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ORIGINAL PAPER

Mental Health of Mothers and Children During the COVID-19 Lockdown: A Cross-sectional Study on a Large Sample of Italian Families

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Abstract

Individuals and communities worldwide have been affected by COVID-19, resulting in stress and emotional instability. Families faced a massive disruption of daily routines, with increased psychological problems for both parents and children. In this cross-sectional study, we explored the emotional impact that health crises have had on Italian families, and in particular on mothers. Nine hundred and seventy-five Italian mothers of children aged 3–18 years participated in this study by completing a survey about maternal and child mental health. The mother's psychological state was assessed using the GHQ and the PSS, while the children's psychological state with the SDQ. We also collected family socio-demographic information. We conducted a path analysis through structural equation modeling on this data, with the hypothesis that socio-demographic variables and mothers' psychological state were related, as well as mothers' psychological condition and children's well-being. Our results demonstrated how, during the lockdown, mothers reported a worsening in their psychological state. Furthermore, we found that both educational level and housing type were positively associated with maternal psychological well-being, while remote working was associated with decreased well-being. Maternal mental health had a strong relationship with reported children's psychological problems. Mothers' perceived stress was related to decreased prosociality and increased hyperactivity, emotional difficulties, and behavioral problems, while mothers' general discomfort and depression were related to increased peer problems and emotional problems. This result supports helping mothers find a new balance between work, family, and children as a way to improve family functioning and well-being, as well as children's mental health and resilience.

Keywords COVID-19 · Mothers · Children · Well-being · Family resilience

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Highlights

- The psychological state reported by Italian mothers worsened during the COVID-19 lockdown.
- Working conditions was a significant factor in determining mothers' sense of self-efficacy, with mothers working remotely at home reporting a lower level of psychological well-being.
- Maternal stress predicted a higher level of children's hyperactivity and conduct problems, while maternal ill-being was mostly related to children's emotional problems.
- Mothers' well-being was related to improvement in all the areas of children's mental health investigated through the SDQ.
- Supporting mothers' well-being would increase their capacity to support children during adversity such as the COVID-19 pandemic and lockdown.

On January 30, 2020, the World Health Organization declared the global outbreak of novel coronavirus (SARS-CoV-2) a Public Health Emergency of International Concern (PHEIC). Italy, along with Germany, France, and Spain, was one of the first European countries to register the first cases of COVID-19 at the end of January 2020 and subsequently imposed travel restrictions on its citizens. For some weeks, it was the country with the largest number of COVID-19 cases after China. On January 31, 2020, the Italian government declared a state of national emergency and, on February 24, imposed the first social distancing restrictions on February 24th, with a decree closing all schools and many commercial activities in the northern regions (Lombardy and Veneto). These restrictions were gradually expanded and eventually extended to the rest of the country, with the period of complete national lockdown commencing on the March 9th (Italian Government, 2020). Effects of lockdown measures on psychological well-being has been widely reported in Italy (Rossi et al., 2020) due to the new stressors associated with quarantine: the lack of warning precluded preparation and preadaptation, the unavailability of antidotes or vaccinations at the time, and the pervasive uncertainty prevent from planning for the future and thus generates additional psychosocial stress.

The 2019 Coronavirus Disease (COVID-19) literally swept across the globe bringing new and unexpected challenges, including high financial losses, safety concerns, and mandatory periods of lockdown. This event has disrupted people's daily routines and generated stress and instability, both for individuals and for families and communities (Prime et al., 2020). A significant number of studies have evaluated the psychological impact of COVID-19 on people, comparing the current health emergency with previous pandemics such as SARS, MERS, Ebola, and H1N1. For example, a review by Brooks et al. (2020) showed that people reported a range of psychological symptoms during the containment measures, such as, among others, depression, stress, irritability, anger, sadness and fear. Moreover, these symptoms tended to linger beyond the end of the lockdown, causing long-term problems, such as posttraumatic stress disorder (Cao et al., 2022; Carmassi et al., 2022).

In the wake of these reports, a global call to action was launched to investigate the psychological impact of the COVID-19 outbreak on mental health and identify effective strategies for dealing with it (Holmes et al., 2020). On a global scale, understanding the reasons for the psychological distress caused by COVID-19 and its related containment measures is thus a priority for psychological research. This could help in coping with the current pandemic scenario as well as in making the scientific community ready for future crises of a similar nature.

The Psychological Impact of COVID-19 on Parents

The pandemic outbreak has had a significant impact on families. Although family relationships can be considered a vital factor in resilience during difficult times (Gobbi et al., 2020), having a family can also increase pandemic stress, both through a fear of family members infecting each other (Kisely et al., 2020; Simione & Gnagnarella, 2020) and a difficulty in managing family life with the limitations imposed by the pandemic. Prime et al. (2020) affirmed that the most challenging factor for parents was the changes in their mood and their general stress levels due to the COVID-19 outbreak. Most parents also reported experiencing symptoms of anxiety and depression, as well as poor sleep. In particular, the extraordinary social distancing experience, imposed during the acute stage of the COVID-19 pandemic, generated feelings of loneliness and increased the risk of depression in family caregivers (Gallagher & Wetherell, 2020).

Furthermore, having pre-existing mental health issues increased the risk of exacerbation and developing mental health problems, due to COVID-19. In particular, while the well-being of many caregivers has been affected by the pandemic stress, this effect was greater among parents, and particularly mothers, who have also experienced prior adversity (Wade et al., 2021). These findings are consistent with previous research on the effects of public health crises on the individuals' mental well-being (Earls et al., 2008;

Lau et al., 2008). In addition, Adams et al. (2020) found an increase in overall stress levels before and after May 2020 among a group of parents. Specifically, participants reported a dramatic change in their activities after the COVID-19 outbreak, and for nearly half of the sample, parenting became more difficult during the pandemic. Other studies have highlighted how family characteristics can influence caregivers' outcomes, as the number of children in a family increases emotional problems, while the presence of both caregivers reduced them (Marchetti et al., 2020). During the acute phase of the COVID-19 pandemic, the exceptional experience of social distancing that lasted for several months in Italy, highlighted the importance of the balcony as a place where community interactions can take place. This turned out to be particularly relevant in Mediterranean countries like Italy, characterized by an extroverted culture, and a habit of spending much of daily life outdoors. Therefore, during the covid-19 pandemics, balconies were considered spaces framing hope for restoring physical as well as social health (Grigoriadou, 2021) for individuals and families.

