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Perinatal mental health and Covid-19-related distress: the role of personality traits

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Summary. Background. Perinatal mental health is a topic of growing interest, that could affect mothers in a period of high vulnerability, and the impact of coronavirus disease 2019 (Covid-19) pandemic is an important factor to consider in this field. The aim of our study is to study the correlations between five dimensions of personality and subjective Covid-19-related distress in a sample of women in the perinatal period. **Methods.** The study included 114 Italian women in the perinatal period. Subjects were asked to complete the Big Five Inventory (BIG-5) and a version of the Impact of Event Scale – Revised (IES-R) anchored to Covid-19-related distress. **Results.** When the BIG-5 personality traits and several confounding variables were included in a regression model with IES-R total score as criterion, neuroticism subscale of BIG-5 inventory was the only variable independently associated with higher IES-R total score ($p<0.001$). **Conclusion.** Our study highlights the importance of considering the personality vulnerability factors that can worsen psychopathological symptoms of women in the perinatal period, especially in periods of high psychological stress.

Key words. Covid-19, perinatal mental health, personality.

La salute mentale nel periodo perinatale e lo stress correlato al Covid-19: il ruolo dei tratti di personalità.

Riassunto. Introduzione. La salute mentale perinatale è un argomento di crescente interesse, che riguarda le madri in un periodo di elevata vulnerabilità. L'impatto della pandemia da Covid-19 è un fattore importante da considerare in questo campo. Lo scopo del nostro studio è studiare le correlazioni tra le cinque dimensioni della personalità e lo stress percepito correlato al Covid-19 in un campione di donne nel periodo perinatale. **Metodi.** Lo studio ha incluso 114 donne italiane nel periodo perinatale. Ai soggetti è stato chiesto di completare il Big Five Inventory (BIG-5) e una versione della Impact of Event Scale – Revised (IES-R) per valutare lo stress correlato al Covid-19. **Risultati.** È stato effettuato un modello di regressione lineare includendo i tratti di personalità valutati mediante BIG-5 e diverse variabili confondenti; la sottoscala nevroticismo del questionario BIG-5 è risultata l'unica variabile indipendente associata a un punteggio totale IES-R maggiormente elevato ($p<0,001$). **Conclusione.** Il nostro studio evidenzia l'importanza di considerare i fattori di vulnerabilità della personalità che possono peggiorare i sintomi psicopatologici delle donne nel periodo perinatale, soprattutto nei periodi di elevato stress psicologico.

Parole chiave. Covid-19, personalità, salute mentale perinatale.

Introduction

Perinatal mental health is a topic of growing interest, with distinct clinical conditions that could affect mothers in a period of high vulnerability. The peripartum is a period of special needs for women with preexisting psychopathological conditions such as Major Depressive Disorders (MDD), Borderline Personality Disorders (BPD), Post-Traumatic Stress Disorder (PTSD) and other psychiatric disorders, who are at higher risk of relapses[1,2]. It is also a time of neuroendocrine, biological, psychological and social adaptation, hence new mental disorders may appear, such as perinatal depression and puerperal psychosis[1,2].

Evidence estimates that the prevalence rate of perinatal mood and anxiety disorders range approximately between 10 and 20%[3,4]. Antenatal depression and anxiety, stressful life events, poor relationship quality and social support, lower socioeconomic status, single marital status and unintended pregnancy are factors which have showed associations with increased risk of depressive symptoms during pregnancy[5]. A recent review suggested that the strongest risk factors for postpartum depression (PD) are antenatal depression and domestic abuse[6].

In some cases, depressive symptoms hide a personality disorder. In fact, there are numerous evidence that report perinatal depressive symptoms in patients with obsessive-compulsive, dependent, avoidant and borderline personality disorders. Moreover, some personality traits have been considered as risk factors for perinatal depression: dependency[7], obsession[8], neuroticism[9], the tendency to severe self-criticism[10].

The impact of the pandemic of coronavirus disease 2019 (Covid-19) has been investigated as another important factor to consider in this field. Previous studies have shown that patients in the prenatal and postnatal periods are particularly at risk of developing mental disorders during health or social disasters[11]. Thus, the prevalence of perinatal anxiety and depression has significantly raised during the pandemic. The results of a systematic review including 11,187 pregnant women in China showed that the prevalence of anxiety was 34% and the prevalence of both anxiety and depression was 18%[12]. The factors which may have contributed to the increase of perinatal mental disorders are the fear of being infected or infected others (intrauterine transmission, passage of the virus from mother to baby during childbirth, infection through breast-feeding), and the uncertainty about the effects of the virus on the fetuses and infants. It is important to highlight that public health policies such as lockdown, limiting prenatal visits, social distancing measures, and their many associated socio-economic consequences (unemployment, loss of income, and domestic violence) may have been an additional challenge for perinatal mental health[13].

