



Research Paper

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

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ABSTRACT

Background: The current study aimed at assessing the levels of perinatal depression (i.e., both antenatal and postnatal) during the fourth wave of the COVID-19 outbreak in a group of Italian women, as well as to evaluate the role of loneliness, anxiety, and lack of maternal support in cumulatively predicting perinatal depression.

Methods: A cross-sectional study was conducted with 200 Italian women recruited during a peak of the COVID-19 pandemic in Italy (i.e., from September to December 2021) from a single prenatal clinic in Southern Italy. A non-parametric binomial test was conducted to assess whether the perinatal depression frequencies of the current sample differed from those found in a pre-Covid reference group. Additionally, hierarchical multiple linear regression analyses assessing whether loneliness, anxiety, and maternal support affected women's perinatal depression were also conducted.

Results: The general prevalence of perinatal depression was significantly higher in participants recruited during the fourth wave of the COVID-19 pandemic compared to the pre-Covid reference group (29% vs. 9.2%). However, results showed that, contrary to postnatal depression (18.2% vs. 19.9%), only the prevalence of antenatal depression was significantly higher compared to the pre-Covid reference group (39.6% vs. 6.4%). Furthermore, loneliness and anxiety, but not maternal support, were associated with higher levels of PD.

Limitations: Limitations concerned the cross-sectional nature of the study and the relatively small sample size.

Conclusions: This study sheds light on the need to address perinatal mental health of women during major stressful events, such as the COVID-19 pandemic.

1. Introduction

Albeit often accompanied by feelings of joy and expectations associated with childbirth, the perinatal period, which goes from pregnancy to 1 year after childbirth, can represent a vulnerable time for the development of negative mental health outcomes, also taking into account the anxiety and worry that women can feel in relation to such occurrence (Furtado et al., 2018; Scandurra et al., 2022a, 2022b). Indeed, previous research estimated that 1 in 5 women are at high risk of developing a mental health disorder in the perinatal period (Fawcett et al., 2019; Hahn-Holbrook et al., 2018; Shorey et al., 2018). As known,

perinatal depression (PD) is the most common mental health disorder during pregnancy (i.e., prenatal depression) or after the childbirth (i.e., postnatal depression), affecting approximately 17% of women (Dagher et al., 2021; Hahn-Holbrook et al., 2018; Underwood et al., 2016). PD is a global health issue as it can cause negative effects on both the mother's mental health and the fetus or child's development (Rollè et al., 2020; Stein et al., 2014).

PD has been associated to multiple risk factors, including social, psychological, biological, and genetic factors (Riva Crugnola et al., 2020; Rollè et al., 2017; O'Connor et al., 2019; Sechi et al., 2020). Recently, a great attention is giving to the exposure to major stressful

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events as an addictive risk factor for PD (Dagher et al., 2021; Silva et al., 2012), especially in the light of the COVID-19 pandemic (Shorey et al., 2021), as it has caused a public and global mental health crisis due to social isolation, fear of being infected by the SARS-CoV-2, and significant other psycho-social dimensions (for a review, see Xiong et al., 2020; Manchia et al., 2022). Evidence supported that the rates of PD in pregnant women have doubled compared to the pre-pandemic period (Kahyaoglu and Kucukkaya, 2021; Saccone et al., 2020; Wu et al., 2020), reaching rates of 31–40% (Basu et al., 2021; Shorey et al., 2021).

Previous studies have pointed out on the crucial role of some psychosocial factors in increasing the likelihood of developing PD during the COVID-19 outbreak. Among them, loneliness (e.g., Milne et al., 2020), anxiety (e.g., Lebel et al., 2020), and lack of maternal support (e.g., Matvienko-Sikar et al., 2020) seem to have played a significant role in the development of PD during the COVID-19 pandemic.

