

RESEARCH ARTICLE OPEN ACCESS

COVID-19 Posttraumatic Effects on Perinatal Psychological Distress: A Cross-Sectional Study at the End of the Pandemic Health Emergency

Alessia Caffieri¹  | Rosa Fabbricatore² | Giorgia Margherita¹¹Department of Humanistic Studies, University of Naples Federico II, Naples, Italy | ²Department of Economics and Statistics, University of Naples Federico II, Naples, Italy**Correspondence:** Alessia Caffieri (alessia.caffieri@unina.it)**Received:** 1 May 2024 | **Revised:** 8 July 2024 | **Accepted:** 15 July 2024**Funding:** The authors received no specific funding for this work.**Keywords:** COVID-19 | loneliness | perinatal | posttraumatic stress | psychological distress

ABSTRACT

Introduction: Psychological distress in pregnant and postpartum women increased during the COVID-19 pandemic. However, the impact of the pandemic in perinatal women at the end of the health emergency has been rarely studied. This study is aimed at investigating the psychological health of pregnant and postpartum women at the end of the COVID-19 public health emergency, hypothesizing that the COVID-19-related fears influence perinatal psychological distress via the mediation of the COVID-19-related posttraumatic impact and loneliness.

Methods: A total of 200 women in the perinatal period, of which 125 were pregnant and 75 were postpartum, participated in an online survey at the end of the COVID-19 public health emergency in Italy. Depression, anxiety, stress, loneliness, posttraumatic impact of COVID-19 pandemic and COVID-19-related fears were assessed. To test the hypotheses, robust serial mediation analyses were performed.

Results: Increased levels of COVID-19-related fears were associated with an increase in perinatal depression, anxiety and stress indirectly through the serial mediation of COVID-19 posttraumatic impact and loneliness. Loneliness played a stronger role in mediating the relationship between COVID-19-related fears and depression than anxiety and stress outcomes.

Conclusions: This study should be considered exploratory for its methodological characteristics and nonreplicability of the pandemic condition. However, this study suggests the importance of assessing posttraumatic reactions to 'collective' crises in pregnant and postpartum women for research and clinical practice. In addition, it sustains the role of loneliness as a transversal construct that should be greatly considered in targeting psychological interventions for women in the perinatal period.

1 | Introduction

Maternal perinatal mental health is a global health priority for the well-documented cascading effects it has on the overall health of mothers, children and families (McNab et al. 2022). Perinatal psychological distress, mainly in terms of depression and anxiety, has increased during the COVID-19 pandemic (Ceulemans et al. 2021; Lopez-Morales et al. 2021; Shuman

et al. 2022). During the pandemic, prenatal and postnatal depression affected one in four women, reaching a global prevalence of 29% and 26%, respectively. On the other side, one in three women showed symptoms of perinatal anxiety, with a global prevalence of 31% (Caffieri et al. 2024).

Since the onset of the COVID-19 pandemic, pandemic-related fears have been high in women in the perinatal period and played

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2024 The Author(s). *Clinical Psychology & Psychotherapy* published by John Wiley & Sons Ltd.

Summary

- The COVID-19 pandemic continued to influence maternal perinatal psychological health even at the end of the health emergency.
- The COVID-19-related posttraumatic impact and loneliness fully mediated the effect of COVID-19-related fears on perinatal psychological distress at the end of the health emergency.
- Posttraumatic impact of ‘social’ and ‘collective’ crises should be included in the assessment of maternal mental health.
- Maternal loneliness should be considered in targeting prevention and treatment interventions for women in the perinatal period.

an important role in increasing perinatal psychological distress (Chen et al. 2022; Liu et al. 2020; Motrico et al. 2022). Some findings also suggested that COVID-19-related fears were among the best predictors of COVID-19-related posttraumatic distress in pregnant and postpartum women (Basu et al. 2021; Motrico et al. 2023; Shiffman et al. 2023). Some studies addressed posttraumatic stress regarding a personal traumatic experience lived during the pandemic (e.g., the loss of a close person or traumatic childbirth) (Berthelot et al. 2020; Gonzalez-Garcia, Exertier, and Denis 2021; Zhou et al. 2020), while other studies considered the entire COVID-19 experience as potentially traumatic, so as a ‘collective trauma’ (Basu et al. 2021), connecting ‘people around the world through helplessness, uncertainty, loss, and grief’ (Kaubisch et al. 2022, 28). In general, higher levels of PTSD were found in women in the perinatal period during the pandemic than before (Berthelot et al. 2020), reaching a prevalence of 27.93% (Delanerolle et al. 2023). Longitudinal studies confirmed that the PTSD symptoms during the postpartum were more severely influenced by COVID-19-related fears, than direct exposure to stressful COVID-19-related events, suggesting the crucial role of COVID-19 fears in predicting COVID-19-related posttraumatic distress (Shiffman et al. 2023). In turn, in terms of ‘collective trauma’, the COVID-19 posttraumatic impact increased perinatal anxiety and depression in the most acute phases of the virus spread (Basu et al. 2021; Hocaoglu et al. 2020; Zhang et al. 2023; Wang et al. 2020). Taken together, these results suggested the potential role of mediator of COVID-19 posttraumatic stress between COVID-19-related fears and perinatal psychological distress.

In addition, COVID-19-related restrictions increased social isolation, lack of social support and loneliness in mothers (Basu et al. 2021; Harrison, Moulds, and Jones 2022; Miyoshi et al. 2022). During the lockdown, loneliness emerged as a mediator between the social support perceived by pregnant women and psychological distress in terms of depression and anxiety (Harrison, Moulds, and Jones 2022). From a psychodynamic perspective, it is possible to hypothesize that, beyond lockdown periods, the COVID-19 pandemic deeply influenced the way through which pregnant and postpartum women perceived the encounter and the bond with significant others. Due to COVID-19-related fears, the closeness with others became something potentially dangerous for women’s

and children’s health in mothers’ representations (Caffieri and Margherita 2023). In this sense, it is possible to hypothesize that the posttraumatic impact of COVID-19 may affect women’s sense of loneliness. Loneliness, in turn, emerged as a risk factor for perinatal depression, anxiety and stress both before (Zaidi et al. 2017; Luoma et al. 2015, 2019) and during the COVID-19 pandemic (Giurgescu et al. 2022; Harrison, Moulds, and Jones 2022; Perzow et al. 2021; Scandurra et al. 2023). In this sense, loneliness could be a mediator between the COVID-19 posttraumatic impact and the perinatal psychological distress.

It is possible that beyond lockdown and acute periods of virus spread, at the end of the COVID-19 health emergency, COVID-19-related fears continued to characterize the maternal emotional experience, and in turn the posttraumatic stress and loneliness, with consequences on perinatal psychological distress.

To the best of our knowledge, no study has assessed the relationship between psychological distress—in terms of anxiety, depression and stress—COVID-19-related fears, COVID-19-related posttraumatic stress and loneliness in pregnant and postpartum women at the end of the COVID-19 pandemic. The current study is aimed at investigating the psychological health of women in the perinatal period at the end of the COVID-19 public health emergency, hypothesizing that the COVID-19-related fears influenced perinatal psychological distress via the mediation of the COVID-19-related posttraumatic impact and loneliness.

1.1 | Hypotheses

First, we hypothesized that, as was observed during the other phases of the COVID-19 pandemic, COVID-19-related fears would increase anxiety, depression and stress in pregnant and postpartum women. Second, we hypothesized that COVID-19-related fears would increase COVID-19 posttraumatic impact and loneliness. Third, we hypothesized that both COVID-19 posttraumatic impact and loneliness would predict maternal psychological distress, in terms of depression, anxiety and stress. Finally, we hypothesized that COVID-19 posttraumatic impact and loneliness would serially mediate between COVID-19-related fears and depression, anxiety and stress in pregnant and postpartum women at the end of the pandemic health emergency.

2 | Method

2.1 | Context

The data were collected in Italy. Italy was the epicentre of the COVID-19 pandemic in Europe (Italian Ministry of Health 2020; Pisano, Sadun, and Zanini 2020) as well as one of the first countries to be affected by COVID-19 in terms of the number of contagions and deaths (Mattiuzzi and Lippi 2023). Considering the burden of the COVID-19 infection, Italy has been also one of the European countries to establish the most restricted measures and for the most long time (Mattiuzzi and

Lippi 2023). However, although the World Health Organization declared the end of COVID-19 as a public health emergency of international concern on May 5, 2023 (WHO 2023, May 5), the formal end of the COVID-19 public health emergency in Italy was declared 1 year before, on March 31st 2022 (DL n. 24, 24/03/2022).

2.2 | Participants

Participants were pregnant and postpartum women (up to 1 year postpartum). The following inclusion criteria were applied: being more than 18 years old, being Italian speaking and having been living in Italy during the COVID-19 health emergency.

