

Exploring factors associated with complete mental health of pregnant women during the COVID-19 pandemic

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ABSTRACT

Objective: To explore a wide range of factors associated with complete mental health (i.e., positive mental health - the presence of flourishing, and the absence of mental illness - depressive and anxious symptoms) among Portuguese pregnant women, during the COVID-19 pandemic.

Design: Quantitative cross-sectional study.

Setting: Data were collected through an online survey placed on social media websites targeting pregnant Portuguese adult women between October 2020 and April 2021.

Participants: The sample comprised 207 pregnant women.

Results: A multivariate logistic regression model showed that higher levels of self-compassion and higher engagement in mindful self-care practices increased the likelihood of reporting complete mental health during pregnancy.

Conclusions: Promoting self-compassion and mindful self-care may be particularly important in pregnant women, as these psychological factors appear to contribute to complete mental health during COVID-19 pandemic.

Implications for practice: The COVID-19 pandemic represented a demanding period for pregnant women. Our findings highlight that targeting the promotion of self-compassion and mindful self-care practices during stressful periods could significantly contribute to their overall mental health.

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Introduction

On March 2020, the World Health Organization (WHO) declared COVID-19 (Coronavirus Disease 2019) a global pandemic. During the last two years, the pandemic has brought numerous challenges to people worldwide. Over time, the pandemic went through different waves, characterized by periods when the number of patients with COVID-19 disease gradually increased, and to control the number of newly infected patients many countries adopted social restrictive measures and lockdowns (Oskovi-Kaplan et al., 2021). In Portugal, the periods of major pandemic-related restrictions occurred between March and May 2020 and between December 2020 and April 2021, and included lockdowns, social physical

distancing, the use of hygienic masks, the closure of schools and the adoption of telework (Diário da República Eletrónico [DRE], (DRE, 2020, 2021). Recent literature has shown that these and other stressors associated with the COVID-19 pandemic (e.g., financial losses) led to an increase of mental health difficulties (Vindegaard & Benros, 2020), especially among vulnerable groups, such as pregnant women (Godleski et al., 2022). Knowing the variables that may contribute to pregnancy mental health during COVID-19 pandemic is crucial to provide this group the adequate psychological care during and beyond stressful contexts such as a pandemic.

Pregnancy mental health during COVID-19 pandemic

Being pregnant is often a positive event characterized by feelings of joy, delight, and fulfillment (Motrico et al., 2020). However, pregnancy also represents a period of a woman's life characterized

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by several challenges, such as physical, hormonal, neurochemical and neurobiological changes, and psychological demands, such as worries about the baby's health and wellbeing, uncertainty about future changes in daily life, and changes in familiar dynamics (e.g., Harpel, 2008; Slade et al., 2009). All of these demands may increase the likelihood of mental health difficulties, such as depressive and anxious symptoms (Teixeira et al., 2009), which can continue or even worsen in the postpartum period and have a negative impact on several maternal and birth outcomes (e.g., shorter gestation, lower birth weight) as well as on the infant's development (Dunkel Schetter & Tanner, 2012; Satyanarayana et al., 2011).

During Covid-19 Pandemic, pregnant women have been dealing with a particularly challenging context, with a potential adverse impact on their mental health (Motrico et al., 2020).

The pandemic-related restrictions, such as lockdowns, resulted in disruptions in the expected routine of prenatal and postnatal care for the mother and the baby (e.g., different timelines or absence of prenatal care appointments, lack of presence and support from partners during prenatal consultations, changes in birth plans) (Lebel et al., 2020). In addition, the social distancing that has been universally recommended by governments around the world may be especially problematic during the pregnancy period, leading to a significant lack of social support, which is known to have an important role in buffering the negative effects of stressful events (Reid & Taylor, 2015).

A few studies have already highlighted the negative impact of COVID-19 pandemic in pregnant women's mental health, showing for instance that the prevalence of depressive and anxious symptoms has increased in this population (Wu et al., 2020), in several countries (e.g., Ahmad & Vismara, 2021), in comparison with similar pre-pandemic pregnant women (e.g., Catherine). Depressive and anxious symptoms are the most prevalent symptoms reported during pregnancy (Teixeira et al., 2009) and have been shown to be associated with several negative outcomes. Depressive symptoms experienced during pregnancy may result in a higher risk of low birth weight, preterm birth, intrauterine growth restriction, and pregnancy complications (Grigoriadis et al., 2013). These symptoms may also increase the risk and severity of depressive symptoms during the postpartum period (Lancaster et al., 2010) and are associated with poorer child outcomes (Milgrom et al., 2004). Similarly, anxious symptoms during pregnancy are associated with a shorter gestation and have adverse implications for fetal neurodevelopment and child outcomes (Dunkel Schetter & Tanner, 2012). These long-term effects of depressive and anxious symptoms on women's and children's health emphasize the importance of strengthening prenatal mental health care.

Complete mental health: looking beyond mental illness

Although previous research has shown that mental health involves more than the absence of mental illness, the bulk of studies in the perinatal period have focused on the reduction of mental illness rather than on the promotion of positive mental health outcomes (Smith et al., 2014). Mental illness and mental health have traditionally been conceptualized as opposite ends of the same continuum, but in recent decades this view has changed considerably (Iasiello et al., 2020). Keyes' dual-continua model of mental health or complete mental health model (Keyes, 2002, 2005; Keyes & Lopez, 2002) has been particularly highlighted. This model is based on the assumption that, although related, mental illness and positive mental health represent two distinct dimensions or continua (Keyes, 2005). Therefore, individuals can be categorized according to their level of mental illness, as well as their level of positive mental health: flourishing, moderate mental health, or languishing. Flourishing refers to the presence of optimal levels of emotional, psychological, and social wellbeing. In turn, individu-

als who manifest feeling stuck, stagnant, empty or that life has no interest are classified as languishing. Finally, an individual is considered to have moderate mental health when they are not included in any of the above categories (Keyes, 2002, 2005). Therefore, according to this model, a state of complete mental health encompasses the absence of mental illness and simultaneously the presence of high levels of positive mental health (i.e., flourishing). The independence of both constructs has been supported by multiple studies (e.g., Iasiello et al., 2020; Trompetter et al., 2017; Xiong et al., 2017).