A large number of studies conducted in Italy during the lockdown concurred that one of the most complex challenges for caregivers during this time was juggling work and family (Rania & Coppola, 2021). Indeed, while the opportunity to work from home during the lockdown was presented as an excellent solution to the issue of reconciling the demands of work and family, the difficulties in accommodating the presence of children while carrying out a job to the same standard as pre-lockdown have been strongly underestimated. As a result, the reconciliation between work and family has been much more demanding and stressful than expected, especially for women, who have had to reduce their work hours in order to either look after children or other dependent family members or to undertake household chores, even when both parents are at home (Lagomarsino et al., 2020). Accordingly, mothers reported the greatest negative psychological impact during the COVID-19 pandemic. In particular, Marchetti et al. (2020) showed that while most parents reported alarming stress levels, mothers displayed higher levels of distress than fathers.

There is broad agreement that a caregiver's mental health has a significant effect on the well-being of children (Newland, 2015). The family stress model states that under conditions of prolonged stress, changes in caregiver behavior, emotional availability, and psychological functioning may have a cascading effect on the well-being of children (Conger et al., 2010). Such model has been re-formulated and applied to the COVID-19 pandemic (Prime et al., 2020). Pandemic-related stress, that unfolds over the months of an enduring community-wide crisis like the COVID-19 pandemic, can impact the well-being of caregivers and, consequently the one of children (Giordano et al., 2022). Indeed, caregivers serve as a funnel through which disruption and stress from the pandemic affect the family functioning and child adjustment (Wade et al., 2021). In line with this, di Giorgio et al. (2021), in a study on the interaction between mothers and the psychological outcomes of their preschool children during the pandemic, found a worsening in sleep quality and a temporal distortion, i.e., a change in perceptions of the passage of time, in both mothers and children.

We can therefore state that in a stressful situation, such as the COVID-19 pandemic, there is a risk of deterioration in family relationships as parental stress and strain can affect parenting behaviors to the extent that the quality of parent-child relationship declines (Russell et al., 2020). Since there are still few references in the literature on this topic and given its importance for children's mental health (Wang et al., 2020), it is crucial to study how the pandemic has affected the psychological well-being of mothers and how this has impacted children's well-being. Understanding the psychological state of parents and the causes of their distress could be decisive in identifying effective interventions for children and families (Abidin, 1992; Scaramella et al., 2008).

The Psychological Impact of COVID-19 on Children and Adolescents

During the COVID-19 pandemic, parents have often been the only role models for their school-age and preschool-aged children. Consequently, parents have had to provide support when needed and promote positive development and new learning experiences for their preschool and school-age children (Wang et al., 2020). A study conducted in China reported psychological difficulties in children during the COVID-19 pandemic, with fear, inattention, and irritability being the most prominent symptoms among younger children (Jiao et al., 2020). Obviously, children have fewer personal resources than adults to deal with the numerous changes the pandemic has imposed on their lives (Liu et al., 2020). Guidelines recommended that parents talk to their children about the situation and explain it to them, as correct information about what is happening and the reasons for the restrictions could help prevent adverse psychological consequences in children (Dalton et al., 2020). However, how and when to do this has been left entirely up to parents. We can speculate that the most stressed parents may feel too overwhelmed by the situation to find appropriate ways to be a supportive figure for their children and thus to find the best ways to deal with children's questions and fears (DiGiovanni et al., 2004). In this situation, adults' lack of answers in response to their

children's concerns could cause an increase in children's psychological distress, resulting in even more emotional, attentional, and behavioral problems.

Adolescents also represent a vulnerable group in the pandemic, because they are already in a particular developmental phase, i.e., a moment of difficult transition (Larsen & Luna, 2018). It has been noted that the COVID-19 pandemic and the consequent lockdown measures were found to have multiple consequences for adolescents' lives: chronic and acute stress, concern for their families, sudden and unexpected bereavements, school interruptions, increased time spent on the internet and social media, anxiety about their future and so on. Social relationships have also been abruptly interrupted. A period such as adolescence, which is characterized mainly by the need for social contact with peers, has instead been replaced by forced domestic isolation. Several studies on adolescents dealing with mass disasters have reported increased levels of anxiety, depression (Chen et al., 2020), and posttraumatic stress (Kar & Bastia, 2006).

The Present Study

Given the importance within the context of the global pandemic of the psychological stability of families and, in particular, of children, we conducted a study to assess and understand the emotional impact that the health emergency has had and is having on Italian families. We decided to focus on mothers because they emerged as the family members who are at greater risk of distress, especially in the Italian context (di Giorgio et al., 2021; Marchetti et al., 2020). In particular, we hypothesized that the lockdown might have significantly affected mothers' lives (Lagomarsino et al., 2020; Prime et al., 2020), which in turns affect their psychological condition (Prati and Mancini 2021) and the well-being of their children (Jiao et al., 2020). More specifically, we hypothesized that working conditions would have an association with mothers' mental health (Feng & Savani, 2020), in particular, we expected that mothers who worked from home during the lockdown would report worse psychological conditions (Arntz et al., 2020; Lagomarsino et al., 2020). We also expected that family conditions would affect mothers reported mental health, with more distress associated with higher number of children and lower distress instead associated with the presence of the father in the same house (Marchetti et al., 2020). We also hypothesized that mothers' psychological conditions would relate to reported children's psychological conditions, with a higher number of difficulties reported by mothers with higher presence of psychological distress (Di Giorgio et al., 2021; McKelvey et al., 2002; Newland, 2015). Finally, based on previous works on the same topic, we would expect that the age of children would also influence the pattern of psychological difficulties in children (Jiao et al., 2020; Liu et al., 2020), with more problems reported for younger children, as they would have less resources respect to older children and adolescents to deal with the pandemic-related stress.

Method

Participants

For this study, we collected data from 975 Italian mothers for this study. Participants were recruited using a convenience or non-statistical sampling, starting with an invitation through social media and email. We also allowed participants to forward the invitation to other potential participants among their friends, colleagues, and family members. Participation was voluntary, as no compensation was provided. Data were collected from 30 April to May 30, 2020. Inclusion criteria were: Italian nationality, being a mother, and having at least one child aged 3 to 18 years.

We removed 39 participants from the sample as influential points i.e., data points which could significantly bias the results (see Data analysis for details), obtaining a final sample of 936 participants. The mean age was 39.22 years (SD = 6.17), with a mean education level of 14.77 years (SD = 3.97). The mean number of children was 1.64 (SD = 0.72; median = 2). Ninety-one percent lived with the father of their children, 9% did not; 48% lived in flat with (43%) or without (5%) one or more balconies, while 52% lived in a detached house with a private (47%) or a communal (5%) garden/lawn. Regarding working conditions, 19% continued to work as usual, 25% worked from home, 25% had lost their jobs due to the pandemic, and 31% did not work before or during the lockdown. The mean age of the children was 7.96 years (SD = 4.00; median = 7 years), and 542 (58%) were girls.