2.3 | Procedure

An ad hoc online survey was developed considering the purposes of the study. Participants were recruited using a snowball sampling procedure, by sharing a link to the questionnaire via social media and chats. Participants were recruited in a specific phase of the COVID-19 virus spread in Italy, between 31 March 2022 and 30 June 2022: the first months after the declaration of the 'formal end' of the COVID-19 public health emergency in Italy. The online recruitment strategy was previously considered valid and useful for accessing the psychological health of women in the perinatal period (Leach et al. 2017). Qualtrics platform was used to create and collect the questionnaires, and data were safely stored in a password-locked archive. Informed consent was gained from all participants. No IP addresses or identifying data were retained. Respondents did not receive any incentive for their participation. The research procedure was approved by the Ethical Committee of Psychological Research of the Department of Humanities of the University of Naples, Federico II (Protocol 3/2021).

2.4 | Measures

The first part of the survey included a description of the study, the researcher's contacts and the informed consent. The second part was a sociodemographic schedule, which included information on the perinatal experience, COVID-19-related experiences and vaccine-related information, for a total of 13 questions. The third part of the survey included self-report scales, for a total of 71 items, as follows:

- The *Depression Anxiety Stress Scale-21* (DASS-21) items (Lovibond and Lovibond 1995; Bottesi et al. 2015) were used for the screening of psychological distress, in three components: depression, anxiety and stress. Items were measured on a 4-point Likert scale, from *not at all* (0) to *very high* (3). For descriptive purposes, the intervals suggested by the creators of the scale to discriminate between different levels of depression, anxiety and stress were used (Lovibond and Lovibond 1995). For the other analyses, the measures were treated as continuous. The DASS-21 has been widely considered appropriate and valid to assess anxiety (Meades and Ayers 2011), depression and stress in pregnant and

postpartum women (Xavier et al. 2016). In the current study, Cronbach's α was 0.874, 0.717 and 0.896 for depression, anxiety and stress, respectively.

- The *UCLA Loneliness Scale* (Russell 1996; Boffo, Mannarini, and Munari 2012) was used to assess general loneliness. It includes 20 items measured on a 4-point Likert scale from *never* (1) to *often* (4). This scale is the most used one to assess loneliness in the perinatal population (Basu et al. 2021; Junttila et al. 2013; Scandurra et al. 2023). Higher scores corresponded to higher levels of loneliness. In the current study, Cronbach's α was 0.910.
- The *Impact of Event Scale-Revised (IES-R)* (Christianson and Marren 2012; Craparo et al. 2013) adapted for the COVID-19 pandemic was used to assess posttraumatic psychological responses to COVID-19 pandemic. It was previously widely used with different populations (Aljaberi et al. 2022; Davico et al. 2021), among which pregnant and postpartum women (Hocaoglu et al. 2020; Ho-Fung et al. 2022; Ionio et al. 2022; Saccone et al. 2020). It includes 22 items, measured on a Likert rating scale from *not at all* (0) to *often* (4). For the current study, the total score was calculated, with higher scores that represented a higher level of COVID-19 posttraumatic impact. The cut-off of 33 was used to discriminate between no and at-risk levels of COVID-19 posttraumatic impact only for descriptive purposes. In the current study, Cronbach's α was 0.931.
- The *Multidimensional Assessment of COVID-19-Related Fears (MAC-RF)* (Schimmenti et al. 2020) was used to assess COVID-19-related fears according to the Schimmenti, Billieux, and Starcevic (2020)'s model, in which COVID-19-related fears are organized around four domains (bodily, interpersonal, cognitive and behavioural), dialectically. Each item is measured on a Likert rating scale from *very unlike me* (0) to *very like me* (5). For the current study, each item ($n = 8$) was considered as a specific fear experience lived by pregnant and postpartum women for descriptive purposes. The overall score of the scale instead was used as an index of clinically significant COVID-19-related fears (Schimmenti et al. 2020), with higher scores indicating higher levels of COVID-19-related fears. In the current study, Cronbach's α was 0.873.

2.5 | Data Analysis

Considering the presence of some missing data in the dataset, Little's Missing Completely At Random (MCAR) test was first performed to test them being completely at random—that is, whether the missingness pattern was completely unrelated to the considered variables (Newman 2014). Then, missing data were imputed through expectation maximization (EM).

Descriptive statistics were computed for the included variables (mean, standard deviation, median, skewness and kurtosis). Bivariate analyses (*t-test*, *chi-squared test* and *Mann-Whitney U test*) were performed to explore differences between pregnant and postpartum women for sociodemographic, perinatal variables, psychological health and affective dimensions. Pearson correlation coefficient (r) and Spearman rank (ρ) were computed to evaluate the relationships between variables in the whole group of participants.

Considering that we involved variables that are not normally distributed (depression, anxiety, stress and posttraumatic levels) in the population of interest, hypotheses were tested via robust mediation analysis (Alfons, Ateş, and Groenen 2022). This analysis procedure is robust against deviations from normality including outliers, heavy tails or skewness. A 5000 fast-and-robust bootstrap resampling procedure was applied to test the indirect effects. In addition, bootstrap analyses were also applied to pairwise contrasts of the indirect effects to investigate whether specific indirect pathways were stronger than each other. The hypotheses were tested on the overall group of women who were enrolled in the study (pregnant and postpartum).

Descriptive analyses were performed using IBM SPSS (Version 29). Mediation analyses were tested via *Robmed* module in R software (Alfons, Ateş, and Groenen 2022).

3 | Results

A total of 200 women in the perinatal period, among which 125 pregnant women and 75 postpartum women, with ages 18–43 ($M = 31$, $SD = 4.62$), participated in the study. All women had a partner. Most of the women had a job ($n = 139$ [69.5%]), were primipara ($n = 130$ [65%]), had no at-risk pregnancy ($n = 153$ [76.5%]) and did not present previous psychopathological diagnosis ($n = 193$ [96.5%]). Among the total, 5% ($n = 10$) had a medically assisted pregnancy. Most of the women had been infected by COVID-19 during pregnancy ($n = 129$ [64.5%]), and most of them received the vaccine against the virus ($n = 181$ [90.5%]). Among the total, 9.5% ($n = 19$) lost a significant other due to COVID-19 infection.

Regarding depression, 31% ($n = 63$) of the women had from mild to extremely severe levels. Similarly, 33.5% ($n = 67$) of the women showed from mild to extremely severe levels of anxiety. At the same time, 51.5% ($n = 103$) of the women showed from mild to extremely severe levels of stress. Most of the women did not report at-risk levels of COVID-19-related posttraumatic symptoms ($n = 161$ [84.7%]). Among the COVID-19-related fears, the women showed higher mean levels for the fear of being infected by the virus (fear of others) ($M = 1.87$, $SD = 1.27$) and the fear that relatives and close friends could be infected by the virus (fear for others) ($M = 1.89$, $SD = 1.23$). At the same time, they presented the lowest mean levels for the fear of not collecting necessary information about the virus (fear of not knowing) ($M = 0.99$, $SD = 0.97$). Characteristics of participants are reported in detail in Table 1.

Considering the sociodemographic, perinatal-related and COVID-19-related characteristics, the pregnant and postpartum women did not show significant differences (Table 1).

In addition, pregnant and postpartum groups did not differ in depression, stress, COVID-19-related posttraumatic impact and loneliness levels (Table 1). On the other side, anxiety appeared significantly higher in pregnant women than in postpartum women. Differently, COVID-19-related fears were significantly higher in postpartum women than in pregnant women. In particular, postpartum women showed higher levels of fear of being

infected by others (fear of other) and feeling paralysed by the fear of doing something wrong during the pandemic (fear of action) than the pregnant group.

3.1 | Results of Bivariate Correlations

Results of the correlation analysis showed that COVID-19-related fears were positively correlated with depression ($\rho = 0.211$, $p = 0.003$), anxiety ($\rho = 0.201$, $p = 0.004$), stress ($\rho = 0.196$, $p = 0.005$), COVID-19-related posttraumatic distress ($\rho = 0.608$, $p \leq 0.001$) and loneliness ($r = 0.174$, $p = 0.014$). In turn, COVID-19-related posttraumatic distress was positively correlated with depression ($\rho = 0.387$, $p \leq 0.001$), anxiety ($\rho = 0.334$, $p \leq 0.001$), stress ($\rho = 0.392$, $p \leq 0.001$) and loneliness ($\rho = 0.283$, $p \leq 0.001$). In addition, loneliness was positively associated with depression ($\rho = 0.581$, $p \leq 0.001$), anxiety ($\rho = 0.335$, $p \leq 0.001$) and stress ($\rho = 0.479$, $p \leq 0.001$) (Table 2).