Numerous findings have demonstrated that anything less than complete mental health is associated with several negative outcomes (e.g., Iasiello et al., 2020; Keyes, 2005). On the other hand, complete mental health has been associated with better physical health, better psychosocial functioning, fewer health limitations of activities of daily living and fewer missed days of work (Keyes, 2004, 2005; Keyes & Simoes, 2012). Even when experiencing mental illness, the presence of flourishing has been related to higher levels of positive functioning. For instance, Teismann et al. (2018) found that lifetime suicide attempts were less likely in patients who suffered from suicide ideation in the presence of positive mental health. During the last years, multiple findings on the complete mental health model have underlined the importance of also incorporating this perspective in clinical practice and research in the perinatal period (e.g., Keyes et al., 2002; Iasiello et al., 2020).

Despite the importance of complete mental health, research on factors contributing to complete mental health during pregnancy is very scarce. In contrast, there is abundant research on risk and protective factors of mental illness of pregnant women (e.g., Arrais & Araujo, 2017; Biaggi et al., 2016). A few systematic reviews have suggested that the most relevant risk factors associated with anxiety and depression during pregnancy were the lack of social support, socioeconomic disadvantage, history of mental illness, being younger, being unmarried, experiencing unplanned pregnancy, adverse events in life and high perceived stress, present/past pregnancy complications, and pregnancy loss (Biaggi et al., 2016) (Fisher et al., 2012). Regarding the psychological resources that seem to be protective factors for depressive symptoms during pregnancy, some recent studies highlight self-compassion and mindfulness as some of the most relevant (Pereira et al., 2020).

Self-compassion is characterized by an attitude of care, and understanding toward oneself, the capacity of being aware of one's painful experiences and the recognition that all human beings are imperfect and suffer (Neff, 2003; K. Neff, 2009; K. Neff, & Vonk, R., 2009) and can be highly beneficial for pregnant women. Previous studies have shown that higher levels of self-compassion may be associated with lower levels of depressive symptoms and more psychological wellbeing among pregnant women (Felder et al., 2016; Fourianalisyawati et al., 2018). Self-compassion has been highly related with self-care (Miller et al., 2019). Therefore it is possible that pregnant women who are more compassionate with themselves adopt an attitude of self-care and acceptance, and may engage in self-care practices, such as mindful self-care. The concept of mindful self-care can be characterized as a process that comprises a mindful awareness and assessment of intrinsic needs and external demands and an intentional commitment to practices of self-care (e.g., exercise, rest, intentionally spending time with friends, etc; Cook-Cottone & Guyker, 2018; Hotchkiss & Cook-Cottone, 2019), and it has been also negatively associated with depressive symptoms among women in the perinatal period (Webb et al., 2019).

Despite some evidence on the effects of self-compassion and mindful self-care on psychopathological symptoms in the perinatal period, their effect on complete mental health is still unknown.

Indeed, the literature of the demanding changes experienced by women during the perinatal period and their recognized impact are often viewed solely from a mental illness perspective (absence vs. presence of mental illness) rather than from a complete mental health approach (i.e., considering both mental illness and positive mental health), which limits a better understanding of what contributes to and enhances women's mental health. Taking the findings on the complete mental health model into account, focusing on mental illness cannot provide a complete image of the mental health status of an individual. To improve overall mental health status, a comprehensive knowledge of the factors associated with both mental illness and positive mental health is required. Indeed, a few studies showed that the explicative factors of positive mental health were not the reverse of those associated with mental illness (e.g., [Kinderman et al., 2015](#); [Winzer et al., 2014](#)), including in the postpartum period ([Monteiro et al., 2021](#)).

The current study

Given that pregnant women's mental health may be adversely affected during difficult times like the COVID-19 pandemic (e.g., [Durankuş & Aksu, 2022](#)), it is essential to support a woman's transition to motherhood in a positive and healthy way ([Motrico et al., 2020](#)). Thus, it is necessary to understand which factors contribute to their complete mental health. The main purpose of this study was to investigate the sociodemographic, clinical-, infant-, and COVID-19-related information and psychological factors associated with complete mental health (i.e., positive mental health [presence of flourishing] and absence of mental illness [absence of clinically relevant depressive and anxiety symptoms]), among Portuguese pregnant women, during the COVID-19 pandemic.

Methods

Procedure

This study is part of a wider research project whose main goal was to develop and evaluate a brief psychological intervention ("Mind the Mom"), delivered through a mobile application, for pregnant women during the COVID-19 pandemic in Portugal. This research project was approved by the Ethics Committee of the [blinded for review] and comprises two assessment moments: 1) a baseline assessment, in which outcome variables were assessed, and 2) a postintervention assessment, in which outcome variables were reassessed and the Mind the Mom program's feasibility and acceptability were assessed. For this study, only baseline assessment data were used. The data collection of the present study took place between October 2020 and April 2021, which corresponded with a period of major pandemic-related restrictions in Portugal. The sample was recruited online, and data were collected through an online survey placed on the website of the host institution [Blind for review]. A link to the survey was posted on social media websites (e.g., Facebook, Instagram), targeting Portuguese women who were pregnant. Participants who clicked on the link were then given detailed information about the study, namely, a description of the objectives, inclusion criteria, and the ethical statement of the study. Participants were informed that their participation was voluntary and anonymous. Only those who agreed to the study conditions and who provided their informed consent by clicking on the option "I understand and accept the conditions of the study" completed the assessment protocol. Participants were eligible for the study if they fulfilled the following inclusion criteria: a) being an adult woman (>18 years old); b) being pregnant with at least 20 weeks of gestation; and c) having the ability to read and write Portuguese.

Measures

Sociodemographic, clinical and COVID-19-related Information

The first part of the online survey was specifically developed for this study by the research team and included questions on standard sociodemographic information (e.g., participants' age, marital status, education level) and clinical data (e.g., history of psychological problems, pregnancy complications). It also included questions to assess several COVID-19-related aspects. Specifically, participants were asked about 1) COVID-19 infection (yes or no); and 2) changes to pregnancy follow-up due to the COVID-19 pandemic ("Has your pregnancy follow-up routine been changed due to the COVID-19 pandemic?"; yes or no). Also, participants responded questions about 1) fear of COVID-19 infection ("How fearful are you of becoming infected with COVID-19?"); 2) perception that the COVID-19 pandemic is affecting their life ("Overall, to what extent do you think the COVID-19 pandemic is affecting your life?"); and 3) worry about COVID-19 pandemic impact ("How worried are you about the impact of pandemic, concerning yourself, baby, family members, etc.?"). These three questions were answered in a 5-point response scale, ranging from 1 (*Not at all*) to 5 (*Extremely fearful/affected/worried*). Finally, participants were asked about 1) COVID-19 infection of close relationships ("Is anyone close to you infected or has been infected with COVID-19?"; yes or no); 2) appraisal of the support received by family and friends ("Overall, what is your level of satisfaction with the support received from your family and friends?"); and 3) appraisal of the support received by the partner ("Overall, what is your level of satisfaction with the support received from your partner?"), both using a 5-point response scale [1 = *Not at all satisfied*; 2 = *Less satisfied*; 3 = *Satisfied*; 4 = *Very satisfied*; 5 = *Completely satisfied*].