Procedures

We administered questionnaires through a series of online forms. In order to proceed to the next form, participants should fill all the questions presented in each form, therefore, no missing data were present in the final dataset. First, participants signed the informed consent and gave their agreement to participate in the study. Then, having given their consent, participants were asked for socio-demographic information and then they then filled in a series of questionnaires. The first part of the questionnaires covered the mother's psychological condition, while the second part addressed the psychological condition of the children. The mothers were requested to base their answers

on one of their children of school-age (between 3 and 18). All data were collected in a completely anonymous format. Ethical approval for this study was granted by the Research Ethics and Integrity Committee of National Research Council (prot. number 0031547/2020), and all procedures were performed according to the ethical standards of the 1964 Helsinki Declaration.

Materials

Socio-demographic information included age, education level, number of children, sex and age of each child, and mode of working (whether they kept on working as usual, were working remotely, whether they had lost their job due to the lockdown, or whether they were unemployed). We also evaluate housing conditions of mothers in order to control for their effects on mental health, as also reported in previous studies, by measuring whether they were cohabiting with their child's father (Spinelli et al., 2020), and their type of housing (0 = flat without balconies, 1 = flat with at least one balcony, 2 = detached house with communal garden, 3 = detached house with private garden; Amerio et al., 2020).

Mothers' psychological state was assessed using the following questionnaires. First, the General Health Questionnaire (GHQ-12, Giorgi et al., 2014), a 12-item questionnaire evaluating their psychological condition in terms of both positive (well-being and self-efficacy, e.g., "Have you recently been able to enjoy your normal day-to-day activities?") and negative states (distress, anxiety, and depressive symptoms, e.g., "Have you recently been feeling unhappy and depressed?"). Each item was evaluated on a 4-point Likert scale. In previous work on Italian samples, GHQ-12 showed good internal reliability, with Cronbach's alpha for the total score = 0.85, and 0.73 to 0.82 for the two subscales (Giorgi et al., 2014), and test-retest reliability, with Pearson's $r = 0.84$ for two successive measurements for the total score (Piccinelli et al., 1993). In our sample, GHQ showed also a good internal reliability, with Cronbach's alpha = 0.85. This questionnaire was used twice: the first time referring to the period immediately before the lockdown, and the second referring to the lockdown period itself. Please notice that both GHQs was collected at the same time, then the first questionnaire was a retrospective report. We also administered the Perceived Stress Scale (PSS, Cohen et al., 2006), a 10-item instrument assessing participants' perception of their control over life events (e.g., "How often have you found that you could not cope with all the things that you had to do?" or "How often have you been upset because of something that happened unexpectedly?"). Each item was evaluated on a 5-point Likert scale. Also the PSS showed good internal reliability and test-retest reliability, Cronbach's alpha = 0.75 and Pearson's $r = 0.85$ for two successive measurements at one week of distance (Mondo et al., 2021). In our sample, PSS showed also a good internal reliability, with Cronbach's alpha = 0.81.

The psychological condition of the children as perceived by their mothers was assessed via the Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001), measuring children's emotional and behavioral difficulties in five main areas. We implied the Italian version of the SDQ, which had normative data for children aged 3–17 (Marzocchi et al., 2002; Tobia & Marzocchi, 2011). This questionnaire included 25 items divided into the following five subscales: prosocial behaviors, peer problems, emotional problems, conduct problems, and symptoms of hyperactivity. Prosocial behavior was the only element to have a positive evaluation (the higher the score the better), whereas the other scales were negatively evaluated (a higher score indicating a more problematic condition). In our sample, SDQ scales showed an acceptable to good internal reliability, with Cronbach's alpha = 0.64, 0.63, 0.76, 0.59, and 0.75 respectively for the subscales prosocial behaviors, peer problems, emotional problems, conduct problems, and symptoms of hyperactivity.

Data Analysis

First, we computed the scores from the raw values collected from the participants. Then, based on these scores and the socio-demographic variables, we computed multivariate outliers using Cook's distance. Following Fox's (2016) recommendations, we defined as an outlier each data point that exceed a Cook's distance of 4/n (where n is the total number of data points) in a regression model with the demographics variables as predictors and the psychological variables as outcomes, i.e., we identified participants showing unexpected pattern of relationship between the study variables. In this manner, we identified and removed 39 participants considered as influential points, i.e., data points which could significantly alter the results of the analysis. We conducted a descriptive analysis on the final sample, computing mean, standard deviation, and score distribution for the psychological variables of mothers and children. In order to assess the impact of lockdown on mothers' psychological state, we compared the distribution of the two GHQ scores collected for mothers, the retrospective one (referred to the period before lockdown) and the actual one (referred to the period during the lockdown), using paired t-tests. This analysis aimed to depict the psychological state of our participants and their children during the lockdown. For the subsequent analysis, we computed a general distress score for the GHQ for the period before the lockdown. About children' psychological conditions, we compared the SDQ scores obtained in our sample with the normative data in Italy by means of one-sample t-test.