3.2 | Results of the Serial Mediation Analyses for Depression

First, the total effect of COVID-19-related fears on depression was significant ($c = 0.149$; $SE = 0.071$; $p = 0.036$) (Figure 1). Considering the effect of COVID-19-related fears on the mediators, COVID-19-related fears predicted COVID-19-related posttraumatic impact ($b_{a1} = 0.963$; $SE = 0.112$; $p \leq 0.001$), but not loneliness ($b_{a2} = 0.061$; $SE = 0.173$; $p = 0.724$). On the other side, the effect of the COVID-19 posttraumatic impact (the first mediator) on loneliness (the second mediator) was significant ($b_{a3} = 0.216$; $SE = 0.057$; $p \leq 0.001$). In addition, the robust regression analyses showed that both the mediators, hence the COVID-19-related posttraumatic impact ($b_{b1} = 0.104$; $SE = 0.052$; $p = 0.046$) and loneliness ($b_{b2} = 0.252$; $SE = 0.042$; $p \leq 0.001$), had a significant effect on depression. The three predictors (the independent variable and the two mediators) explained the variance of depression with an adjusted robust R^2 of 0.317. Finally, the direct effect of COVID-19-related fears on depression was not significant after the mediators were sequentially entered into the model ($c' = -0.019$; $SE = 0.085$; $p = 0.817$). Hence, this result showed that COVID-19-related posttraumatic impact and loneliness fully mediated the relationship between COVID-19-related fears and depression.

Bootstrap analyses confirmed that the serial mediation indirect effect was significant ($\beta = 0.052$; 95% $CI = 0.025-0.095$). In addition, the single indirect effect via COVID-19-related posttraumatic impact emerged as significant ($\beta = 0.100$; 95% $CI = 0.005-0.211$), whereas the single mediation via loneliness was not significant ($\beta = 0.015$; 95% $CI = -0.067$ to 0.107) (Table 3).

Contrasts in pairs showed no difference in magnitude between the indirect effects. In particular, the contrast between the single mediation via COVID-19-related posttraumatic impact and the serial mediation was not significant ($\beta = 0.047$; 95% $CI = -0.060$ to 0.163). This result indicated that the single mediation via COVID-19-related posttraumatic impact and the serial mediation had a similar strength in explaining the relationship between COVID-19-related fears and depression (Table 3).

TABLE 1 | Characteristics of participants and comparison between pregnant and postpartum women.

	Total (N = 200)	Pregnant women (N = 125)	Postpartum women (N = 75)	p value
	N (%)	N (%)	N (%)	
Demographic				
Age (mean [SD])	200 (100) (31.05 [4.62])	30.66 (4.40)	31.69 (4.93)	0.125 ^a
Age				
18–30	95 (47.7)	63 (50.4)	32 (42.7)	0.28 ^b
30–45	105 (52.5)	62 (49.6)	43 (57.3)	
Level of education				
Secondary school/high school	112 (56)	69 (55.2)	43 (57.3)	0.76 ^b
University studies	88 (44)	56 (44.8)	32 (42.7)	
Previous psychopathology				
No	193 (96.5)	120 (96)	73 (97.53)	NA ^d
Yes	7 (3.5)	5 (4)	2 (2.7)	
Relationship status				
Partnered	200 (100)	125 (100)	75 (100)	
Job				
No	61 (30.5)	44 (35.2)	17 (22.7)	0.06 ^b
Yes	139 (69.5)	81 (64.8)	58 (77.3)	
Primigravida/primiparous				
No	70 (35)	40 (32)	30 (40)	0.25 ^b
Yes	130 (65)	85 (68)	45 (60)	
At-risk pregnancy				
No	153 (76.5)	97 (77.6)	56 (74.7)	0.64 ^b
Yes	47 (23.5)	28 (22.4)	19 (25.3)	
Medically assisted pregnancy				
No	190 (95)	118 (94.4)	73 (97.3)	NA ^d
Yes	10 (5)	7 (5.6)	2 (2.7)	
COVID-19-related descriptive variables				
COVID-19 diagnosis				
Not having been infected by the virus at all	20 (10)	3 (2.4)	17 (22.7)	NA ^d
Not being infected during pregnancy	129 (64.5)	86 (68.8)	43 (57.3)	
Being infected during pregnancy	51 (25.5)	36 (28.8)	15 (20)	
Significant others died due to COVID-19				
No	181 (90.5)	112 (89.6)	69 (92)	0.57 ^b
Yes	19 (9.5)	13 (10.4)	6 (8)	

(Continues)

TABLE 1 | (Continued)

	Total (N=200)	Pregnant women (N=125)	Postpartum women (N=75)	p value
	N (%)	N (%)	N (%)	
Vaccine against COVID-19				
No	19 (9.5)	15 (12)	4 (5.3)	NA ^d
Yes	181 (90.5)	110 (88)	71 (94.7)	
Received vaccine during pregnancy				
No	97 (48.5)	58 (46.4)	39 (52)	0.44 ^b
Yes	103 (51.5)	67 (53.6)	36 (48)	
Psychological distress levels				
Depression (scores) ^e (mean [sd] median)	—	(6.60 [6.50] 4.00)	(7.41 [8.51] 4.00)	0.92 ^c
No at-risk (≤ 9)	137 (68.5)			
Mild (10–12)	33 (16.5)			
Moderate (13–20)	19 (9.5)			
Severe (21–27)	6 (3.0)			
Extreme severe (28–42)	5 (2.5)			
Anxiety (scores) ^e	—	(6.49 [5.38] 6.00)	(5.38 [6.91] 4.00)	0.01 ^{c*}
No at-risk (≤ 6)	133 (66.5)			
Mild (7–9)	19 (9.5)			
Moderate (10–14)	30 (15)			
Severe (15–19)	11 (5.5)			
Extreme severe (20–42)	7 (3.5)			
Stress (scores) ^e	—	(11.48 [7.27] 10.00)	(13.54 [9.33] 12.00)	0.30 ^c
No at-risk (≤ 10)	97 (48.5)			
Mild (11–18)	72 (36)			
Moderate (19–26)	18 (9)			
Severe (27–34)	9 (4.5)			
Extreme severe (35–42)	4 (2)			
COVID-19-related impact	—	(17.51 [14.57] 17.00)	(18.75 [14.40] 17.96)	0.32 ^c
No	161 (84.7)			
At-risk	29 (15.3)			
Loneliness (mean [sd])	—	(41.13 [9.56])	(43.82 [9.79])	0.06 ^a
COVID-19-related fear (mean [sd])	—	(10.37 [6.63])	(12.46 [6.61])	0.03 ^{a*}
Fear of the body (mean [sd]) ^f	—	(1.39 [1.12])	(1.39 [1.10])	0.98 ^a
Fear for the body (mean [sd]) ^g	—	(1.40 [1.26])	(1.71 [1.16])	0.08 ^a
Fear of others (mean [sd]) ^h	—	(1.68 [1.29])	(2.18 [1.17])	0.006 ^{a**}
Fear for others (mean [sd]) ⁱ	—	(1.76 [1.25])	(2.10 [1.19])	0.056 ^a
Fear of knowing (mean [sd]) ^j	—	(1.24 [1.15])	(1.39 [1.15])	0.38 ^a

(Continues)

TABLE 1 | (Continued)

	Total (N=200)	Pregnant women (N=125)	Postpartum women (N=75)	p value
	N (%)	N (%)	N (%)	
Fear of not knowing (mean [sd]) ^k	—	(0.96 [0.91])	(1.03 [1.07])	0.58 ^a
Fear of action (mean [sd]) ^l	—	(0.95 [1.07])	(1.43 [1.22])	0.004 ^{***}
Fear of inaction (mean [sd]) ^m	—	(0.99 [0.97])	(1.22 [1.10])	0.12 ^a

^aT test (two tails).

^bChi-squared test.

^cMann-Whitney U test.

^dChi-squared test was not calculated because more than 20% of the cells of the contingency table have a predicted cell count of less than five. Hence, chi-square results may be invalid.

^eLevels of severity according to cut-off scores suggested by Lovibond and Lovibond (1995).

^fFear of the body (Item 1)=the fear that the body would not protect the individual against the COVID-19 infection.

^gFear for the body (Item 2)=the fear that the body could enter in contact with infected objects.

^hFear of others (Item 3)=the fear of being infected by others.

ⁱFear for others (Item 4)=the fear that relatives and friends could be infected.

^jFear of knowing (Item 5)=the fear of feeling anxious after exposure to information about the virus.

^kFear of not knowing (Item 6)=fear of not being able to collect information about the virus.

^lFear of action (Item 7)=feeling paralysed by the fear of doing something wrong.

^mFear of inaction (Item 8)=the feeling of having always something to do.

* $p < 0.05$, and ** $p < 0.01$.

