Health anxiety, death anxiety and coronaphobia: Predictors of postpartum depression symptomatology during the COVID-19 pandemic

Ana-Maria Andrei[1], Rebecca Webb[2], Violeta Enea[1*]

1. Department of Psychology, Alexandru Ioan Cuza University, Iaşi, Romania

2. Centre for Maternal and Child Health Research, City, University of London, United Kingdom.

*Corresponding Author: violeta.enea@uaic.ro

Abstract

Objective: To determine levels of postpartum depression symptoms and possible relevant predictors, such as death anxiety, health anxiety, and coronavirus-related anxiety.

Design: Cross-sectional web-based survey using quantitative methods.

Setting: Exclusively online recruiting via social media and unpaid cross-posting conducted during the third wave of the COVID-19 pandemic in Romania.

Participants: Women were eligible to take part in the study if they were mothers over the age of 18 and had a baby aged between 4 weeks – 12 months of age; 1024 women were included in the final sample.

Measurements and findings: Health anxiety, death anxiety, coronavirus-related anxiety, and postpartum depression symptoms were measured using validated instruments. Current depression symptomatology was 67.6%, 26.7% scored above the cut-off for high health anxiety, 1% for coronavirus-related anxiety, and 62.7% for death anxiety. Significant predictors for depressive symptomatology were breastfeeding, history of depression, family income, number of children, health anxiety, death anxiety, and coronavirus anxiety. Further, hierarchical multiple regression analysis indicated that death anxiety, health anxiety, and coronavirus anxiety predicted postpartum depression symptoms over and above socio-demographic factors.

Key conclusions: Supported by previous studies, our results suggest that postpartum depression symptomatology levels during the COVID-19 pandemic are high and that they are predicted by health and death anxiety, which are also increased during the pandemic.

Implication for practice: The findings provide information to identify the risk for depression symptoms in postpartum mothers during acute public health situations.

Introduction

Mothers in the postpartum period are in a particularly critical window of vulnerability as this is a period full of psychological and physiological challenges, during which readaptation and adjustments to this major life event could result in psycho-pathological symptoms (Johann and Ehlert, 2022). This time can mean quite significant adjustments to mothers' lives, and some may experience perinatal mental health difficulties during this period. One of the most common and most researched perinatal mental health difficulties is postpartum depression. Research suggests the prevalence of postpartum depression (PPD) symptomatology is 10–15% (Mohd Arifin et al., 2018), and that it can have pervasive and negative impacts on mothers and their families. For example, PPD symptoms are associated with mothers having distorted maternal perceptions, such as feeling their infant is cold towards them (Bernard et al., 2018). At the same time, hormonal changes during the postpartum period may lead to deleterious maternal functioning (Brummelte and Galea, 2016), while symptoms in mothers are associated with difficulties with the mother-child relationships in terms of impairments in infant attachment and child emotional regulation (Murray et al., 2014). Further, depressive symptomatology leads to a lower maternal self-confidence (Logsdon et al., 2009), which is associated with infant regulatory problems (Matthies et al., 2017).

Research suggests that since the start of the COVID-19 pandemic, PPD symptomatology rates have increased (An et al., 2021; Lopez et al., 2021), along with postpartum anxiety (Lopez et al., 2021; Suarez-Rico et al., 2021) and stress (Boekhorst et al., 2021). Furthermore, the impact of COVID-19 on postpartum mothers has been found in multiple areas such as sleep disturbances (Kinser et al., 2021; Wang et al., 2021), loneliness, elevated posttraumatic stress, hunger for updated information (Basu et al., 2021), and family

and job concerns (Kinser et al., 2021). All these factors are linked to mental health symptomatology (Basu et al., 2021).

Although research suggests the impacts of PPD symptoms on mothers and their families can be attenuated through screening, high-quality intervention, and good social support (Huang et al., 2018; Stephens et al., 2016), COVID-19 led to unprecedented measures being taken by the authorities. For example, Romania was under a state of alert, and authorities decided that wearing a mask was obligatory in all public spaces, for everyone above the age of 5. Furthermore, all gatherings in closed or open spaces were forbidden, including parties or weddings. This has also meant that mothers were deprived of prenatal and pediatric courses, support from partners during hospital visits, and the reduction of social and family support in the postpartum period. Mothers who gave birth during the pandemic reportedly experienced feelings of isolation, as they lacked their partners' support during labor and were forced to manage on their own their feelings of anxiety and stress, reporting an overall disappointment over their experience of birth, since their initial expectations were unmet (Sweet et al., 2021). They described the event as shaped by chaos, uncertainty, and confusion, given the pandemic context, and the limited physical contact with the newborn of mothers who tested positive for COVID-19 (as required by hospital policy) is considered a traumatic experience, generating feelings of abandonment (Fumagalli et al., 2022). These measures may have exacerbated mothers' mental health difficulties during the perinatal period. Given the impact PPD symptoms can have on mothers and their families, this is particularly concerning, and the current study investigates some of the predictors of PPD symptomatology among mothers during the COVID-19 pandemic, in order to widen the understanding of how perinatal experiences could bring more challenges in the context of a global pandemic.

Health anxiety and death anxiety

Aside from the impact of the measures authorities took to reduce the spread of COVID-19 on postpartum mothers, an additional difficulty was the fear surrounding contracting COVID-19 and the risk of death as a result of this. During the pandemic, public health campaigns emphasized the importance of good hand hygiene, wearing masks, and social distancing. The constant information about keeping safe to protect one's health may have influenced health anxiety (Su et al., 2021; Kini et al., 2020). This is where a person worries about having a serious mental or physical illness and consists of negatively interpreting one's own ambiguous somatic sensations (Bati et al., 2018; Salkovskis et al., 2002). Cognitive-behavioral models posit that health anxiety is a risk factor for increased anxiety during the pandemic (Jungmann and Witthöft, 2020). Higher levels of health anxiety during the pandemic may have consisted in overestimating risks regarding the chances of becoming infected with or dying from COVID-19 infection and engaging in more health anxiety-related behaviors such as increased doctor visits (Tull et al., 2020). Furthermore, health anxiety has been associated with depressive symptoms suggesting it can have a pervasive impact on individuals (Kibbey et al., 2021; Uçar et al., 2015).

Research suggests that mothers in the general population report higher levels of health anxiety (Canli and Karaúar, 2020; Kirmizi et al., 2021; Kurcer et al., 2021) and COVID-19 related anxiety (Enea et al., 2021a; Jungmann and Witthöft, 2020). Therefore, it seems appropriate to suggest that, in addition to the usual concerns associated with being a new parent, mothers having babies during the COVID-19 pandemic may be at increased risk for developing health anxiety and COVID-19 related anxiety, regarding themselves or their babies contracting and dying from the infection (Hossain et al., 2020). This may in turn put mothers at increased risk for developing PPD symptoms.

