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Effects of the COVID-19 pandemic on perinatal mental health in Spain: Positive and negative outcomes



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ABSTRACT

Background: Previous studies have shown that perinatal distress has a negative influence on pregnancy outcome and the physiological development of the baby.

Objective: The aim of this study was to describe the effects of the COVID-19 pandemic on maternal perinatal mental health in Spain.

Methods: Seven hundred and twenty-four women (N=450 pregnancy, N=274 postpartum) were recruited online during the pandemic. The Edinburgh Postnatal Depression Scale, the Positive and Negative Affect Schedule, and the Satisfaction With Life Scale were administered. Variables related to sociodemographic information, the COVID-19 pandemic, and perinatal care were also assessed.

Findings: The results showed that 58% of women reported depressive symptoms. Moreover, 51% of women reported anxiety symptoms. On the other hand, a regression analysis for life satisfaction showed that besides the perception about their own health, marital status or being a health practitioner were also significant predictors during pregnancy. However, perception about baby's health and sleep, perception about their own health, and marital status were significant predictors of life satisfaction during the postpartum stage.

Discussion: Women assessed during the COVID-19 pandemic reported high rates of psychological distress.

Conclusion: These results highlight the need of clinical support during this period. Knowing the routes to both distress and well-being may help maternity services to effectively cope with the pandemic.

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Problem

The impact of the COVID-19 pandemic on perinatal distress and well-being is still unknown.

What is Already Known

Previous studies have shown that perinatal distress has a negative influence on pregnancy outcome and the physiological development of the baby. For the general population, depression and anxiety are the most frequent psychological consequences from the COVID-19 pandemic, but little is

known about the perinatal mental health of women during this period.

What this Paper Adds

Women in the perinatal stage (pregnancy or postpartum) showed very high rates of distress, which are predicted by the perception of their own health, quality of baby's sleep and type of feeding. This study also highlights that the COVID-19 pandemic has affected well-being in many ways and that it is essential to assess different measures of well-being to have a better perspective of perinatal functioning. These results suggest the need to provide psychological support to these women.

Introduction

Pregnancy and childbirth are life events that are usually associated with positive emotions. However, some women

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experience this perinatal period as a stressful life event [1]. Pregnancy and postpartum periods involve physical, psychological, and social changes that some women do not easily adapt to. In addition, these moments are sometimes associated with other stressors like medical complications, financial or marital strain, or loss of job status, which could impact on the mother's mental health [2].

Psychosocial stress in pregnancy and postpartum appears when a woman feels that she cannot cope with demands, and this stress is expressed both behaviourally and physiologically [3]. Mental health difficulties including depression and anxiety have been widely observed (13–20%) in mothers [4]. The most common symptoms include emotional lability, guilt, dysphoria, concentration difficulties, sleep problems, anxiety, feelings of worthlessness, rumination, obsessive thoughts, and even suicidal ideation. Some studies have shown that this psychological distress has negative influences on pregnancy outcome and the behavioural and physiological development of the baby [5].

Psychological consequences of SARS-CoV-2 in the general population

The current health emergency around the world produced by the 2019 coronavirus disease (COVID-19) is the largest and most pervasive pandemic that has been experienced in the last 50 years [6]. Although evidence on the psychological effects of this outbreak is still scarce, there is already enough data confirming that this pandemic is having an important impact on mental health in the general population [7].

One of the most striking consequences of this pandemic is the significant increase in anxiety and depression rates worldwide. In a survey among the general population in China, 53.8% classified the psychological impact of the pandemic as moderate or severe, 16.5% reported moderate to severe depressive symptoms, and 28.8% reported moderate to severe anxiety [8]. Women, students, and people with lower socioeconomic status, lower perceived physical health, and/or less social support were associated with higher levels of stress, anxiety, and depression [8]. In Italy, higher levels of anxiety were found in women and young people, as well as in people who had a family member with a COVID-19 diagnosis [9]. Spain, one of the countries with a high number of infections and mortality, also showed high rates of psychological symptoms in the general population [10]. The rate of probable depression was 22.1%, while for clinical anxiety it was 19.6% [11].