3.3 | Results of the Serial Mediation Analyses for Anxiety

As well as for depression, the total effect of COVID-19-related fears on anxiety was significant ($c = 0.116$; $SE = 0.059$; $p = 0.048$) (Figure 2). The adjusted robust R^2 of the model was 0.174. The effect of COVID-19-related posttraumatic impact on anxiety was significant ($b_{b1} = 0.140$; $SE = 0.050$; $p = 0.005$). No significant direct relationship between loneliness and anxiety was found, instead ($b_{b2} = 0.068$; $SE = 0.037$; $p = 0.066$).

Loneliness was not a significant single mediator in the model, as emerged from the bootstrap analysis ($\beta = 0.004$; 95% CI = -0.015 to 0.041). On the other side, COVID-19-related posttraumatic impact emerged as a significant single mediator between COVID-19-related fears and anxiety ($\beta = 0.134$; 95% CI = 0.041 – 0.245). Finally, a significant serial mediation indirect effect was also found ($\beta = 0.014$; 95% CI = 0.001 – 0.039) (Table 4). Observing the no significant direct effect of COVID-19-related fears on anxiety ($c' = -0.036$; $SE = 0.074$; $p = 0.622$), we could assume a full mediation effect.

From contrast analyses, a stronger effect of the single mediation of COVID-19-related posttraumatic impact than the single mediation of loneliness ($\beta = 0.130$; 95% CI = 0.029 – 0.241) and the serial mediation model ($\beta = 0.120$; 95% CI = 0.023 – 0.234) emerged.

3.4 | Results of the Serial Mediation Analyses for Stress

The total effect of COVID-19-related fears on stress was significant ($c = 0.201$; $SE = 0.080$; $p = 0.012$) (Figure 3). Considering the relationship between the mediators and stress, both the COVID-19-related posttraumatic impact ($b_{b1} = 0.170$; $SE = 0.040$; $p \leq 0.001$) and loneliness ($b_{b2} = 0.236$; $SE = 0.044$; $p \leq 0.001$) showed a significant effect. The COVID-19-related fears and the mediators explained 28.4% of the variance of stress (adjusted

robust $R^2 = 0.284$). The direct effect of COVID-19-related fears on stress was not significant after entering the mediators into the model ($c' = -0.028$; $SE = 0.076$; $p = 0.71$). Hence, as well as it was observed for depression and anxiety, the effect of the COVID-19-related fears on stress was fully mediated by the COVID-19-related posttraumatic impact and loneliness.

Results from the bootstrap analysis confirmed that the indirect effect of COVID-19-related fears on stress via serial mediation was significant ($\beta = 0.049$; 95% CI = 0.020 – 0.094). In addition, the single indirect effect via COVID-19-related posttraumatic impact was significant ($\beta = 0.163$; 95% CI = 0.089 – 0.259), while the single indirect effect via loneliness was not significant ($\beta = 0.017$; 95% CI = -0.062 to 0.100).

As well as for anxiety, contrasts showed that the indirect effect of COVID-19-related posttraumatic impact alone was stronger than the single mediation indirect effect of loneliness ($\beta = 0.146$; 95% CI = 0.032 – 0.263) and the indirect effect of the serial mediation ($\beta = 0.114$; 95% CI = 0.024 – 0.208) (Table 5).

4 | Discussion

The current study explored the psychological health of pregnant and postpartum women at the formal end of the COVID-19 pandemic in Italy. The results highlighted that, despite the end of the health emergency, the COVID-19 pandemic continued to influence perinatal psychological distress. In particular, the effects of COVID-19-related fears on perinatal maternal depression, anxiety and stress were fully mediated by the COVID-19-related posttraumatic impact and loneliness.

4.1 | Perinatal Psychological Health at the End of the COVID-19 Emergency

The at-risk levels of perinatal depression and anxiety observed in the current study were, in general, consistent with the global

TABLE 2 | Mean, standard deviation, median, skewness, kurtosis and correlation matrix.

	Mean	SD	Median	Skewness	Kurtosis	1	2	3	4	5	6
1. Depression	6.91	7.31	4.00	1.73	3.82	—					
2. Anxiety	6.08	6.00	4.00	1.64	3.64	0.634 ^{b***}	—				
3. Stress	12.26	8.14	12.00	1.11	1.49	0.696 ^{b***}	0.569 ^{b***}	—			
4. Loneliness	17.96	12.81	17.96	1.12	1.30	0.581 ^{b***}	0.335 ^{b***}	0.479 ^{b***}	—		
5. COVID-19-related posttraumatic impact	42.11	9.54	42.00	-0.3	-0.40	0.387 ^{b***}	0.334 ^{b***}	0.392 ^{b***}	0.283 ^{b***}	—	
6. COVID-19-related fears	11.15	6.68	10.79	0.18	-0.47	0.211 ^{b**}	0.201 ^{b**}	0.196 ^{b**}	0.174 ^{a*}	0.608 ^{b***}	—

^aPearson r .

^bSpearman rho.

* $p < 0.05$, ** $p < 0.01$, and *** $p \leq 0.001$.

prevalence rates reported during the COVID-19 pandemic (Caffieri et al. 2024), though lower than those observed during lockdown periods in Italy (Camoni et al. 2022; Lega et al. 2022; Molgora and Accordini 2020; Ostacoli et al. 2020; Saccone et al. 2020; Spinola et al. 2020). Moreover, among the participants of the current study, 15.3% had at-risk levels of COVID-19-related posttraumatic stress. This rate was substantially lower than data collected during the first phases of the pandemic in other countries (41%–53%) (Basu et al. 2021; Motrico et al. 2023; Saccone et al. 2020). On one side, the current results are consistent with the high heterogeneity in COVID-19-related posttraumatic stress levels found in pregnant and postpartum women (Delanerolle et al. 2023). On the other side, the low risk of COVID-19-related posttraumatic stress observed in the current study may depend precisely on the period in which the data were collected, hence at the end of the health emergency, 2 years after the onset of the virus spread, as effect of a progressive adaptation and normalization of the pandemic in mothers (Shiffman et al. 2023).

Moreover, comparing the different COVID-19-related specific fears, the fears in the interpersonal domain were prominent in pregnant and postpartum women. These results were consistent with findings observed in the general population (Schimmenti et al. 2020) and with the findings that showed that pregnant and postpartum women during the COVID-19 pandemic had high concerns about the health of their children and significant others, even more than their own health (Caffieri and Margherita 2021; Fumagalli et al. 2021; Ravaldi et al. 2020).

4.2 | Differences Between Pregnant and Postpartum Women

Comparing pregnant and postpartum women, broad similarities were found among the two groups—in terms of at-risk socio-demographic factors, posttraumatic impact, loneliness, depression and stress—sustaining the invitation to consider the entire perinatal period as a vulnerable period of exposure to the risk of psychological distress, regardless of specific phases of the perinatal path (Perzow et al. 2021; Vanwetswinkel et al. 2022; Zhou et al. 2020). However, higher levels of anxiety were found in pregnant women than women during postpartum. Although, during the COVID-19 pandemic, the prevalences of prenatal and postpartum anxiety rates were similar (Caffieri et al. 2024), the result of the current study was consistent with prepandemic data that generally showed higher anxiety during pregnancy than during the postpartum period (Dennis, Falah-Hassani, and Shiri 2017). Before the COVID-19 pandemic, anxiety was considered higher during pregnancy than during postpartum because pregnancy was generally more associated with uncertainty. However, during the first phases of the COVID-19 pandemic, great uncertainty and unpredictability were enlarged to the entire perinatal course. During the phase in which the data of the current study were collected, the unpredictability and uncertainty regarding the COVID-19 spread were highly decreased. This might explain why our results were more similar to prepandemic data than pandemic ones. Moreover, women during postpartum showed higher COVID-19-related fears than pregnant women. In particular, postpartum women showed

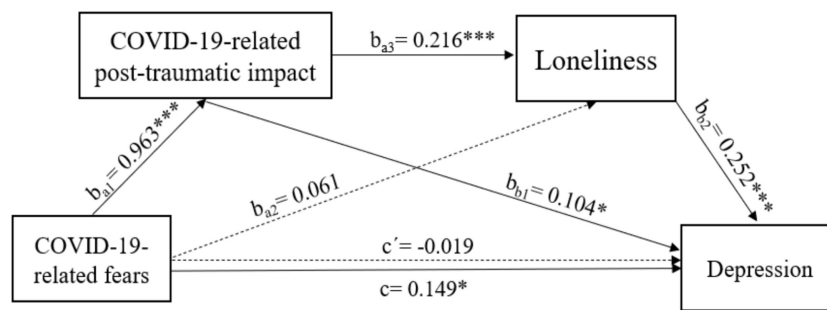


FIGURE 1 | Serial mediation model for depression. Notes: Standardized beta values are reported. * $p < 0.05$; ** $p < 0.01$; *** $p \leq 0.001$.