Furthermore, the restrictions imposed by the authorities have led to the reduction of specialist support (Obata et al., 2021; Sat and Sozbir, 2021) and mothers being less likely to

be screened for PPD and anxiety symptoms (Sakowicz et al., 2021). In-person interactions with health care practitioners were drastically reduced at the beginning of the pandemic, and replaced with online or telephone services, which makes contact with health professionals more difficult in women with limited access to technology (Wilson, 2022), and is also considered unhelpful by some postpartum women (Silverio et al., 2021).

The pandemic forced mothers and their families to take voluntary prevention measures, consistent with public health recommendations, such as self-isolation, physical distancing or reducing physical contacts in order to keep themselves and their babies safe (Sweet et al., 2021). Moreover, in the case of those with health anxiety, high rates could generate one of two behaviours: women might either avoid seeking medical help, considering hospitals highly contagious, or they might see professional confirmation of their health status as a reassurance factor and therefore burden health-care services (Asmundson and Taylor, 2020). Both behavioural responses could have negative consequences, both for mothers, their family and the medical system. Furthermore, the hardships of the pandemic led to some people experiencing existential questions, such as mortality awareness or feelings of loneliness, both of which are positive predictors of fear of COVID-19 (Enea et al., 2021a). The number of deaths worldwide due to COVID-19 raises significant worries about the self and loved ones losing their lives due to the virus. This meant that everyone was forced to face death and its consequences (Wdowiak et al., 2021). The usual sources of protection against the fear of death (self-esteem, cultural worldviews, and close interpersonal relationships), postulated by Terror Management Theory (Solomon et al., 1991), have been removed due to the measures taken by authorities to reduce the spread of COVID-19. Furthermore, for mothers, there is an additional level of vulnerability caused by pregnancy and childbirth, for example, research suggests that mothers who have just given birth have a shattered sense of self-esteem (Hutchinson and Cassidy, 2021), while the COVID-19 pandemic seriously

limited personal interactions, encouraged social distancing, and discouraged new mothers from engaging in close interpersonal relationships. As death anxiety is associated with depression (Nobahar et al., 2021; Semenova and Stadtlander, 2016) and as women tend to manifest higher death anxiety than men (Wong, 2012), this increases in death anxiety during the COVID-19 pandemic may put mothers at increased risk for PPD symptomatology. Furthermore, literature shows significant negative correlations between death anxiety and wellbeing (Mansori et al., 2018).

The psychological distress caused by this little-known virus generated terrible fear, anxiety (Saravanan and Mahmoud, 2021), and the feeling that our sense of self and others was constantly threatened by the risk of getting the infection, infecting others or by the loss of social interaction (Scalabrini et al., 2020). The scientific literature on the perinatal period during the epidemic has been significantly enriched in the last year. However, there are no studies, to our knowledge, regarding death anxiety and health anxiety in postpartum women. Given these variables' potential links to PPD, it is important that these variables are studied.

To our best knowledge, this is the first study investigating health and death anxiety during the pandemic in Romanian postnatal mothers. The current study aimed to (1) examine the levels of PPD symptoms, death, health, and coronavirus anxiety and (2) identify some of the predictors of PPD symptoms in Romanian postpartum mothers during the COVID-19 pandemic. Based on previous studies conducted in the general population (Kibbey et al., 2021; Enea et al., 2021a; Nobahar et al., 2021), we hypothesized that death and health anxiety would be significantly associated with coronavirus-related anxiety and that all three forms of anxiety would be significant predictors of PPD symptomatology in our samples of Romanian mothers during the postpartum period.

Method

Participants and procedure

A total of 1204 mothers (M_{age} = 30.36; SD = 4.49) completed the online survey, however, 180 were removed due to their infant being too old or too young. Participants were eligible to take part in the study if they were mothers over the age of 18 and had a baby aged between 4 weeks and 12 months of age. Mothers were recruited exclusively online via social media and unpaid cross-posting. They were asked to fill out an online questionnaire using the survey software *Google Forms*. Before taking part, all mothers were provided with an information sheet and gave their informed consent.

This research was carried out during wave three of the COVID-19 pandemic (between the end of February 2021 and June 8th, 2021) in Romania. At the beginning of the study, the total number of patients diagnosed with COVID-19 in Romania was 1049,539 and the total number of deaths was 31,098. When the study was completed, the number of people infected with COVID-19 was 1079,154 and the total number of deaths was 34,077. Ethical approval was obtained from the Ethics Committee of the Faculty of Psychology and Education Sciences (no.3320/2020). The manuscript has been written according to the Improving the quality of Web surveys: The Checklist for Reporting Results of Internet E- Surveys (CHERRIES) guideline (Eysenbach, 2004).

Measures

Socio-demographic questionnaire

The socio-demographic questionnaire asked mothers to answer questions relating to their: age, marital status (*married/not married*), residence (*urban area/rural area*), and education level (*secondary school, professional school, high school, post-high school, university, postgraduate studies*), professional status (*pupil, student, housewife, employed, other*), parity (*primiparous, multiparous*) and family income. Mothers were also asked about

their infant's age, if they had any previous episodes of depression symptoms (*yes/no*), whether they were breastfeeding (*yes/no*), whether their pregnancy was planned (*wanted/unplanned but wanted/unplanned and unwanted*), and type of birth (*vaginal birth/emergency cesarian/elective cesarian*).

Edinburgh postpartum depression scale (EPDS)

PPD symptoms were measured using the EPDS (Cox et al., 1987). This is a self-report questionnaire. It is not a diagnostic measure, thus throughout this paper, we will refer only to symptoms of PPD and not to the clinical diagnosis. Items such as "*I have blamed myself unnecessarily when things went wrong*" or "*I have been so unhappy that I have been crying*" are scored from 0 for "*No, never*" to 3 for "*Yes, most of the time*". The total scores range from 0 to 30 and Cox et al. (1987) recommend a cut-off point of 12/13 as a reliable indicator of PPD symptomatology. The scale has good internal consistency; the Cronbach alpha coefficient of the original instrument was $\alpha = 0.92$, and $\alpha = 0.87$ for the current study.

