



# The impact of COVID-19 pandemic on psychopathological symptoms in mothers and their school-age children before, during and after the COVID-19 pandemic peak

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## Abstract

The COVID-19 pandemic had an impact on children's and caregivers' mental health. We investigated psychopathological symptoms in a group of non-at-risk and a group of at-risk mothers and their school-age children from the pre-pandemic period to the lockdown period and to the post-lockdown period. We used the SCL-90/R to assess mothers' psychological symptoms, the CBCL 1½–5, and the CBCL 6–18 for the perceived children's emotional-behavioral functioning. Analysis of variance was conducted to assess significant differences in the groups over the three assessment points. Linear regressions were run to investigate the effect of maternal psychological symptoms on their children's functioning. In the non-at-risk group, maternal psychopathological symptoms significantly varied during the pandemic. Children's Aggression scores decreased after the lockdown, while Depression scores significantly increased during lockdown and after. The mothers in the at-risk group presented overall decreasing scores over the three assessment points. Children's Aggression scores did not increase during lockdown. Depression scores did not show significant changes over the three assessment points. Overall, our results showed that mothers' psychopathological risk did not influence specific areas of children's emotional/behavioral functioning, but it had an effect on the general offspring psychological well-being.

## Introduction

The COVID-19 pandemic and the related measures put in place to stem its spread have had a drastic impact on mental health in the general population (Ceban et al., 2021; Lee et al., 2021; Wang et al., 2021; Wang et al., 2021c; Xiong et al., 2020). Exposure to disasters has a strong negative impact on mental health and can lead to the development

of anxiety and depression symptoms (Xiong et al., 2020). The World Health Organization (2020) highlighted that children's emotional and behavioral functioning significantly worsened during the pandemic (Liu et al., 2021). School closures and restrictions—although necessary measures to prevent the spread of the virus—have negatively impacted children's and youth's mental-health (Ren et al., 2021a, 2021b; Viner et al., 2020), and the lack of in-person socialization and online learning has affected both children's mental health and their learning progress (Vaillancourt et al., 2021). Psychosocial distress in pre-school and school children has been associated with subsequent social, emotional, and behavioral problems (Gleason et al., 2016). Recent studies have underlined how children showed several problems, such as aggressiveness, depression, and behavioral disorders (Bignardi et al., 2021) during the pandemic outbreak.

The most alarming outcomes have been found in children with pre-existing emotional and behavioral problems (Phelps & Sperry, 2020). However, even non-at-risk individuals—that is, those who did not show any clinical manifestations before the pandemic—have suffered the impact of COVID-19 (Cerniglia et al., 2021).

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## Caregivers' responses to COVID-19 and their children's responses

From the perspective of the developmental psychopathology framework, the literature has posited that caregivers' emotional response to a stressful event (for example, the COVID-19 pandemic) can play an important role in their children's emotional/behavioral functioning (Cummings, 2018). The transmission of psychological symptoms from caregivers to children has also been studied regarding the COVID-19 pandemic (Cimino et al., 2021). During lockdowns, parents and their children were forced to be confined together at home, leading to drastic changes in daily habits and routine (Yue et al., 2020). In a study on mother-child feeding interactions, Cerniglia et al. (2021) underlined significantly higher internalizing and externalizing scores of children during the pandemic. A study by Chartier et al. (2021) found a significant association between caregivers' and children's peritraumatic stress when caregivers experienced psychological symptoms in response to the pandemic. In fact, children are strongly dependent on their caregivers, as they are the primary source of their protection and emotional regulation (Dalton et al., 2020). However, caregivers' preoccupation with the pandemic or other stress factors related to it might compromise their ability to respond to their children's signs of suffering and distress (Stein et al., 2009). This is especially true in the COVID-19 situation (and in every other disaster situation), as children may be frightened by what they cannot understand, and a misperception of reality can cause wrong attributions (Norris et al., 2002). When an external threat is present, the caregiver's response and emotional reaction can play a substantial role in their children's adaptation. Thus, parents not only shape their outcomes in times of crisis, but they also shape their offspring's adaptation and coping strategies (Cobham et al., 2016).