Positive mental health

The Mental Health Continuum Short Form (MHC-SF; [Keyes et al., 2008](#)); Portuguese Version [PV]; ([Monteiro et al., 2020](#)) was used to measure positive mental health. This questionnaire consists of 14 items divided into three dimensions: emotional, social and psychological wellbeing. Each item is rated on a 6-point response scale from 0 (*never*) to 5 (*every day*) in reference to the last month. The MHC-SF can be scored continuously (scores range from 0 to 70, and higher scores indicate better positive mental health) or categorically considering mental health status (flourishing, moderate mental health, languishing). Using Keyes' criteria ([Keyes et al., 2008](#)), women who answered every day or almost every day at least once on the emotional wellbeing subscale and at least six times on the psychological and social wellbeing subscales were categorized as flourishing. Because in this study we were specifically interested in flourishing mental health, participants who did not fit the criteria for flourishing were categorized as not flourishing. In our sample, the Cronbach's alpha was .93.

Depressive symptoms

The Edinburgh Postnatal Depression Scale (EPDS; [Cox et al., 1987](#)); PV: ([Areias et al., 1996](#)) was used to assess depressive symptoms. The EPDS is a widely used self-report questionnaire, which comprises 10 items that cover different emotions (e.g., sadness). Participants are asked to rate the items considering the previous seven days with an individualized four-point response scale (ranging from 0 to 3). The total score ranges between 0 and 30, and higher scores are indicative of more severe depressive symptoms. In the Portuguese validation studies, a score of 10 or higher identifies women who have clinically relevant depressive symptoms ([Figueiredo, 1997](#)). In our sample, Cronbach's alpha was .87.

Anxiety symptoms

The anxiety subscale of the Hospital Anxiety and Depression Scale (HADS-A; Zigmond & Snaith, 1983); PV: (Pais-Ribeiro et al., 2007) was used to assess anxiety symptoms in the previous week. This questionnaire contains 7 items (e.g., “I feel tense or wound up”) and uses a 4-point response scale, ranging from 0 (*not at all*) to 3 (*most of the time*). Higher scores are indicative of higher levels of symptomatology. A cut-off score of 11 points or higher is indicative of the presence of clinically relevant anxiety symptoms (Bjelland et al., 2002). In this sample, Cronbach’s alpha was .83.

Self-compassion

The Self-Compassion Scale-Short Form (SCS-SF; Raes et al., 2011); PV: (Castilho et al., 2015) was used to measure self-compassion levels. The SCS-SF comprises 12 items (e.g., “When I’m going through a very hard time, I give myself the caring and tenderness I need”) answered on a 5-point response scale, ranging from 1 (*almost never*) to 5 (*almost always*). After negative items are reverse coded, it is possible to obtain a global measure of self-compassion by estimating the mean of the 12 items, with higher scores indicating more self-compassion. In the present sample, the Cronbach’s alpha was .90.

Mindful self-care

The Mindful Self-Care Scale – Brief (MSCS-B) (Hotchkiss & Cook-Cottone, 2019) was used to measure the self-reported frequency of behaviors that measure self-care behavior. The MSCS-B is a 24-item scale, answered on a 5-point response scale, ranging from 1 (*never*) to 5 (*regularly*), and addresses 6 domains of self-care: mindful relaxation (e.g., “I sought out images to relax (e.g., art, film, window shopping, nature”), physical care (e.g., “I exercised at least 30 to 60 minutes”), self-compassion and purpose (e.g., “I kindly acknowledged my own challenges and difficulties”), supportive relationships (“I felt supported by people in my life”), supportive structure (“I maintained a manageable schedule”), and mindful awareness (e.g., “I had a calm awareness of my thoughts”). After negative items are reverse coded, it is possible to obtain a global measure of mindful self-care, by estimating the mean of the 6 domains, with higher scores indicating more mindful self-care. In the present sample, the Cronbach’s alpha coefficient was .91.

Data analysis

Data were analyzed using the Statistical Package for Social Sciences (IBM SPSS, version 25.0). Descriptive statistics were first computed for sample characterization.

To investigate the factors related to complete mental health, a dummy variable was first coded based on the MHC-SF, EPDS and HADS-A cutoff scores (presented in the Measures section). Participants who were flourishing and did not report clinically relevant depressive and anxiety symptoms were categorized as presenting complete mental health. Participants who did not fill these criteria were categorized as not presenting complete mental health. Separate univariate logistic regression analyses were run for all sociodemographic, clinical-, infant-, and COVID-19-related information and psychological factors on the dependent variable. Afterwards, to examine which factors were independently associated with complete mental health, variables in the univariate analysis with a p level $< .10$ were entered into a multivariable logistic regression. A relevant assumption of logistic regression (i.e., no multicollinearity) was verified through the variance inflation factor (VIF) and the tolerance values. The VIF statistics were all below 10, and the tolerance values were above 0.2, suggesting no multicollinearity concerns (Field, 2009). Odds ratios (ORs) and 95% confidence intervals (CIs) were computed to reflect association strength and signif-

icance. Nagelkerke R^2 statistic was calculated to estimate the variance attributed to the predictors in the logistic regression model.

Results

Participants

In total, 275 women gave their consent to participate in the study. However, 68 women were removed from the sample due to being pregnant for less than 20 weeks. Thus, the final sample of this cross-sectional study consisted of 207 pregnant women. The complete sociodemographic, clinical, and COVID-19-related information is presented in Table 1. Overall, 90.8% of women were married or living with a partner, 82.1% had completed university studies and 88.4% were employed. This was the first pregnancy for most women (61.4%) and the majority reported not having had a COVID-19 infection (95.7%).

