al. (2020)	General population (n = 6041)	Canada	Female gender: 86.5% Age range: 11 to 88 years old.	Cross-sectional online survey in the early phases of the pandemic.	Brief Obsessive-Compulsive Scale (BOCS), Perceived Stress Scale (PSS), Generalized Anxiety Disorder scale (GAD-7), Major Depressive Disorder (MDD), Patient Health Questionnaire (PHQ-9)	60.3% reported the appearance of OCD symptoms, and 53.8% hand washing compulsions. Compulsive hand washing was positively correlated with stress and anxiety, but not with major depression.	Have pre-pandemic OC symptoms.
AlHusseini et al. (2021)	General population	Saudi Arabia	Female gender: 60.5% Age: not informed	Cross-sectional survey via social media platforms	Patient Health Questionnaire (PHQ-9) and Obsessive-Compulsive Inventory-Revised Assessment Test (OCI-R)	Self-reported values ranging from 48.1% to 81.2%.	It was more frequent in the male, 55 years or older, married, with higher income, higher education levels and employed.
Fernández et al. (2020)	General population (n = 4408 subjects in the initial survey and n = 644 in the replication survey).	Argentina	Female gender: 71.2% Age range: 18 to 92 years old.	Cross-sectional online survey, during quarantine, in April-2020; and replication survey in April-May 2020.	Complete Brief Symptom Inventory-53.	25.1% reported elevated OC symptoms.	Not described.
Ji et al. (2020)	University students (n = 5827 subjects in survey 1 and 2 and n = 4006 in survey 3).	China	Female gender: 65.4%, 64.7% & 54.7% respectively Mean age: 21.3 (DS: 2.5), 21.2 (DS: 2.3) & 20.9 (DS: 2.0) years respectively.	Longitudinal survey online or by telephone at three times: February 8, 2020 (15 days of quarantine); March 25, 2020; and April 28, 2020 (15 days without new cases).	Yale-Brown Obsessive Compulsive (Y-BOCS); Zung's Self-Assessment Anxiety Scale (SAS); and questions about the level of fear	OCD scores were obtained in 11.3%, 3.6% and 3.5% of the participants for surveys 1, 2 and 3 respectively	High rates of fear and anxiety; the masculine gender; have brothers; and are specialized in a non-clinical discipline
Knowles & Olatunji (2021)	Healthy volunteers, university students (n = 108),	US	Female gender: 75% Mean age: 19.6 (SD: 1.2)	Comparative study. Pre-pandemic (January 2020) and early pandemic (February-March 2020)	Padua Inventory-Contamination, Obsessions and Washing Compulsions Subscale and Obsessive-Compulsive Inventory-Revised (OCI-R)	Participants reported a wide range of contamination fear. Significant increase in obsessive-compulsive washing symptoms was described.	Information overload on COVID-19, and individual differences in disgust proneness
Mazza et al. (2020)	COVID-19 survivors (n= 402); some with previous mental illness (n = 36), but not OCD.	Italy	Female gender: 34.8% Mean age: 57.8 years old.	Clinical interview one month after hospital discharge (April-June 2020).	Not described.	20% report OC symptoms.	Not described.