TABLE 3 | Indirect effects and contrasts for depression—bootstrap results.

	β	95% CI (L–U)
Indirect effects		
Total indirect effects	0.169	0.049–0.302
COVID-19-related fears → COVID-19-related posttraumatic impact → depression	0.100	0.005–0.211
COVID-19-related fears → loneliness → depression	0.015	–0.067 to 0.107
COVID-19-related fears → COVID-19-related posttraumatic impact → loneliness → depression	0.052	0.025–0.095
Contrasts		
Model 1–Model 2	0.084	–0.056 to 0.210
Model 1–Model 3	0.047	–0.060 to 0.163
Model 2–Model 3	–0.036	–0.146 to 0.067

Abbreviations: β = standardized beta; 95% CI (L–U) = 95% confidence intervals (lower and upper bound); Model 1 = COVID-19-related fears → COVID-19-related posttraumatic impact → depression; Model 2 = COVID-19-related fears → loneliness → depression; Model 3 = COVID-19-related fears → COVID-19-related posttraumatic impact → loneliness → depression.

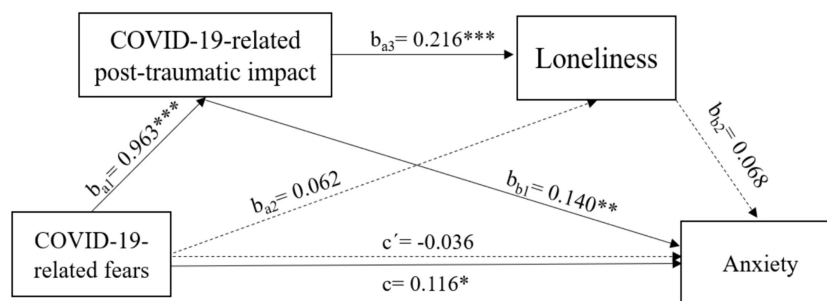


FIGURE 2 | Serial mediation model for anxiety. Notes: Standardized beta values are reported. * $p < 0.05$; ** $p < 0.01$; *** $p \leq 0.001$.

higher levels of fear of being infected by others (fear of other) and feeling paralysed by the fear of doing something wrong (fear of action). This result was in line with the conflict we found in women in the postpartum period who participated in a qualitative study in the same period of data collection of the current study. From women’s narratives emerged the fear related to not promoting the relationship of the child with other people (fear of action) to protect him from the infection (fear of other) (Caffieri and Margherita 2023).

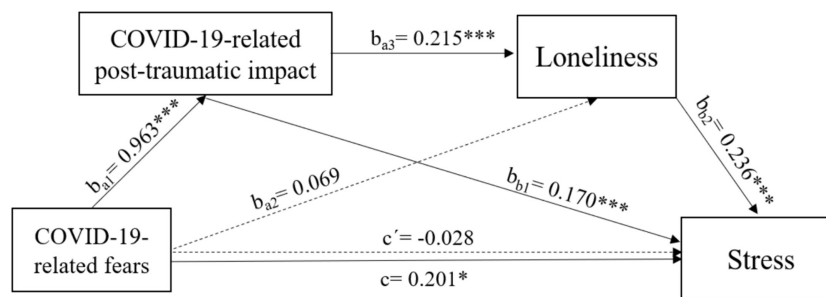
4.3 | The Mediation Effects of COVID-19-Related Posttraumatic Impact and Loneliness

Moreover, the results of serial mediation analyses suggested the pathways through which COVID-19-related fears—considered one of the main predictors of perinatal psychological distress during the first and acute phases of the COVID-19 pandemic (Chen et al. 2022; Liu et al. 2020; Motrico et al. 2022)—influenced perinatal depression, anxiety and stress at the end of the

TABLE 4 | Indirect effects and contrasts for anxiety–bootstrap results.

	β	95% CI (L–U)
Indirect effects		
Total indirect effects	0.153	0.057–0.265
COVID-19-related fears → COVID-19-related posttraumatic impact → anxiety	0.134	0.041–0.245
COVID-19-related fears → loneliness → anxiety	0.004	–0.015 to 0.041
COVID-19-related fears → COVID-19-related posttraumatic impact → loneliness → anxiety	0.014	0.001–0.039
Contrasts		
Model 1–Model 2	0.130	0.029–0.241
Model 1–Model 3	0.120	0.023–0.234
Model 2–Model 3	–0.009	–0.061 to 0.013

Abbreviations: β = standardized beta; 95% CI (L–U) = 95% confidence intervals (lower and upper bound); Model 1 = COVID-19-related fears → COVID-19-related posttraumatic impact → anxiety; Model 2 = COVID-19-related fears → loneliness → anxiety; Model 3 = COVID-19-related fears → COVID-19-related posttraumatic impact → loneliness → anxiety.

**FIGURE 3** | Serial mediation model for stress. Notes: Standardized beta values are reported. * $p < 0.05$; ** $p < 0.01$; *** $p \leq 0.001$.**TABLE 5** | Indirect effects and contrasts for stress–bootstrap results.

	β	95% CI (L–U)
Indirect effects		
Total indirect effects	0.230	0.119–0.350
COVID-19-related fears → COVID-19-related posttraumatic impact → stress	0.163	0.089–0.259
COVID-19-related fears → loneliness → stress	0.017	–0.062 to 0.100
COVID-19-related fears → COVID-19-related posttraumatic impact → loneliness → stress	0.049	0.020–0.094
Contrasts		
Model 1–Model 2	0.146	0.032–0.263
Model 1–Model 3	0.114	0.024–0.208
Model 2–Model 3	–0.032	–0.138 to 0.058

Abbreviations: β = standardized beta; 95% CI (L–U) = 95% confidence intervals (lower and upper bound); Model 1 = COVID-19-related fears → COVID-19-related posttraumatic impact → stress; Model 2 = COVID-19-related fears → loneliness → stress; Model 3 = COVID-19-related fears → COVID-19-related posttraumatic impact → loneliness → stress.

pandemic health emergency in Italy. In particular, the results showed that COVID-19-related posttraumatic impact and loneliness fully mediated the effect of COVID-19-related fears on perinatal depression, anxiety and stress. In particular, a part of

the influence of COVID-19-related fears on perinatal psychological distress was explained by COVID-19-related posttraumatic impact. In addition, another part of the influence depended on the increase of COVID-19 posttraumatic impact that in turn

increased loneliness in pregnant and postpartum women. In detail, as well as was observed in and across other phases of the pandemic, COVID-19-related fears predicted COVID-19-related posttraumatic stress in pregnant and postpartum women at the end of the health emergency (Basu et al. 2021; Shiffman et al. 2023). The posttraumatic impact of COVID-19 reflected a peculiar psychological functioning in which the COVID-19-related ‘emergency’ was still perceived as present and threatening to the woman’s psychological integrity. Hence, it is possible that higher COVID-19-related fears increased the threat representation of the pandemic increasing the COVID-19-related posttraumatic impact, which in turn influenced perinatal depression, anxiety and stress at the end of the health emergency. At the same time, the COVID-19-related posttraumatic impact increased perinatal depression, anxiety and stress by increasing maternal loneliness. While previous data have shown the effect of COVID-19-related social restrictions on loneliness (Basu et al. 2021; Miyoshi et al., 2022), the current results showed that beyond the lockdown periods, it is possible that the entire COVID-19 pandemic experience—through its ‘traumatic’ and multicomponent impact (King et al. 2021)—deeply altered how women in the perinatal period perceived the closeness with significant others, increasing loneliness. COVID-19-related traumatic characteristics, largely involving the interpersonal domain, impacted the qualitative evaluation of relationships in terms of closeness and emotional connection (de Jong-Gierveld 1987; Heinrich and Gullone 2006; Russell 1996). In turn, loneliness increased perinatal depression, anxiety and stress as was previously shown by other studies (Zaidi et al. 2017; Luoma et al. 2015, 2019; Giurgescu et al. 2022; Harrison, Moulds, and Jones 2022; Perzow et al. 2021; Scandurra et al. 2023).

The fact that the serial mediation models showed the same significant pathways for depression, anxiety and stress suggested that COVID-19-related posttraumatic impact and loneliness could be transversal mediators to different forms of psychological distress. At the same time, the results based on contrasts provided some specific information on the magnitude of the mediation effects.

Considering depression, no difference in strength emerged between the single mediation via COVID-19-related posttraumatic impact and the serial multiple mediation model. This result suggested that in explaining the effect of COVID-19-related fears on perinatal depression, these two pathways need to be considered both valid and similar in magnitude. In contrast, when considering stress and anxiety, single mediation via COVID-19-related posttraumatic impact was stronger than the serial model. This result suggested that, although the influence of loneliness could not be ignored, COVID-19-related posttraumatic impact played the main role in predicting the effect of COVID-19-related fears on anxiety and stress in women in the perinatal period. Considering these results, it is not surprising that loneliness had a greater weight in predicting depression—being a component of this form of distress (Cacioppo and Patrick 2008)—than in predicting anxiety and stress.