Lockdown restrictions imposed by governments with the aim of decreasing the widespread of the SARS-CoV-2 limited women's access to social support, thus increasing disproportionately the sense of loneliness, that can be defined as the negative feeling associated with the appraisal of one's social network as deficient or absent (Peplau et al., 1982). Indeed, hospitals have worldwide not allowed pregnant women's relatives to accompany them during childbirth or check-ups as a precautionary measure against the spread of the virus. Thus, many pregnant women have experienced a great amount of loneliness and lack of maternal support during the COVID-19 outbreak (Basu et al., 2021; Stokholm et al., 2022), and it is widely recognized that social support is a crucial source of wellbeing in the perinatal period (Biaggi et al., 2016; Emmanuel et al., 2012) and that loneliness has adverse effects on mental health, morbidity, and mortality (Leigh-Hunt et al., 2017). Furthermore, previous studies reported that pregnant women also developed unprecedented rates of anxiety (Ravaldi et al., 2021; Saccone et al., 2020) that have been related to specific concerns about the impact of COVID-19 on maternal health, fetal and neonatal health (Fakari and Simbar, 2020), and vertical transmission of the SARS-CoV-2 from mother to fetus (Saccone et al., 2020).

Taking into account Italy, that is the context of the current study, Italian studies on this topic confirmed the scientific literature that highlighted the increased levels of perceived loneliness and anxiety during the COVID-19 outbreak (Bochicchio et al., 2021, 2023; Maldonato et al., 2020; Scandurra et al., 2023), as well as their role as a risk to perinatal mental health and the protective role of maternal support (Caffieri and Margherita, 2021; Colli et al., 2021; Craig et al., 2021; Fumagalli et al., 2022; Lega et al., 2022; Orsolini et al., 2022; Ravaldi et al., 2021; Rollè et al., 2022). "Green passes" became mandatory in Italy for all workers, both in the public and private sectors, as of October 15, 2021. In November 2021, a new peak of COVID-19 cases was registered in Italy. In fact, a new variant was identified during this period (i.e., "Omicron"), which is a cause for concern. Therefore, on November 24, 2021, the extended "Green pass" (or "super Green pass") was approved, which applies only to vaccinated and cured individuals. Faced with increasing infections, the situation in hospitals again ran into serious difficulties. Thus, programmed interventions were suspended, access to health services was restricted, and ordinary wards were converted into wards specifically dedicated to COVID-19 patients.

However, to the best of our knowledge, no previous Italian studies have assessed the role of loneliness, anxiety, and maternal support in cumulatively predicting PD. Thus, based on these premises, this study had two main aims. The first aim was to assess the levels of PD (i.e., both antenatal and postnatal) during the fourth wave of the COVID-19 outbreak in a group of Italian women. The second aim was to examine the role of loneliness, anxiety, and lack of maternal support in affecting PD. Specifically, we hypothesized that: (1) participants of the current study would be higher in PD than the Italian reference group (Cena et al., 2021), who was recruited before the COVID-19 outbreak; and (2) higher levels of loneliness and anxiety, and lower levels of maternal support, would be associated with higher levels of PD.

2. Method

2.1. Participants and procedures

Participants could take part in the study if they: (1) aged ≥ 18 years; (2) spoke Italian; (3) were not infected by the Sars-Cov-2; (4) were in the third trimester if in the prenatal period; and (5) had given birth no more than three days ago if in the postnatal period.

Two-hundred women were recruited during a peak of the COVID-19 pandemic (i.e., from September to December 2021) from the prenatal clinic of the Federico II University Public Hospital of Naples, in Southern Italy. All women provided their consent to participate in the study. A clinical psychologist, assisted by a student obstetrician, administered the battery to the women in the ward rooms where they were admitted. Participants who exceeded cutoffs for PD were offered psychological counseling.

The study was approved by the medical ethical committee of the University of Naples Federico II (protocol number 145/20), developed in accordance with the EU General Data Protection Regulation, and designed in accordance with the Declaration of Helsinki on Ethical Principles for Medical Research Involving Human Subjects.

2.2. Measures

2.2.1. Socio-demographic and clinical characteristics

Sociodemographic and clinic variables included age, partner (yes vs. no), pregnancy stage (prenatal vs. postnatal), type of pregnancy (risk vs. physiological), and being primiparas or multiparas.