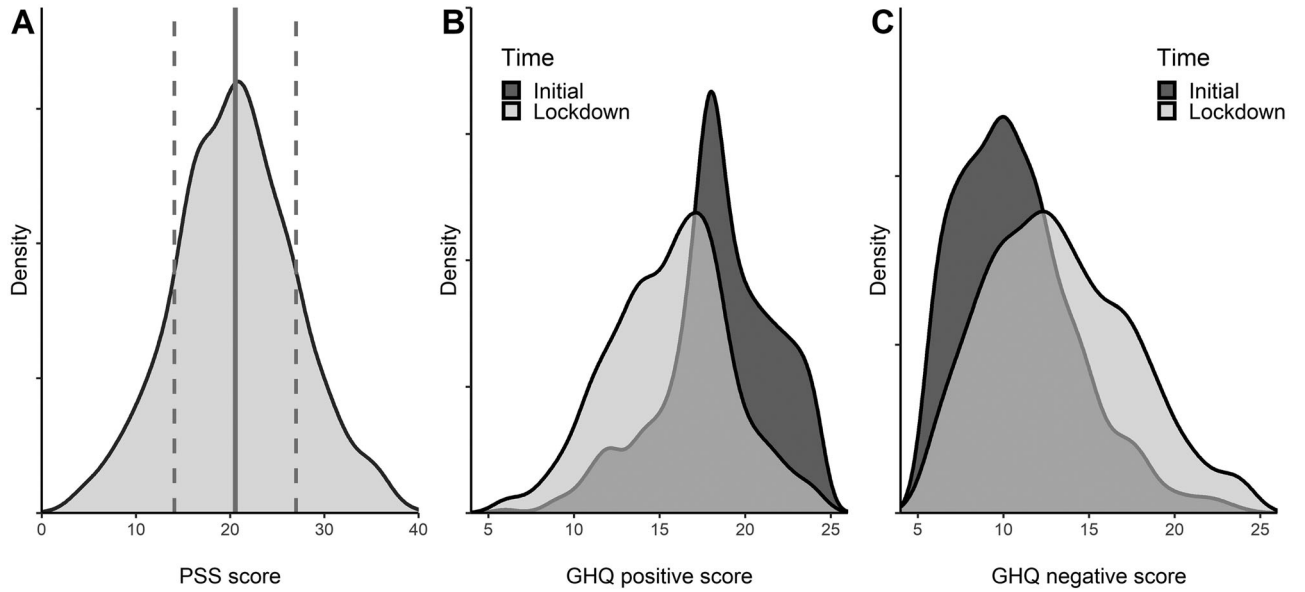

Fig. 1 Distribution of scores on mothers' psychological conditions. **A** The PSS scores and the descriptive values from a corresponding Italian sample, with the solid gray line reporting the average value and the two dotted lines reporting ± 1 SD from the mean. **B** and **C** The distributions of the GHQ positive and the GHQ negative reported for the period before lockdown ("initial", dark gray) and during lockdown ("lockdown", light gray). Please note that the GHQ score reported for the period before the lockdown was assessed retrospectively during the lockdown

We then analyzed the relationship between socio-demographic factors and the psychological state of mothers. First, the effect of working conditions was assessed using univariate ANOVA analysis, followed by Tukey corrected post-hoc for significant results. Then, the relationship with other socio-demographic variables (age, level of education, father's presence, housing type, and the number of children) and psychological variables was assessed using Pearson's bivariate correlations. We also conducted a correlation analysis between the socio-demographic and psychological variables of mothers and the psychological variables of children, i.e., the five factors of the SDQ.

Lastly, we conducted a general path analysis by means of Structural Equation Modeling (SEM) to include all our socio-demographic and psychological variables in a single model. First, we included the socio-demographic variables of mothers and their initial distress (as their total GHQ score before lockdown) as predictors of mothers' psychological condition, (i.e., the PSS, and GHQ, positive and negative), and we then considered these three scores as predictors of the psychological condition of the children as reported by their mothers, i.e., the five scores of the SDQ while controlling for the age and sex of the children. In our model, the number of events per variable (EPV) was higher than 50, which is considered largely sufficient to interpret our model as meaningful (Harrell, 2015). We conducted model analysis through maximum likelihood estimation and reported the standardized coefficients and their standard errors. As suggested by Schreiber et al. (2006), the model fitting indices include: χ^2 statistics, comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean squared residual (SRMR). Model fit was considered adequate with the following values: nonsignificant χ^2, RMSEA of 0.06 or less, SRMR of 0.08 or less, and CFI and TLI above 0.95 (Hu & Bentler, 1999). SEM was estimated using bootstrapping over 1000 samples because it is considered the best method of making the model fit robust to non-normal data.

All our analysis was conducted with R statistical software (R Core Team, 2014). We used the package lavaan (Rosseel, 2012) for path analysis and the package ggplot2 (Wickham, 2016) for data visualization.

Results

Descriptive and Preliminary Analysis: Mothers' and Children's Psychological Condition during Lockdown

First, we analyzed the distributions of psychological variables as reported by mothers. Perceived stress (Fig. 1A) showed an average value of 20.54, which was within the range of mild stress (higher than 13). On the other hand, 124 mothers (13.25%) reported very high stress levels, i.e., higher than 27. Thus, our participants reported a range of stress levels between mild and high. We also analyzed the GHQ subscales for positive and negative scores. We collected data on both these scores for the period before and

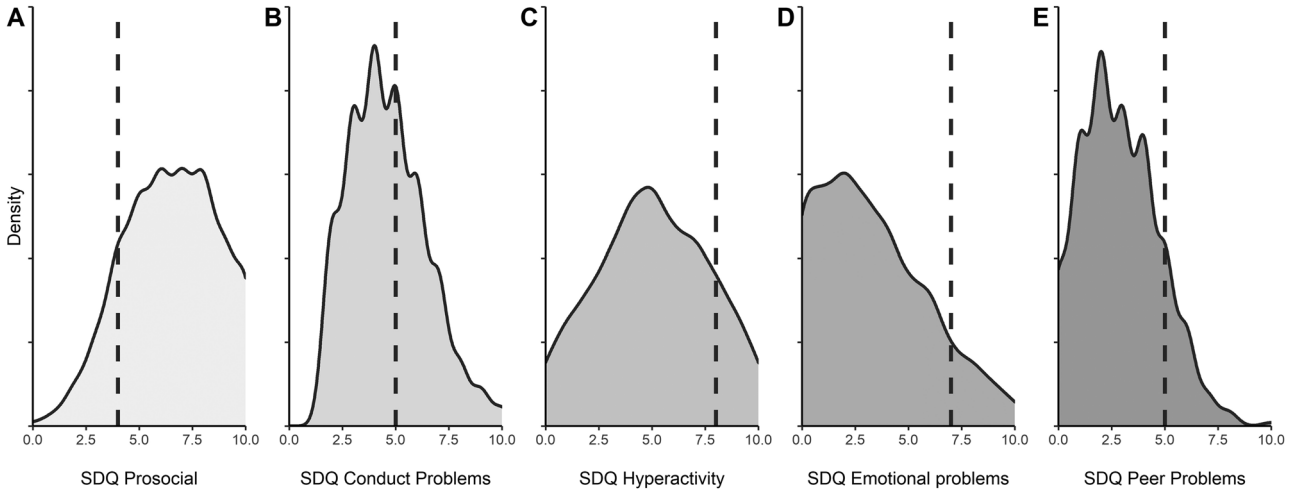

Fig. 2 Distribution of scores on the psychological conditions of children. The SDQ scores are reported with their cutoff values for abnormal values, i.e., <4 for prosociality (**A**), >5 for conduct problems (**B**), >8 for hyperactivity (**C**), >7 for emotional problems (**D**), and >5 for peer problems (**E**)

during the lockdown. The positive score of the GHQ, measuring well-being and self-efficacy, moved from an average value of 18.48 before lockdown to an average value of 15.59 during the lockdown, $t(935) = 22.83$, $p < 0.01$. At the same time, the negative score of the GHQ, measuring distress and depressive symptoms, increased from an average value of 10.78 at the beginning of the lockdown to an average value of 12.29, $t(935) = -17.47$, $p < 0.01$. Thus, reported mothers' psychological state during lockdown worsened in terms of both decreased well-being and increased distress.