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Table 1., continued

References	Sample	Origin	Gender and age	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors
Meda et al. (2021)	Healthy volunteers, university students (n = 358),	Italy	Female gender: 79.9% Mean age: 21,3 (SD: 2,1)	Comparative study. Pre-pandemic (October-December 2019), during national lockdown (April 2020) and post-lockdown (May-June 2020)	Obsessive-Compulsive Inventory-Revised (OCI-R)	No significant increase in obsessive-compulsive symptoms seen during lockdown, though lifting of lockdown was associated with reduced symptoms.	Not described.
Mrklas et al. (2020)	Health workers (n = 1414) and other workers (n = 3951), subscribed to Text4Hope to seek support, due to having high self-reported symptoms.	Canada	Female gender: 86.2% Age: not informed .	Cross-sectional online survey (March-May 2020).	Symptom Checklist 90-Revised (SC-90-R)	Before the pandemic, the self-reported prevalence of OC symptoms due to contamination (obsessive hand washing) was 35.3% vs. 29.3% in health workers compared to other workers; going to 46.1% vs 57.6% after the pandemic's start.	Not described.
Munk et al., (2020)	General population (n = 949)	Germany	Female gender: 79.5% Mean age: 28.97 years old.	Cross-sectional online survey during quarantine (March-April 2020).	Obsessive-Compulsive Inventory-Revised	During quarantine, a prevalence of OCD of 21.4% was recorded vs. 3.6% recorded 12 months earlier.	Not described.
Seçer and Ulaş (2020)	Young sample (n = 598)	Türkiye	Female gender: 61.1% Mean age: 16.4 (DS: 2.14) years old.	Online cross-sectional study during quarantine.	Obsessive Compulsive Inventory. Child Version; Experiential Avoidance Questionnaire; Fear of COVID-19 Scale; Emotional Reactivity Scale; y Depression and Anxiety Scale for Children.	Not described.	Fear of COVID-19, emotional reactivity, depression-anxiety and experimental avoidance
Tian et al. (2020)	General population (n = 1060)	China	Female gender: 48.2% Mean age = 35.01 (DS: 12.8) years old	Cross-sectional online survey (January-February 2020)	Symptom Checklist-90 (SCL-90)	Score from 1.62 (DS: 0.58) (in 1986) vs 2.24 (DS: 0.75) (during the pandemic). Recorded OC symptoms are: being forgetful, worrying about neatness of clothing and manners, and repeatedly washing hands.	Not described.

Table 2. COVID-19 Pandemic and OCD (Samples with OCD)

References	Sample	Origin	Gender and age	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors	Interventions carried out
Alonso et al. (2021)	Patients with OCD ($n = 127$) and without ($n = 237$)	Spain	Female gender: OCD: 53.5%; Control: 57.4% Mean age: OCD: 42.0 (SD: 11.3). Control: 40.8 (SD: 12.3)	Comparative study. Pre-pandemic data (December 2019-March 2020) and during pandemic (April-May 2020)	Yale-Brown Obsessive Compulsive Scale (Y-BOCS)	65.3 % of patients reported symptom worsening; but only 31.4 % had worsening >25 %. 15.7% of patients described a significant improvement in their obsessions and compulsions, The risk of getting infected by COVID-19 was reported as a new obsession that became obsessive in approximately 10% of the patients.	The presence of pre-pandemic depression, contamination/washing symptoms, and lower perceived social support	It was necessary to change (25.1% of the patients), increase the dose of pharmacological treatment (all but 2 patients) or add benzodiazepines.
Benatti et al. (2020)	Patients with OCD ($n = 123$) 35.8% with clinical symptoms and 64.2% without.	Italy	Female gender: 45.5%. Age: not informed	Clinical interview, face to face (6%) or by telephone.	Not described.	29.5% present development of new obsessions and / or relapse in past obsessions. The most frequent compulsion phenotypes were washing and cleaning.	The increase was significantly greater in the group with clinical symptoms.	Not described.
Capuzzi et al. (2020)	Patients with OCD in 2020 during the pandemic ($n = 225$) and on the same dates in 2019 ($n = 388$).	Italy	Female gender: 13.9% y 12.9% respectively. Mean age: 43.9 (SD: 16.5) and 44.2 (SD: 18.1) years old respectively.	Comparative cross-sectional study by face-to-face clinical interview.	Not described.	Consultations for TOC grew to 4.0% vs 0.5% in the same period of 2019.	Patients with OCD were significantly more likely to present to the emergency room during the lockdown.	Not described.
Chakraborty & Karmakar (2020)	Patients with OCD due to contamination ($n = 84$). 32.14% without treatment or discontinuous treatment.	Iran.	Female gender: 76.2%. Age: not informed.	Cross-sectional study through telephone interviews, (April-May 2020 compared to pre-pandemic data).	Yale-Brown Obsessive Compulsive (Y-BOCS)	6% of the total (3 with total remission of symptoms and 2 with partial remission before the pandemic) who had stopped their medication had an exacerbation of symptoms.	Not described.	Not described.
Cost et al. (2022)	Psychiatric patients ($n = 347$). 62% pre-existing psychiatric diagnosis. OCD in an unspecified subset.	Canada	Female gender: 48.2% Mean age: 13.05 (SD: 2.53) years old.	Cross-sectional study (February-July 2020)	International CRISIS questionnaire	Worsening in obsessions/compulsions was reported in 19.7-22.6% of total sample, in samples with prevalences of 13% to 30% in OCD; whereas improvements were noted in 3-4% of the sample.	Deterioration was associated with having a pre-COVID psychiatric diagnosis, and greater stress due to social isolation.	Not described.