Short health anxiety inventory (SHAI)

The short version of the Health Anxiety Inventory (SHAI; Salkovskis et al., 2002) is a self-report measure with 18 items. Each item consists of four statements regarding features of health anxiety (e.g., worries about health, perceived physical pain) and is scored from 0 to 3. Mothers were asked to choose the statement which best characterized them, for example, the options mothers could choose from for item 10 were: (a) *If I have a bodily sensation or change, I rarely wonder what it means;* (b) *If I have a bodily sensation or change, I often wonder what it means;* (c) *If I have a bodily sensation or change, I always wonder what it means;* (d) *If I have a bodily sensation or change I must know what it means.* The final four items of the measure required mothers to imagine they had a serious illness while answering the questions. Possible scores range from 0 to 54. The authors of the measure state that SHAI

is sensitive to all degrees of intensity, from mild worries to hypochondrias and is useful as a brief screening instrument (Salkovskis et al., 2002). The original scale had a good alpha coefficient of 0.95. The Cronbach alpha coefficient in the current study was α = 0.89.

Death anxiety questionnaire (DAQ)

The Death Anxiety Questionnaire (Conte et al., 1982) is a 15-item self-report instrument focusing on worries regarding death ("*Does it bother you that you may die before you have done everything you wanted to do*?" or "*Do you worry that dying may be very painful*?"). Possible responses are on a 3-point Likert scale (0 = *not at all*, 1 = *somewhat*, 2 = *very much*), with the total score ranging from 0 to 30. The original scale has a Cronbach alpha coefficient of α = 0.83. The scale showed good internal consistency (α = 0.89).

Coronavirus anxiety scale (CAS)

The *Coronavirus Anxiety Scale* (CAS; Lee, 2020) is a mental health screening and self-report measure focusing on the dysfunctional anxiety generated by the pandemic. It is a short instrument of 5 items (i.e. "*I felt dizzy, lightheaded, or faint when I read or listened to news about the coronavirus*") that focuses on physical symptoms triggered by the pandemic (dizziness, sleep disturbances, tonic immobility, appetite loss, and abdominal distress). Items are evaluated on a 5 point Likert scale (0 = *not at all*; 4 = *nearly every day over the last 2 weeks*) with a maximum total score of 20. Scores ≥ 9 indicate possible dysfunctional anxiety about the coronavirus. The scale has good internal consistency (α = 0.93), with a coefficient of α = 0.849 in the current study.

Statistical analysis

Statistical analyses were carried out using Statistical Package for Social Sciences (IBM SPSS Statistics 23). Descriptive analyses were performed for the socio-demographic characteristics (see Table 1). The normality of the data distribution was verified using

Skewness (values between −1 and 1) and Kurtosis (values between −3 and 3) (Kim, 2013).

Where data did not meet normality criteria, we applied a two-step transformation to normality

(Templeton, 2011).

Table 1.

Socio-demographic and clinical characteristics of the sample (N = 1024).

Socio-demographic characteristics	N (%)
Age in years (mean, SD)	30.36 ± 4.49
Marital status	
Married	931 (90.9%)
Not married	93 (9.1%)
Residence	
Urban area	806 (78.7%)
Rural area	218 (21.3%)
Educational level	
Secondary school	10 (1%)
Professional school	20 (2%)
High school	168 (16.4%)
Post high school	63 (6.2%)
University	501 (48.9%)
Postgraduate studies	262 (25.6%)
Professional Status	
Pupil	3 (0.3%)
Student	23 (2.2%)
Housewife	167 (16.3%)
Employed	741 (72.4%)
Other	90 (8.8%)
Breastfeeding	
Yes	738 (72.1%)
No	286 (27.9%)
Depression symptoms before birth	
Yes	411 (40.1%)
Before pregnancy	225 (22%)
During pregnancy	29 (2.8%)

Socio-demographic characteristics	N (%)
Before and during pregnancy	37 (3.6%)
After a previous pregnancy	95 (9.2%)
During and after a previous pregnancy	5 (0.5%)
Before and after a previous pregnancy	8 (0.8%)
Before, during and after a previous pregnancy	12 (1.2%)
No	613 (59.9%)
No of children	
1	756 (73.8%)
2	230 (22.5%)
3	27 (2.6%)
4	9 (0.9%)
5	1 (0.1%)
6	1 (0.1%)
Type of pregnancy	
Planned	554 (54.1%)
Unplanned, but wanted	445 (43.5%)
Unplanned and unwanted	25 (2.4%)
Type of birth	
Vaginal birth	337 (32.9%)
Emergency cesarian	540 (52.7%)
Elective cesarian	147 (14.4%)
Family income per month	
< 200 euro	8 (0.8%)
200–399 euro	60 (5.9%)
400–599 euro	97 (9.5%)
600–999 euro	140 (13.7%)
1000–1199 euro	175 (17.1%)
1200–1399 euro	141 (13.8%)
Above 1400 euro	403 (39.4%)

To identify the levels of PPD symptomatology in our population we used a range score from

10 to 12 for mild depressive symptoms and a cut-off of 13 for moderate to severe depressive

symptoms (Cox et al., 1987). We used a cut-off of 15 for high health anxiety (Zhang et al.,

2015) and 8.5 for death anxiety (Conte et al., 1982). To identify predictors of PPD

symptomatology during the COVID-19 pandemic, we took several steps. Firstly, we used Pearson's correlations for all variables in this study. Next, we used the EPDS 13 cut-off score to identify those with and without moderate to severe PPD symptoms. We then used the EPDS category (PPD symptoms vs. no PPD symptoms) as the dependent variable, and demographics, health anxiety, and death anxiety as the independent variables in t-tests and one-way ANOVAs to identify differences in EPDS scores among groups. Lastly, statistically significant variables identified from the correlation and t-test / ANOVA analyses were then set as predictor variables in a multiple hierarchical regression analysis, with PPD symptomology as the outcome variable. Thus, the predictor variables for the hierarchical multiple regression included the socio-demographic variables in the first step: age, marital status (1 = *married*, 2 = *not married*), breastfeeding (1 = *yes*, 0 = *no*), history of depression symptoms (1 = *yes*, 2 = *no*), family income, and parity (1 = *primiparous*, 2 = *multiparous*). The second step included health anxiety, the third step coronavirus anxiety, and the final step was death anxiety.

All regression conditions were verified before running the analysis: singularity, multicollinearity, homoscedasticity, outliers' avoidance, Tolerance values, normality, influential cases, additivity, and linearity (Field, 2013). *P* less than 0.05 was considered significant.

Results

Sample characteristics

Mother's ages ranged from 18 to 45, with a mean age of 30.36 ($SD = 4.49$). Most of the participants were married ($n = 931$; 90.9%), living in an urban area ($n = 806$; 78.7%), employed ($n = 741$; 72.4%), and had completed a bachelor's degree or higher ($n = 763$; 74.5%). Most mothers were breastfeeding their baby ($n = 738$; 72.1%), and the majority were

primiparous ($n = 756$; 73.8%). For more details, see Table 1. In terms of past depression symptoms, nearly 40% (40.1%; $n = 411$) of mothers stated that they had experienced episodes of depression symptomatology in the past.