Figure 1 illustrates the proportion of women in each subgroup regarding their positive mental health and mental illness status (i.e., presence or absence of flourishing mental health and presence or absence of clinically relevant depressive and anxiety symptoms). Of the total sample, 47.3% ($n = 98$) of participants reported clinically relevant depressive and/or anxiety symptoms. Of the participants with clinically relevant symptoms, 23.5% ($n = 23$) reported flourishing mental health. Considering the women who did not present clinically relevant symptoms (52.7%; $n = 109$), 58.7% ($n = 64$) reported flourishing mental health.

Factors associated with complete mental health

Table 2 presents the univariate and multivariate logistic regression analyses of the contribution of all study variables to complete mental health. The univariate analyses revealed that none of the sociodemographic variables were significantly associated with an increased likelihood of presenting complete mental health. Regarding clinical and health-related factors, the results of the univariate analysis showed that the presence of physical health problems, a previous history of psychopathology and having medical complications during pregnancy were associated with having lower odds of presenting complete mental health. Considering variables related with social support, women who appraised the support received by family and friends and the support received by their partners as good had higher odds of presenting complete mental health. Additionally, the psychological factors (i.e., self-compassion and mindful self-care) were associated with an increased likelihood of presenting complete mental health in the univariate analysis.

After including all the variables that in the univariate analyses had a p level $< .10$, the multivariate logistic regression showed that the odds of presenting complete mental health were significantly higher for pregnant women who had higher levels of self-compassion and mindful self-care. Additionally, a marginally significant result was found for history of psychological problems, suggesting that pregnant women who had previous psychopathology had lower odds of reporting complete mental health. The final model was significantly reliable ($\chi^2_{(7)} = 95.52, p < .001$; Cox and Snell $R^2 = .40$; Nagelkerke $R^2 = .57$) and correctly predicted 82.8% of the cases.

Discussion

In this study, we aimed to explore the building blocks of complete mental health during pregnancy. Specifically, we explored a wide range of factors associated with complete mental health (i.e., the presence of flourishing and the absence of depressive and anxious symptoms) among Portuguese pregnant women, during the COVID-19 pandemic. Overall, the results suggest that not having a

Table 1
Sociodemographic, Clinical and COVID-19-related Information of the Sample.

	M (SD) / n (%)
Age	32.31 (4.12)
Marital status	
Married/De facto union	188 (90.8)
Not in a relationship	19 (9.2)
Employment status	
Employed	183 (88.4)
Not currently working	24 (11.6)
Educational level	
Up to the 9 th grade	3 (1.4)
10 th to 12 th grade	34 (16.4)
University studies	170 (82.1)
Net household monthly income	
<500€	3 (1.4)
500€-1000€	35 (16.9)
1000€-2000€	89 (43)
2000€-3500€	67 (32.4)
>3500€	13 (6.3)
Residence	
Urban	143 (69.1)
Rural	64 (30.9)
Physical health problems	
Yes	39 (18.8)
No	168 (81.2)
History of psychological problems	
Yes	72 (34.8)
No	135 (65.2)
Current psychological/psychiatric treatment	
Yes	35 (16.8)
No	172 (83.1)
Gestational age	28.33 (5.43)
First pregnancy	
Yes	127 (61.4)
No	80 (38.6)
Pregnancy complications	
Yes	41 (19.8)
No	166 (80.2)
COVID-19 infection	
Yes	9 (4.4)
No	198 (95.7)
Changes to pregnancy follow-up due to the COVID-19 pandemic	
Yes	115 (55.6)
No	92 (44.4)
Fear of COVID-19 infection	4.03 (0.94)
Perception that the COVID-19 pandemic is affecting their life	4.34 (0.73)
Worry about COVID-19 pandemic impact (oneself, baby, family members, etc)	4.42 (0.73)

previous history of psychological problems and having higher levels of self-compassion and mindful self-care can increase the likelihood of pregnant women having complete mental health.

Higher levels of self-compassion were found to increase the likelihood of having complete mental health. These findings are in line with previous studies showing that higher levels of self-compassion in pregnant women can help them experience lower levels of depressive and anxious symptoms (e.g., Felder et al., 2016). Likewise, there is solid evidence from studies conducted among the general community that self-compassion can promote positive mental health (Akin & Akin, 2015; Shin & Lim, 2019) and decrease the likelihood of psychopathology (Sacristan-Martin et al., 2019; Trompetter et al., 2017). During lockdown, recent literature also found that self-compassion may be a psychological skill with a protective role against anxiety, depression, and stress, in general population (Gutiérrez-Hernández et al., 2021). In fact, pregnant women with higher levels of self-compassion may be better able to activate their soothing system of affect regulation (Gilbert, 2014), they may be kinder to themselves and experience a higher sense of common humanity (Singh & Sharma, 2020). This may help them to better regulate their negative emotions, to experience less psy-

chopathological symptoms, and to achieve more easily optimal levels of emotional, psychological and social wellbeing.

Engagement in mindful self-care practices, which encompasses six domains of self-care (mindful relaxation, physical care, self-compassion and purpose, supportive relationships, supportive structure, and mindful awareness; Hotchkiss & Cook-Cottone, 2019), was shown to increase the likelihood of pregnant women reporting complete mental health. These results are consistent with previous studies that found that mindful self-care was negatively associated with depressive symptoms among pregnant women (e.g., Webb et al., 2019) and with studies conducted among the general population that have found that mindful self-care is positively associated with flourishing (McGuinness & Nordstokke, 2021). Although there is evidence showing the protective role of self-compassion against psychological distress for the mother and child during the COVID-19 pandemic (Davis et al., 2021), mindful self-care practices have not been studied in this context. These findings suggest that developing interventions that promote the learning and practice of mindful self-care may bolster pregnant women's ability to self-regulate and improve their overall wellbeing (Webb et al., 2019), thereby contributing to their