We subsequently analyzed the distribution of the SDQ scores (Fig. 2). Out of our sample, 84 (10.04%) reported problems with prosociality, 277 (29.59%) displayed problems with conduct, 100 (10.68%) displayed symptoms of hyperactivity, 75 (8.01%) reported emotional problems, and 80 (8.55%) reported problems with peers. Compared to Italian normative data of SDQ (Marzocchi et al., 2002), during the COVID-19 lockdown mothers reported similar scores for the prosociality subscale, $t(935) = -0.07$, $p = 0.940$, whereas they reported higher scores for all the other subscales, indicating more problems in the areas of conduct, $t(935) = 46.99$, $p < 0.01$, emotions, $t(935) = 14.34$, $p < 0.01$, hyperactivity, $t(935) = 20.42$, $p < 0.01$, and relationships with peers, $t(935) = 18.50$, $p < 0.01$. Thus, this analysis revealed that mothers did report problems about their children and that those problems seemed to be inflated by the lockdown scenario.

Relationship of Socio-demographic Variables with Mothers' Psychological Condition

We assessed the relationship between socio-demographic variables and psychological condition of mothers. First, we tested if working conditions was related to difference in the PSS, the GHQ positive, and the GHQ negative with a series of univariate ANOVAs. Both the PSS, $F(1,934) = 0.01$, $p = 0.94$, and the GHQ negative, $F(1,934) = 0.17$, $p = 0.68$, did not significantly change for different working condition, the GHQ positive did, $F(1,934) = 9.08$, $p < 0.01$. Tukey corrected post-hoc comparing the four different conditions showed that mothers who worked remotely reported lower scores on the GHQ positive ($M = 14.90$, SD = 3.43) compared with those who had lost their jobs ($M = 16.02$, SD = 3.48), $p < 0.01$, as well as those who were unemployed ($M = 15.93$, $SD = 3.35$), $p < 0.01$. None of the other comparisons were significant, $p > 0.13$. Following this analysis, we simplified this factor by comparing the mothers who were working remotely with the others.

We then conducted bivariate Pearson's correlations between all our socio-demographic variables and the psychological variables. The descriptive statistics and correlation coefficients for this analysis are reported in Table 1. As can be seen, age was positively related to the level of education and number of children, and negatively correlated with the PSS. The level of education was negatively related to the number of children, whereas it was positively correlated to initial distress and the GHQ positive. Living with the child's father was correlated to better types of housing, a greater number of children, and increased GHQ positive. Housing conditions were related positively to both the number of children and the GHQ positive. The initial state of distress was related positively to the PSS, and both initial distress and the PSS were positively related to the GHQ negative but negatively to the GHQ positive. Lastly, the GHQ negative showed a strong negative correlation to the GHQ positive. Overall, this analysis indicates that levels of education, the presence of the father, and the type of

Table 1 Means and standard deviations of mothers' socio-demographic and psychological variables, and correlation coefficients between them

Variable	*M*	SD	1	2	3	4	5	6	7	8	9
1. Age	39.22	6.17									
2. Education	14.77	3.97	0.09**								
3. Remote working	0.25	0.43	−0.06	−0.16**							
4. Father	1.99	1.08	−0.03	0.05	−0.07*						
5. Housing cond.	1.99	1.08	−0.03	0.00	−0.01	0.12**					
6. Num. children	1.74	0.72	0.11**	−0.07*	−0.04	0.12**	0.10**				
7. Initial distress	29.26	3.95	0.08*	−0.07*	0.01	−0.05	−0.01	−0.03			
8. PSS	20.54	6.45	−0.10**	−0.03	0.01	0.02	−0.04	0.03	0.19**		
9. GHQ positive	15.59	3.51	0.01	0.10**	−0.11**	0.08*	0.08*	−0.03	−0.53**	−0.24**	
10. GHQ negative	13.29	4.22	−0.05	−0.00	0.05	0.03	−0.04	−0.00	0.68**	0.17**	−0.44**

M and SD represent mean and standard deviation, respectively. Remote working is coded as 0 = no, 1 = yes. Father indicates if the child's father lives with the mother and is coded as 0 = absent, 1 = present

*$p < 0.05$

**$p < 0.01$

housing were related to a better psychological state, whereas working remotely and initial distress were related to the worst psychological state.

Relationship between Mothers and Children's Psychological Conditions

Subsequently, we correlated the socio-demographic and psychological state of the mother with the psychological state of her child. The results of this correlation analysis are reported in Table 2. The mother's age was related to fewer reported symptoms of hyperactivity, while the level of maternal education was related to fewer perceived problems in all areas. Housing type was correlated with increased prosocial behavior and decreased symptoms of emotional distress, while the number of children increased perceived children's problems in the areas of emotions and conduct. The age of children was related to more prosocial behavior and to fewer symptoms of hyperactivity. Children being male related to a better score in the areas of prosociality, peer problems, symptoms of hyperactivity, and emotional problems. The initial distress of the mother was related to higher scores for all problematic areas we investigated. The PSS and GHQ negative were related to the worst scores in all areas, while the GHQ positive was linked to better scores in all areas.

In the next analysis, we tested all the relationship patterns we had investigated in a complex path analysis model (see Fig. 3). We assessed the effect of socio-demographic variables on mothers' psychological states and then the effect of mothers' psychological states on the perceived psychological states of their children. We conducted this analysis using a structured equation model with parameters estimated on 1000 bootstrapped samples. The model showed good fit indices, except for the chi-squared that was significant, $\chi^2(41) = 91.25$, $p < 0.05$; SRMR = 0.03, CFI = 0.98, TLI = 0.95, RMSEA = 0.04, $CI_{RMSEA} = [0.03, 0.05]$.

The analysis revealed that the mother's initial level of distress was significantly related to the level of PSS ($b = 0.23$, SE = 0.04, $\beta = 0.20$, $p < 0.01$), GHQ negative ($b = 0.14$, SE = 0.03, $\beta = 0.18$, $p < 0.01$), and GHQ positive ($b = -0.15$, SE = 0.02, $\beta = -0.24$, $p < 0.01$). Among the socio-demographic variables, remote working was related to a reduced score on GHQ positive ($b = -0.78$, SE = 0.27, $\beta = -0.10$, $p < 0.01$), and both the PSS ($b = -0.12$, SE = 0.03, $\beta = -0.12$, $p < 0.01$), and the GHQ negative ($b = -0.05$, SE = 0.02, $\beta = -0.07$, $p < 0.05$) decreased with age. Housing type related positively to the GHQ positive ($b = 0.24$, SE = 0.10, $\beta = 0.08$, $p < 0.05$). The level of maternal education revealed a trend toward significance in predicting higher GHQ positive scores ($b = 0.05$, SE = 0.03, $\beta = 0.06$, $p = 0.06$).