2.2.2. Perinatal depression

Perinatal depression was measured through the Edinburgh Postnatal Depression Scale (EPDS) (Cox et al., 1987; Italian version by Benvenuti et al., 1999), a 10-item scale assessing both pre- and postnatal depressive symptoms during the previous week. An example item is "In the past 7 days I have been so unhappy that I have had difficulty sleeping." Response options range from 0 to 3. Thus, the total score ranged from 0 to 30, with higher scores indicating more severe depressive symptoms. A cut-off score of ≥ 12 is generally used as a screening method for the presence of PD (Smith-Nielsen et al., 2018). The alpha coefficient for the current sample was 0.87.

2.2.3. Loneliness

Loneliness was measured through the UCLA Loneliness Scale ((Russell, 1996); Italian version by Boffo et al., 2012) a 20-item measure assessing individual's general loneliness and satisfaction with one's own social network. An example item is "I have nobody to talk to." Response options range from 1 ("Never") to 4 ("Often"), with higher scores indicating greater loneliness. The alpha coefficient for the current sample was 0.89.

2.2.4. Anxiety

Anxiety was measured through the Hamilton Anxiety Rating Scale (HAM-A; Maier et al., 1988; Italian version by Cassano and Pancheri, 1993), a 14-item measure assessing the severity of anxiety symptoms, by taking into account both psychic (i.e., mental agitation and psychological distress) and somatic anxiety (i.e., physical complaints related to anxiety). Response options range from 0 ("Not present") to 4 ("Very severe"), with higher scores indicating higher symptoms of anxiety. The alpha coefficient for the current sample was 0.91.

2.2.5. Maternal support

Social support associated with perinatal depression was measured through the Maternity Social Support Scale (MSSS; Webster et al., 2000; Italian version by Dabrassi et al., 2009), a 6-item measure assessing the levels of perceived social support as perceived by the women. An example item is "My family is always there for me." Response options

range from 1 (“Never”) to 5 (“Always”), with higher scores indicating greater maternal support. The alpha coefficient for the current sample was 0.73.

2.3. Statistical analyses

All statistical analyses were performed with SPSS version 26, setting the level of significance at 0.05.

We first analyzed participants’ sociodemographic characteristics, descriptive statistics (distribution of frequencies, means, and standard deviation), and bivariate correlations between variables.

Second, we conducted a non-parametric binomial test to assess whether the PD frequencies (EPDS ≥ 12) of the current sample differed from those reported by [Cena et al. \(2021\)](#).

Third, the associations between psychosocial factors (i.e., loneliness, anxiety, and maternal support) and PD were assessed through a hierarchical multiple linear regression analysis, with PD as the outcome variable and psychosocial factors as independent variables. This analysis was controlled for age, partner (yes vs. no), trimester, pregnancy stage (prenatal vs. postnatal), type of pregnancy (risk vs. physiological), and being primiparas or multiparas. Cohen’s f^2 method was calculated as an indicator of the effect size, according to which $f^2 \geq 0.02$, $f^2 \geq 0.15$, and $f^2 \geq 0.35$ represent small, medium, and large effect sizes (Cohen, 1988). To ascertain the absence of multicollinearity, we assessed the variance inflation factor (VIF) of psychosocial factors and PD. Conventionally, VIFs near or above 5 may be considered acceptable values ([Akinwande et al., 2015](#)).

3. Results

3.1. Participants characteristics

Participants ranged in age from 18 to 45 years old ($M = 32.75$, $SD = 6.13$). Most of the sample were in a romantic relationship ($n = 187$; 93.5%). Participants were almost equally distributed in prenatal ($n = 101$; 50.5%) and postnatal ($n = 99$; 49.5%) period, as well as in primipara ($n = 99$; 49.5%) and multipara ($n = 101$; 50.5%) status. Additionally, participants were exactly equally distributed in at risk ($n = 100$; 50%) and physiological ($n = 100$; 50%) pregnancy.

3.2. Descriptive statistics and bivariate correlations

Means, standard deviations, and bivariate correlations between the main variables analyzed (PD, loneliness, anxiety, and maternal support) are reported in [Table 1](#). Results of the Pearson correlation indicated that PD correlated positively with loneliness and anxiety. On the contrary, maternal support correlated negatively with anxiety, but not with PD and loneliness.