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Table 2., continued

References	Sample	Origin	Gender and age	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors	Interventions carried out
Davide et al. (2020)	OCD patients ($n = 30$) who had completed the therapeutic route.	Italy	Female gender: 53.33% Mean age: 43.17 (SD: 14.87) years old.	Semi-structured, face-to-face clinical interview, before quarantine and after 6 weeks of quarantine.	Yale-Brown Obsessive Compulsive (Y-BOCS) Severity score	A significant increase in the severity of obsession and compulsion is observed.	Remission status of OCD symptoms before quarantine; present or not pre-pandemic contamination symptoms; and / or living with a relative in the same home during quarantine.	Not described.
French & Lyne (2020)	Patient with OCD due to contamination ($n = 1$) controlled by drug treatment.	Ireland	Gender: female. Age: 30 years old.	Face-to-face clinical interview before any COVID-19 case was registered in Europe, and follow-up during the early phases of the pandemic.	CIE-10	Significant deterioration of underlying OCD symptoms related to exposure to COVID-19 news. With intensification of compulsive rituals, avoidance behaviors and psychological distress. She reported feeling safer as public health measures were implemented.	Exposure to the news about COVID-19.	He improves with adjusting the medication, but his compulsive acts continued. It relapses after the appearance of the first cases in Ireland (making a treatment readjustment necessary).
Hezel et al. (2022)	Healthy individuals ($n = 30$) and people with OCD ($n = 33$)	USA (NY)	Female gender: 71% Mean age: 27.4 (SD = 7.0) years old.	Longitudinal study at four assessment timepoints: baseline (April 2020) and one, two, and six months later.	Clinical interviews and self-report questionnaires on baseline resilience, the Obsessive-Compulsive Inventory-Revised (OCI-R), the Depression Anxiety Stress Scales (DASS-21), and the Epidemic-Pandemic Impacts Inventory (EPII)	There were no significant changes across timepoints in obsessive-compulsive, depressive, or anxiety symptom severity within each diagnostic group. But the majority of participants diagnosed with OCD perceived worsening.	Less resilience was associated with worsening obsessive-compulsive symptoms worsening depressive in both groups, and worsening anxiety symptoms in individuals with OCD.	One (3%) received ERP only; seven (21%) received a combination of ERP and medication (four of whom started a new medication); six (18%) had non-CBT therapy and medication (three started a new medication); four (12%) were taking psychiatric medication only (two started medication); and one (3%) was receiving a non-CBT therapy only.

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Table 2., continued

References	Sample	Origin	Gender and age	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors	Interventions carried out
Højgaard et al. (2021)	Patients with OCD (n = 201)	Denmark	Female gender: 8% Age: 37.76 (SD: 4) years old.	Cross-sectional study (April 2020)	Questions adapted from Yale-Brown Obsessive-Compulsive Scale (Y-BOCS)	61.2 % of the patients reported an increase in OCD severity during the pandemic. Five participants reported the emergence of contamination symptoms and two of harm related symptoms.	61.2 % of the patients reported an increase in OCD severity during the pandemic. Five participants reported the emergence of contamination symptoms and two of harm related symptoms.	Not described.
Jain et al. (2021)	A woman (n = 1) with OCD history, anxiety and major depressive disorder. And a man (n = 1) with depression, suicidal ideation and cleaning OC.	USA	Female gender: Age: 73 years old Male gender: Age: 38 years old	Face-to-face clinical interview.	Yale-Brown Obsessive-Compulsive Scale	Female: Worsening of cleaning OC. Male: Relates the obsessive need to clean	Not described.	The medication is readjusted. Concomitant Cognitive behavioral therapy, with exposure prevention, and response is advised.
Jelinek et al. (2021)	Patients with cleaning OCD (n = 394)	Germany	Female gender: 73.8% Age: 37.76 (SD: 12.14) years old.	Online Study (March-May 2020)	Obsessive-Compulsive Inventory-Revised (OCI-R); Patient Health Questionnaire (PHQ-9)	71.8% reported an increase in the severity of their symptoms, 6.5% a decrease, and 21.7% reported no change.	Have OC cleaning.	Not described.
Khosravani et al. (2021)	Patients with OCD (n = 270) before and during COVID-19	Iran	Female gender: 57.4% Mean age: 36 (SD = 12.1)	Comparative study, Face-to face interview before the outbreak, and in July 2020 during the first wave of the COVID-19 pandemic.	The dimensional obsessive-compulsive scale (DOCS); The Yale-Brown obsessive-compulsive scale (Y-BOCS); The COVID-19 Stress Scale (CSS)	Obsessions and compulsions related to fears of contamination, responsibility for causing harm, unacceptable thoughts and symmetry increased by 3-5 points, while the total score determined that the Y-BOCS increased by around 9 points.	Danger and contamination-related stress reactions	All participants were taking medication, and 30% of the total sample had previously received psychological treatment.