### Non-at-risk caregivers and at-risk caregivers

Consistent with these considerations, recent research has found that parents' psychopathological risk is associated with increases in children's behavior problems (both externalizing and internalizing) during the pandemic (Whittle et al., 2020). Parents' psychopathological symptoms may interfere with their perceptions of their child's adaptation, leading to inadequate parenting, an underestimation of their children's symptoms, and/or inadequate pattern of parent-child interactions (Taraban & Shaw, 2018). However, even caregivers without any previous signs of psychopathological risk and their children might suffer the long-term consequences of the COVID-19 pandemic, especially mothers who are frequently the primary caregiver (Granek et al.,

2014). As underlined by Clark et al. (2021) in a study on the mental health of Irish working mothers during the lockdown, at-home confinement may have exacerbated the pandemic burden, having to manage home schooling, childcare, and children's socialization along with their usual work routine.

To the best of our knowledge, the increase (or decrease) in other symptomatic dimensions (apart from anxiety and depression) in mothers with and without psychopathological risk and their children has yet to be investigated in a longitudinal study. Thus, this study aimed at longitudinally exploring whether the psychopathological symptoms of a sample of mothers and their children increased, decreased, or remained the same at three assessment points: before the COVID-19 outbreak, during the first wave of the pandemic, and in the current situation, when most restrictions have been lifted but the impact of the pandemic on people's lives is still high. This study was specifically intended to assess:

1. The possible increase or decrease in symptoms over three assessment points in a group of mothers with psychopathological risk and a group of mothers without psychopathological risk and their children;
2. The children's depression and aggression symptoms over the three assessment points;
3. The possible effect of maternal psychopathological risk on their child's depression and aggression symptoms over time.

## Methods

### Sample and procedure

Four hundred mothers and their children were selected from a larger previous study (Marzilli et al., 2021) started before the COVID-19 outbreak (in October 2019; T1) and re-contacted during the first wave of the pandemic (March 2020; T2), and in October 2021 (T3). The recruitment of the subjects for this research was based on consecutive sampling of individuals who (in the previous study) declared their availability to be re-contacted for other studies. Considering the data analyses performed, the number of recruited participants was sufficient to obtain a statistical power of 0.81 with a medium effect size ( $f^2=0.40$ ) and a critical alpha of 0.05 (two-tailed). Besides their availability, the inclusion criteria for the subjects in the present study were: no referred psychiatric diagnosis; no medical condition present at the moment of the recruitment; no undergoing medical or psychological treatment; no infection by COVID-19; and no experiences of the loss of any close relative due to COVID-19. At T1 and T2, the children were 5 years old, and at T3, they were 6 years old. Household income and educational

level remained unchanged at T1, T2, and T3 (socio-demographic characteristics are shown in Table 1). At all assessment points, the mothers filled out the Symptom Check-List 90/R questionnaire and the Child Behavior Check-List. At T1, the sample was divided into two sub-samples: mothers exceeding the SCL-90/R clinical cut-off ( $> 1$ ; see below) composed the at-risk group (RG) and mothers who did not exceed this cut-off composed the non-at-risk group (NRG).

Mothers who agreed to participate in this study signed written informant consent forms, consistent with the Declaration of Helsinki. Before its start, the present study was authorized by the Ethical Committee of Sapienza (n. 0,000,809–2020).

## Tools

To assess the mothers' psychopathological risk, the present study used the Symptom Check-List/90-R. The mothers' perceptions of their children's emotional and behavioral functioning were investigated using the Child-Behavior Check-List 1,5–5 and 6-18. An online survey was created via Google Forms, which included both self-report and report-form questionnaires. In the first section of the survey, the objectives, procedures, and theoretical background of this study were explained. Mothers were invited to read this section and explicitly agree or refuse to participate and to eventually complete and send the survey if they agreed to participate. All measures were administered at T1, T2, and T3 using the same procedure.