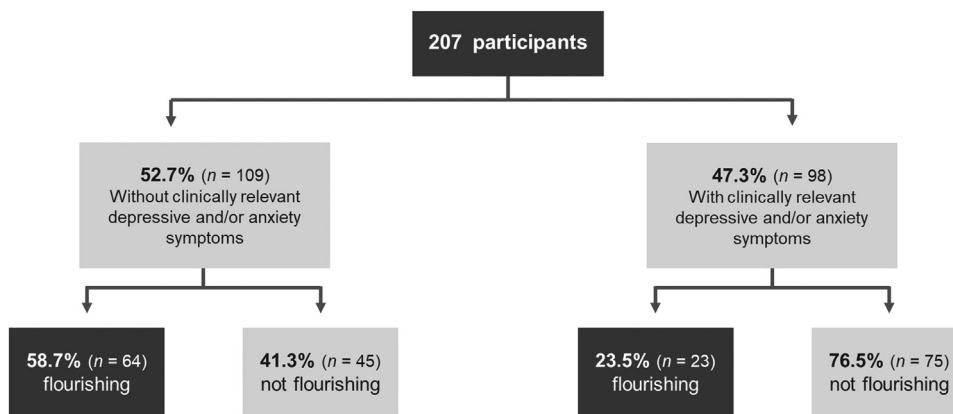


Fig. 1. Proportion of Women in Each Subgroup Considering a Complete Mental Health Perspective

Table 2
Univariate and Multivariate Logistic Regressions of the Factors Associated with Complete Mental Health

	Univariate analysis		Multivariate analysis $R^2 = .40$ (Cox & Snell); $.57$ (Nagelkerke)		
	OR [95% CI]	P	B (SE)	p	OR [95% IC]
Age (years)	0.98 [0.91-1.05]	.485	-	-	-
Marital status	0.75 [0.28-1.99]	.559	-	-	-
Education	1.19 [0.80-1.76]	.387	-	-	-
Employment status	0.91 [0.36-2.32]	.844	-	-	-
Household monthly income	1.20 [0.85-1.70]	.301	-	-	-
Physical health problems	0.43 [0.18-1.03]	.057	-1.10 (0.69)	.111	0.33 [0.09-1.29]
History of psychological problems	3.13 [1.54-6.37]	.002	0.95 (0.50)	.058	2.60 [0.97-6.96]
First pregnancy	0.70 [0.37-1.29]	.250	-	-	-
Medical complications during pregnancy	2.10 [0.91-4.85]	.082	1.01 (0.65)	.116	2.76 [0.78-9.77]
Changes in pregnancy monitoring due to COVID-19	1.38 [0.77-2.50]	.283	-	-	-
Perception that COVID-19 affects everyday life	0.75 [0.50-1.11]	.152	-	-	-
COVID-19 infection of close relationships	0.64 [0.30-1.34]	.253	-	-	-
Appraisal of support received - Family and Friends	2.59 [1.70-3.93]	<.001	0.36 (0.33)	.282	1.43 [0.75-2.72]
Appraisal of support received - Partner	1.79 [1.20-2.66]	.004	-0.17 (0.28)	.540	0.84 [0.48-1.46]
Mindful self-care	1.64 [1.41-1.90]	<.001	0.44 (0.09)	<.001	1.55 [1.29-1.86]
Self-compassion	7.85 [3.86-15.95]	<.001	1.38 (0.45)	.002	1.65 [1.65-9.65]

Note: Dependent variable: 0 = Absence of flourishing and presence of depressive and/or anxiety symptoms, 1 = Flourishing and absence of depressive and anxiety symptoms; Marital status [0 = Single; 1 = Married/In a relationship]; Employment status [0= Unemployed; 1 = Employed]; Physical health problems [0 = Yes; 1 = No]; History of psychological problems [0 = No; 1 = Yes]; First pregnancy [0 = No; 1 = Yes]; Medical complications [0 = No; 1 = Yes]; Changes in pregnancy monitoring [0 = No; 1 = Yes]; COVID-19 infection of close relationships [0 = No; 1 = Yes]
Abbreviations: 95% CI, 95% confidence interval; OR, odds ratio.

complete mental health during a demanding period such as a pandemic

Although a previous history of psychopathology is consistently brought up as an important factor for mental health in the perinatal period (e.g., Milgrom et al., 2008), the results of this study showed that it was only marginally significant when included together with the remaining variables of the model. Despite being easily identified by practitioners, sociodemographic and clinical factors have limited practical application, as they refer mostly to contextual factors that are not easily modifiable through psychological interventions. It is possible that women with a previous history of psychopathology may have previous vulnerabilities (e.g., self-criticism, avoidance-based coping strategies), which emphasizes the need to shift the focus on assessment from demographic, contextual or pregnancy-related risk factors to other psychological factors grounded in existing theories of depression, anxiety or positive mental health.

Although our study has an exploratory nature and future studies are needed to confirm these results, our findings give important insights that could help design better targeted mental healthcare during pregnancy. Specifically, the promotion of self-compassion and mindful self-care in psychological interventions for pregnant women seems to be important for promoting women's complete mental health. Moreover, mental healthcare systems should strive

to promote complete mental health in individuals, not just reduce their mental illness. In this sense, the assessment and promotion of positive mental health should be considered as an additional goal, complementary to the assessment and treatment of psychopathology.

Limitations and future research and clinical directions

This study presents several limitations that should be mentioned. First, this study has a cross-sectional design, therefore, a causal relationship cannot be inferred between mindful self-care and self-compassion and complete mental health. Also, other variables may explain complete mental health that we did not include in this study. Future longitudinal studies with other potential predictors of complete mental health would be needed to better understand the directionality of the associations between the variables explored in the current. Second, the sample was collected online, which may compromise its representativeness, as this method of data collection is often associated with a self-selection bias because participants who participated in the study were likely to be more motivated to participate and interested in pregnancy issues and mental health subject, than those in the general population. Future studies should include different recruitment methods (e.g., online and face-to-face). Third, it is possible that the online re-

cruitment may have led to an over-representation of women in a relationship, living in urban areas and with higher education and income, which could have also contributed to our findings. Thus, there are significant limitations when generalizing the results of our research work to all pregnant women. Future studies should use a sample with more sociodemographic diversity, maybe obtained through face-to-face sample collection. Forth, the validity of the results can be compromised because only self-reported instruments were used to assess the study variables. In fact, participants may be influenced by social desirability and their answers may not reflect their feelings or thoughts in a reliable way. It is also important to consider that, although no multicollinearity concerns were raised in our analysis, the measure used to assess mindful self-care also includes the assessment of self-compassion. In this sense, the measures present some overlapping and could possibly have influenced the results.

Despite these limitations, the current study also has important strengths, as well as research and clinical implications. It provides an innovative contribution to better understand the role of specific variables (i.e., self-compassion and mindful self-care), which may contribute to the development of complete mental health in pregnant women, specifically during a pandemic context. This study suggests that pregnant women's self-compassion and mindful self-care plays an important role in their complete mental health and should be integrated in psychological interventions. Moreover, this study highlights the importance of mental healthcare systems in striving to promote complete mental health in individuals, not just reduce their mental illness. In this sense, the assessment and promotion of positive mental health should be considered as an additional goal, complementary to the assessment and treatment of psychopathology.