People who had mental health problems prior to the crisis are more susceptible to developing symptoms of anxiety and depression, or suffer a relapse of their underlying process [12]. It is worth mentioning that anxiety and depression can also have an important impact on other health measures. The pandemic is also causing additional health problems, such as insomnia, social isolation, suicidal risk, problems related to anger or violence [13], while it is also increasing health risk behaviours (e.g. increased consumption of alcohol and tobacco [14]).

There are several factors that may explain this increase in psychological symptoms. Firstly, the novelty of the disease, its rapid transmission and lethality, and the uncertainty about its consequences could cause anxiety in the general population and in people with previously reported mental disorders [14]. Secondly, confinement and social isolation has been related to higher psychological distress. Some studies show that people in quarantine have reported higher rates of anxiety, stress, and poorer sleep quality [15]. Prolonged confinement may reduce life satisfaction [16]. These effects are, in turn, mediated by a reduction in physical exercise, which could entail an additional source of stress [17]. Thirdly, several studies have considered the economic aspects of this outbreak. The uncertainty about the world economy has led to the appearance of economic stress and anxiety [18]. Previous

studies have shown that economic crises are associated with a significant increase in depressive symptoms and a decrease in life satisfaction, and they have a significant impact on crucial protective resources for mental health [19].

Consequences of COVID-19 on perinatal mental health

Conditions such as stressful life events, emergency situations, and natural disasters are important risk factors that can lead to people developing mental health disorders during the perinatal period [20]. Little is known about the clinical consequences of COVID-19 for a pregnant woman, and research on previous coronaviruses (i.e. MERS-CoV and SARS-CoV) and pregnancy/childbirth is very scarce. There is still less knowledge about the effects on perinatal mental health. A recent study conducted in Italy [21], assessing the psychological impact of the COVID-19 outbreak on 100 pregnant women, showed that more than half of the respondents rated the psychological impact as severe, while 68% of pregnant women met the cut-off point for anxiety. This study also revealed that the impact was much more severe in women in the first trimester of pregnancy. Similarly, in a Canadian study, Berthelot et al. [22] have shown that pregnant women tested during the COVID-19 crisis reported higher levels of depressive and anxiety symptoms and less positive affectivity than the pre-COVID-19 cohort. In the same area of interest, research from the 2003 SARS outbreak revealed slightly higher rates of anxiety levels in pregnant women in comparison to the pre-SARS control group [23]. Pregnant women were worried about contracting an infection, transmitting an infection to the baby, or acquiring an infection during birth. Two-thirds of them were scared of going to hospital and one third adopted behavioural strategies to ameliorate their risk of contracting an infection (e.g. confinement) [23]. Although these previous findings are relevant, the social and health characteristics of pregnant women may vary among countries. Therefore, it is necessary to continue investigating the impact of COVID-19 in different countries. Furthermore, much more research is needed to understand the perinatal mental health impacts and consequences from circumstances such as self-isolation, living in a household with an affected person, or limited access to services and to emergency health care due to the overload on hospitals.

In fact, the novelty of the disease, the unexpected global impact, the uncertainty about its physical consequences (for both mothers and babies), and the risk of transmission are factors that affect the birth experience and, in turn, may increase psychological distress. There is no definitive evidence that COVID-19 can be vertically transmitted [24], and the few horizontally infected neonates reported have shown mild clinical symptoms [25]. Despite the lack of evidence, the current COVID-19 pandemic has caused important changes in the care policy of neonatology units [26]. Initial recommendations included restrictions on early skin-to-skin contact, breastfeeding, the presence of the father at childbirth, and late-cord clamping [27]. Close and early contact is considered essential for emotional attachment and is an important protective factor for the baby's health, well-being and development [6]. Thus, these practices may have a harmful impact on mother-infant bonding and they may affect mental health.