## Measures

The SCL-90/R (Derogatis & Lazarus, 1994) was completed by the mothers to assess psychological risk. The SCL is a 90-item self-report symptom inventory measuring psychological symptoms and psychological distress rated on a Likert scale ranging from 0 (not at all) to 4 (extremely). The tool asks participants to report whether they have experienced symptoms of somatization (e.g., headaches), obsessive-compulsivity (e.g., having to

check and double-check what you do), interpersonal sensitivity (e.g., feeling that people are unfriendly or dislike you), depression (e.g., feeling blue), anxiety scale (e.g., feeling fearful), hostility (e.g., having urges to beat, injure, or harm someone), phobic anxiety (e.g., feeling afraid to go out of your house alone), paranoid ideation (e.g., persecutory beliefs concerning a perceived threat toward oneself), and psychoticism (e.g., having thoughts that are not your own) in the past week. The questionnaire also provided a global severity index (GSI). The SCL-90/R showed a good internal consistency in adults in this sample (Cronbach's  $\alpha = 0.83$ ).

The mothers also completed the CBCL 1½–5 (Achenbach & Rescorla, 2001a) to report their perceptions of their offspring's emotional and behavioral functioning at T1 and T2 and CBCL 6–18 at T3 (Achenbach & Rescorla, 2021b). Both versions assess internalizing and externalizing problems, although some items show a different formulation that is coherent with the developmental changes within the domains over time. Following a previous study we created two subsets: "depression" and "aggression" (Cerniglia et al., 2018).

## Data analysis

Descriptive analysis confirmed that all variables were normally distributed. The analysis of variance (ANOVAs) was used to assess significant differences in the NRG and the RG on the SCL-90-R for mothers and on the CBCL for children. Bonferroni's post hoc tests were run. Mean values are reported with their respective standard deviations. The p-values are reported with values  $< 0.05$  considered significant. The child's gender showed no significant effect on the variables examined at any assessment point.

Eventually, we conducted a series of linear regressions to investigate the effect of maternal psychological symptoms on their children's functioning over the three assessment points in both groups. We used IBM SPSS v.26 to conduct the data analysis.

**Table 1** Socio-demographic characteristics of the subjects of the study at T1

	NRG (N=331)	RG (N=69)		
<i>Children's gender</i>	166 M	165F	35 M	35F N <sub>tot</sub>
<i>Children's age, M (SD)</i>	5.26 (1.22)		5.53 (1.18)	400
<i>Mothers' age, M (SD)</i>	35.16 (1.56)		34.54 (2.04)	
<i>Household income</i>	approx. 2500 euros/month		approx. 2500 euros/month	
<i>Educational level</i>	At least 12 years of schooling		At least 12 years of schooling	

NRG = non at-risk group; RG = at risk group; M = males; F = females

## Results

### Mothers' symptoms at T1, T2, and T3 in the NRG and RG

The GSI of the NRG mothers significantly decreased from T1 to T2 (Wilks' lambda = 0.92;  $F = 12.75$ ;  $\eta^2_p = 0.72$ ;  $p < 0.001$ ; mean difference = -0.14), whereas in the RG, GSI was significantly decreased from T1 to T3 (Wilks' lambda = 0.72;  $F = 12.79$ ;  $\eta^2 = 0.27$ ;  $p < 0.001$ ; mean difference = -2.99) and from T2 to T3 (mean difference = -0.30). At T3, 7.2% of the mothers' GSI scores were normal (GSI < 63) in the RG. In the NRG, repeated measures ANOVA showed the same patterns for obsessive-compulsive, interpersonal sensitivity, anxiety, hostility, phobic anxiety, and paranoid ideation. All of these scales significantly increased at T3. Interpersonal sensitivity, anxiety, and hostility also significantly decreased at T2 from T1. Depression and somatization were the only scales that followed a different pattern. They significantly increased at T2 and significantly decreased at T3. Even when increased, no SCL-90 scale in the NRG reached clinical levels over the three assessment points. In the RG, repeated measures ANOVA showed the same pattern for the somatization, obsessive-compulsive, depression, anxiety, phobic anxiety, and psychoticism scales. The scores in all these scales significantly decreased at T3 from T1 and T2; interpersonal sensitivity, paranoid ideation, and hostility followed the same pattern, but no significant

differences were found. Apart from anxiety, which also significantly increased at T2 and phobic anxiety, which significantly decreased at T2, all other scales showed no significant difference between T1 and T2. The results are shown in Table 2.