Levels of postpartum depression symptomatology, death anxiety, and health anxiety

Current PPD symptomatology was 67.6% ($n = 693$), out of which 11.3% ($n = 116$) of mothers had mild depressive symptoms and 56.3% ($n = 577$) had moderate to severe depressive symptoms. In our sample, 26.7% ($n = 273$) scored above the cut-off for health anxiety, and 1% ($n = 10$) scored above the cut-off for coronavirus anxiety. The number of mothers scoring above the cut-off for death anxiety was 642 (62.7%).

Predictors of postpartum depression symptomology

Pearson's correlations

Correlation analyses (see Table 2) reflect statistically significant associations between all variables, at a significance level of < 0.05.

Table 2

Means, standard deviations and correlations among variables.

	M	SD	1	2	3	4	5
1 PPD Symptoms	13.36	5.91	–				
2 Health anxiety	12.26	7.28	.365**	–			
3 Death anxiety	11.19	6.65	.260**	.413**	–		
4 Coronavirus anxiety	.63	1.71	.214**	.202**	.148**	–	
5 Age	30.36	4.49	−0.068*	−0.009	−0.183**	.109**	

Note. $N = 1024$. *$p < .05$. For the Coronavirus anxiety scale the mean and standard deviation were computed using the non-normal variable and the correlations were computed using the normalized variable. **$p < .01$.

Univariate analysis

Results from the ANOVA and t-tests indicate statistically significant differences in EPDS scores based on marital status ($t = -2.2$, $p = .028$), family income ($F (6, 1018) = 2.224$, $p = .039$), breastfeeding ($t = -4.95$, $p < .001$), parity ($t = 2.98$, $p = .003$), and history of depression symptoms ($t = 9.85$, $p < .001$). There was no statistically significant difference in PPD symptomology scores among mothers of different education levels, type of birth, type of pregnancy, residence and professional status ($p > .05$).

Hierarchical multiple regression

All models in our regression analysis (see Table 3) were statistically significant. In the first step, breastfeeding ($\beta = -0.123$, $p < .001$), history of depression symptoms ($\beta = 0.296$, $p <. 001$) and parity ($\beta = -0.115$, $p < .001$) were significant predictors of PPD symptomology ($R^2 = 0.124$, $F(6, 1017) = 23.993$, $p < .001$). Breastfeeding was a negative predictor of PPD symptomatology: mothers who breastfeed score lower on EPDS scale ($M = 12.8$, SD=5.80) than mothers who do not breastfeed ($M = 14.81$, SD=5.91). History of depression symptoms was a positive predictor: mothers who reported an episode of depression symptomatology in the past scored higher ($M = 15.51$, SD=5.71) on PPD symptomatology than mothers who did not ($M = 11.95$, SD=5.62). In the second step, health anxiety ($\beta = 0.329$, $p < .001$) was also a significant predictor ($R^2 = 0.104$, $F(1, 1016) = 137.280$, $p < .001$), as was coronavirus anxiety ($\beta = 0.108$, $p < .001$) (3rd step: $R^2 = 0.011$, $F(1, 1015) = 14.442$, $p < .001$). In the final step, death anxiety ($\beta = 0.098$, $p = .002$), was also

a statistically significant predictor of PPD symptomology ($R^2 = 0.007$, $F(1, 1014) = 9.985$, $p < .01$).

Table 3

Hierarchical Multiple Regression - Postpartum depression symptoms.

	B	ΔR²	F	p
Model 1		.124	23.993	<0.001
Breastfeeding	−0.123***			
History of depression symptoms	0.296***			
Age	−0.025			
Family Income	−0.059			
Marital Status	0.029			
Parity	−0.115***			
Model 2		.104	137.280	<0.001
Breastfeeding	−0.129***			
History of depression symptoms	0.235***			
Age	−0.017			
Family Income	−0.083**			
Marital Status	0.027			
Parity	−0.115***			
Health anxiety	0.329***			
Model 3		.011	14.442	<0.001
Breastfeeding	−0.129***			
History of depression symptoms	0.229***			

	B	ΔR²	F	p
Age	−0.027			
Family Income	−0.077**			
Marital Status	0.033			
Parity	−0.113***			
Health anxiety	0.305***			
Coronavirus anxiety	0.108***			
Model 4		.007	9.985	<0.01
Breastfeeding	−0.131***			
History of depression symptoms	0.226***			
Age	−0.010			
Family Income	−0.066*			
Marital Status	0.033			
Parity	−0.113***			
Health anxiety	0.267***			
Coronavirus anxiety	0.100***			
Death Anxiety	0.098**			

*$p < .05$; **$p < .01$; ***$p < .001$.

Discussion

In the current study, we first aimed to identify the levels of PPD symptomatology, death, health, and coronavirus anxiety in Romanian postpartum mothers during the COVID-19 pandemic. We found high levels of PPD symptomology (67.6%) and death anxiety (62.7%). Nearly a third of mothers reported health anxiety (26.7%) and only 1% of mothers had high coronavirus anxiety.

The high levels of PPD symptoms found in our sample are in line with that of other studies carried out during the COVID-19 pandemic (An et al., 2021; Ostacoli et al., 2020). For example, in a cross-sectional study carried out by An et al. (2021), the prevalence of PPD symptoms among Chinese postpartum women during the pandemic was 56.9%. Furthermore, Ostacoli et al. (2020) found 44.2% of Italian postpartum mothers were experiencing PPD symptoms. Outside of the pandemic, the prevalence ranges between 10 and 15% (Mohd Arifin et al., 2018), with a meta-analysis conducted by Lyubenova et al. (2021) showing prevalence of 11% for PPD symptomology when using the cut-off of 13 on the EPDS. This increase in PPD symptoms during the pandemic is particularly concerning, especially given the reduction in specialist services and screening (Obata et al., 2021; Sakowicz et al., 2021; Sat and Sozbir, 2021). This suggests that mothers may be more likely to fall through the gaps, and not receive the treatment that they need during this vulnerable period. These risks due to the pandemic may also be exacerbated by the fact that PPD is considered to be a rather unknown or superficially treated phenomenon in Romania, among both the general population and health providers (Dimitriu et al., 2020). The practical implications of our results, therefore, lie in raising awareness regarding PPD symptomatology, both among the general population and healthcare providers. The high rates found in our sample indicate the need for more psycho-educational programs, which, in the context of COVID-19, could be implemented online, while best maintaining health services integrity and meeting ethical requirements (Maldonado-Castellanos, 2020). Recent findings show online mental health services are satisfactory for both providers and patients and are an appropriate alternative during the COVID-19 pandemic (Li et al., 2021). However, it is important to note that research suggests some mothers find remote interaction less appealing, but they do appreciate it as being more informative and helpful than no health service at all (Fumagalli et al., 2022).