3.3. Levels of perinatal depression and comparisons with the reference sample

The prevalence of PD was 39.6% among pregnant women and 18.2% among women who have given birth ([Table 2](#)). The general prevalence of PD (i.e., without differentiating antenatal and postnatal depression)

Table 1
Descriptive statistics and bivariate correlations between perinatal depression, loneliness, anxiety, and maternal support.

	1	2	3	4	<i>M</i> ± <i>SD</i>
Perinatal depression	–				8.29 ± 6.02
Loneliness	0.48***	–			37.59 ± 8.13
Anxiety	0.65***	0.42***	–		7.55 ± 8.36
Maternal support	–0.12	–0.20**	–0.01	–	21.13 ± 2.29

Notes. *M* = Mean; *SD* = Standard Deviation. ** $p < 0.01$; *** $p < 0.001$.

Table 2

Levels of antenatal and post-natal depression and comparison with an Italian reference group.

	EPDS ≥ 12 Perinatal depression <i>n/N</i> (%)	Antenatal depression <i>n/N</i> (%)	Postnatal depression <i>n/N</i> (%)
Current sample	58/200 (29)	40/101 (39.6)	18 (18.2)
Reference sample	133/1462 (9.2)	74/1160 (6.4)	60/302 (19.9)
PR	0.22***	0.28***	0.15

Notes. *n* = Sample size with EPDS > 12; *N* = Total sample size of the subgroup; PR = Probability Ratio. *** $p < 0.001$.

in the current sample differed significantly from the Italian reference group (29% vs. 9.2%). However, when PD is differentiated according to the time period (i.e., pre- and post-partum), only the prevalence of antenatal depression differed between samples (39.6% vs. 6.4%).

3.4. Associations of loneliness, anxiety, and maternal support with perinatal depression

Results for hierarchical multiple linear regression analysis are reported in [Table 3](#). All VIFs on the main variables were acceptable, ranging from 1.03 to 1.35.

Demographics and clinical characteristics in step 1 explained 11% of variation in PD. Specifically, only being in the prenatal period was associated with higher scores on PD.

Adding psychosocial factors in step 2 of the regression model explained a significant additional 39% of the variation in PD. Specifically, among psychosocial factors, loneliness, and anxiety, but not maternal support, were associated with higher levels of PD.

The final statistical model for all dimensions accounted for 50% of the variance in PD, with a large effect size ($f^2 = 0.76$).

4. Discussion

The current study examined the prevalence of PD in a group of Italian women during the fourth wave of the COVID-19 outbreak, as well as the role of loneliness, anxiety, and maternal support in affecting PD. The results partially confirmed our hypotheses.

Regarding the first aim, we found that the general prevalence of PD

Table 3
Hierarchical multiple linear regression of perinatal depression on loneliness, anxiety, and maternal support.

	Perinatal depression		
	<i>B</i> (<i>SE</i>)	β	95% <i>CI</i>
Step 1 – Control variables			
Age	–0.04 (0.07)	–0.04	–0.17, 0.09
Partner (no)	–2.89 (1.93)	–0.11	–6.70, –0.91
Pregnancy stage (prenatal)	–4.19 (0.83)	–0.35***	–5.83, –2.55
Type of pregnancy (at risk)	0.53 (0.84)	0.04	–1.12, 2.19
Primiparas (vs. multiparas)	0.09 (0.85)	0.01	–1.59, 1.77
	$R^2 = 0.11$; $F = 5.57***$		
Step 2 – Psychosocial dimensions			
Age	–0.06 (0.05)	–0.07	–0.17, 0.04
Partner (no)	–0.02 (1.66)	–0.01	–3.29, 3.26
Pregnancy stage (prenatal)	–2.47 (0.65)	–0.21***	–3.75, –1.19
Type of pregnancy (at risk)	0.16 (0.64)	0.01	–1.10, 1.42
Primiparas (vs. multiparas)	0.47 (0.65)	0.04	–0.81, 1.76
Loneliness	0.16 (0.04)	0.21***	0.07, 0.24
Anxiety	0.37 (0.04)	0.52***	0.28, 0.45
Maternal support	–0.16 (0.16)	–0.06	–0.46, 0.15
	$R^2 = 0.50$; $\Delta R^2 = 0.39***$; $F = 23.60***$		