### Children's symptoms at T1, T2, and T3 in the NRG and RG

We conducted a repeated measures analysis of variance (ANOVA) to evaluate possible differences in total CBCL scores over the three assessment points. In the NRG group, we found a significant time effect (Wilks' lambda = 0.60;  $F = 108.3$ ;  $p < 0.001$ ;  $\eta^2_p = 0.39$ ). Follow-up comparisons indicated that each pairwise difference was significant. There was a significant increase from T1 to T2 (mean difference = 14.49) and a significant decrease at T3 from T2 (mean difference = -10.31). There was a significant time effect in the children of the RG mothers as well (Wilks' Lambda = 0.31;  $F = 73.12$ ;  $p < 0.001$ ;  $\eta^2_p = 0.68$ ). Pairwise comparisons showed a significant decrease from T1 to T2 (mean difference = -43.67) and a significant increase from T2 to T3 (mean difference = 32.750). The increase from T1 to T3 was not significant.

### Children's depression and aggression symptoms over the three assessment points

In the NRG, aggression increased significantly at T2 (mean difference = 0.44) but decreased significantly at T3

**Table 2** SCL-90-R subscales' means and standard deviations over time in the NRG and RG

	T1		T2				T3					
	NRG		RG		NRG		RG		NRG		RG	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
SOM	.34	.31	1.77	.78	.23	.25	1.79	.83	.19	.36	1.26	.79
O-C	.17	.21	1.74	.59	.16	.21	1.75	.60	.25	.49	1.49	.61
I-S	.26	.25	1.49	.43	.17	.22	1.44	.49	.32	.42	1.42	.56
DEP	.29	.29	1.83	.49	.33	.37	1.83	.39	.21	.33	.96	.53
ANX	.22	.29	1.65	.60	.19	.26	1.72	.67	.25	.48	1.40	.55
HOS	.17	.22	1.31	.49	.13	.19	1.30	.55	.21	.43	1.27	.67
PHO	.19	.22	1.58	.73	.18	.23	1.39	.70	.24	.52	1.42	.83
PAR	.16	.33	1.51	.54	.16	.23	1.49	.53	.29	.50	1.57	.62
PSY	.20	.21	1.59	.68	.21	.23	1.60	.63	.23	.44	1.33	.57
TOT	19.5	18.1	146	45.3	18.3	17.4	146.7	47.6	21.5	37.2	118.9	49.6
GSI	.22	.20	1.62	.50	.20	.19	1.63	.53	.24	.41	1.32	.55
PSDI	1.24	.26	2.04	.42	1.21	.24	2.02	.41	1.17	.31	1.88	.41
PST	14.8	10.8	70.7	11.3	14.1	10.7	71.2	11.2	14.6	18.1	62.1	15.6

M: mean; SD: standard deviation. NRG: non at-risk group. RG: at-risk group. M: males; F: females. GSI: Global Severity Index; PSDI: Positive Symptoms Distress Index; PST: Positive Symptoms Total. SOM: Somatization; O-C: Obsessive-Compulsive; I-S: Interpersonal Sensitivity; DEP: Depression; ANX: Anxiety; HOS: Hostility; PHOB: Phobic Anxiety; PAR: Paranoid Ideation; PSY: Psychoticism

(mean difference = -1.6), reaching even lower levels than T1 (mean difference from T1 to T3 = 1.2), while depression significantly increased from T1 to T2 (mean difference = 0.44), significantly increasing again at T3 (mean difference (T1–T3) = 0.66). In the RG, aggression significantly decreased from T1 and T2 to T3 (Wilks' lambda = 0.24;  $F = 11.04$ ;  $\eta = 0.24$ ;  $p < 0.001$ ). There was no significant increase at T2, as the means remained substantially stable (mean difference from T1–T2 = 0.1). There were no significant changes in the depression factor over the three assessment points (Table 3).

**Effect of maternal psychopathological risk on their child's depression and aggression symptoms over time**

A linear regression was conducted to determine whether the mothers' GSI could predict the children's CBCL total scores and aggression and depression subscale scores over the three assessment points. The results showed that GSI could not predict aggression and depression scores in either the NRG or the RG at every assessment point. However, the results showed a significant effect of the GSI on the CBCL total scores at T3 ( $F(1,67) = 6.337$ ,  $p < 0.014$ ), with an  $R^2 = 0.087$ , suggesting that 8.7% of the variation was predicted by the mother's GSI scores in the RG.