Moreover, during the pandemic, anti-vaccine positions have increased, lingering doubts about vaccine safety. These doubts were particularly important for pregnant women fearing effects on their fetus[13]. Prenatal exposure to negative maternal psychological factors, including stress due to disasters, can be associated with a range of poor outcomes for the offspring, including preterm birth, adverse obstetrical outcomes (such as preeclampsia), and low birth-weight[14]. In addition, pregnant women with Covid-19 are at risk for placental dysfunction, characterized by inflammatory changes, massive peri villous fibrin depositions and placental necrosis, and related fetal distress, specifically when infected with the Delta variant[15]. It is also known that certain maternal infections during pregnancy may have a role in the development of a range of mental disorders in the offspring, such as schizophrenia, autism spectrum disorders, and attention deficit/hyperactivity disorder[16-18].

Even though the Covid-19 public health emergency has been declared ended, it is important to increase knowledge about perinatal mental disorders by studying the implications of such period of high distress on perinatal mental health. Thus, the aim of our study has been to study the relationships of specific dimensions of personality with the degree of subjective distress caused by Covid-19 pandemic in a sample of Italian women in the perinatal period.

Materials and methods

Participants

The sample was made of 114 Italian women of 32.06 ±4.96 years (age range: 20-46); 57 of them (50%) were pregnant, 57 (50%) had given birth within the previous 12 months.

Such amount of participants was selected as a sample size calculation performed with the G*Power 3.1 software[19] indicated that 92 subjects are needed to achieve a moderate effect size (f^2=0.15) with power=0.80 and alpha=0.05 in a regression analysis with five tested predictor and 12 total number of predictors (details on predictors are given below).

The recruitment was performed between April 2020 and January 2021. Among the participants, 35 (24.3%) were recruited from obstetrics department, 9 (7.8%) from the outpatients gynecologic service, 70 (61.4%) from the general population (i.e. they were volunteers).

Inclusion criteria were being pregnant or having a child under the age of 1. The exclusion criteria were as follows: the refusal to provide an informed consent, less than 18 years of age, the presence of a diagnosis of mental retardation or schizophrenia spectrum disorder, a poor knowledge of the Italian language or other limitation in verbal communication which compromised the patient's ability to perform the research. Subjects voluntarily participated in the study, i.e. they did not receive payment or other compensation.

Materials

All participants were administered a checklist assessing certain clinical and socio-demographic information: age, pregnancy status, education level, ongoing psychotropic medications, previous pregnancies, intended pregnancy, family history of mental disorders.

Subjects were asked to complete the self-report measures Big Five Inventory (BIG-5)[20] and Impact of Event Scale – Revised (IES-R)[21].

The BIG-5 Inventory is a 44-item inventory that measures an individual on the Big Five Factors (dimensions) of personality[20]. The items of this scale were selected from Big Five prototype definitions that had been developed through expert ratings to allow efficient and flexible assessment of the five personality dimensions (extraversion, agreeableness, conscientiousness, neuroticism, and openness)[20]. In the present sample, Cronbach's alpha for each subscale was: 0.726 for extraversion, 0.673 for agreeableness, 0.716 for conscientiousness, 0.800 for neuroticism and 0.745 for openness.

The IES-R scale, is a self-report questionnaire of 22 items, appropriate to measure the subjective

response to a specific traumatic event in the adult population, especially in the response sets of intrusion (intrusive thoughts, nightmares, intrusive feelings and imagery, dissociative-like re-experiencing), avoidance (numbing of responsiveness, avoidance of feelings, situations, and ideas), and hyperarousal (anger, irritability, hypervigilance, difficulty concentrating, heightened startle)[21]. In the present study, IES-R was specifically anchored to Covid-19-related distress; IES-R total score was used, and Cronbach's alpha was 0.917.

Statistical analyses

All analyses were performed using the SPSS (26.0) statistical package (IBM, Armonk, NY, USA). Descriptive analyses with means and standard deviations were performed. Spearman correlation coefficients (rho) were calculated to study the associations of the explored variables. A linear regression was performed with those BIG-5 subscales which were significantly associated with IES by Spearman correlation as the determinants, and IES total score as outcome (dependent variable). The following variables were also included in the regression model as covariates that could be considered as potential confounders of the association between personality traits and psychopathological reaction to stress: age, pregnancy status, education, use of psychiatric medication at the time of evaluation, previous pregnancies, planned pregnancy or not, family history of psychiatric disorders. The major assumptions of multiple regression (zero conditional mean of errors, homoscedasticity, normal distribution of errors, multicollinearity, outliers) were checked.