The lack of knowledge about the short- and longer-term psychological impact of adversity on mothers' well-being is a serious gap when considering optimal maternity care. Therefore, it is important to have a balanced perspective about the impact of COVID-19 on pregnancy, considering not only psychosocial symptoms but also maternal well-being. Knowing these relevant mental health consequences may help maternity services to effectively cope with the pandemic.

The aim of the present study was to describe the effects of the COVID-19 pandemic on maternal perinatal mental health in Spain. Specifically, the study aims were to:

- 1) analyse psychological distress (i.e. symptoms of anxiety and depression) during the perinatal stage (pregnancy or postpartum);
- 2) explore well-being dimensions (i.e. positive and negative emotions and satisfaction with life);
- 3) identify variables that may be associated with both psychological distress and well-being.

If the current COVID-19 pandemic is considered as a stressful and uncontrollable event, it is expected to find high rates of psychological distress and lower rates of well-being in mothers. It is also expected that psychological distress and well-being are affected by some variables related to the sociodemographic characteristics, the pandemic, and the perinatal care.

Methods

Study design

This was a cross-sectional survey study aimed at describing the effects of the COVID-19 pandemic on maternal perinatal mental health in Spain.

Setting/Sampling

The sample consisted of 724 women (>18 years old) who were either expecting a baby (antenatal period) or who had given birth in the previous six months (postnatal period) at the time of the study and during the initial time of the COVID-19 alarm state in Spain. The sociodemographic characteristics of the sample are shown in Table 1.

Variables

Participants completed ad hoc questions about pregnancy/postpartum health, baby care, number of children, and COVID-19 infection. The Edinburgh Postnatal Depression Scale (EPDS; [28]), the Positive and Negative Affect Schedule (PANAS [29]) and the Satisfaction With Life Scale (SWLS [30]) have been used for this study.

The EPDS is a 10-item self-report measure assessing the severity of maternal depression. The EPDS is a widely-used screening instrument for postnatal depression and is valid for use in prenatal and early postnatal depression. Each item consists

Table 1
Sociodemographic characteristics of the sample.

	N = 724
Mean age:	33.36 (SD = 4.12)
Education:	
University studies	553 (76.4%)
Vocational education	125 (17.3%)
Secondary studies	42 (5.8%)
Primary studies	2 (0.5%)
Marital status:	
Married or living with a partner	662 (91.4%)
Single / Separated	62 (8.6%)
Employment status:	
Maternity leave	323 (44.6%)
Employed	275 (38%)
Unemployed	80 (11%)
Housekeeper	41 (5.7%)
Student	5 (0.7%)

of four statements, which are ranked from 0 to 3 in terms of symptom severity. The reliability in our study was high ($\alpha = .87$). The optimum cut-off score on EPDS is 11 or more [31]. Moreover, the cut-off score on the anxiety subscale (i.e. items 3, 4 and 5) is six or more [32].

The PANAS is a self-report measure that consists of two 10-item scales to measure both positive and negative affect. Each item is rated on a 5-point scale of 1 (not at all) to 5 (very much). The reliability in our study was $\alpha = .88$ for Positive Affect and $\alpha = .89$ for Negative Affect subscales respectively.

The SWLS is a 5-item instrument designed to measure global cognitive judgments of satisfaction with one's life. Each item is rated on a 7-point scale of 1 (strongly disagree) to 7 (strongly agree). The reliability in our study was high ($\alpha = .85$).

Data collection

The survey was uploaded onto a Qualtrics platform (<https://www.qualtrics.com>) for distribution. The survey was distributed through social media by using snowball sampling. Snowball sampling is a convenience sample method often used to access low-incidence populations or specific groups of people (i.e. pregnant or postpartum women in our study). In this method, the study participants recruit future subjects among their acquaintances.

Prior to completing the online survey, women had to accept the informed consent included on the first screen. Participation was voluntary and participants did not receive any reward. The study was approved by the University Ethics Committee and was conducted in compliance with the Declaration of Helsinki. Recruitment was conducted between 7th April and 8th May.