In the NRG, a significant regression equation was found at every assessment point that predicted CBCL scores based on mothers' GSI (T1:  $F(1,330) = 42.642$ ,  $p < 0.000$ ,  $R^2 = 0.114$  [11%]; T2:  $F(1,330) = 15.145$ ,  $p < 0.000$ ,  $R^2 = 0.044$  [4%]). In particular, at T3, our regression equation seemed to suggest that 72% of the variation in CBCL scores was predicted by the mothers' GSI ( $F(1,330) = 889,634$ ,  $p < 0.000$ ,  $R^2 = 0.729$ ).

**Discussion**

**Symptoms in non-at-risk mothers**

This study aimed to verify whether psychopathological symptoms in mothers and their children varied during the pre-pandemic, lockdown, and post-lockdown periods.

Overall, our work confirmed that the COVID-19 pandemic had a significant impact on various aspects of individuals' mental health.

Our results showed that depression and somatization symptoms in mothers of the NRG increased from the pre-pandemic to the post-lockdown period but decreased at T3, when most of the restrictions taken to stem the spreading of the virus were lifted. The increase in depressive symptoms in the general population during the pandemic and the lockdowns has been demonstrated by previous studies (see for example, Ettman et al., 2020), as is the case regarding the reduction of symptoms when most restrictions were lifted (Arendt et al., 2020). Our study adds to the previous literature in that it also focuses on somatization, which has been defined as a key feature of traumatic experiences (van der Kolk et al., 1996) but has been mostly overlooked in the literature on the COVID-19 pandemic psychological outcomes, except for some interesting studies (e.g. Zhang et al., 2021). These studies posited that the psychological outcomes observed during the SARS and EBOLA viral outbreaks indicated acute stress reactions, including psychosomatic symptoms such as pain, fatigue, weakness, and lethargy (Leow et al., 2005). Importantly, no mother in the NRG exceeded the clinical cut-off of the SCL-90/R at any assessment point on any subscale. Thus, although maternal psychopathological symptoms varied significantly during the pandemic, no mother presented with severe clinical manifestations. If depression and somatization showed the above trend, the general level of psychopathological symptoms and distress in mothers belonging to the NRG group decreased from T1 to T2. Specifically, interpersonal sensibility, anxiety, and hostility symptoms decreased from T1 to T2. However, maternal obsessive-compulsive, interpersonal sensibility, anxiety, hostility, phobic anxiety, and paranoid ideation symptoms increased at T3 (when most restrictions were lifted). These results appear counterintuitive, as one would expect that symptoms increased subsequent to the pandemic outbreak and restrictions to social, work, and school routines had been applied, and decreased when these restrictions were lifted and the uncertainty and fear generated by the emergency lessened. In fact, most previous research has shown that individuals' mental health during the pandemic worsened (Tian et al., 2020); however, other

**Table 3** CBCL Aggression/Depression's means and standard deviations over time in the NRG and RG

	T1		T2				T3					
	NRG		RG		NRG		RG		NRG		RG	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Aggression	3.58	2.29	4.36	3.18	.33	.61	4.26	3.17	2.86	2.62	2.57	2.98
Depression	1.39	1.29	2.01	1.88	.60	.74	2.28	1.96	2.47	2.14	2.28	2.38

NRG: non at-risk group. RG: at-risk group. M: males; F: females

scholars have found different results. In a study by Gijzen et al. (2020), more than half of the participants mentioned the positive outcomes of the COVID-19 pandemic. Moreover, recent research has suggested that the lockdown had a positive impact on anxiety symptoms (Magson et al., 2021). A study by O'Connor et al. (2021) that investigated the trajectories of adults' mental health during the lockdown in the UK also showed a significant decrease in anxiety symptoms and a significant increase in perceived well-being. It is possible that staying at home and spending more time with family had a positive impact on people's well-being. This can be due to the fact that the lockdown forcibly removed potential daily life stressors, such as going to work, traffic jams, and overcrowded public transport, and gave people the possibility to spend more time with their loved ones. When considering this apparently counterintuitive phenomenon, we must bear in mind that a wide range of individual, relational, and social factors could play a protective role, shaping the lockdown into a more positive experience (Shanahan et al., 2020).