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Table 2., continued

References	Sample	Origin	Gender and age	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors	Interventions carried out
Kumar & Somani (2020)	Patient ($n = 1$) with OCD due to contamination, controlled by drug treatment.	India	Gender: male. Age: 28 years old.	Face-to-face clinical interview in the first phase of the pandemic.	Not described.	Treatment stops being effective after overexposure to COVID-19 news. Patient has intense fear of infection, exhibits avoidance behaviors and compulsive hand washing. This began because it was the recommended measure against infection, yet it becomes a disabling compulsion.	Overexposure to COVID-19 news.	The treatment is readjusted. No subsequent results are reported.
Littman et al. (2020)	Patients with OCD ($n = 65$)	Israel	Female gender: 58.46% Age range: 20 to 39 years old.	Online survey (March-April 2020) after 16 days of quarantine and until the end of the quarantine.	Depression, anxiety and stress scale (DASS-21) and questions about their OCD.	Most of the patients were unaffected (23/65) or even experienced symptomatic improvement (21/65). No phenotype transposition is recorded.	High levels of anxiety and stress are related to an increase in prevalence. Quarantine would be a preventive factor for compulsive cleaning or checking behaviors.	Not described.
Matsunaga et al. (2020)	Patients with contamination OCD ($n = 29$), aggressiveness / control ($n = 20$) and symmetry / repetition and ordering ($n = 11$). Under treatment. 40% with complete remission (CR) and 60% with partial remission (PR) of symptoms in the pre-pandemic phase.	Japan	Female gender: 58.3% Mean age = 41.5 (SD: 7.9) years old.	Face-to-face clinical interview (April-May 2020).	Yale Brown Obsessive-Compulsive Scale (Y-BOCS)	In both groups, the total mean scores increased. There was no transition of symptoms. 6.7% (1+3-CR:PR) presented contamination obsessions, or additional (1) or renewed (5) washing compulsions. 10% (3+ 3-CR:PR) presented worsening of symptoms (time spent on compulsions).	High rates of anxiety, depression, generalized anxiety, and pre-pandemic presence of contamination symptoms associated with respiratory virus infection, such as influenza.	Not described.