The prevalence of health anxiety in our sample was 27.5%, similar to rates in the general population during the pandemic. For example, in a study of 218 people carried out in Egypt, the prevalence of health anxiety was 28% (Abdelghani et al., 2021). The relevance of our findings is greater in the pandemic context, since health anxiety is an influential factor for the frequency of specialist mental healthcare use (Norbye et al., 2022), and therefore, an important element to focus on when implementing and readjusting pandemic management strategies. Strict following of the measures imposed by the authorities is associated with increased health anxiety and depressive symptoms during the peripartum (Shayganfard et al., 2020). Individuals with high rates of health anxiety are more inclined to take part in health-related information seeking behaviours, which might result in greater worries and increased negative responses to the information they have been previously exposed to (Baumgartner and Hartmann, 2011). This brings forward the importance of focusing on health anxiety when implementing and readjusting pandemic management strategies, especially in the context of the perinatal period.

The rate of death anxiety in this sample is 62.7%, with other research also reporting high rates, such as 53.2% in China in the general population (Zhang et al., 2020) or 80% in physicians in Latin America (Indacochea –Cáceda et al., 2021). The high levels of PPD symptoms, health anxiety and death anxiety found in this study, coupled with the fact that previous research has found that depression is associated with both health anxiety (Kibbey et al., 2021; Uçar et al., 2015;) and death anxiety (Nobahar et al., 2021; Semenova and Stadtlander, 2016), suggest that both are a vulnerability factor for postpartum psychological distress.

The second aim of this study was to identify predictors of PPD symptomatology during the COVID-19 pandemic in our population of Romanian mothers. Our correlation analysis found that all variables in the study were associated. Of note, and in line with

previous research were significant positive correlations found between death anxiety and coronavirus anxiety (Enea et al., 2021b; Lee et al., 2020) and health anxiety and coronavirus anxiety (Landi et al., 2020).

Our regression analyses revealed that health anxiety, death anxiety, and coronavirus anxiety were all significant predictors of PPD symptomatology. This is in line with previous research indicating that death preoccupation (Vollmer et al., 2011) and death anxiety (Menzies et al., 2019) are predictors of psychological distress. Furthermore, previous research has found health anxiety to be a predictor of increased consultation rate in mothers (Tomenson et al., 2012). Our results from the hierarchical multiple regression analysis indicated that death anxiety, health anxiety, and coronavirus anxiety predicted PPD symptoms over and above socio-demographic factors. These results are in line with previous research that has found COVID-19 related worries are associated with death anxiety (Enea et al., 2021b) and that health anxiety is a vulnerability factor during the pandemic (Lee et al., 2020), causing increased psychological distress (Taylor, 2019).

Our results suggest that the symptomatology of PPD during the COVID-19 pandemic is likely to be exacerbated by health anxiety and death anxiety. Facing life-threatening events (such as the COVID-19 pandemic) is a major factor of impact, considerably increasing the levels of death anxiety and since death issues are extremely personal, the theme of death may easily be overlooked by health practitioners (Adelbratt and Strang, 2000). Furthermore, health professionals can also experience death anxiety (Ura et al., 2021), which can lead to difficulties in communicating with patients (Tuffrey-Wijne et al., 2017). A poorer understanding of death and dying is highly linked to death anxiety (Stancliffe et al., 2016) and to a shattered wellbeing (Mansori et al., 2018), therefore, it is important to consider screening for health and death anxiety during this uncertain period. The increased levels of PPD symptomatology suggest that the guidelines from the American College of Obstetricians

and Gynecologists (ACOG) related to screening (at least one screening during the peripartum using a validated instrument) should be implemented in all maternal health services (ACOG, 2015). Furthermore, authorities need to be aware of the impact of the closure of services on mothers' health anxiety, death anxiety, and PPD symptomology and thus take this into account during their decision-making. Awareness should be raised among healthcare professionals regarding all constructs of our study, especially in the context of a global pandemic. There is a need for more targeted interventions to address all factors that might contribute to the development of PPD symptomatology in order to improve mothers` wellbeing.

Our study is not without limitations. One of the main limitations of this study is the population. Due to the online recruitment and administration, the vast majority of mothers were university educated, married, employed, and on a high income. This makes results hard to generalize to more vulnerable populations, such as those on a low income. Future research should therefore focus on other recruitment methods in order to reach more vulnerable populations. Another limitation of the research is the cross-sectional design meaning conclusions of causality cannot be drawn.

Conclusion

Our results suggest that PPD symptomatology levels during the COVID-19 pandemic are high and that they are predicted by health and death anxiety, which are also increased during the pandemic. These findings are supported by previous studies investigating health anxiety and death anxiety (Abdelghani et al., 2021; Zhang et al., 2020; Enea et al., 2021b).

Our results suggest that health professionals should pay attention to health and death anxiety during this uncertain period and consider screening for it. Additionally, screening for

PPD symptomology needs to continue, and the closure of specialist services to prevent infection needs to be weighed up with the impact of this on mothers' mental health.

References

Abdelghani M., Mahdy R., El-Gohari H. Health anxiety to COVID-19 virus infection and its relationship to quality of life in a sample of health care workers in Egypt: a cross-sectional study. *Archives. Psych. Psychoth.* 2021;23(1):19–28. doi: 10.12740/APP/130304.

Adelbratt S., Strang P. Death Anxiety in brain tumour patients and their spouses. *Palliat. Med.* 2000;14(6):499–507. doi: 10.1191/026921600701536426.

ACOG C. Screening for perinatal depression. *Obstr. Gynaecol.* 2015;125:1268–1271. doi: 10.1097/01.aog.0000465192.34779.dc.

An R., Chen X., Wu Y., Liu J., Deng C., Liu Y., Guo H. A survey of postpartum depression and health care needs among Chinese postpartum women during the pandemic of COVID-19. *Arch. Psychiatr. Nurs.* 2021;35(2):172–177. doi: 10.1016/j.apnu.2021.02.001.

Asmundson G.J.G., Taylor S. How health anxiety influences responses to viral outbreaks like COVID-19: what all decision-makers, health authorities, and health care professionals need to know. *J. Anxiety. Disord.* 2020;71 doi: 10.1016/j.janxdis.2020.102211

Basu A., Kim H., Basaldua R., Choi K., Charron L., Kelsall N.….Koenen K. A cross-national study of factors associated with women's perinatal mental health and wellbeing during the COVID-19 pandemic. *PLoS. One.* 2021;16(4) doi: 10.1371/journal.pone.0249780.