Data analysis plan

In order to explore differences in psychological measures based on sociodemographic characteristics, pregnancy/postpartum period, baby care and health status, several Student's t-tests and Analysis of Variance (ANOVA) were conducted. Tukey follow-up tests were used to further analyse significant interactions. Then, a series of multiple regressions analysed predictive variables of depression and satisfaction with life in pregnant women and women in the postpartum period.

Results

Analyses of psychological measures in relation to sociodemographic variables

Descriptive analyses of psychological measures for the total sample are presented in Table 2. The mean scores for Total EPDS and EPDS-Anxiety were 12 (SD = 5.19) and 7.36 (SD = 2.47) respectively. Taking into account the cut-off scores greater than 11 on Total EPDS and greater than six on EPDS-Anxiety, the prevalence of depression and anxiety were 58.7% and 51.2% respectively.

Table 3 shows descriptive analyses of employment and marital status. Differences in depression scores were found, depending on employment status ($F = 3.657$; $p = .012$; $f^2 = .015$). Post hoc analyses (Tukey) showed that housekeepers reported higher levels of depressive symptoms in comparison with employed women or students ($p = .025$; $p = .026$). Significant differences were also found in satisfaction with life ($F = 17.651$; $p < .001$; $f^2 = .069$) and positive emotions ($F = 3.347$; $p < .019$; $f^2 = .019$), depending on employment status. Specifically, post hoc comparisons (Tukey) revealed that employed women or students showed higher life satisfaction and

Table 2
Mean scores and standard deviations of psychological measures in the total sample.

	Total EPDS		EPDS-Anxiety		PANAS Positive		PANAS Negative		SWLS	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Total sample (N = 724)	12.00	5.19	7.36	2.47	28.71	6.81	22.61	7.18	26.38	5.53

EPDS: Edinburgh Postnatal Depression Scale; PANAS: Positive and Negative Affect Schedule; SWLS: Satisfaction With Life Scale.

Table 3
Mean scores and standard deviations of psychological measures by employment and marital status.

	Total EPDS			PANAS Positive			PANAS Negative			SWLS		
	Mean	SD	Statistic (p value)	Mean	SD	Statistic (p value)	Mean	SD	Statistic (p value)	Mean	SD	Statistic (p value)
Employment status												
Employed or studying (N = 280)	11.40	5.01	F(3720) = 3.657 (.012*)	29.42	6.82	F(3720) = 3.347 (.019*)	22.12	6.99	F(3720) = 1.645 (.178)	27.07	4.72	F(3720) = 17.651 (.001**)
Housekeeper (N = 41)	13.82	5.29		26.21	7.53		24.36	7.99		22.82	7.22	
Unemployed (N = 80)	12.81	4.69		27.82	7.31		23.48	6.58		23.32	6.83	
Maternity leave (N = 323)	12.09	5.38		28.63	6.50		22.60	7.35		26.97	5.16	
Marital status												
Single or separated (N = 62)	12.90	5.91	t(722) = 1.425 (.155)	28.93	7.01	t(722) = .267 (.789)	23.06	7.74	t(722) = .516 (.606)	24.39	6.92	t(722) = -2.466 (.016*)
Married/living-partner (N = 662)	11.92	5.11		28.69	6.80		22.57	7.13		26.54	5.36	

EPDS: Edinburgh Postnatal Depression Scale; PANAS: Positive and Negative Affect Schedule; SWLS: Satisfaction With Life Scale.

* p < .05, ** p < .001.

positive emotions than housekeepers (p < .001) and unemployed participants (p < .001). Similarly, women on maternity leave showed higher satisfaction with life compared to housekeepers (p < .001) and the unemployed (p < .001).

For marital status, t-test analysis showed differences in life satisfaction (t = -2.466; p = .016; R_{XY}² = .012); married women or women living with their partner showed greater satisfaction with life in comparison with single and separate women.