Notes. *B* = Unstandardized regression coefficient; *SE* = Standard error; *CI* = Confidence interval; β = Unstandardized regression coefficient; R^2 = R-square; ΔR^2 = Change in R^2 ; *** $p < 0.001$.

was significantly higher in participants recruited during the COVID-19 compared to the pre-Covid reference group (29% vs. 9.2%). This finding confirms previous research showing that COVID-19 is significantly correlated with depression (Tomfohr-Madsen et al., 2021). COVID-19 can indeed represent a risk factor that further exacerbates the vulnerability affecting women during the perinatal period, thus worsening their affective life and leading to increased PD. However, our results showed that, contrary to the postnatal depression (18.2% vs. 19.9%), only the prevalence of antenatal depression was significantly higher compared to the pre-Covid reference group (39.6% vs. 6.4%). This is in line with previous research indicating that during COVID-19 depression and anxiety increased in women specifically in the ante-natal period (Tomfohr-Madsen et al., 2021), as well as with studies observing significant reductions in the rate of PD from pregnancy to post-partum (Heron et al., 2004; Sidebottom et al., 2014; Silva et al., 2012; Verreault et al., 2014). This might be due to the fact that anxiety, as it traditionally refers to a feared future occurrence (Foschi et al., 2018; Innamorati et al., 2018), especially affects women awaiting their child's birth as opposed to those who already went through childbirth.

Regarding the second aim, we found that loneliness and anxiety, but not maternal support, were associated with higher levels of PD. This can be understood in light of the role that loneliness and anxiety play in influencing the affective and emotional life of women's experience before, during, and after childbirth. As opposed to the need for interaction and unity with others, loneliness is present when social networks appear to the individual as absent or insufficient, and includes emotional, cognitive, and motivational aspects (Galanaki, 2004). Loneliness has been generally found to be significantly associated with depression (Erzen and Çikrikci, 2018). Our study showed that this occurs specifically in women during the ante- and postnatal periods, perhaps due to the major vulnerability that this special time lapse represents in women's life. Indeed, it has been shown that lack of social support represents a relevant risk factor for maternal well-being in the prenatal period and for the pregnancy outcomes (Elsenbruch et al., 2007). However, although previous studies have clearly identified maternal support as a resilience factor protecting women from PD, aiding them in feeling connected and cared about (Gjerdingen et al., 2014; Reid and Taylor, 2015; Vaezi et al., 2019), surprisingly we did not find statistically significant associations between these dimensions. This might be due to the measure used (i.e., the MSSS), which assesses specifically the support perceived by women during pregnancy, while the COVID-19 has generated an extreme need for more expanded social support due to the very restrictive measures adopted to slow down the spread of SARS-CoV-2 (Szkody et al., 2021). Thus, it seems plausible to us to hypothesize that participants of the current study, answering questionnaires during a peak of the COVID-19 pandemic, were in need for social support, but not necessarily as a pregnant woman. It might also be that once anxiety, loneliness, and maternal support are combined, the first two (i.e., anxiety and loneliness) result as significant because they might represent stronger dimensions if compared with maternal support. Indeed, it has been shown that factors independent from pregnancy and childbirth (such as anxiety and loneliness, but not maternal support) can significantly influence women's perceived anxiety in the perinatal period (Moyer et al., 2020). Thus, taken together, our results point to the importance of paying special attention to loneliness and anxiety as risk factors possibly leading to PD.

4.1. Limitations

The results should be read in light of significant limitations.

The cross-sectional nature of the study does not allow to make conclusive inferences about the causality and directionality of the relationships among variables. Furthermore, the sample is relatively small and recruited in a single clinic in Southern Italy. This means that the sample is not representative of the Italian population of women who have given birth during the COVID-19. Additionally, as participants

were all Italian, our results cannot be expanded to other socio-cultural contexts. Finally, we did not administer scales assessing other psychological symptoms beyond PD.