Baumgartner S.E., Hartmann T. The role of health anxiety in online health information search. *Cyberpsych,. Behavior, Social. Network.* 2011;14(10):613–618. doi: 10.1089/cyber.2010.0425.

Bati A.H., Mandiracioglu A., Govsa F., Çam O. Health anxiety and cyberchondria among Ege University health science students. *Nurse. Educ. Today.* 2018;71:169–173. doi: 10.1016/j.nedt.2018.09.029.

Bernard K., Nissim G., Vaccaro S., Harris J.L., Lindhiem O. Association between maternal depression and maternal sensitivity from birth to 12 months: a meta-analysis. *Attach. Hum. Dev.* 2018;20(6):578–599. doi: 10.1080/14616734.2018.1430839.

Boekhorst M., Muskens L., Hulsbosch L., Van Deun K., Bergink V., Pop V., van den Heuvel M.I. The COVID-19 outbreak increases maternal stress during pregnancy, but not the risk for postpartum depression. *Arch. Womens. Ment. Health.* 2021;24:1037–1043. doi: 10.1007/s00737-021-01104-9.

Brummelte S., Galea L. Postpartum depression: etiology, treatment and consequences for maternal care. *Horm. Behav.* 2016;77:153–166. doi: 10.1016/j.yhbeh.2015.08.008.

Canli D., Karaşar B. Health anxiety and emotion regulation during the period of COVID-19 outbreak in Turkey. *Psychiatria. Danibiana.* 2020;32(3–4):513–520. doi: 10.24869/psyd.2020.513.

Conte H., Bakur-Weiner M., Plutchik R., Bennett R. Measuring death anxiety: conceptual, psychometric, and factor-analytic aspects. *J. Pers. Soc. Psychol.* 1982;43(4):775–785. doi: 10.1037/0022-3514.43.4.775

Cox J., Holden J., Sagovsky R. Detection of postnatal depression. *Br. J. Psychiatry.* 1987;150(6):782–786. doi: 10.1192/bjp.150.6.782.

Dimitriu M., Pantea-Stoian A., Rosu G., Dan A., Caimacan A., Zygouropoulos N.….Jacotă –Alexe F. Postpartum depression - a serious, dangerous, disabling, extremely frequent condition that is almost completely ignored in Romania. *Mediterran. J. Clin. Psych.* 2020;8(1) doi: 10.6092/2282-1619/mjcp-2413.

Enea V., Candel O., Zancu S., Scrumeda A., Bărbuşelu M., Largu A., Manciuc C. Death anxiety and burnout in intensive care unit specialists facing the COVID-19 outbreak: the mediating role

of obsession with COVID-19 and coronaphobia. *Death Stud.* 2021;46(10):2306–2315. doi: 10.1080/07481187.2021.1928331.

Enea V., Eisenbeck N., Petrescu T., Carreno D. Perceived impact of quarantine on loneliness, death obsession, and preoccupation with God: predictors of increased fear of COVID-19. *Front. Psychol.* 2021:12. doi: 10.3389/fpsyg.2021.643977.

Eysenbach G. Improving the quality of web surveys: the checklist for reporting results of Internet E-Surveys (CHERRIES) *J. Med. Internet. Res.* 2004;6(3):e34. doi: 10.2196/jmir.6.3.e34

Field A. SAGE Publications Inc; New Delhi: 2013. Discovering Statistics Using IBM SPSS Statistics.

Fumagalli D., Bignardi T., Vanzulli A., Corbella P.F., Meroni M.G., Interdonato M.L. Expectant management of placenta accreta after a mid-trimester pregnancy loss: a case report and a short review. *Case Rep. Perinat. Med.* 2022;11(1) doi: 10.1515/crpm-2021-0008.

Fumagalli S., Ornaghi S., Borrelli S., Vergani P., Nespoli A. The experiences of childbearing women who tested positive to COVID-19 during the pandemic in northern Italy. *Women Birth.* 2022;35(3):242–253. doi: 10.1016/j.wombi.2021.01.00110.1.

Hossain N., Samuel M., Sandeep R., Imtiaz S., Zaheer S. Perceptions, generalized anxiety and fears of pregnant women about corona virus infection in the heart of pandemic. *Res. Square.* 2020 doi: 10.21203/rs.3.rs-32235/v1.

Huang L., Zhao Y., Qiang C., Fan B. Is cognitive behavioral therapy a better choice dor mothers with postnatal depression? A systematic review and meta-analysis. *PLoS. One.* 2018;13(10) doi: 10.1371/journal.pone.0205243

Hutchinson J., Cassidy T. Well-being, self-esteem and body satisfaction in new mothers. *J. Reprod. Infant. Psychol.* 2021;40(5):532–546. doi: 10.1080/02646838.2021.1916452.

Indacochea -Cáceda, S., Torres- Malca, J., Vera-Ponce, V., Pérez, M., De La Cruz - Vargas, J., 2021. Fear and death anxiety among Latin American doctors during the Covid-19 pandemic. medRxiv, 2021–02. doi: 10.1101/2021.02.12.21251445.

Johann A., Ehlert U. Similarities and differences between postpartum depression and depression at other stages of female life: a systematic review. *J. Psychosom. Obstetr. Gynec.* 2022;43(3):340–348. doi: 10.1080/0167482X.2021.1962276.

Jungmann S., Witthöft M. Health anxiety, cyberchondria, and coping in the current COVID-19 pandemic: which factors are related to coronavirus anxiety? *J. Anxiety. Disord.* 2020;73 doi: 10.1016/j.janxdis.2020.102239.

Kibbey M., Fedorenko E., Farris S. Anxiety, depression, and health anxiety in undergraduate students living in initial US outbreak "hotspot" during COVID-19 pandemic. *Cogn. Behav. Ther.* 2021;50(5):409–421. doi: 10.1080/16506073.2020.1853805.

Kim H.-Y. Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. *Restor. Dent. Endodon.* 2013;38(1):52–54. doi: 10.5395/rde.2013.38.1.52.

Kini G., Karkal R., Bhargava M. All's not well with the "worried well": understanding health anxiety due to COVID-19. *J. Prev. Med. Hyg.* 2020;61(3):E321–E323. doi: 10.15167/2421-4248/jpmh2020.61.3.1605

Kinser P., JAllo N., Amstadter A., Thacker L., Jones E., Moyer S.…Salisbury A. Depression, anxiety, resilience, and coping: the experience of pregnant and new mothers during the first few months of the COVID-19 pandemic. *J. Women's. Health.* 2021;30(5):654–664. doi: 10.1089/jwh.2020.8866

Kirmizi M., Yalcinkaya G., Sengul Y. Gender differences in health anxiety and musculoskeletal symptoms during the COVID-19 pandemic. *J. Back. Musculoskelet. Rehabil.* 2021;34(2):161–167. doi: 10.3233/BMR-200301

Kurcer M., Erdogan Z., Cakir Kardes V. The effect of the COVID-19 pandemic on health anxiety andcyberchondria levels of university students. *Perspect. Psychiatr. Care.* 2021;58(1):132–140. doi: 10.1111/ppc.12850.