Author contributions

FM, DVF, RP, HM, CM, AP: designed and executed the study. FM and DVF: conducted the data analyses and wrote the first draft. RP, HM and AP collaborated in revising the final manuscript. All authors approved the final version of the manuscript for submission.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Ethical approval was obtained from the Ethics Committee of the Faculty of Psychology and Educational Sciences of the University of Coimbra.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.midw.2022.103521](https://doi.org/10.1016/j.midw.2022.103521).

References

- Ahmad, M., Vismara, L., 2021. The psychological impact of COVID-19 pandemic on women's mental health during pregnancy: A rapid evidence review. *Int. J. Environ. Res. Public Health* (13) 18. doi:[10.3390/ijerph18137112](https://doi.org/10.3390/ijerph18137112).
- Akin, A., Akin, U., 2015. Examining the predictive role of self-compassion on flourishing in Turkish university students. *Anal. Psicol.* 31 (3), 802. doi:[10.6018/analesps.31.3.192041](https://doi.org/10.6018/analesps.31.3.192041).
- Areias, M.E., Kumar, R., Barros, H., Figueiredo, E., 1996. Comparative incidence of depression in women and men, during pregnancy and after childbirth. Validation of the Edinburgh Postnatal Depression Scale in Portuguese mothers. *Br. J. Psychiatry* 169 (1), 30–35. doi:[10.1192/bjp.169.1.30](https://doi.org/10.1192/bjp.169.1.30).
- Arrais, A., Araujo, T.C., 2017. Depressão pós-parto: Uma revisão sobre fatores de risco e de proteção. *Psicol., Saúde Doenças* 18, 828–845.
- Biaggi, A., Conroy, S., Pawlby, S., Pariante, C.M., 2016. Identifying the women at risk of antenatal anxiety and depression: a systematic review. *J. Affect. Disord.* 191, 62–77. doi:[10.1016/j.jad.2015.11.014](https://doi.org/10.1016/j.jad.2015.11.014).
- Bjelland, I., Dahl, A.A., Haug, T.T., Neckelmann, D., 2002. The validity of the hospital anxiety and depression scale. An updated literature review. *J. Psychosom. Res.* 52 (2), 69–77. doi:[10.1016/s0022-3999\(01\)00296-3](https://doi.org/10.1016/s0022-3999(01)00296-3).
- Castilho, P., Pinto-Gouveia, J., Duarte, J., 2015. Evaluating the multifactor structure of the long and short versions of the Self-Compassion Scale in a clinical sample. *J. Clin. Psychol.* 71 (9), 856–870. doi:[10.1002/jclp.22187](https://doi.org/10.1002/jclp.22187).
- Cox, J.L., Holden, J.M., Sagovsky, R., 1987. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *Br. J. Psychiatry* 150, 782–786. doi:[10.1192/bjp.150.6.782](https://doi.org/10.1192/bjp.150.6.782).
- Davis, J.A., Gibson, L.Y., Bear, N.L., Finlay-Jones, A.L., Ohan, J.L., Silva, D.T., Prescott, S.L., 2021. Can positive mindsets be protective against stress and isolation experienced during the COVID-19 pandemic? A mixed methods approach to understanding emotional health and wellbeing needs of perinatal women. *Int. J. Environ. Res. Public Health* 18 (13), 6958. doi:[10.3390/ijerph18136958](https://doi.org/10.3390/ijerph18136958).
- Diário da República Eletrónico (2020). Decreto no. 11-A/2020. <https://dre.pt/pesquisa/-/search/151904698/details/maximized>
- Diário da República Eletrónico (2021). Comunicado do Conselho de Ministros de 15 de abril de 2021. <https://www.portugal.gov.pt/pt/gc22/governo/comunicado-de-conselho-de-ministros?i=414>
- Durankuş, F., Aksu, E., 2022. Effects of the COVID-19 pandemic on anxiety and depressive symptoms in pregnant women: a preliminary study. *J. Matern. Fetal Neonatal Med.* 35 (2), 205–211. doi:[10.1080/14767058.2020.1763946](https://doi.org/10.1080/14767058.2020.1763946).
- Felder, J.N., Lemon, E., Shea, K., Kripke, K., Dimidjian, S., 2016. Role of self-compassion in psychological well-being among perinatal women. *Arch. Women's Ment. Health* 19 (4), 687–690. doi:[10.1007/s00737-016-0628-2](https://doi.org/10.1007/s00737-016-0628-2).
- Field, A., 2009. *Discovering Statistics Using SPSS, 3rd ed.* Sage.
- Figueiredo, B. (1997). Depressão pós-parto, interação mãe-bebê e desenvolvimento infantil [Dissertação de doutoramento não publicada, Universidade do Minho].
- Fisher, J., Cabral de Mello, M., Patel, V., Rahman, A., Tran, T., Holton, S., Holmes, W., 2012. Prevalence and determinants of common perinatal mental disorders in women in low- and lower-middle-income countries: a systematic review. *Bull. World Health Organ.* 90 (2), 139–149. doi:[10.2471/BLT.11.091850](https://doi.org/10.2471/BLT.11.091850).
- Gilbert, P., 2014. The origins and nature of compassion focused therapy. *Br. J. Clin. Psychol.* 53 (1), 6–41. doi:[10.1111/bjc.12043](https://doi.org/10.1111/bjc.12043).
- Godleski, S., Harris, C., Fitzpatrick, K., Kothari, A., 2022. Social and behavioral vulnerability, pregnancy, and negative mental health outcomes in the U.S. during the COVID-19 pandemic. *AIMS Public Health* 9 (2), 331–341. doi:[10.3934/publichealth.2022023](https://doi.org/10.3934/publichealth.2022023).
- Grigoriadis, S., VonderPorten, E.H., Mamisashvili, L., Tomlinson, G., Dennis, C.L., Koren, G., Steiner, M., Mousmanis, P., Cheung, A., Radford, K., Martinovic, J., Ross, L.E., 2013. The impact of maternal depression during pregnancy on perinatal outcomes: a systematic review and meta-analysis. *J. Clin. Psychiatry* 74 (4), 321–341. doi:[10.4088/JCP.12r07968](https://doi.org/10.4088/JCP.12r07968).
- Gutiérrez-Hernández, M.E., Fanjul, L.F., Díaz-Megolla, A., Reyes-Hurtado, P., Herrera-Rodríguez, J.F., Enjuto-Castellanos, M.D., Peñate, W., 2021. COVID-19 lockdown and mental health in a sample population in Spain: the role of self-compassion. *Int. J. Environ. Res. Public Health* 18 (4). doi:[10.3390/ijerph18042103](https://doi.org/10.3390/ijerph18042103).
- Harpel, T.S., 2008. Fear of the unknown: Ultrasound and anxiety about fetal health. *Health (N. Y)* 12 (3), 295–312. doi:[10.1177/1363459308090050](https://doi.org/10.1177/1363459308090050).
- Hotchkiss, J.T., Cook-Cottone, C.P., 2019. Validation of the Mindful Self-Care Scale (MSCS) and development of the Brief-MSCS among hospice and healthcare professionals: A confirmatory factor analysis approach to validation. *Palliat Support Care* 17 (6), 628–636. doi:[10.1017/s1478951519000269](https://doi.org/10.1017/s1478951519000269).
- Iasiello, M., van Agteren, J., Cochrane, E.M., 2020. Mental health and/or mental illness: a scoping review of the evidence and implications of the dual-continua model of mental health. *Evid. Base* 2020 (1), 1–45.
- Keyes, C.L., 2002. The mental health continuum: From languishing to flourishing in life. *J. Health Soc. Behav.* 43 (2), 207–222. doi:[10.2307/3090197](https://doi.org/10.2307/3090197).
- Keyes, C.L., 2004. The nexus of cardiovascular disease and depression revisited: the complete mental health perspective and the moderating role of age and gender. *Aging Ment. Health* 8 (3), 266–274. doi:[10.1080/13607860410001669804](https://doi.org/10.1080/13607860410001669804).