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Table 2., continued

References	Sample	Origin	Gender and age	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors	Interventions carried out
Moreira-de-Oliveira et al. (2022)	OCD patients ($n = 30$), Compulsive behavior: washing (26.7%), checking (20.0%), symmetry/order (3.3%), and other (46.7%).	Brazil	Female gender: 66.7%. Initial mean age: 15,7 (SD 8,99)	One-year large study (from January 2019 - January 2020 and about one year later).	Yale Brown Obsessive-Compulsive Scale (YBOS); Obsessive-Compulsive Inventory – Revised (OCI-R); Coronavirus Traumatic and Stressful Life Events Scale.	When analyzed individually, there are patients who worsen (46.66%), patients who improve (50%) and others who remain stable (3.34%).	Patients with worsening OCD severity were younger and had a shorter disease duration, which could make them more vulnerable during the pandemic.	All with pharmacological treatment. It is also possible that being under continuous high dose serotonin reuptake inhibitors might have contributed to this non-exacerbation of symptoms during the COVID-19 crisis.
Nissen et al. (2020)	Children and adolescents with OCD. Newly diagnosed (GP: $n = 65$) or who had completed their primary treatment several years before (CG: $n = 37$).	Denmark	Female gender: 63.1% & 66.7% respectively. Mean age: 14.9 (SD: 2.66) & 14.14 (SD: 2.79) years old respectively.	Cross-sectional and comparative study (April-May 2020)	Schedule for Affective Disorders and Schizophrenia for School-Aged Children Semi-structured severity rating (KSADS) Children's Yale-Brown Obsessive-Compulsive Scale (CYBOCS)	OCD worsens in 44.6% of GP subjects vs 73% of GC. 18.5% of GP increases avoidance behaviors.	The aggravation correlated with the degree of anxiety, depression, avoidance behavior, OCD aggressiveness, age of onset, and presence of concomitant psychiatric disorder.	Not described.
Pan et al. (2021)	Older persons with depression, anxiety, or OCD ($n = 1181$) and without ($n = 336$)	Netherlands	Female gender: 64% Mean age: 56.1 (SD: 13.2) years old.	Cohort study (April-May, 2020)	Questionnaire on perceived mental health impact, fear of COVID-19, coping, and four validated scales assessing depressive symptoms, anxiety, worry, and loneliness.	No overall increase in the severity of symptoms was observed.	The largest burden of mental health disorders.	Not described.

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Table 2., continued

References	Sample	Origin	Gender and age	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors	Interventions carried out
Rosa-Alcázar et al. (2021)	OCD patients ($n = 122$) and without ($n = 115$)	Spain	Mean age: 33.48 (SD: 11.13) years old.	Cohort study.	Comparative study on adaptive strategies.	In OCD patients a greater use of inappropriate strategies (denial, substance abuse and self-blame) was observed.	Anxiety and depression levels were related to the use of less adaptive strategies.	Effective and adaptive coping strategies.
Sharma et al. (2020)	Patients with OCD during the pandemic (GP: $n = 204$) and with OCD during the same period one year earlier (CG: $n = 207$). 63% for contamination.	India	Female gender: 27% & 25% respectively. Mean age: 32.28 (SD: 9.7) & 32.97 (SD: 11.14) years old respectively.	Cross-sectional study by telephone interview, 2 months after the declaration of the pandemic.	Yale-Brown Obsessive-Compulsive Scale (Y-BOCS)	Relapse rates of 21% are observed in the GP vs 20% in the CG, related to partial remissions and lack of adherence to drug treatment. 6% reported obsessive-compulsive symptoms related to COVID-19.	Not described.	Not described.
Storch et al. (2021)	Clinicians ($n = 595$) informing on OCD patients ($n = 232$).	USA	Clinicians female gender: 77%. Patients female gender: 51% Age: 28.5 years old.	Online survey to clinicians regarding patients with OCD receiving exposure and response prevention treatment (ERP) prior and during the pandemic (July-August, 2020)	National Institute of Mental Health-Global Obsessive-Compulsive Scale (NIMH-GOCS) and Yale-Brown Obsessive-Compulsive Scale (Y-BOCS)	Clinicians estimated that 38% of their patients had symptoms worsen during the pandemic and 47% estimated that symptoms remained unchanged despite participating in ERP.	Treatment was less effective on adults, with lower levels of doubt/uncertainty, with financial distress, and medically at-risk.	Rates of improvement attenuated during the COVID-19 pandemic.
Tanir et al. (2020)	Children and adolescents with OCD ($n = 61$), 55.7% with complete remission of symptoms and the rest with partial remission. 11.4% without treatment and 1.6% under cognitive-behavioral therapy.	Turkey	Female gender: 44.3% Mean age: 13.62 (SD: 2.72) years old.	Cross-sectional study by telephone or online interview (April-2020); the results were compared with those recorded in the pre-pandemic stage.	Children's Yale-Brown Obsessive Compulsive (CY-BOCS) Clinical Global Impression-Severity Scale (CGI-S)	Relapses are observed in 31.1% of patients with total clinical remission and worsening in 54.09%. 34.4% do not present changes and 11.4% present an improvement. Obsessions due to contamination (78.6% vs 65.7%), aggressiveness (18% vs 16.4%) and somatic (19.7 vs 9.8%) increases. Cleaning/washing hands is the most frequent compulsion (75.4% vs 62.3%).	Not described.	Not described.