Analyses of psychological measures in relation to COVID-19 variables

Table 4 shows a descriptive analysis of each psychological measure depending on some variables related to the COVID-19 pandemic. Health practitioners (doctors, nurses, etc.) showed higher satisfaction with life (t = 3.048; p = .002; R_{XY}² = .012). Differences in life satisfaction were also found depending on beliefs of having or having had the COVID-19 virus (F = 4.193; p = .015; η^2 = .011). Post-hoc analyses (Tukey) showed that women who have doubt were less satisfied with life than those who

believed that they had not been infected by the virus (p = .011). In the same way, satisfaction with life score was different depending on the participation in activities on the balconies in Spain (F = 2.945; p = .032; η^2 = .012). Specifically, post-hoc analyses (Tukey) showed that women who participate very often in these activities were more satisfied than those who do not (p = .043).

Analyses of psychological measures in relation to perinatal care

Table 5 shows a descriptive analysis of each psychological measure, depending on the motherhood stage (pregnancy or postpartum), the type of feeding provided to the baby and the number of pregnancies. Statistically significant differences were found in depression symptoms (F = 4.514; p = .012; η^2 = .032) and negative emotions (F = 3.764; p = .024; η^2 = .027), depending on the type of feeding. Tukey tests showed that women who fed their babies with formula milk reported higher levels of depressive symptoms and negative emotions than women who breastfed (p = .043; p = .042).

Table 4
Mean scores and standard deviation of psychological measures in relation to COVID-19 variables.

	Total EPDS			PANAS Positive			PANAS Negative			SWLS		
	Mean	SD	Statistic (p value)	Mean	SD	Statistic (p value)	Mean	SD	Statistic (p value)	Mean	SD	Statistic (p value)
Health practitioner												
Yes (N = 141)	11.81	5.02	t(722) = -.484 (.629)	28.85	6.60	t(722) = .280 (.780)	21.78	6.79	t(722) = -1.539 (.124)	27.64	5.25	t(722) = 3.048 (.002*)
No (N = 583)	12.05	5.23		28.67	6.86		22.81	7.26		26.07	5.58	
COVID-19 infection beliefs												
Yes (N = 31)	12.41	5.33	F(2721) = .672 (.511)	27.35	6.82	F(2721) = .851 (.427)	23.83	7.56	F(2721) = .895 (.409)	26.58	5.35	F(2721) = 4.193 (.015*)
No (N = 544)	11.87	5.16		28.86	6.79		22.42	7.25		26.68	5.33	
Doubt (N = 149)	12.38	5.26		28.61	6.90		23.04	6.82		25.21	6.13	
Participation in balcony activities												
No (N = 171)	12.24	5.49	F(3720) = 2.099 (.099)	28.43	7.40	F(3720) = .939 (.421)	22.65	7.31	F(3720) = .763 (.515)	25.78	5.98	F(3720) = 2.945 (.032*)
Rarely (N = 136)	12.55	5.25		28.26	6.81		22.88	7.53		26.11	5.56	
Sometimes (N = 185)	12.23	5.27		28.54	6.76		23.06	7.19		26.02	5.68	
Very often (N = 232)	11.32	4.81		29.31	6.39		22.06	6.86		27.25	4.94	

EPDS: Edinburgh Postnatal Depression Scale; PANAS: Positive and Negative Affect Schedule; SWLS: Satisfaction With Life Scale.

* p < .05.

Table 5
Mean scores and standard deviations of psychological measures in relation to perinatal care variables.

	Total EPDS			PANAS Positive			PANAS Negative			SWLS		
	Mean	SD	Statistic (p value)	Mean	SD	Statistic (p value)	Mean	SD	Statistic (p value)	Mean	SD	Statistic (p value)
Motherhood stage												
Pregnancy (N = 450)	12.04	5.12	t(722) = .273 (.785)	28.66	6.95	t(722) = -.262 (.793)	22.77	7.08	t(722) = .762 (.446)	26.37	5.32	t(722) = -.004 (.997)
Postpartum (N = 274)	11.93	5.31		28.79	6.58		22.35	7.34		26.37	5.86	
Type of feeding												
Breastfeeding (N = 178)	11.24	5.16	F(2721) = 4.514 (.012*)	29.15	6.21	F(2721) = .843 (.432)	21.49	6.89	F(2721) = 3.764 (.024*)	26.75	5.77	F(2721) = 1.177 (.310)
Mixed (N = 53)	13.09	4.69		28.39	6.60		23.50	7.70		25.98	5.63	
Formula milk (N = 43)	13.39	6.16		27.81	7.95		24.48	8.22		25.32	6.48	
Number of pregnancies												
First (N = 256)	11.48	4.96	F(2721) = 3.683 (.026*)	29.80	6.90	F(2721) = 10.468 (.000**)	21.85	6.81	F(2721) = 2.603 (.075)	26.73	5.04	F(2721) = 5.779 (.003*)
Second (N = 264)	12.72	5.41		27.10	6.87		23.26	7.45		25.39	6.01	
Third/higher (N = 120)	12.08	5.17		28.85	6.26		23.00	7.61		27.16	5.35	