### Symptoms in at-risk mothers

It is important to note that the reduction of social stressors (due to the restrictions in social contacts during the peak of the pandemic and the lockdown) that may have predicted the decrease of psychopathological symptoms in the NRG could have also had a role in the variation of the scores of mothers in the RG sub-sample (composed of mothers who exceeded the clinical cut-off of the SCL-90/R at T1). In fact, the mothers in the RG group also presented with overall decreasing scores from T1 to T2 and from T2 to T3. In particular, somatization, obsessive-compulsive, depression, anxiety, phobic anxiety, and psychoticism maternal symptoms followed this trend. We speculate that the forced isolation of the lockdown could have produced a sort of "shelter effect"—that is, the feeling of being protected from the outside dangers from the virus itself and from the (potentially contagious) contact with others. This may have caused the decrease in the perceived (the SCL-90/R is a self-report measure) psychological distress in these mothers.

### Offspring's aggression symptoms

With regard to children in the NRG group (children of mothers who did not exceed the SCL-90/R clinical cut-off at T1), their total scores of psychopathological risk increased from T1 to T2, but decreased at T3. This is a fascinating result, considering that their mothers showed a different trend. The literature on maternal and offspring symptomatology has widely demonstrated an interconnection between mothers' and children's psychological statuses (Fanti et al., 2013). However, in this study, mothers rated their offspring

emotional/behavioral functioning as worsened during the lockdown when compared with the pre-pandemic period, whereas they self-reported less psychopathological symptoms for themselves. Our results showed that in the NRG group, children's aggressive symptoms decreased at T3 (reaching even lower scores than pre-pandemic) after increasing at T2. We hypothesize that children presented higher symptoms of aggression during the lockdown period due to the great disruption of daily routines (Dubois-Comtois et al., 2021) that exceeded their capacity to adapt. School attendance and social interactions were impeded, for instance, and the environment was no longer perceived as safe, stable, and predictable (Glynn et al., 2021). Stability, predictability, and coherence of the environment in which they live are recognized as key aspects of children's psychological well-being (Evans, 2021). In the absence of these crucial aspects, children's capacity to regulate emotions and externalizing behaviors was impaired. We speculate that at T3, when most of the restrictions had been lifted, school reopened and social life were (at least partially) restored, and the aggressive symptoms were rapidly lowered due to children's resilience. Interestingly, during the lockdown, aggressive symptoms did not increase in offspring of mothers at risk for psychopathology; instead, these symptoms decreased both at T2 and T3. It is possible that aggressive problems before the pandemic manifested mainly at school or in other social contexts, and due to the forced isolation, these children were perceived as less problematic. Spending more time at home and with their families (although forcedly) may have had a positive effect and may have acted as a regulator of aggressive behaviors (Magson et al., 2021).

### Offspring's depression symptoms

Depression increased from T1 to T2 and from T2 to T3 but only in the group with non-at-risk mothers. Children in the RG group did not show increased depression scores from T2 to T3. This result is in line with previous studies showing that depressive symptoms are the most frequent and present in children during the peak of the pandemic (Hawes et al., 2021). Unlike the trend of the aggression scores, depression levels also increased from T2 to T3 only in the children of mothers in the NRG. As it is widely known, children's mental health is severely influenced by the family system. Children whose mothers were not showing signs of psychological risk were more likely used to a caring, responsive, attentive, and sensible environment. The COVID-19 pandemic deeply (and often negatively) affected family processes and the quality of interactions. (Courtney et al., 2020). Responsive families could have struggled to maintain the same level of responsiveness that they had before the COVID-19 pandemic (Spinelli et al., 2020, 2021). We speculate that this may have led these children to suffer from

this lack of responsiveness they were not used to, leading them to develop depressive symptoms that were exacerbated during of the pandemic. In contrast, children from families that were already used to encounter a less responsive environment may have not perceived the profound impact of COVID-19 on family interactions that were already more deficient before the pandemic outbreak, not necessarily leading them to develop depressive symptoms. However, children from both families were able to regulate the aggressive behaviors they showed when facing the lockdown (aggressive behavior could be considered a form of protest; Oliveira et al., 2021).