Results

The mean age of the present sample of women was 32.06 ± 3.70 years. Among pregnant women week of pregnancy was 29.56 ± 8.33, among women in their post-partum period the age of the offspring was 4.38 ± 2.3 weeks. 70.2% of the pregnancies were intended, 29.8 % were not. 60.5% of the women were at their first pregnancy, 39.5% were multiparous; 7.4% of the women had lower secondary education diploma, 53.7% had upper secondary education diploma, and 39.5 % had a Bachelor and Master Degree; 25.4% of the women had a family history of psychiatric disorders, and 6.1% of them was taking psychotropic medications. Further details on descriptive statistics are reported in Table 1.

Table 1. Descriptive statistics of the sample (n=114, 57 pregnant women, 57 women who had given birth in the previous 12 months).

Variables	
Age, M ± SD	32.06 ± 3.70
Week of pregnancy (among pregnant women, n=57), M ± SD	29.56 ± 8.33
Weeks of age of the newborn (among women in the postnatal period), M ± SD	4.38 ± 2.3
Education	
Lower Secondary Education Diploma, N (%)	7 (7.4)
Upper Secondary Education Diploma, N (%)	63 (53.7)
Bachelor and Master Degree, N (%)	44 (39.5)
Intended pregnancy, N (%)	80 (70.2%)
Primiparous, N (%)	69 (60.5%)
Presence of family history of psychiatric disorders, N (%)	29 (25.4%)
Ongoing psychotropic medications, N (%)	7 (6.1%)

Spearman correlations showed that IES-R total score was significantly associated with the BIG-5 subscales on neuroticism (ρ= 0.379; p<0.001), extravesion (ρ=-0.221; p=0.018), conscientiousness (ρ=-0.196; p=0.036), and openess (ρ=-0.195; p=0.038), while it was not significantly associated with the agreeableness subscale.

The linear regression model with IES total score as criterion, with extraversion, conscientiousness, neuroticism, and openness as determinants, and with age, pregnancy status, education, use of psychiatric medication at the time of evaluation, previous pregnancies, planned pregnancy or not, family history of psychiatric disorders as covariates, explained 19.9% of the variability of the data (R squared=0.199, adjusted R squared=0.112). In this model, neuroticism was significantly (beta=0.375, p<0.001) independently associated with IES, so that a more pronounced form of such personality pattern was associated with higher IES score even when controlling for the presence of the other variables. Further details are reported in table 2 and in figure 1.

Discussion

Our study showed that neuroticism was the unique personality dimension detected by BIG-5 Inventory significantly and independently correlated with the perceived impact of the pandemic, also when certain potential confounding factors were controlled for.

Literature reported that neuroticism refers to individual differences in negative emotionality and predicts a range of negative outcomes, including low subjective well-being[22] and poor physical and mental health[23]. Prior research has established that personality differences modulate the stress process[24].

Table 2. Linear regression with Impact of Event Scale – Revised total score as criterion.

			95% CI	
	Standardized Coefficient (B)	**P**	**Lower Bound**	**Upper Bound**
Age	-0.058	0.579	-0.041	0.023
Pregnancy	0.065	0.489	-0.183	0.380
Education	0.008	0.940	-0.213	0.229
Ongoing psychotropic medications	-0.071	0.507	-0.894	0.445
Previous pregnancies	-0.036	0.705	-0.348	0.236
Intended pregnancy	0.019	0.838	-0.274	0.338
Family history of psychiatric disorders	-0.164	0.094	-0.625	0.050
Conscientiousness	-0.083	0.396	-0.363	0.145
Openness	0.026	0.800	-0.219	0.283
Extraversion	0.015	0.898	-0.268	0.305
Neuroticism	0.375	<0.001*	0.167	0.624