4.4 | Limitations

Our study has its limitations.

First, being interested in observing the psychological health of women during a specific period of the COVID-19 pandemic (after the declaration of the end of the health emergency), the possibility of increasing the number of participants who were enrolled in the study by extending the period of data collection was not possible. In addition, being the pregnant ($n = 125$) and postpartum ($n = 75$) groups not balanced in number, the comparison results may be partially distorted.

Second, no exclusion criteria based on sociodemographic at-risk factors for perinatal psychological health were included, due to the interest in universally assessing the psychological health of pregnant and postpartum women at the end of the health emergency. We are aware that at the methodological level, if we had tested the model ‘net of’ risk factors, it would have been theoretically stronger. However, the sample size and the wide unbalance between no or at-risk women in our group of participants did not allow us to ‘control’ for the confounding effect of these variables. This aspect limited the generalizability and robustness of the results.

Third, online snowballing recruitment had also its limitations. Postpartum women recruited online were commonly younger, had a higher education, had a stable relationship and were primipara than women recruited in person (Leach et al. 2017). In addition, they seemed to show poorer mental health than the women in person recruited (Leach et al. 2017). These aspects limited the generalizability of the results and at the same time may provide an overestimate of the psychological distress.

Fourth, although valid, and commonly used scales for assessing psychological variables in the perinatal population were used, these measures were not specific for pregnant and postpartum women. In particular, a general scale was used to assess loneliness, regardless of the specifics of ‘maternal’ loneliness. The same reflections can be applied to the MAC-RF scale, which did not assess COVID-19-related fears toward the infant’s health, specifically.

Fifth, the mediation models were tested on cross-sectional data. Longitudinal data would be useful to confirm the inferential hypotheses.

Considering the limitations mentioned above, the study design, and the no replicability of the research due to the change in the COVID-19 pandemic phase, this study should be considered exploratory.

4.5 | Implications for Research and Clinical Practice

However, the results of the current study have several implications for research and clinical practice.

For research, the findings imply continuing to study the possible ‘side effects’ through which the COVID-19 pandemic will impact maternal psychological health in the following years. In addition, it would be important to study the role of mediation of loneliness between other ‘collective’, ‘interpersonal’ or ‘individual’ traumas and perinatal psychological distress. For this purpose, creating and validating specific tools to assess ‘maternal loneliness’ could be beneficial.

For clinical practice, the results suggest the importance of including a screening of the posttraumatic symptoms and affective experiences lived by pregnant and postpartum women in routine assessment, during collective and social crises. In addition, the results suggest the importance of including maternal loneliness among the focuses of preventive and treatment interventions for maternal distress, mainly in cases of women's exposure to traumatic experiences.

4.6 | Conclusion

During the acute phases of the pandemic, COVID-19 was universally and socially recognized as a dangerous threat. However, at the formal end of the 'collective' health emergency, the 'internal' perception of the COVID-19-related threat became fundamental for understanding the way through which the COVID-19 pandemic continued to influence maternal health.

The current results showed that—probably due to the effect of the end of the pandemic health emergency—the posttraumatic impact of COVID-19 decreased when we compare the results of the current study with previous studies published in the literature (Basu et al. 2021; Saccone et al. 2020). However, this study showed the underlying mechanisms through which the COVID-19-related fears continued to characterize the affective maternal experience, influencing perinatal psychological distress via COVID-19-related posttraumatic impact and loneliness. In front of a world characterized by several 'collective' traumatic experiences, such as epidemics and wars, the results suggest the importance of considering both the direct impact and underlying mechanisms through which these collective events affect maternal psychological health, both during and after the end of the emergency. In particular, the current study suggests that the posttraumatic reaction and loneliness can be key aspects which can influence the effect of the crisis-related fears and maternal depression, anxiety and stress levels, strengthening the possible mediation role of loneliness in concurrently influencing perinatal depression after collective crisis.

Acknowledgements

The authors have nothing to report.

Disclosure

All the contents of the manuscript, including figures and tables, are original and not published elsewhere.

Ethics Statement

Ethical approval was obtained from the Ethical Committee of Psychological Research of the Department of Humanities of the University of Naples, Federico II (Protocol 3/2021) for all aspects of the current research.

Consent

All the participants were informed about the aims and all the aspects related to the research. All the participants provided informed consent to take part in the study.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Raw data are available from the corresponding author upon request.

References

- Alfons, A., N. Y. Ateş, and P. J. Groenen. 2022. "A Robust Bootstrap Test for Mediation Analysis." *Organizational Research Methods* 25, no. 3: 591–617. <https://doi.org/10.1177/1094428121999096>.
- Aljoberi, M. A., K. H. Lee, N. A. Alareqe, et al. 2022. "Rasch Modeling and Multilevel Confirmatory Factor Analysis for the Usability of the Impact of Event Scale-Revised (IES-R) During the COVID-19 Pandemic." *Healthcare (Basel, Switzerland)* 10, no. 10: 1858. <https://doi.org/10.3390/healthcare10101858>.
- Basu, A., H. H. Kim, R. Basaldua, et al. 2021. "A Cross-National Study of Factors Associated With Women's Perinatal Mental Health and Wellbeing During the COVID-19 Pandemic." *PLoS ONE* 16, no. 4: e0249780. <https://doi.org/10.1371/journal.pone.0249780>.
- Berthelot, N., R. Lemieux, J. Garon-Bissonnette, C. Drouin-Maziade, É. Martel, and M. Maziade. 2020. "Uptrend in Distress and Psychiatric Symptomatology in Pregnant Women During the Coronavirus Disease 2019 Pandemic." *Acta Obstetrica et Gynecologica Scandinavica* 99, no. 7: 848–855. <https://doi.org/10.1111/aogs.13925>.
- Boffo, M., S. Mannarini, and C. Munari. 2012. "Exploratory Structure Equation Modeling of the UCLA Loneliness Scale: A Contribution to the Italian Adaptation." *TPM: Testing, Psychometrics, Methodology in Applied Psychology* 19, no. 4: 345–363. <https://doi.org/10.4473/TPM19.4.7>.
- Bottesi, G., M. Ghisi, G. Altoè, E. Conforti, G. Melli, and C. Sica. 2015. "The Italian Version of the Depression Anxiety Stress Scales-21: Factor Structure and Psychometric Properties on Community and Clinical Samples." *Comprehensive Psychiatry* 60: 170–181. <https://doi.org/10.1016/j.comppsy.2015.04.005>.
- Cacioppo, J. T., and W. Patrick. 2008. *Loneliness: Human Nature and the Need for Social Connection*. WW Norton & Company.
- Caffieri, A., I. Gómez-Gómez, C. Barquero-Jimenez, P. de-Juan-Iglesias, G. Margherita, and E. Motrico. 2024. "Global Prevalence of Perinatal Depression and Anxiety During the COVID-19 Pandemic: An Umbrella Review and Meta-Analytic Synthesis." *Acta Obstetrica et Gynecologica Scandinavica* 103: 210–224.
- Caffieri, A., and G. Margherita. 2021. "The Psychological Impact of COVID-19 on Women's Wellbeing During Pregnancy and Postpartum One Year After Pandemic Outbreak in Italy. A Systematic Review." *Mediterranean Journal of Clinical Psychology* 9, no. 2: 1–24. <https://doi.org/10.13129/2282-1619/mjcp-3026>.
- Caffieri, A., and G. Margherita. 2023. "The Time of Motherhood in a Time of Crisis: A Longitudinal Qualitative Study." *Journal of Reproductive and Infant Psychology* Advanced online: 1–17.
- Camoni, L., F. Mirabella, A. Gigantesco, et al. 2022. "The Impact of the COVID-19 Pandemic on Women's Perinatal Mental Health: Preliminary Data on the Risk of Perinatal Depression/Anxiety From a National Survey in Italy." *International Journal of Environmental Research and Public Health* 19, no. 22: 14822. <https://doi.org/10.3390/ijerph192214822>.
- Ceulemans, M., V. Foulon, E. Ngo, et al. 2021. "Mental Health Status of Pregnant and Breastfeeding Women During the COVID-19 Pandemic—A Multinational Cross-Sectional Study." *Acta Obstetrica et Gynecologica Scandinavica* 100, no. 7: 1219–1229. <https://doi.org/10.1111/aogs.14092>.
- Chen, Q., W. Li, J. Xiong, and X. Zheng. 2022. "Prevalence and Risk Factors Associated With Postpartum Depression During the COVID-19 Pandemic: A Literature Review and Meta-Analysis." *International*