Landi G., Pakenham K., Boccolini G., Grandi S., Tossani E. Health anxiety and mental health outcome during COVID-19 lockdown in Italy: the mediating and moderating roles of psychological flexibility. *Front. Psychol.* 2020;11:2195. doi: 10.3389/fpsyg.2020.02195.

Lee S. Coronavirus anxiety scale: a brief mental health screener for COVID-19 related anxiety. *Death. Stud.* 2020;44(7):393–401. doi: 10.1080/07481187.2020.1748481.

Lee S., Jobe M., Mathis A., Gibbons J. Incremental validity of coronaphobia: coronavirus anxiety explains depression, generalized anxiety and death anxiety. *J. Anxiety Disorder.* 2020;74 doi: 10.1016/j.janxdis.2020.102268.

Logsdon M., Wisner K., Hanusa B. Does Maternal Role Functioning Improve with Antidepressant Treatment in Women with Postpartum Depression? *J. Women's. Health.* 2009;18(1):85–90. doi: 10.1089/jwh.2007.0635. [PMC free article]

Lopez D., Hinojo C., Bernal J., LAiz M., Santiago J., Vilches V.…Gonzalez-Mesa E. Resilience and psychological distress in pregnant women during quarantine due to the COVID-19 outbreak in Spain: a multicentre cross-sectional online survey. *J. Psychosom. Obstetr. Gynaec.* 2021;42(2):115–122. doi: 10.1080/0167482X.2021.1896491.

Lyubenova A., Neupane D., Levis B., Wu Y., Sun Y., He C.…Thombs B. Depression prevalence based on the Edinburgh Postnatal Depression Scale compared to Structured Clinical

Interview for DSM DIsorders classification: systematic review and individual participant data meta-analysis. *Int. J. Methods. Psychiatr. Res.* 2021;30(1):e1860. doi: 10.1002/mpr.1860

Maldonado-Castellanos I. Ethical issues when planning mental health services after COVID-19 outbreak. *Asian. J. Psychiatr.* 2020;54 doi: 10.1016/j.ajp.2020.102285.

Mansori Y., Dolatian M., Shams J., Nasiri M. The relationship between death anxiety and spiritual well-being in patients with gynecologic cancer. *Adv. Nurs. Midwifery.* 2018;27(3):28–34. doi: 10.21859/ANM-027025.

Matthies L., Wallwiener S., Müller M., Doster A., Plewniok K., Feller S….Reck C. Maternal self-confidence during the first four months postpartum and its association with anxiety and early infant regulatory problems. *Infant. Behav. Develop.* 2017;49:228–237. doi: 10.1016/j.infbeh.2017.09.011.

Menzies R., Sharpe L., Dar-Nimrod I. The relationship between death anxiety and severity of mental illnesses. *Br. J. Clin. Psychol.* 2019;58(4):452–467. doi: 10.1111/bjc.12229.

Mohd Arifin S., Cheyne H., Maxwell M. Review of the prevalence of postnatal depression across cultures. *AIMS. Public Health.* 2018;5(3):260–295. doi: 10.3934/publichealth.2018.3.260

Murray L., Cooper P., Fearon P. Parenting difficulties and postnatal depression: implications for primary healthcare assessment and intervention. *Commun. Pract.* 2014;87(11):34–38.

Nobahar M., Talebi E., Amaniyan S., Tarahomy M. Depression, death anxiety, and the related factors in nurses caring for COVID-19 patients at Kosar Hospital, Semnan, Iran. *Intern. J. Health. Life. Sci.* 2021;7(2) doi: 10.5812/ijhls.113242

Norbye A.D., Abelsen B., Førde O.H., Ringberg U. Health anxiety is an important driver of healthcare use. *BMC. Health. Serv. Res.* 2022;22(1):1–12. doi: 10.1186/s12913-022-07529-x.

Obata S., Miyagi E., Haruyama Y., Umazume T., Kobashi G., Yoshimi A.…Yamada H. Psychological stress among pregnant and puerperal women in Japan during the coronavirus disease 2019 pandemic. *J.. Obstretics Gynaec. Res.* 2021;47(9):2990–3000. doi: 10.1111/jog.14877

Ostacoli L., Cosma S., Bevilacqua F., Berchialla P., Bovetti M., Carosso A.…Benedetto C. Psychosocial factors associated with postpartum psychological distress during the Covid-19 pandemic: a cross-sectional study. *BMC. Pregnancy. Childbirth.* 2020;20:1–8. doi: 10.1186/s12884-020-03399-5

Sakowicz A., Imeroni S., Matovina C., Daiter M., Grobman W., Miller E. Postpartum depression screening during the COVID-19 pandemic. *Am. J. Obstretics Gynaec.* 2021;224(2):S371–S372. doi: 10.1016/j.ajog.2020.12.611

Salkovskis P., Rimes K., Warwick H., Clark D. The Health Anxiety Inventory: development and validation of scales for the measurement of health anxiety and hypochondriasis. *Psychol. Med.* 2002;32(5):843–853. doi: 10.1017/s0033291702005822.

Saravanan C., Mahmoud I. The impact of knowledge, anxiety and fear on psychological distress during COVID-19 among residents of the United Arab Emirates. *American. Journal. of. Health. Behaviour.* 2021;45(4) doi: 10.5993/AJHB.45.4.15

Sat S., Sozbir S. Use of mobile applications by pregnant women and levels of pregnancy distress during the COVID-19 (coronavirus) pandemic. Maternal and. *Child. Health. J.* 2021;25(7):1057–1068. doi: 10.1007/s10995-021-03162-y.

Scalabrini A., Mucci C., Angeletti L., Northoff G. The self and its world: a neuro-ecological and temporo-spatial account of existential fear. *Clin. Neuropsych.* 2020;17(2):46–58. doi: 10.36131/clinicalnpsych20200203

Semenova V., Stadtlander L. Death anxiety, depression, and coping in family caregivers. *J. Social,. Behavioral, Health. Sci.* 2016;10(1):34–48. doi: 10.5590/JSBHS.2016.10.1.05

Shayganfard M., Mahdavi F., Haghighi M., Sadeghi Bahmani D., Brand S. Health anxiety predicts postponing or cancelling routine medical health care appointments among women in perinatal stage during the Covid-19 lockdown. *Int. J. Environ. Res. Public. Health.* 2020;17(21):8272. doi: 10.3390/ijerph17218272.