- Keyes, C.L., 2005. Mental illness and/or mental health? Investigating axioms of the complete state model of health. *J. Consult. Clin. Psychol.* 73 (3), 539–548. doi:10.1037/0022-006X.73.3.539.
- Keyes, C.L., Simoes, E.J., 2012. To flourish or not: Positive mental health and all-cause mortality. *Am. J. Public Health* 102 (11), 2164–2172. doi:10.2105/AJPH.2012.300918.
- Keyes, C.L., Wissing, M., Potgieter, J.P., Temane, M., Kruger, A., van Rooy, S., 2008. Evaluation of the Mental Health Continuum-Short Form (MHC-SF) in Setswana-speaking South Africans. *Clin. Psychol. Psychother.* 15 (3), 181–192. doi:10.1002/cpp.572.
- Keyes, C.L.M., Lopez, S.J., 2002. Toward a science of mental health: positive directions in diagnosis and interventions. In: *Handbook of Positive Psychology*. Oxford University Press, pp. 45–59.
- Kinderman, P., Tai, S., Pontin, E., Schwannauer, M., Jarman, I., Lisboa, P., 2015. Causal and mediating factors for anxiety, depression and well-being. *Br. J. Psychiatry* 206 (6), 456–460. doi:10.1192/bjp.bp.114.147553.
- Lancaster, C.A., Gold, K.J., Flynn, H.A., Yoo, H., Marcus, S.M., Davis, M.M., 2010. Risk factors for depressive symptoms during pregnancy: A systematic review. *Am. J. Obstet. Gynecol.* 202 (1), 5–14. doi:10.1016/j.ajog.2009.09.007.
- Lebel, C., MacKinnon, A., Bagshawe, M., Tomfohr-Madsen, L., Giesbrecht, G., 2020. Elevated depression and anxiety symptoms among pregnant individuals during the COVID-19 pandemic. *J. Affect. Disord.* 277, 5–13. doi:10.1016/j.jad.2020.07.126.
- McGuinness, C., Nordstokke, D., 2021. Mindful self-care and resilience in first-year undergraduate students. *J. Am. Coll. Health* 1–9. doi:10.1080/07448481.2021.1978463.
- Milgrom, J., Gemmill, A., Bilszta, J.L., Hayes, B., Barnett, B., Brooks, J., Ericksen, J., Ellwood, D., Buist, A., 2008. Antenatal risk factors for postnatal depression: a large prospective study. *J. Affect. Disord.* 108 (1–2), 147–157. doi:10.1016/j.jad.2007.10.014.
- Milgrom, J., Westley, D., Gemmill, A., 2004. The mediating role of maternal responsiveness in some longer term effects of postnatal depression on infant development. *Infant Behav Dev* 27, 443–454. doi:10.1016/j.infbeh.2004.03.003.
- Monteiro, F., Fonseca, A., Pereira, M., Canavarro, M.C., 2020. Measuring positive mental health in the postpartum period: the bifactor structure of the Mental Health Continuum-Short Form in Portuguese women. *Assessment* doi:10.1177/1073191120910247.
- Monteiro, F., Fonseca, A., Pereira, M., Canavarro, M.C., 2021. Is positive mental health and the absence of mental illness the same? Factors associated with flourishing and the absence of depressive symptoms in postpartum women. *J. Clin. Psychol.* 77 (3), 629–645. doi:10.1002/jclp.23081.
- Motrico, E., Mateus, V., Bina, R., Felice, E., Bramante, A., Kalcev, G., Mauri, M., Martins, S., Mesquita, A., 2020. Good practices in perinatal mental health during the COVID-19 pandemic: a report from task-force RISEUP-PPD COVID-19. *Clín. Salud* 31, 155–160. doi:10.5093/clysa2020a26.
- Neff, K., 2003. The development and validation of a scale to measure self-compassion. *Self Identity* 2 (3), 223–250. doi:10.1080/15298860390209035.
- Neff, K., 2009. Self-Compassion. In: Leary, M., Hoyle, R. (Eds.), *Handbook of Individual Differences in Social Behavior*. The Guilford Press, pp. 561–573.
- Neff, K., Vonk, R., 2009. Self-compassion versus global self-esteem: two different ways of relating to oneself. *J. Pers.* 77 (1), 23–50. doi:10.1111/j.1467-6494.2008.00537.x.
- Oskovi-Kaplan, Z.A., Buyuk, G., Ozgu-Erdinc, A.S., Keskin, H.L., Ozbas, A., Moraloglu Tekin, O., 2021. The effect of COVID-19 pandemic and social restrictions on depression rates and maternal attachment in immediate postpartum women: A preliminary study. *Psychiatr. Q.* 92 (2), 675–682. doi:10.1007/s1126-020-09843-1.
- Pais-Ribeiro, J., Silva, I., Ferreira, T., Martins, A., Meneses, R., Baltar, M., 2007. Validation study of a Portuguese version of the hospital anxiety and depression scale. *Psychol., Health Med.* 12 (2), 225–235. doi:10.1080/13548500500524088.
- Pereira, A.T., Xavier, S., Bento, E., Azevedo, J., Marques, M., Soares, M.J., Freitas, V., Pinto, A.M., Roque, C., Macedo, A., 2020. Mindfulness, self-compassion and depressive symptoms in pregnant women. *Eur. Psychiatry* 33. doi:10.1016/j.eurpsy.2016.01.1517.