*p<0.05

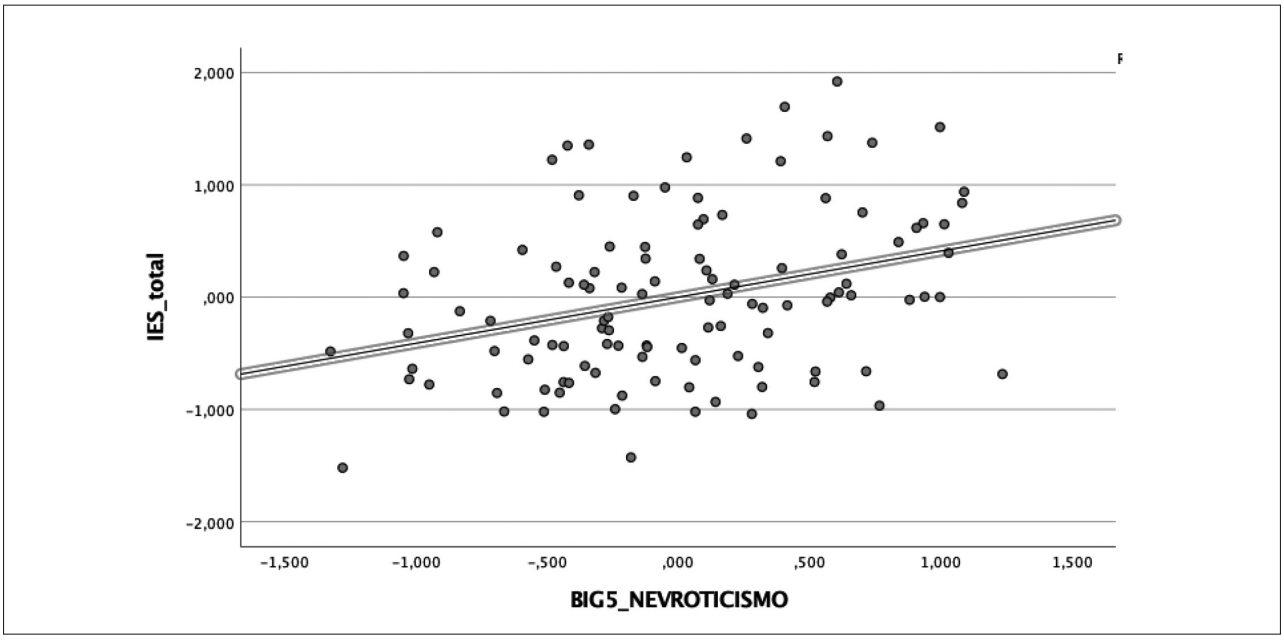

Figure 1. Regression scatterplot showing the significant association between IES-R total score and neuroticism BIG-5 subscale, after controlling for confounding factors (age, pregnancy, education, ongoing psychotropic medications, previous pregnancies, intended pregnancy, family history of psychiatric disorders, conscientiousness, openness and extraversion BIG-5 subscales).

More specifically, neuroticism, is characterized by depression, anxiety and greater reactivity to stressful events[24]. Extraversion, instead, characterized by sociability, assertiveness, and energy, has been typically associated with lower stress reactivity and lower negative affect[24]. However, the transactional theory of stress suggests that personal characteristics will not necessarily predict stress reactivity in all circumstances, but may function differently when the situational context varies[25].

Regarding Covid-19 pandemic, evidence suggests a potential function of neuroticism in aggravating the stress process. Bellingtier et al.[25] reported that individuals higher in neuroticism were more likely to perceive the pandemic as strongly affecting their personal lives with greater perceived stress and worry, higher levels of depression and anxiety symptoms and lower well-being. Hence, the feelings of insecurity, instability, difficulty in controlling emotions, difficulty in managing interpersonal dynamics peculiar to this dimension may play a relevant role in the psychic discomfort resulting from an event of this magnitude.

A recent study reports some relevant data regarding neuroticism and perceived stress. It suggests that highly neurotic individuals were at higher risk for

stress during the Covid-19 pandemic. In addition, neuroticism significantly mediated the relationship between fear of Covid-19 and perceived stress. More specifically, higher levels of neuroticism were related to higher levels of fear of Covid-19 and perceived stress[26]. Hence, emotional vulnerability related to pregnancy or the recent birth of a child, can contribute to making women with this personality trait particularly at risk in terms of perinatal mental health[24].

Exploring mental health status of women in the perinatal period is an important issue, also in light of the recent evidence about maternal mental health and child development. In fact, numerous studies showed that the children of mothers with perinatal mental disorders had a higher risk, compared to controls, for the early onset of emotional development disorders and lower emotion recognition at ten years[27,28], possible neuropsychological or cognitive deficits[29-31], internalizing and externalizing behavioral disorders[28], sleep disturbances[32,33], persistent lower growth[34] and long-term consequences on the child and adolescent mental health[35].

Limits and future perspectives

The results of the present research should be interpreted taking into consideration certain limitations. This is a cross-sectional study, therefore the existence of a causal link between the variables that are associated cannot be stated with certainty, nor the possible implication of this potential causal link. A longitudinal study of the variables involved, aimed to evaluate their evolution pre and post pandemic could provide useful information. Although the neuroticism subscale of the BIG5 and the IES-S scale evaluate different psychological constructs, there might be some degree of similarity in certain items of the two scales, which could contribute to explain the observed association. Moreover, a critical point is the small clinical sample, it should be expanded to make the results generalizable.

Overall, our study contributes to highlight potential implications of Covid-19 pandemic on perinatal mental health, also considering the personality vulnerability factors. It is important to detect these psychological situations in order to take care of the mothers, to prevent the consequences on childbirth and to increase knowledge in this field of research[35-43].

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Institutional review board statement: the study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Sapienza University of Rome (approval date 31 January 2018, approval date 4816).

Informed consent statement: informed consent was obtained from all subjects involved in the study.

Conflicts of interests: the authors have no conflict of interests to declare.

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