(continued on the next page)

Table 2., continued

References	Sample	Origin	Gender and age	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors	Interventions carried out
Tükel et al. (2022)	Patients with OCD ($n = 30$) and without ($n = 30$)	Turkey	Female gender: 63.3% Mean age: 34.1 (SD: 12.6)	Comparative cross-sectional study (before March-21) based on retrospective information provided by the patients.	Yale-Brown Obsessive Compulsive Scale (Y-BOCS)	The most common obsessions/ compulsions were contamination/ cleaning-washing (73.3%) and doubt/ checking (60.0%). OCD symptoms worsened in 60% of OCD patients, remained unchanged in 30%, and improved in 10%.	Fear of and obsession with COVID-19.	Not described.
Wheaton et al. (2021)	Subjects with OCD ($n = 252$) and without ($n = 305$).	USA	Female gender: 89.4% & 40.9% respectively Mean age: 31,31 (SD: 10,38) & 37.67 (SD: 12.73) years old respectively	Cross-sectional online survey	Questions on how the pandemic has affected the patients; COVID-19 Threat Scale (CTS); Dimensional Obsessive-Compulsive Scale (DOCS); Depression Anxiety Stress Scales 21 (DASS-21)	46.8 % of the subjects with OCD reported a little worsening of symptoms, and the 29.4% an extensive worsening. 19.8% reported no change. 4.0% expressed improvement.	Not described.	Not described.

Discussion

Prevalence Analysis

In the general population, and those having mild symptoms and left without treatment, a significant increase in the prevalence of OC symptoms was observed (Abba-Aji et al., 2020; Fernández et al., 2020; Knowles & Olatunji, 2021; Mazza et al., 2020; Munk et al., 2020; Tian et al., 2020). In the study by Meda et al. (2021), they report no worsening, but it does improve after lockdown. These increases range from 11.3% to 25.1% (Fernández et al., 2020; Ji et al., 2020; Munk et al., 2020), even amounting to 60.3% to 81.2% of the respondents (Abba-Aji et al., 2020; Al Hussein et al., 2021; Jelinek et al., 2021) in the early phases of the pandemic. These data are far from the pre-pandemic prevalence, established at 2% to 3% for any psychiatric diagnosis (Cudris-Torres et al., 2020), or the 3.6% of prevalence registered in Germany twelve months before the pandemic (Munk et al., 2020). Therefore, the data obtained are in line with the forecasts and confirm an increase in the prevalence of OC symptoms due to the pandemic. However, taking into account the data provided by Ji et al. (2020), it is possible that the prevalence returns to normal levels when new cases are no longer detected, particularly because signs of OC symptoms do not automatically mean the beginning of an OC disorder.

In adult people with previous OCD, an increase in the prevalence from 6% to 71.8% has been described (Alonso et al., 2021; Cudris-Torres et al., 2020; Benatti et al., 2020; Jelinek et al., 2021; Højgaard et al., 2021; Littman et al., 2020; Matsunaga et al., 2020; Moreira-de-Oliveira et al., 2022; Tükel et al., 2022; Wheaton et al., 2021). In the child-youth population, a worsening of OCD has been described. In this way, Cost et al. (2022) reported a worsening of obsessions and compulsions in 19.7% to 22.6% (in samples with prevalences of 13% to

30% in OCD); and Nissen et al. (2020), in a sample with a concurrent psychiatric disorder, observed a worsening in 44.6% of the newly diagnosed subjects, and in 73% of those who had completed their primary treatment, especially if they were no longer receiving a pharmacological treatment.