EPDS: Edinburgh Postnatal Depression Scale; PANAS: Positive and Negative Affect Schedule; SWLS: Satisfaction With Life Scale.
* p < .05, ** p < .001.

Moreover, differences depending on the number of pregnancies were found. First, there was a significant difference in depressive symptoms ($F = 3.683$; $p = .026$; $f^2 = .011$), where women in their first pregnancy showed lower depressive symptoms than women in their second pregnancy ($p = .019$). There was also a significant difference in life satisfaction ($F = 5.779$; $p = .003$; $f^2 = .018$); women in their first or third (or higher) pregnancy showed higher life satisfaction than women in their second pregnancy ($p = .016$; $p = .010$). With regard to positive emotions, significant differences were found ($F = 10.468$; $p < .001$; $f^2 = .032$), showing higher levels of positive emotion in women in their first pregnancy than in women in their second pregnancy ($p < .001$).

No differences were found in depression levels ($t = .273$; $p = .785$), life satisfaction ($t = -.004$; $p = .997$), positive emotion ($t = -.262$; $p = .793$) or negative emotions ($t = .762$; $p = .446$) depending on the motherhood stage.

Table 6 shows Spearman correlations between psychological measures and the mother's health, the fetus/baby's health, quality of feeding and sleep of the baby. For the two first variables we used mothers in pregnancy and postpartum stages, but for the last two only mothers who have given birth were analysed. As shown, all the measures showed significant correlations with the variables analysed. Specifically, better perceived self-health, quality of feeding and baby's sleep were associated with lower levels of depressive symptoms and negative emotions. On the other hand, better perceived self-health, quality of feeding and baby's sleep were associated with higher positive emotions and satisfaction with life.

Predictive models

In order to provide predictive models of depression and satisfaction with life for pregnant women and for women in the postpartum stage during the COVID-19 pandemic, we carried out

Table 6
Spearman correlations coefficient between psychological measures and health variables (mother and baby).

	Total EPDS	PANAS Positive	PANAS Negative	SWLS
Mother's health (N = 724)	-.212**	.264**	-.154**	.248**
Baby's health (N = 724)	-.128**	.161**	-.077*	.203**
Baby's feeding (N = 274)	-.233**	.135*	-.135*	.193**
Baby's sleep (N = 274)	-.299**	.180**	-.257**	.149*

EPDS: Edinburgh Postnatal Depression Scale; PANAS: Positive and Negative Affect Schedule; SWLS: Satisfaction With Life Scale.
* p < .05; ** p < .001.

four multiple regressions by using forward stepwise variable selection. For pregnant women, sociodemographic variables, variables related to COVID-19, and mothers' perception about their health and their baby's health were used as predictive variables. For women in the postpartum stage, feeding type, quality of baby's feeding, and baby's sleep were added.

In pregnant women only, the perception about their own health was significant ($\beta = -.31$; $p < .001$), resulting in a single predictive model ($F = 44.72$; $p < .001$), which accounted for 9% of the variance of depression symptoms. However, satisfaction with life in pregnant women was predicted by the perception about their own health ($\beta = .25$; $p < .001$), the type of profession practiced (health professional) ($\beta = -.13$; $p = .004$), and marital status ($\beta = .112$; $p = .019$). This model also accounted for 9% of the variance of satisfaction with life ($F = 14.46$; $p < .001$). For each regression model, the tolerance level and Variance Inflation Factor (VIF) for multicollinearity was acceptable (1.00), as was the Durbin-Watson statistic for the independence of residuals (1.8–2.03).