- Journal of Environmental Research and Public Health* 19, no. 4: 2219. <https://doi.org/10.3390/ijerph19042219>.
- Christianson, S., and J. Marren. 2012. "The Impact of Event Scale - Revised (IES-R)." *MedSurg Nursing: Official Journal of the Academy of Medical-Surgical Nurses* 21, no. 5: 321–322.
- Craparo, G., P. Faraci, G. Rotondo, and A. Gori. 2013. "The Impact of Event Scale - Revised: Psychometric Properties of the Italian Version in a Sample of Flood Victims." *Neuropsychiatric Disease and Treatment* 9: 1427–1432. <https://doi.org/10.2147/NDT.S51793>.
- Davico, C., A. Ghiggia, D. Marcotulli, F. Ricci, F. Amianto, and B. Vitiello. 2021. "Psychological Impact of the COVID-19 Pandemic on Adults and Their Children in Italy." *Frontiers in Psychiatry* 12: 572997. <https://doi.org/10.3389/fpsy.2021.572997>.
- de Jong-Gierveld, J. 1987. "Developing and Testing a Model of Loneliness." *Journal of Personality and Social Psychology* 53, no. 1: 119–128. <https://doi.org/10.1037/0022-3514.53.1.119>.
- Delanerolle, G., M. McCauley, M. Hirsch, et al. 2023. "The Prevalence of Mental Ill-Health in Women During Pregnancy and After Childbirth During the Covid-19 Pandemic: A Systematic Review and Meta-Analysis." *BMC Pregnancy and Childbirth* 23, no. 1: 1–40. <https://doi.org/10.1186/s12884-022-05243-4>.
- Dennis, C. L., K. Falah-Hassani, and R. Shiri. 2017. "Prevalence of Antenatal and Postnatal Anxiety: Systematic Review and Meta-Analysis." *The British Journal of Psychiatry* 210, no. 5: 315–323. <https://doi.org/10.1192/bjp.bp.116.187179>.
- Fumagalli, S., S. Ornaghi, S. Borrelli, P. Vergani, and A. Nespoli. 2021. "The Experiences of Childbearing Women Who Tested Positive to COVID-19 During the Pandemic in Northern Italy." *Women and Birth* 35: 242–253. <https://doi.org/10.1016/j.wombi.2021.01.001>.
- Giurgescu, C., A. C. Wong, B. Rengers, et al. 2022. "Loneliness and Depressive Symptoms Among Pregnant Black Women During the COVID-19 Pandemic." *Western Journal of Nursing Research* 44, no. 1: 23–30. <https://doi.org/10.1177/01939459211043937>.
- Gonzalez-Garcia, V., M. Exertier, and A. Denis. 2021. "Anxiety, Post-Traumatic Stress Symptoms, and Emotion Regulation: A Longitudinal Study of Pregnant Women Having Given Birth During the COVID-19 Pandemic." *European Journal of Trauma & Dissociation = Revue Europeenne du Trauma et de la Dissociation* 5, no. 2: 100225. <https://doi.org/10.1016/j.ejtd.2021.100225>.
- Harrison, V., M. L. Moulds, and K. Jones. 2022. "Perceived Social Support and Prenatal Wellbeing: the Mediating Effects of Loneliness and Repetitive Negative Thinking on Anxiety and Depression During the COVID-19 Pandemic." *Women and Birth* 35, no. 3: 232–241. <https://doi.org/10.1016/j.wombi.2020.12.014>.
- Heinrich, L. M., and E. Gullone. 2006. "The Clinical Significance of Loneliness: A Literature Review." *Clinical Psychology Review* 26, no. 6: 695–718. <https://doi.org/10.1016/j.cpr.2006.04.002>.
- Hocaoglu, M., R. Ayaz, T. Gunay, E. Akin, A. Turgut, and A. Karateke. 2020. "Anxiety and Post-Traumatic Stress Disorder Symptoms in Pregnant Women During the COVID-19 Pandemic's Delay Phase." *Psychiatria Danubina* 32, no. 3–4: 521–526. <https://doi.org/10.24869/psyd.2020.521>.
- Ho-Fung, C., E. Andersson, H. Hsuan-Ying, G. Acharya, and S. Schwank. 2022. "Self-Reported Mental Health Status of Pregnant Women in Sweden During the COVID-19 Pandemic: A Cross-Sectional Survey." *BMC Pregnancy and Childbirth* 22, no. 1: 260. <https://doi.org/10.1186/s12884-022-04553-x>.
- Ionio, C., M. Gallese, V. Fenaroli, et al. 2022. "COVID-19: What About Pregnant Women During First Lockdown in Italy?" *Journal of Reproductive and Infant Psychology* 40, no. 6: 577–589. <https://doi.org/10.1080/02646838.2021.1928614>.
- Italian Ministry of Health. 2020. "Covid-19, Situation in Italy." [accessed August 2023]. Available at <http://www.salute.gov.it/portale/nuovocoronavirus/dettaglioContenutiNuovoCoronavirus.jsp?lingua=english&id=5367&area=nuovoCoronavirus&menu=vuoto>.
- Junttila, N., S. Ahlqvist-Björkroth, M. Aromaa, P. Rautava, J. Piha, and V. Marja. 2013. "Mothers and Fathers Loneliness During Pregnancy, Infancy, and Toddlerhood." *Psychology and Education - an Interdisciplinary Journal* 50: 98–104. Available from: https://www.researchgate.net/profile/Laurie-Theeke2/publication/286044814_Loneliness_in_school_age_Children_An_integrative_review_of_quantitative_studies/links/568fd5ec08aed0aed810bb31/Loneliness-in-school-age-Children-An-integrativ-e-review-of-quantitative-studies.pdf#page=102.
- Kaubisch, L. T., C. Reck, A. von Tettenborn, and C. F. J. Woll. 2022. "The COVID-19 Pandemic as a Traumatic Event and the Associated Psychological Impact on Families - A Systematic Review." *Journal of Affective Disorders* 319: 27–39. <https://doi.org/10.1016/j.jad.2022.08.109>.
- King, L. S., D. E. Feddoes, J. S. Kirshenbaum, K. L. Humphreys, and I. H. Gotlib. 2021. "Pregnancy During the Pandemic: The Impact of COVID-19-Related Stress on Risk for Prenatal Depression." *Psychological Medicine* 53, no. 1: 170–180. <https://doi.org/10.1017/S003329172100132X>.
- Leach, L. S., P. Butterworth, C. Poyser, P. J. Batterham, and L. M. Farrer. 2017. "Online Recruitment: Feasibility, Cost, and Representativeness in a Study of Postpartum Women." *Journal of Medical Internet Research* 19, no. 3: e61. <https://doi.org/10.2196/jmir.5745>.
- Lega, I., A. Bramante, L. Lauria, et al. 2022. "The Psychological Impact of COVID-19 Among Women Accessing Family Care Centers During Pregnancy and the Postnatal Period in Italy." *International Journal of Environmental Research and Public Health* 19, no. 4: 1983. <https://doi.org/10.3390/ijerph19041983>.
- Liu, X., M. Chen, Y. Wang, et al. 2020. "Prenatal Anxiety and Obstetric Decisions Among Pregnant Women in Wuhan and Chongqing During the COVID-19 Outbreak: A Cross-Sectional Study." *BJOG* 127, no. 10: 1229–1240. <https://doi.org/10.1111/1471-0528.16304>.
- Lopez-Morales, H., M. V. Del-Valle, M. L. Andres, R. Gelpi Trudo, L. Canet-Juric, and S. Urquijo. 2021. "Longitudinal Study on Prenatal Depression and Anxiety During the COVID-19 Pandemic." *Archives of Women's Mental Health* 24, no. 6: 1027–1036. <https://doi.org/10.1007/s00737-021-01248-w>.
- Lovibond, S. H., and P. F. Lovibond. 1995. "Manual for the Depression Anxiety Stress Scales." Psychology Foundation of Australia.
- Luoma, I., M. Korhonen, K. Puura, and R. K. Salmelin. 2019. "Maternal Loneliness: Concurrent and Longitudinal Associations With Depressive Symptoms and Child Adjustment." *Psychology, Health & Medicine* 24, no. 6: 667–679. <https://doi.org/10.1080/13548506.2018.1554251>.
- Luoma, I., M. Korhonen, R. K. Salmelin, M. Helminen, and T. Tamminen. 2015. "Long-Term Trajectories of Maternal Depressive Symptoms and Their Antenatal Predictors." *Journal of Affective Disorders* 170: 30–38. <https://doi.org/10.1016/j.jad.2014.08.017>.
- Mattuzzi, C., and G. Lippi. 2023. "Timeline Analysis of Clinical Severity of COVID-19 in the General Population." *European Journal of Internal Medicine* 110: 97–98. <https://doi.org/10.1016/j.ejim.2022.12.007>.
- McNab, S. E., S. L. Dryer, L. Fitzgerald, et al. 2022. "The Silent Burden: A Landscape Analysis of Common Perinatal Mental Disorders in Low- and Middle-Income Countries." *BMC Pregnancy and Childbirth* 22, no. 1: 342. <https://doi.org/10.1186/s12884-022-04589-z>.
- Meades, R., and S. Ayers. 2011. "Anxiety Measures Validated in Perinatal Populations: A Systematic Review." *Journal of Affective Disorders* 133, no. 1–2: 1–15. <https://doi.org/10.1016/j.jad.2010.10.009>.
- Miyoshi, A., Y. Ueda, A. Yagi, et al. 2022. "How the COVID-19 Pandemic Changed a New Mother's Sense of Loneliness, and Who Was Key to Helping Them Through It." *Journal of Clinical Gynecology and Obstetrics* 11, no. 4: 101–107. <https://doi.org/10.14740/jcgo824>.
- Molgora, S., and M. Accordini. 2020. "Motherhood in the Time of Coronavirus: The Impact of the Pandemic Emergency on Expectant