### **Maternal psychopathology's effect on their offspring's symptoms**

Lastly, our results showed that maternal psychopathology did not predict aggressive and depressive problems in children at any assessment point, although it predicted the total CBCL score from T1 to T3. Thus, it seems that mothers' psychopathological risk did not influence specific areas of children's emotional/behavioral functioning, rather it had an effect on the general offspring psychological well-being, as other studies had previously posited (Cerniglia & Cimino, 2020; Marchetti et al., 2020). However, the lack of a direct effect of maternal psychopathological risk on children's depressive and aggressive symptoms may be due to the greater complexity of the phenomenon we are investigating. As many contributions indicate (Cummings et al., 2020; Morgül et al., 2020; Prime et al., 2020), children's manifested symptomatology can be predicted and mediated by a many factors – e.g. family functioning (Mchale & Rasmussen, 1998), paternal role (Cimino et al., 2015), socioeconomic status (Mikolajczak et al., 2018) that we did not specifically consider in our study. The direct relationship between maternal psychopathological risk and child symptoms may not be sufficient to explain the complexity of this phenomenon.

### **The use of internet based cognitive behavioral therapy as a cost-effective and evidence-based treatment**

The COVID-19 pandemic has posed major and new challenges for all health care workers. A new and different approach to psychological treatment has been required in order to stem the spread of the virus during the pandemic peak. Recent studies point out that the most evidence-based treatment appears to be cognitive behavioral therapy, particularly when conducted online, which has been highly effective in preventing the spread of infection during the pandemic (Ho et al., 2020). In particular, the use of CBT could be a useful tool in addressing and treating mothers'

psychiatric symptoms caused by the pandemic, including insomnia (Soh et al., 2020), depression, anxiety, panic attacks, somatic symptoms, posttraumatic stress, delirium, psychosis and even suicidality (Ho et al., 2020)). Even though CBT has been proven more cost-effective than other types of intervention, prior studies (Solomon et al., 2015) have argued that those costs should be further mitigated. Zhang and Ho (2017) developed a Moodle implementation for web-based intervention. The cost of such intervention would be limited to the cost of hosting the server, confirming an important advantage of CBT for what concerns its cost–benefit ratio (Veer-Tazelaar et al., 2010).

### **Conclusion**

The COVID-19 pandemic has considerably affected the mental health of mothers and their offspring. In our study, the mental health of most mothers worsened during the pandemic. In particular, depressive and somatization symptoms significantly increased during the lockdown. Most of the mothers in our study reported significant changes in their children's emotional and behavioral functioning. Depressive symptoms, especially in the children of at-risk mothers, seemed to increase, as children failed to restore their vitality due to the lack of social stimulation outside the family. However, some symptoms significantly decreased in mothers and their offspring. The pandemic forcibly removed several daily life stressors and led to a general slowdown in the pace of life and work, giving the opportunity to spend more time with family and staying at home with loved ones. This could have had a positive impact on these mothers' mental health and may have acted as a regulator of aggressive behaviors in their children. When considering the effect of the pandemic, we have to consider both sides of the phenomenon and that a wide range of individual, relational, and social factors can shape the outcome of the COVID-19 impact on psychological well-being. This study has several limitations. First, the measure used to assess mothers' psychopathological symptoms was a self-report tool. Although the SCL-90/R is widely and effectively used in this field of research (Tian et al., 2020), other studies using measures administered by experts and clinicians are needed. Moreover, the size of the study was relatively small, considering that it was a community sample. A major limitation in our study concerns the fact that we didn't consider the number of people living in the same household—nor their age – in our sample. Recent research confirms the impact this condition could have on children's and other household members' mental health in different cultures (Tee et al., 2020; Wang et al., 2020a, 2020b, 2021a, 2021b, 2021d). Lastly, the homogeneity of the sample in terms of race and geographical origin

does not enable broad generalization of the results to a wider population.

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**Data availability** The datasets generated during and analyzed during the current study are available from the corresponding author on reasonable request.

## Declarations

**Ethical information** Mothers who agreed to participate in this study signed a written informant consent, consistent with the Declaration of Helsinki. Before its start, the present study was authorized by the Ethical Committee of Sapienza (n. 0000809-2020).

**Conflicts of interest** The authors declare that they have no competing or potential conflicts of interest.

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