Finally, in women in the postpartum stage, depression symptoms were predicted by the quality of baby's sleep ($\beta = -.366$; $p < .001$) and the type of feeding provided to the baby ($\beta = .214$; $p < .001$). The resulting model was significant ($F = 26.32$; $p < .001$) and accounted for 17% of the variance of depression. We found four significant variables as predictors of satisfaction with life: baby's health ($\beta = .156$; $p = .017$), quality of baby's sleep ($\beta = .163$; $p = .009$), perception about their own health ($\beta = .145$; $p = .025$), and marital status ($\beta = .125$; $p = .046$). The resulting regression model explains 8% of the variance of satisfaction with life ($F = 6.832$; $p < .001$).

Discussion

The aim of this study was to describe the effects of the COVID-19 pandemic on maternal perinatal mental health in Spain. Regarding

the first objective (i.e. analysing psychological distress in mothers), the results showed that rates of depression and anxiety symptoms were high. More than half of the women (58%) reported depressive symptoms, assessed as EPDS > 11. Taking pre-COVID studies as a reference, the rate of depressive symptoms evaluated in pregnant women was 12.9%, assessed by EPDS [31]. On the other hand, half of the women (51%) reported anxiety symptoms, assessed as EPDS for anxiety scored >6. Pre-COVID studies have shown that anxiety rates for pregnant women were 16% [32]. Moreover, these depression and anxiety rates were higher than those reported in the general population in Spain during the pandemic [11]. These results are consistent with prior findings in the literature, where reported levels of depression and anxiety have increased after the COVID-19 outbreak, both in pregnant women [22] and in the general population [8]. Although these results do not necessarily imply a greater presence of depressive or anxiety disorders, it is worth mentioning that perinatal distress has a negative impact on the course of pregnancy and baby development and later psychopathologies [33].

Regarding the second objective (i.e. exploring well-being dimensions), the results showed that the average life satisfaction in our sample was slightly higher than the average found in the scale validation study in a general population sample (N=752; range age 26–35) [34]. This fact might reflect that life satisfaction may offer relatively few, or slower, variations in response to specific environmental circumstances. In comparison to their normative group (N=495; range age 26–35 [35]), women in our sample reported lower positive emotions and higher negative emotions. Previous studies have also shown that the COVID-19 pandemic reduced positive affectivity in pregnant women in comparison to the pre-COVID-19 cohort [22]. These results highlight that the pandemic can affect well-being in many ways, and that to have a better perspective of perinatal functioning, it is essential to incorporate different measures of well-being.

Regarding the third objective, it was expected that psychological distress and well-being were associated with variables related to sociodemographic characteristics, the pandemic, and perinatal care. Firstly, symptoms and well-being were associated with individuals' employment situation, women housekeepers being the most affected [36]. Being at work, or studying, or being on maternity leave was shown to improve psychological well-being. Similarly, people's marital situation affected well-being, where being married or living with a partner was associated with higher life satisfaction. The effect of the protective role of being married on well-being has been previously reported [37].

Secondly, with regard to the COVID-19 pandemic, the results showed that women who believed they were infected with COVID-19 reported lower levels of life satisfaction. Having uncertainty about health may affect well-being, even more than having the actual diagnosis. This result may be explained by the continuous concern about information about the virus and the uncertainty about the perinatal effects of COVID-19 [26]. It underlines the need to have empirically guided recommendations that help mothers deal with perceived uncertainty during difficult times.

On the other hand, life satisfaction was higher for health practitioners and for women participating in social activities on their balconies. In Spain, activities on the balconies during the pandemic was a social practice to express gratitude to health care workers and stay connected with neighbours. These results may highlight the protective roles of helping people who are suffering or feeling connected to others during the crisis. Previous studies have shown that finding positive meaning in a difficult situation is important to well-being. Moreover, finding positive emotions by connecting with others increases the likelihood that individuals find positive meaning in stressful circumstances [38].