Silverio S.A., De Backer K., Easter A., von Dadelszen P., Magee L.A., Sandall J. Women's experiences of maternity service reconfiguration during the COVID-19 pandemic: a qualitative investigation. *Midwifery.* 2021;102 doi: 10.1016/j.midw.2021.103116.

Solomon S., Greenberg J., Pyszczynski T. A Terror Management Theory of social behaviour: the psychological functions of self-esteem and cultural worldviews. *Adv. Exp. Soc. Psychol.* 1991;24:93–159. doi: 10.1016/s0065-2601(08)60328-7.

Stancliffe R., Wiese M., Read S., Jeltes G., Clayton J. Knowing, planning for and fearing death : findings from adults with intellectual disabilities and disability staff. *J. Intellect. Disabil. Res.* 2016;60(7):741. doi: 10.1111/jir.12305. -741.

Stephens S., Ford E., Paudyal P., Smith H. Effectiveness of psychological interventions for postnatal depression in primary care: a meta-analysis. *Ann. Fam. Med.* 2016;14(5):463–472. doi: 10.1370/afm.1967

Sweet L., Bradfield Z., Vasilevski V., Wynter K., Hauck Y., Kuliukas L.…Wilson A.N. Becoming a mother in the 'new' social world in Australia during the first wave of the COVID-19 pandemic. *Midwifery.* 2021;98 doi: 10.1016/j.midw.2021.102996.

Su Z., McDonnell D., Wen J., Kozak M., Abbas J., Segalo S.…Xiang Y.-T. Mental health consequences of COVID-19 media coverage: the need for effective crisis communication practices. *Global. Health.* 2021;17(1):1–8. doi: 10.1186/s12992-020-00654-4.

Suarez-Rico B., Estrada-Gutierrez G., Sanchez-Martinez M., Perichart-Perera O., Rodriguez-Hernandez C., Gonzalez-Leyva C.…Reyes-Munoz E. Prevalence of depression, anxiety, and perceived stress in postpartum Mexican women during the COVID-19 lockdown. *Int. J. Environ. Res. Public. Health.* 2021;18(9):4627. doi: 10.3390/ijerph18094627.

Taylor S. Cambridge Scholars Publishing; 2019. The Psychology of pandemics: Preparing For the Next Global Outbreak of Infectious Disease.

Templeton G. A two-step approach for transforming continuous variables to normal: implications and recommendations for IS research. *Commun. AIS.* 2011;28(1):41–58. doi: 10.17705/1CAIS.02804.

Tomenson B., McBeth J., Chew-Graham C., MacFarlane G., Davies I., Jackson J.…Creed F. Somatization and health anxiety as predictors of health care use. *Psychosom. Med.* 2012;74(6):656–664. doi: 10.1097/PSY.0b013e31825cb140.

Tuffrey-Wijne I., Rose T., Grant R., Wijne A. Communicating about death and dying: developing training for staff working in services for people with intellectual disabilities. *J. Appl. Res. Intellec. Disabil.* 2017;30(6):1099–1110. doi: 10.1111/jar.12382.

Tull M., Barbano A., Scamaldo K., Richmond J., Edmonds K., Rose J., Gratz K. The prospective influence of COVID-19 affective risk assessments and intolerance of uncertainty on later dimensions of health anxiety. *J. Anxiety. Disord.* 2020;75 doi: 10.1016/j.janxdis.2020.102290.

Uçar M., Sarp U., Karaastan O., Gul A., Tanik N., Arik H. Health anxiety and depression in patients with fibromyalgia syndrome. *J. Int. Med. Res.* 2015;43(5):679–685. doi: 10.1177/0300060515587578

Ura C., Okamura T., Takase A., Shimmei M., Ogawa Y. We have fear of death in common: factors associated with positive attitudes toward end-of-life care among care staff in long-term care facilities. *Geriatr. Gerontol. Int.* 2021;22(1):87–89. doi: 10.1111/ggi.14323.

Vollmer T., Wittmann M., Schweiger C., Hiddemann W. Preoccupation with death as predictor of psychological distress in patients with haematologic malignancies. *Eur. J. Cancer. Care. (Engl)* 2011;20(3):403–411. doi: 10.1111/j.1365-2354.2010.01203.x.

Wang J., Zhou Y., Qian W., Zhou Y., Han R., Liu Z. Maternal insomnia during the COVID-19 pandemic: associations with depression and anxiety. *Soc. Psych. Psychiatr. Epidemiol.* 2021;56:1477–1485. doi: 10.1007/s00127-021-02072-2.

Wdowiak A., Makara-Studzinska M., Raczkiewicz D., Janczyk P., Słabuszewska-Józwiak A., Wdowiak-Filip A., Studzinska N. Effect of excessive body weight and emotional disorders on the course of pregnancy and well-being of a newborn before and during COVID-19 pandemic. *J. Clin. Med.* 2021;10(4):656. doi: 10.3390/jcm10040656

Wilson C.A. Perinatal mental health during the COVID-19 pandemic. *Prog. Neurol. Psychiatry.* 2022;26(3):4–6. doi: 10.1002/pnp.751. [CrossRef] [Google Scholar]

Wong S. Does superstition help? A study of the role of superstitions and death beliefs on death anxiety amongst Chinese undergraduates in Hong Kong. *OMEGA. -. J. Death Dying.* 2012;65(1):55–70. doi: 10.2190/om.65.1.d

Zhang Y., Liu R., Li G., Mao S., Yuan Y. The reliability and validity of a Chinese-version Short Health Anxiety Inventory: an investigation of university students. *Neuropsychiatr. Dis. Treat.* 2015;11:1739–1747. doi: 10.2147/NDT.S83501.

Zhang Q., Zheng R., Fu Y., Mu Q., Li J. Post traumatic stress disorder and death anxiety symptoms during the coronavirus epidemic in 2019: a cross-sectional study based on the affected population. *BMC. Public. Health.* 2020 doi: 10.21203/rs.3.rs-80116/v1.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data availability statement

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

Availability of data

All data will be made available on request.

Ethics approval

All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional research committee of Alexandru Ioan Cuza University and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Our work is in line with the *Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals* and aims for the inclusion of representative human populations (sex, age and ethnicity) as per those recommendations.

This article does not contain any studies with animals performed by any of the authors.

Informed consent

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

CRediT authorship contribution statement

Ana-Maria Andrei: Conceptualization, Formal analysis, Investigation, Writing – original draft. Rebecca Webb: Validation, Resources, Writing – review & editing, Visualization.

Violeta Enea: Conceptualization, Project administration, Writing – review & editing, Supervision.

Declaration of Competing Interest

Acknowledgments