In the next step of the path analysis, we investigated the relationship pattern between mothers' psychological state and that of their children, controlling for the child's age and sex. The mother's stress was seen to relate to lower children's prosociality ($b = -0.05$, SE = 0.01, $\beta = -0.14$, $p < 0.01$) and increased children's symptoms of hyperactivity ($b = 0.09$, SE = 0.02, $\beta = 0.23$, $p < 0.01$), emotional problems ($b = 0.06$, SE = 0.02, $\beta = 0.14$, $p < 0.01$), and problems in the area of conduct ($b = 0.07$, SE = 0.01, $\beta = 0.24$, $p < 0.01$). By contrast, the GHQ negative only significantly relate to increased problems with peers ($b = 0.04$, SE = 0.02, $\beta = 0.09$, $p = 0.05$) and emotional problems ($b = 0.15$, SE = 0.03, $\beta = 0.24$, $p < 0.01$). The GHQ positive was significantly related to all of the investigated areas, in particular with an increased level of prosociality ($b = 0.14$, SE = 0.02, $\beta = 0.23$, $p < 0.01$) while a

Table 2 Means and standard deviations of psychological variables in children, and correlations between these and their mothers' variables

SDQ scale	*M*	SD	Age	Edu.	RW	Father	House cond.	Num. child	Child age	Child sex	Initial distress	PSS	GHQ pos	GHQ neg
Prosocial	6.49	2.19	0.02	−0.01	−0.03	0.04	0.09**	0.03	0.16**	0.15**	−0.06	−0.26**	0.29**	−0.19**
Peer	2.86	1.83	0.05	−0.11**	0.04	−0.04	−0.01	0.01	0.01	−0.11**	0.15**	0.14**	−0.17**	0.16**
Hyperact.	5.04	2.60	−0.08*	−0.09**	0.01	−0.06	−0.05	−0.03	−0.14**	−0.17**	0.12**	0.36**	−0.30**	0.29**
Emotion	3.29	2.57	0.03	−0.12**	0.03	−0.02	−0.07*	0.11**	0.08*	−0.05	0.10**	0.34**	−0.27**	0.37**
Conduct	4.64	1.81	−0.03	−0.07*	−0.01	−0.02	−0.05	0.07*	−0.05	−0.09**	0.11**	0.33**	−0.24**	0.27**

M and SD represent the mean and standard deviation, respectively. Age indicates maternal age, while Child's age is the age of the children; Child sex is coded as 0 = female, 1 = male; Edu. = Education level; RW = remote working (0 = no, 1 = yes); Father = living with the father

*$p < 0.05$

**$p < 0.01$

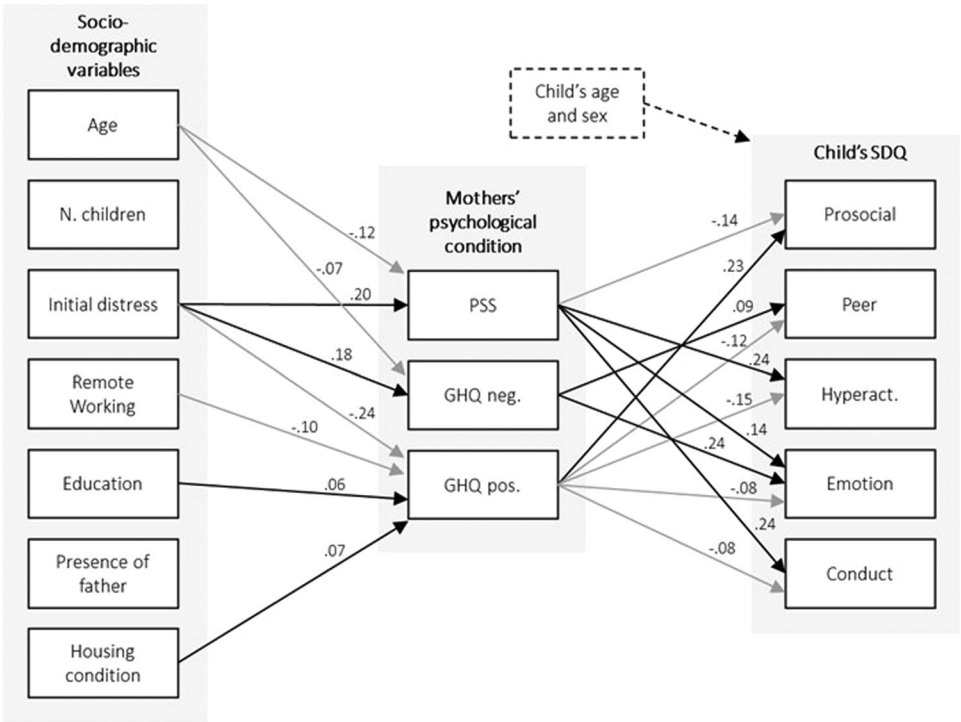

Fig. 3 Path analysis model assessing the effect of socio-demographic variables (on the left) on the psychological condition of mothers (middle column), and in turn on the psychological condition of children (on the right). PSS Perceived Stress Scale, GHQ General Health Questionnaire, SDQ Strengths and Difficulties Questionnaire. For the sake of clarity, only significant structural paths are depicted with their relative standardized coefficients, while nonsignificant paths, error terms, residuals, and covariances are not displayed. Black arrows indicate positive effects (increments), while gray arrows indicate negative effects (decrements). The effects of the controlling variables (child's age and sex) are not reported (see text for more details)

reduced level of problems with peers ($b = -0.06$, $SE = 0.02$, $\beta = -0.12$, $p < 0.01$), symptoms of hyperactivity ($b = -0.11$, $SE = 0.03$, $\beta = -0.15$, $p < 0.01$), emotional problems ($b = -0.06$, $SE = 0.03$, $\beta = -0.08$, $p < 0.05$), and conduct issues ($b = -0.04$, $SE = 0.02$, $\beta = -0.09$, $p < 0.05$).