- and Postpartum Women's Psychological Well-Being." *Frontiers in Psychology* 11: 567155. <https://doi.org/10.3389/fpsyg.2020.567155>.
- Motrico, E., T. Galán-Luque, C. Rodríguez-Domínguez, I. Gómez-Gómez, and S. Domínguez-Salas. 2023. "Factors Associated With Post-Traumatic Stress Symptoms in Pregnant and Postpartum Women." *Journal of Women's Health (Larchmt)* 32, no. 5: 583–591. <https://doi.org/10.1089/jwh.2022.0400>.
- Motrico, E., P. Moreno-Peral, K. Uriko, et al. 2022. "Clinical Practice Guidelines With Recommendations for Peripartum Depression: A European Systematic Review." *Acta Psychiatrica Scandinavica* 146, no. 4: 325–339. <https://doi.org/10.1111/acps.13478>.
- Newman, D. A. 2014. "Missing Data: Five Practical Guidelines." *Organizational Research Methods* 17, no. 4: 372–411. <https://doi.org/10.1177/1094428114548590>.
- Ostacoli, L., S. Cosma, F. Bevilacqua, et al. 2020. "Psychosocial Factors Associated With Postpartum Psychological Distress During the Covid-19 Pandemic: A Cross-Sectional Study." *BMC Pregnancy and Childbirth* 20, no. 1: 703. <https://doi.org/10.1186/s12884-020-03399-5>.
- Perzow, S. E. D., E. P. Hennessey, M. C. Hoffman, N. K. Grote, E. P. Davis, and B. L. Hankin. 2021. "Mental Health of Pregnant and Postpartum Women in Response to the COVID-19 Pandemic." *Journal of Affective Disorders Reports* 4: 100123. <https://doi.org/10.1016/j.jadr.2021.100123>.
- Pisano, G., R. Sadun, and M. Zanini. 2020. "Lessons from Italy's Response to Coronavirus." *Harvard Business Review*. Accessed August 2023. <https://hbr.org/2020/03/lessons-from-italys-response-to-coronavirus>.
- Ravaldi, C., V. Ricca, A. Wilson, C. Homer, and A. Vannacci. 2020. "Previous Psychopathology Predicted Severe COVID-19 Concern, Anxiety, and PTSD Symptoms in Pregnant Women During "Lockdown" in Italy." *Archives of Women's Mental Health* 23: 783–786. <https://doi.org/10.1007/s00737-020-01086-0>.
- Russell, D. W. 1996. "UCLA Loneliness Scale (Version 3): Reliability, Validity, and Factor Structure." *Journal of Personality Assessment* 66, no. 1: 20–40. https://doi.org/10.1207/s15327752jpa6601_2.
- Saccone, G., A. Florio, F. Aiello, et al. 2020. "Psychological Impact of Coronavirus Disease 2019 in Pregnant Women." *American Journal of Obstetrics and Gynecology* 223, no. 2: 293–295. <https://doi.org/10.1016/j.ajog.2020.05.003>.
- Scandurra, C., S. Mezzalana, S. Aviani, et al. 2023. "Perinatal Depression During the Fourth Wave of the COVID-19 Outbreak in a Single Prenatal Clinic in Southern Italy: The Role of Loneliness, Anxiety, and Maternal Support." *Journal of Affective Disorders Reports* 13: 100585. <https://doi.org/10.1016/j.jadr.2023.100585>.
- Schimmenti, A., J. Billieux, and V. Starcevic. 2020. "The Four Horsemen of Fear: An Integrated Model of Understanding Fear Experiences During the Covid-19 Pandemic." *Clinical Neuropsychiatry: Journal of Treatment Evaluation* 17, no. 2: 41–45. <https://doi.org/10.36131/CN20200202>.
- Schimmenti, A., V. Starcevic, A. Giardina, Y. Khazaal, and J. Billieux. 2020. "Multidimensional Assessment of COVID-19-Related Fears (MAC-RF): A Theory-Based Instrument for the Assessment of Clinically Relevant Fears During Pandemics." *Frontiers in Psychiatry* 11: 748. <https://doi.org/10.3389/fpsyg.2020.00748>.
- Shiffman, N., H. Gluska, S. Margalit, et al. 2023. "Postpartum Post-Traumatic Stress Symptoms During the COVID-19 Period: Exposure and Fear as Mediating Factors." *European Journal of Psychotraumatology* 14, no. 2: 2228151. <https://doi.org/10.1080/20008066.2023.2228151>.
- Shuman, C. J., A. F. Pehl, N. Pareddy, et al. 2022. "Postpartum Depression and Associated Risk Factors During the COVID-19 Pandemic." *BMC Research Notes* 15, no. 1: 102. <https://doi.org/10.1186/s13104-022-05991-8>.
- Spinola, O., M. Liotti, A. M. Speranza, and R. Tambelli. 2020. "Effects of COVID-19 Epidemic Lockdown on Postpartum Depressive Symptoms in a Sample of Italian Mothers." *Frontiers in Psychiatry* 11: 1177. <https://doi.org/10.3389/fpsyg.2020.589916>.
- Vanwetswinkel, F., R. Bruffaerts, U. Arif, and T. Hompes. 2022. "The Longitudinal Course of Depressive Symptoms During the Perinatal Period: A Systematic Review." *Journal of Affective Disorders* 315: 213–223. <https://doi.org/10.1016/j.jad.2022.06.087>.
- Wang, Y., L. Chen, T. Wu, et al. 2020. "Impact of Covid-19 in Pregnancy on Mother's Psychological Status and Infant's Neurobehavioral Development: A Longitudinal Cohort Study in China." *BMC Medicine* 18, no. 1: 347. <https://doi.org/10.1186/s12916-020-01825-1>.
- World Health Organization (WHO). 2023. "Statement on the Fifteenth Meeting of the IHR (2005) Emergency Committee on the COVID-19 Pandemic." [https://www.who.int/news/item/05-05-2023-statement-on-the-fifteenth-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-coronavirus-disease-\(covid-19\)-pandemic?adgroupsurvey=%7badgroupsurvey%7d&gclid=EA1aIQobChMivOHi0_TKgAMVWQcGAB0GogPKEAAYASABEguKfD_BwE](https://www.who.int/news/item/05-05-2023-statement-on-the-fifteenth-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-coronavirus-disease-(covid-19)-pandemic?adgroupsurvey=%7badgroupsurvey%7d&gclid=EA1aIQobChMivOHi0_TKgAMVWQcGAB0GogPKEAAYASABEguKfD_BwE).
- Xavier, S., E. Bento, J. Azevedo, et al. 2016. "Validation of the Depression, Anxiety and Stress Scale–DASS-21 in a Community Sample of Portuguese Pregnant Women." *European Psychiatry* 33, no. S1: s239. <https://doi.org/10.1016/j.eurpsy.2016.01.600>.
- Zaidi, F., A. Nigam, R. Anjum, and R. Agarwalla. 2017. "Postpartum Depression in Women: A Risk Factor Analysis." *Journal of Clinical and Diagnostic Research: JCDR* 11, no. 8: QC13–QC16. <https://doi.org/10.7860/JCDR/2017/25480.10479>.
- Zhang, E., S. Su, S. Gao, et al. 2023. "Coronavirus Disease 2019 Pandemic-Related Long-Term Chronic Impacts on Psychological Health of Perinatal Women in China." *American Journal of Perinatology* 41: e1301–e1312. <https://doi.org/10.1055/a-2008-4674>.
- Zhou, Y., H. Shi, Z. Liu, et al. 2020. "The Prevalence of Psychiatric Symptoms of Pregnant and Non-Pregnant Women During the COVID-19 Epidemic." *Translational Psychiatry* 10, no. 1: 319. <https://doi.org/10.1038/s41398-020-01006-x>.