However, the data on 6.5-11.4% (Cudris-Torres et al., 2020), to 30% (Tükel et al., 2022) of adult patients with OCD do not report significant deterioration. And even the 4% to 15.7% of adult population whose data indicate a deterioration (Alonso et al., 2021; Jelinek et al., 2021; Tanir et al., 2020; Tükel et al., 2022; Wheaton et al., 2021), and 3% to 4% of child-youth patients (Cost et al., 2022) may experience symptomatic improvement, confirming the possible protective effect, in an important part of the patients, of hygiene measures and mobility limitations recommended by the health authorities (Jelinek et al., 2021; Littman et al., 2020; Pan et al., 2021) and in some cases, the administration of serotonin reuptake inhibitors in continuous high doses (Moreira-de-Oliveira et al., 2022). According to Hezel et al. (2022), the differences observed (from aggravation, to no change, or even to improvement of symptoms) may be due to the sample's levels of resilience, and also to the phase of the pandemic analyzed. Along these lines, the researchers observed in OCD patients the greatest severity of symptoms during April-May 2020 and November-December 2020, during the first and second wave of the COVID-19 pandemic; and fewer symptoms during June-August 2020, when COVID-19 cases stood drastically lower.

Symptoms Detected

The compulsions that present the greatest symptomatologic aggravation are those of contamination (Jelinek et al., 2021, Sharma et al., 2020; Tükel et al., 2022; Wheaton et al., 2021), aggressiveness and somatic symptoms (Sharma et al., 2020). Hand washing is the most frequent new or renewed compulsion (Abba-Aji et al., 2020; Benatti et al., 2020; French & Lyne, 2020; Jain et al., 2021; Matsunaga et al., 2020; Mrklas et al., 2020; Munk et al., 2020; Sharma et al., 2020; Tanir et al., 2020; Tian et al., 2020; Tükel et al., 2022), and may affect 53.8% (Abba-Aji et al., 2020) of the general population, and up to 73% of the diagnosed OCD population (Tükel et al., 2022). Other recorded OC symptoms are being forgetful and worrying about the neatness of clothing and manners (Banerjee, 2020), the fears of contamination (Alonso et al., 2021; Højgaard et al., 2021; Khosravani et al., 2021), responsibility for causing harm (Højgaard et al., 2021; Khosravani et al., 2021), unacceptable thoughts and symmetry (Khosravani et al., 2021). No transition of symptoms has been recorded (Benatti et al., 2020; Matsunaga et al., 2020).

Risk Factors

The great variability of results observed in the prevalence data is directly related to the conjunction of risk factors. This risk registers higher in the male gender (Ji et al., 2020; Seçer and Ulaş, 2020) and in people with previous psychiatric illnesses (Cost et al., 2022; Mazza et al., 2020). It increases with age (Nissen et al., 2020), with educational level (Ji et al., 2020; Mrklas et al., 2020), and with the level of contact with the infection (Mrklas et al., 2020; Tian et al., 2020).

Regarding the appearance, relapse or worsening of symptoms in patients previously diagnosed with OCD, the following constitute the risk factors: the state of symptom remission before the pandemic (Alonso et al., 2021; Benatti et al., 2020; Davide et al., 2020; French & Lyne, 2020; Sharma et al., 2020), the aggressiveness of OCD (Nissen et al., 2020), the presence of pre-pandemic contamination symptoms (Davide et al., 2020; French & Lyne, 2020; Højgaard et al., 2021), especially those associated with respiratory infection by viruses such as influenza (Matsunaga et al., 2020), overexposure to news about COVID-19 (French & Lyne, 2020; Kumar & Somani, 2020), absence (Cudris-Torres et al., 2020; Nissen et al., 2020) or lack of adherence to OCD treatment (Sharma et al., 2020), self-reported psychiatric comorbidity (Højgaard et al., 2021), being younger and having a shorter duration of illness (Moreira-de-Oliveira et al., 2022), low resilience (Hezel et al., 2022) and lower perceived social support (Alonso et al., 2021).

Interventions

Researchers agree that symptoms improve when medication is administered (Jain et al., 2021) or readjusted (Alonso et al., 2021; French & Lyne, 2020; Hezel et al., 2022; Jain et al., 2021; Kumar and Somani, 2020; Nissen et al., 2020); although treatment does not always solve the compulsive handwashing problem (French & Lyne,

2020; Jain et al., 2021).