Children's age had an effect on the SDQ scores, as for older children mothers reported more prosociality ($b = 0.09$, $SE = 0.02$, $\beta = 0.16$, $p < 0.01$), and fewer issues around hyperactivity ($b = -0.08$, $SE = 0.02$, $\beta = -0.13$, $p < 0.01$), although they reported more emotional problems ($b = 0.06$, $SE = 0.02$, $\beta = 0.09$, $p < 0.01$). Being male predicted higher reported levels of prosociality ($b = 0.60$, $SE = 0.13$, $\beta = 0.14$, $p < 0.01$), and fewer problems with peers ($b = -0.38$, $SE = 0.11$, $\beta = -0.10$, $p < 0.01$) and with conduct ($b = -0.25$, $SE = 0.12$, $\beta = -0.07$, $p < 0.05$) and fewer symptoms of hyperactivity ($b = -0.78$, $SE = 0.16$, $\beta = -0.15$, $p < 0.01$).

Discussion

This research aimed to investigate how the outbreak of COVID-19 and the social restrictions imposed in Italy in response to it have had an impact on the psychological well-being of mothers and their children, compared to the period before the lockdown. As expected, our study found that mothers reported a worsened psychological state during the lockdown in terms of both decreased well-being and increased distress, as highlighted by the results that we

obtained analyzing the GHQ scores referred to the period before and during the lockdown. These results were consistent with the findings by previous studies on this topic, which highlighted the psychological distress of mothers during lockdown and quarantine period. Indeed, previous research showed that women reported a high risk of acute and posttraumatic stress symptoms (Brooks et al., 2020; Liu et al., 2020), with a great risk of suffering from parenting-related exhaustion and high levels of psychological distress. Moreover, clinically relevant depressive symptoms were reported in 33.16% of mothers with children aged 0–18 months, in 42.55% of those with children aged 18 months to 4 years, and in 43.37% of those with children aged between 5 and 8 years. The prevalence of anxiety in mothers was 36.27%, 32.62%, and 29.59% across the same age groups (Cameron et al., 2020).

In our sample, mothers reported on average a high level of perceived stress accompanied by a worse psychological condition reported during lockdown respect to the preceding period as collected retrospectively. The spread of the pandemic was very demanding for parents, and there are several stressors to be considered in this context. Firstly, school closures and children being confined to home represented a new condition to manage (Fegert et al., 2020). In addition, the burden of childcare and homeschooling was not perceived by mothers to be shared equally between men and women; rather, they reported having greater responsibilities than fathers and thus more demanding conditions (Cheng et al., 2021). Since women are typically at increased risk of depression (Parker & Brotchie, 2010) as well as more vulnerable to stress (Taylor et al., 2000), maternal mental health was an important factor to monitor during the pandemic. In particular, mothers of young children are more exposed to the risk of suicide in a non-pandemic scenario, and this risk is further increased in situations of acute stress (Rahman et al., 2013), such as the COVID-19 outbreak. Thus, specific social and psychological attention should be devoted to mothers during future lockdowns or periods of quarantine.

One of the main predictors of the worst psychological conditions during the pandemic was the maternal psychological condition, which was reported in relation to the pre-pandemic period. This was not surprising, as psychiatric problems are usually related to decreased resilience or higher vulnerability to stress (Shrivastava & Desousa, 2016). Thus, a high level of stress and psychological symptoms at the outbreak of the pandemic could lead to a maladaptive response to the stress induced by the pandemic and lockdown measures, leading to the person being in an even worse condition (see Simione et al., 2022). A worldwide study on a very large sample showed that psychiatric conditions have worsened in more than half of patients during the COVID-19 pandemic (Gobbi et al., 2020), suggesting that psychiatric patients have an increased vulnerability to pandemic-related stress. A similar finding was also reported in a sample of non-patients, in which a history of psychological conditions increased the risk of depression, anxiety, and stress (Zhu et al., 2020a, 2020b). In summary, our results also showed that a pre-existing condition of psychological vulnerability increased the psychological impact of COVID-19 and lockdown as stressors in mothers.

Regarding working condition, we hypothesized that it would relate to mothers' psychological condition, in particular with worse condition reported by remote workers (Arntz et al., 2020; Lagomarsino et al., 2020). Consistent with this prediction, we found that working conditions were related to mothers' sense of self-efficacy and, in particular, that that women working remotely at home reported a lower level of psychological well-being. Overall, working parents reported lower psychological well-being during the pandemic, which was related to greater financial insecurity (Cheng et al., 2021). This may also be due to the school closures that were implemented as a measure to contain the pandemic. This situation shifted part of the burden of schooling away from schools and teachers directly onto parents. During the pandemic, working mothers reported lower job satisfaction and productivity than fathers, as they perceived to devote more time to housework and childcare (Feng & Savani, 2020). A study from Japan showed the very same result, with mothers reporting having to take on greater family-related responsibilities and childcare at home, while fathers tended to work outside the home as usual (Yamamura & Tsustsui, 2021). Overall, these results indicated the importance of providing adequate social and political support to address the responsibilities balance in families between mothers and fathers, in view of the concrete risk that the pandemic might further increase the gender gap at work, whereas pre-pandemic data had shown instead a trend toward an equalization of working conditions for mothers and fathers at home (Arntz et al., 2020).

Among the other socio-demographic variables and family conditions, we expected a relationship of number of children and presence of father in the same house with the mothers' distress (Marchetti et al., 2020). In our sample, these variables were not related to mothers' psychological state. Instead, we found that only education levels and housing type were positively related to mothers' psychological state, i.e., a higher level of education and better housing predicted a better psychological condition. This result was in contrast with previous studies on samples of Italian parents, that had shown education levels to have no effect on parenting-related emotional exhaustion (Marchetti et al., 2020) and housing to have no effect on parenting stress (Spinelli et al., 2020). Moreover, unlike Spinelli et al. (2020), our study found no evidence of the number of children having an effect on mothers' psychological

condition. Thus, the effects that we found are different from previous literature and are smaller than those found by other studies. We would encourage clarification of the socio-demographic risk or protective factors for family well-being in future meta-analysis on this topic, as such effects seem to emerge inconsistently in different studies.

Consistent with our hypothesis (Jiao et al., 2020), we found that reported children's psychological state was also found to have worsened in the COVID-19 pandemic situation. This could be explained by the sudden disruption of their daily routines, the reduced social contact with both family members and peers, and being confined to the home. These results are in line with studies conducted during previous quarantine experiences that showed increased emotional distress, low mood, and irritability in parents and children quarantined due to pandemic outbreaks such as MERS (Yoon et al., 2016) and SARS (Mihashi et al., 2009). This result should be interpreted with caution because we collected data for the period before the lockdown retrospectively during the lockdown.