- Raes, F., Pommier, E., Neff, K.D., Van Gucht, D., 2011. Construction and factorial validation of a short form of the self-compassion scale. *Clin. Psychol. Psychother.* 18 (3), 250–255. doi:10.1002/cpp.702.
- Reid, K.M., Taylor, M.G., 2015. Social support, stress, and maternal postpartum depression: a comparison of supportive relationships. *Soc. Sci. Res.* 54, 246–262. doi:10.1016/j.ssresearch.2015.08.009.
- Sacristan-Martin, O., Santed, M.A., Garcia-Campayo, J., Duncan, L.G., Bardacke, N., Fernandez-Alonso, C., Garcia-Sacristan, G., Garcia-Sacristan, D., Barcelo-Soler, A., Montero-Marin, J., 2019. A mindfulness and compassion-based program applied to pregnant women and their partners to decrease depression symptoms during pregnancy and postpartum: Study protocol for a randomized controlled trial. *Trials* 20 (1), 654. doi:10.1186/s13063-019-3739-z.
- Satyanarayana, V.A., Lukose, A., Srinivasan, K., 2011. Maternal mental health in pregnancy and child behavior. *Indian J Psychiatry* 53 (4), 351–361. doi:10.4103/0019-5545.91911.
- Schetter, C., Tanner, L., 2012. Anxiety, depression and stress in pregnancy: implications for mothers, children, research, and practice. *Curr Opin Psychiatry* 25 (2), 141–148. doi:10.1097/YCO.0b013e3283503680.
- Shin, N.Y., Lim, Y.J., 2019. Contribution of self-compassion to positive mental health among Korean university students. *Int. J. Psychol.* 54 (6), 800–806.
- Singh, S., Sharma, A., 2020. Positive parenting amidst COVID-19. *Mrida: Int. J. Human. Soc. Sci.* 1 (1).
- Slade, A., Cohen, L.J., Sadler, L.S., Miller, M., 2009. The psychology and psychopathology of pregnancy. In: Zeanah, C. (Ed.), *Handbook of Infant Mental Health*. The Guilford Press, pp. 22–39 Vol. 3.
- Teismann, T., Brailovskaia, J., Siegmann, P., Nyhuis, P., Wolter, M., Willutzki, U., 2018. Dual factor model of mental health: co-occurrence of positive mental health and suicide ideation in inpatients and outpatients. *Psychiatry Res.* 260, 343–345. doi:10.1016/j.psychres.2017.11.085.
- Teixeira, C., Figueiredo, B., Conde, A., Pacheco, A., Costa, R., 2009. Anxiety and depression during pregnancy in women and men. *J. Affect. Disord.* 119 (1–3), 142–148. doi:10.1016/j.jad.2009.03.005.
- Trompeter, H.R., de Kleine, E., Bohlmeijer, E.T., 2017. Why does positive mental health buffer against psychopathology? An exploratory study on self-compassion as a resilience mechanism and adaptive emotion regulation strategy. *Cognit. Ther. Res.* 41 (3), 459–468. doi:10.1007/s10608-016-9774-0.
- Trompeter, H.R., Lamers, S.M.A., Westerhof, G.J., Fledderus, M., Bohlmeijer, E.T., 2017. Both positive mental health and psychopathology should be monitored in psychotherapy: confirmation for the dual-factor model in acceptance and commitment therapy. *Behav. Res. Ther.* 91, 58–63. doi:10.1016/j.brat.2017.01.008.
- Vindegaard, N., Benros, M.E., 2020. COVID-19 pandemic and mental health consequences: Systematic review of the current evidence. *Brain Behav. Immun.* 89, 531–542. doi:10.1016/j.bbi.2020.05.048.
- Webb, J., Scritchfield, R., Vinoski Thomas, E., Lisenbee, J., Mooney, J., & Rogers, C. (2019). Exploring a model of depressive symptoms, negative body image, and mindful self-care in pregnancy and mothers of young children. https://www.bodykindnessbook.com/wp-content/uploads/2019/03/Webb-et-al.-2019-SBM-poster_final.pdf
- Winzer, R., Lindblad, F., Sorjonen, K., Lindberg, L., 2014. Positive versus negative mental health in emerging adulthood: A national cross-sectional survey. *BMC Public Health* 14, 1238. doi:10.1186/1471-2458-14-1238.
- Wu, Y., Zhang, C., Liu, H., Duan, C., Li, C., Fan, J., Li, H., Chen, L., Xu, H., Li, X., Guo, Y., Wang, Y., Li, X., Li, J., Zhang, T., You, Y., Li, H., Yang, S., Tao, X., Xu, Y., Lao, H., Wen, M., Zhou, Y., Wang, J., Chen, Y., Meng, D., Zhai, J., Ye, Y., Zhong, Q., Yang, X., Zhang, D., Zhang, J., Wu, X., Chen, W., Dennis, C.-L., Huang, H.F., 2020. Perinatal depressive and anxiety symptoms of pregnant women during the coronavirus disease 2019 outbreak in China. *Am. J. Obstet. Gynecol.* 223 (2), 240. doi:10.1016/j.ajog.2020.05.009.
- Xiong, J., Qjin, Y., Gao, M., Hai, M., 2017. Longitudinal study of a dual-factor model of mental health in Chinese youth. *School Psychol. Int.* 38 (3), 287–303. doi:10.1177/0143034317689970.
- Zigmond, A.S., Snaith, R.P., 1983. The hospital anxiety and depression scale. *Acta Psychiatr. Scand.* 67 (6), 361–370. doi:10.1111/j.1600-0447.1983.tb09716.x.