In turn, in a study carried out during the COVID-19 pandemic, it was observed that, contrary to expectations, 47% of the patients did not present a significant improvement when applying cognitive-behavioral therapy based on exposure and response prevention outcomes (Storch et al., 2021). Better results have been observed when combining both therapies (Jain et al., 2021). In this way, in the study carried out by Alonso et al. (2021), 6% of the patients had to incorporate pharmacological therapy in combination with previously established psychological therapy.

During this pandemic, it has also been observed that OCD patients experienced difficulties managing some adaptive (positive reinterpretation, acceptance, humor) and maladaptive (denial, self-blame) strategies, presenting a greater use of inappropriate strategies (denial, abuse of substances, and self-blame), which has led to recommending training in the use of effective and adaptive coping strategies (Rosa-Alcázar et al., 2021). And according to Hezel et al. (2022) teaching skills to bolster resilience could be a potential intervention target for reducing the risk of psychopathology.

Strengths and Limitations

The authors of this review used a rigorous approach to the identification of relevant trials. Moreover, all data was extracted independently by two reviewers, and reliability checks were conducted. However, the results are subject to the limitations of the studies analyzed. Assessing the impact of predictors on outcome through a meta-analytic approach was not possible for the reasons outlined. Studies in the population with diagnosed OCD have been preferably carried out by telephone and not face-to-face assistance, and have small samples that combine different OCD phenotypes. In addition, three case-studies were included – whose results, given the specific characteristics of each of them – should be taken with caution, and the results cannot be generalized. In the general population, people prefer to use the online survey, which stands related to population bias. In turn, a self-reported response is related to memory and social desirability bias. Only one study has an exposure-free control group. Finally, except for a short-term longitudinal study, all the rest are cross-sectional studies, which does not allow us to analyze the long-term impact.

Conclusion, Implications and Future Directions

Despite its limitations, this study allows us to conclude that the pandemic increases the prevalence of OC symptoms in all populations, in a prevalence that ranges from 11.3% to 81.2% depending on the sample, the context, and the moment of the study. In any case, the data found do not allow us to know whether this will translate in the long term into an increase in the number of OCD cases. In patients with diagnosed OCD, the pandemic is related to the appearance of new obsessions, relapses, and/or worsening of the pre-existing symptoms in a prevalence range that extends from 6% to 71.8% depending, likewise, on the analyzed sample, the context and the time of the study. Identified risk factors consist of being young and with little time in therapy, the state of symptom remission before the pandemic, the aggressiveness of OCD, the presence of pre-pandemic contamination symptoms, overexposure to news about COVID-19, and the absence or lack of adherence to pharmacological treatment. Low resilience and little social support emerge as aggravating factors.

OCD symptoms reverse after readjustment of medication, although the compulsion to wash hands does not always do so. In turn, cognitive-behavioral therapy remains less effective than registered in the pre-pandemic phase. This could be due to difficulties in using proper coping strategies. So, the combined use of pharmacological treatment, cognitive-behavioral therapies and training in coping strategies will be recommended. Also, teaching skills to reinforce resilience could help reduce the risk of psychopathology in future crises.

These results should be interpreted in light of some limitations related to the biases mentioned above. In any case, the results provided constitute preliminary evidence regarding the effect of the pandemic on OCD, which can help governments and health authorities to make decisions in other situations similar to those of this pandemic, to prevent the appearance of obsessions and relapses and know how to act in the event that they occur.

They also show the need for further research on the subject. As a result of this review, it is possible to propose future lines of research. Thus, it would be interesting to carry out more longitudinal studies to find out the pandemic's effect on OCD in the long term. Another topic of interest bears on the study of combined therapies (pharmacological + cognitive-behavioral + coping strategies) proposed by some of the researchers that, despite not being new, are poorly documented.

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Author contributions

Olga MALAS: conceptualization, design, methodology, investigation, project administration, data management, formal analysis, interpretation, supervision, writing original draft, writing review and editing.

María-Dolores TOLSÁ: conceptualization, design, methodology, investigation, project administration, data management, formal analysis, interpretation, supervision, writing original draft, writing review and editing.

All authors gave their final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declaration of interest statement

The authors have no conflicts of interest to disclose.

Ethical statement

This manuscript is the authors' original work. Human participants have not been involved in this study. No ethical approval, informed consent, or data handling policy was needed.

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