As expected, the psychological state of mothers predicted the perceived psychological state of children, with a higher number of children's difficulties reported by mothers who reported higher level of distress (Di Giorgio et al., 2021; McKelvey et al., 2002; Newland, 2015). The mothers' perceived stress was related to reduced prosociality and increased hyperactivity, emotional problems, and behavioral problems, while general distress and depression resulted in an increase in peer and emotional problems. By contrast, mothers' self-efficacy and well-being related to an improvement in all the areas of children's mental health investigated through the SDQ. If we consider just the effects of greater standardized magnitude in the model (with $\beta > 0.20$), it appears that maternal stress impacted mostly on children's hyperactivity and conduct, maternal depression impacted mostly on children's emotional problems, and maternal well-being on children's prosociality. These results shed light on the importance of assessing the psychological condition of mothers and children using multiple factors, since considering only general factors such as stress or emotional distress could give misleading results. Moreover, these findings show the importance of having separate measures for psychological distress or symptoms and well-being, as they differently related to reported children's mental health. Ù

Practical Implications

Our results showed how psychological well-being cannot be equated to the absence of distress, and interventions aimed at increasing well-being should not be limited to the alleviation of psychological problems (Huppert, 2009). Psychological interventions that are tailored to increase mothers' self-efficacy, satisfaction with life, and effective functioning are needed alongside more classical interventions aimed at reducing stress and psychological symptoms. Supporting mothers' well-being would also enhance their capacity to support children in the face of adversity and to assume the role of tutoring their children in resilience (Giordano et al., 2021; Giordano & Ungar, 2021) by increasing their level of mental health, in particular in the area of prosociality. In this respect, a candidate for application in this context can be retrieved in the family of mindfulness-based interventions. These interventions seem to be capable of increasing parents' self-efficacy while reducing their perceived stress, anxiety, and psychological distress (Perez-Blasco et al., 2013). Furthermore, mindfulness interventions can be delivered as family interventions, targeting both parents and children abilities to communicate, having a compassionate attitude, and manage their emotions (Harnett & Dawe, 2012). Indeed, mindfulness-based interventions could have a positive impact on a range of psychological variables, and understanding their impact on family resilience is an critical avenue for future research.

In the same vein, psychological interventions for families and children should be programmed by carefully considering children's age, as we found that for younger children mothers reported more hyperactivity and prosociality problems, while for older children they reported more emotional problems. This result was partially in line with our hypotheses (Jiao et al., 2020; Liu et al., 2020). As predicted, we expected more problems in general for younger children, as they have fewer personal and psychological resources than older ones for coping with the lockdown's dramatic changes in their lives (Liu et al., 2020). However, we expected that older children, as adolescents, should report more problems in the area of sociality. Instead, we found that, for older children, mothers reported more emotional problems. Our result suggests that older children could have been capable of exploiting the new communicative channels provided by the internet and social media to remain in contact with their peers and friends, but that this new social connectivity could be risky from a psychological point of view (Bhatia, 2020). In fact, the increased social media usage among adolescents could lead to problematic internet use, as well as increased negative emotional responses and reduced happiness (see Evli & Şimşek, 2022). This capability of accessing and properly using the new communication channels could be further exploited proposing online interventions for adolescents, which could be useful both during acute crisis time, such as the lockdown due to the pandemic scenario, and in normal time, to offer prevention and promotion of positive mental health in adolescents (see Baños et al., 2017). All

these factors should be carefully taken into consideration in both present psychological interventions and management of future similar scenarios.

Limitations

Certain limitations should be considered in interpreting our data. Firstly, our study implied a cross-sectional design. Thus, the imposed causal role of mothers' well-being on children's well-being should be interpreted with caution, as a causal relationship in the opposite direction i.e. from children to mothers, could be not excluded. Secondly, data on children were collected solely through mothers' reports. As we assessed on average a state of high distress in mothers during the pandemic outbreak, this distress could have affected their perception of children's well-being. Please notice that this limitation applies to most of the studies relying on questionnaires about children mental health, which usually are completed by the parents or teachers. More compelling methods, such as interviews or psychological consultations, are available, but they are costly and not applicable in any case during the COVID-19 outbreak due to the lockdown restrictions. To mitigate the impact of these limitations, in the path model we controlled for the effect of mothers' previous and current psychological conditions while evaluating the effects of all variables on children's mental health; thus at least in part, we should have mitigated any distortion. Third, as we collected only data about the mothers, our data lacks to include the fathers' point of view on family and children's psychological conditions during the pandemic spread and related restriction measures, such as the lockdown. Therefore, our data should be interpreted in the light of this bias and could not be generalized to all parents' psychological conditions during the lockdown. Lastly, we collected data online through invitations on social media platforms, so we were only able to reach mothers who were apt to use electronic devices and social media. However, at the time of data collection, there was no other way to recruit participants. On the other hand, while online sampling brings with it many limitations, it also allows us to reach and test a considerable number of participants in a limited amount of time. Again, we would like to put some caution in generalize our conclusions, as we collected our sample with a non-statistical sampling method, which implies a self-selection bias in participants enrolled and does not allow a control over the socio-demographic characteristics of the sample. However, our results can be considered as robust as they were based on sufficiently large sample, which included mothers with different ages, education levels, and working conditions. Moreover, our sample was roughly aligned to the socio-demographic characteristics of Italian mothers published by the Istituto Nazionale di Statistica (*National Institute of Statistics*; ISTAT, 2022).

Conclusions

In conclusion, we found that mothers felt overwhelmed and stressed in the context of the pandemic, with increased levels of emotional symptoms and frustration. They also perceived their children to be more hyperactive, undisciplined, and emotionally unstable. Moreover, we should expect to see some long and very long-term effects of this stressful situation, e.g., an increased incidence of posttraumatic stress disorders among parents and children (Sprang & Silman, 2013). However, our data also show that increasing self-efficacy in mothers could have a substantial impact on both mothers' and children's well-being. In light of these results, we would stress that family interventions in this time of crisis should focus on both containing psychological distress and supporting family resilience. In particular, mothers, with their pivotal role in managing the social and emotional needs of the family, should be the main targets of such interventions. Helping mothers to find a new balance between work, family, and children can increase the smooth functioning and well-being of families, and thus children's well-being and resilience.

Data Availability

The raw data supporting the conclusions of this article will be made available by the authors upon reasonable request.

Authors' Contributions All authors contributed to the study's conception and design. Material preparation was performed mainly by F.C. and F.G. Data collection was performed primarily by G.S. Data analysis was performed by L.S., M.L., and S.G. The first draft of the manuscript was written by G.S. and L.S., and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Compliance with Ethical Standards

Conflict of Interest The authors declare no competing interests.

Ethical Approval The questionnaire and methodology for this study were approved by the Research Ethics and Integrity Committee of CNR (Rome, Italy) and adhere to the tenets of the 1964 Helsinki Declaration and its later amendments.

Informed Consent Informed consent was obtained from all individual adult participants included in the study.

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