Thirdly, with regard to perinatal care, women in their first pregnancy showed lower depressive symptoms and higher well-being (i.e. life satisfaction and positive emotions). Moreover, the results showed that mothers who provided formula milk-based feeding have worse psychological functioning (i.e. higher depressive symptoms and negative emotions). These results can be explained by the loss of the maternal bond with the baby that occurs in mothers with depression, leading to abandonment of breastfeeding [39]. The results also showed that better perceived health (i.e. the mother's and the baby's health) and higher quality of the baby's feeding and the baby's sleep were associated with better psychological functioning in mothers.

Finally, regarding predictors of mental health in mothers, our regression analysis for depressive symptoms revealed that perception about their own health was the only significant predictor during pregnancy. This result is in line with recent studies conducted in China, which have found that information about confirmed and suspected infections in January was associated with greater depressive symptoms in pregnant women [40]. During the postpartum period, perception about the quality of the baby's sleep and the type of feeding were the significant predictors.

On the other hand, regression analysis for life satisfaction showed that besides the perception about their own health, being a health practitioner or being married were also significant predictors for life satisfaction during pregnancy. However, perception about the baby's health and sleep, perception about their own health, and marital status were significant predictors of life satisfaction during postpartum. This result is in line with the results by Fontanele de Oliveira et al. [41], who found that physical health and being married or living with a partner were predictors of quality of life in postpartum women.

Conclusions

These results show that the routes to distress and well-being are different, and that the predictors of mental health during the COVID-19 pandemic are different depending on the perinatal stage in which the woman is. Therefore, it is crucial to integrate measures of both well-being and distress in protocols for evaluating perinatal mental health. These results may shed light on the design of future interventions aimed at improving perinatal mental health.

This study has some limitations. Firstly, this is a cross-sectional study. Thus, only acute psychological responses were examined in the present study. Longer longitudinal follow-up is needed to examine the long-term perinatal consequences, targeting the child and family. Secondly, this is a non-representative study. Given the way the survey was distributed (through social media), probably the most vulnerable women (i.e. low income, no internet access, etc.) have not participated in the study. It would be necessary to carry out future studies that included all sectors of the population in order to increase the generalisability of these findings. Thirdly, although the EPDS is considered the golden standard in the evaluation of perinatal depression, this measure should be used with caution when interpreting cut-off scores across different languages and cultures, and in the first week postpartum, when validity and reliability are uncertain [42]. Although we used a conservative cut-off point (>11), it would be necessary to complement the assessment protocol with more sensitive measures or diagnostic interviews.

Despite these limitations, this study contributes to the examination of perinatal mental health during the COVID-19 pandemic, and the variables that affect it. Moreover, one definite strength of this study was the use of an extensive array of measurements. This allowed us to expand our vision of perinatal

mental health beyond symptoms, highlighting the importance of well-being variables, such as satisfaction with life or positive emotions, and balancing the evidence-based knowledge about the impact of COVID-19 on perinatal mental health. Knowing these routes to both distress and well-being may help maternity services to effectively cope with the pandemic. In this area of interest, these results are especially relevant to public health. Without good-quality empirical data, it is difficult for health care providers and decision makers to devise policies that prevent and ameliorate any negative impacts. Considering that strategies related to perinatal mental health during the pandemic were limited by the absence of empirical data, this study may guide medical and psychological associations worldwide to provide clinical recommendations for pregnant women and help them be better supported.

Ethical statement

The present study has been approved by the deontological commission of the School of Psychology of the Complutense University of Madrid on April 6, 2020 with the number 033.

Author contribution

C.C and A.D conceived, planned the study, and wrote the Introduction and Discussion sections. B.P and A.S wrote the Methods section and designed the tables. C.M processed the data, performed the analysis and drafted the results section. All authors discussed the results and commented on the manuscript.

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Conflicts of interest

None declared.

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