Thus, based on these limitations, future research should use longitudinal designs to identify cause-effect relationships among loneliness, anxiety, maternal support, and PD; recruit representative, larger, and more diverse samples of women; and assess the role of other psychological symptoms as confounding variables.

4.2. Clinical implications

Despite limitations, our study may provide useful implications for the mental health needs of women who give birth during a pandemic. Specifically, based on the work by Suwalska et al. (2021), implications should concern information, screening, and intervention.

Regarding information, especially during the perinatal period women should be warned against the impact that COVID-19-related perceived uncertainty might have on their and their baby's health. In this regard, for instance, Kahyaoglu and Kucukkaya (2021) found that receiving information about COVID-19 was a factor significantly associated with both anxiety and depression. Informing women – whether in person or through telemedicine – about safety procedures against COVID-19-related risks can indeed alleviate stress and the related anxiety (Preis et al., 2020). Therefore, information delivered to women during pregnancy and after childbirth is essential to get them help and psychological support as early as possible, in order to ward off increasingly negative outcomes.

Regarding screening, risk factors such as perceived stress, lack of social support, and previous history of mental health problems should be assessed especially throughout the perinatal period. Women going through childbirth should be specifically screened for relevant personal vulnerabilities (e.g., mood problems such as anxiety and depression; Farewell et al., 2020) in order to prevent adverse experiences that might affect the mother and her baby's health. Monitoring women's mood and perceived stress during the perinatal period is thus crucial to intervene as early as possible to prevent the possible manifestations of mental health problems (Berthelot et al., 2020).

In addition, after assessing for perceived stress and potential mental health problems during the perinatal period, intervention should be carried out through the collaboration of different health care professionals. Psychological support and, when appropriate, psychiatric consultations can be effective in providing mothers with the instruments to face the mental health problems that might arise in the perinatal period (Suwalska et al., 2021). Whether in person or through telematic tools, these are crucial factors to be implemented in order for women to receive the best treatment options for perinatal depression and other mental health problems that can arise before, during, and after childbirth.

Finally, even though maternal support was not significantly associated with reduced PD, this does not mean that it is not necessary to work on this dimension as well. Indeed, it has been widely acknowledged that poor social support is predictive of depressive symptoms during pregnancy (Racine et al., 2020). Therefore, in addition to perceived anxiety and loneliness, working on maternal support can be regarded as crucial for the prevention of perinatal depression.

5. Conclusions

The prevalence of PD in a group of Italian women recruited during the COVID-19 outbreak was generally higher compared to a pre-Covid reference Italian group. Furthermore, loneliness and anxiety were significantly associated with PD. On the contrary, maternal support was not associated with PD, thus partially confirmed our hypothesis. Although the limitations concerning the sample and the research design, this study sheds light on the need to address perinatal mental health of women during major stressful events, such as the COVID-19 pandemic.

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Data availability

The data and materials that support the findings of this study are available from the corresponding author upon reasonable request.

Ethics approval

The current study was approved by the Medical Ethical Committee of the University of Naples Federico II (protocol number 145/20), conducted in accordance with the EU General Data Protection Regulation (GDPR), and designed in the respect of principles of the Declaration of Helsinki.

Consent to participate and for publication

All patients gave their written consent to the study and for publication of aggregate data.

CRedit authorship contribution statement

Cristiano Scandurra: Methodology, Data curation, Writing – original draft, Project administration, Supervision, Formal analysis, Writing – review & editing. **Selene Mezzalana:** Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Silvia Aviani:** Methodology, Funding acquisition, Data curation, Writing – original draft, Writing – review & editing. **Valeria Lastra:** Methodology, Funding acquisition, Data curation, Writing – review & editing. **Vincenzo Bochicchio:** Funding acquisition, Data curation, Writing – review & editing. **Rosanna Zapparella:** Funding acquisition, Data curation, Formal analysis, Writing – review & editing. **Gabriele Saccone:** Funding acquisition, Data curation, Writing – review & editing. **Nelson Mauro Maldonato:** Data curation, Formal analysis, Writing – review & editing. **Mariavittoria Locci:** Data curation, Formal analysis, Writing – review & editing, Project administration, Supervision.

Declaration of Competing Interest

The authors declare that they have no conflict of interest.

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