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Research Paper

Anxiety, post-traumatic stress symptoms, and emotion regulation: A longitudinal study of pregnant women having given birth during the COVID-19 pandemic

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ABSTRACT

The objectives of the present longitudinal study were to (i) understand the potential impacts of concern about the COVID-19 epidemic and containment measures (e.g. lockdown) on the psychological and emotional status of women during pregnancy and after childbirth, (ii) identify factors associated with these impacts, and (iii) to study the mothers' coping strategies and protective factors.

Data were collected during pregnancy (timepoint 1, during France's first period of lockdown from April 6th to May 11th, 2020) and then one month after childbirth (timepoint 2). At timepoint 1, 90 women completed a sociodemographic questionnaire, the Spielberger Trait Anxiety Inventory, the Edinburgh Postnatal Depression Scale, and the Multidimensional Scale of Perceived Social Support. At timepoint 2, 26 women completed the City Birth Trauma Scale, the Interpersonal Emotional Regulation Questionnaire, and the Posttraumatic Growth Inventory. The relationship between social support and worry about the fetus/baby during the COVID-19 pandemic was statistically significant (Rho=- 0.21; p< 0.05). Worry about the fetus/baby was also significantly correlated with the anxiety score (Rho=0.60; p<0.01) and the depression score (Rho= 0.37, p<0.01). When the study population was compared with a control sample of new mothers having given birth outside the lockdown period, we observed differences in the prevalence of anxiety but not in the prevalence of postpartum PTSD. Lastly, the relationship between posttraumatic growth and emotion regulation was not significant (Rho=0.29, p= 0.16 for soothing; Rho=0.26, p = 0.20 for social modeling; Rho=0.28; p = 0.17 for perspective-taking; Rho=0.35; p = 0.08 for enhancing positive affect). In view of the sample size and the statistical tests, this study should be considered as exploratory. Our present results open up opportunities for further research and suggest that a possible impact of COVID-19 must be considered when evaluating potential psychological disorders in the perinatal period.

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1. Introduction

By December 2020, about 75 million people worldwide were tested positive for coronavirus disease 2019 (COVID-19) (Johns Hopkins University, 2019). The global pandemic forced governments to adopt containment measures (such as periods of “lockdown”) designed to slow the spread of the disease. The emerging nature of COVID-19 created many uncertainties, and a lack of health-related information was associated with an elevated psychological impact and a higher level of stress (Wang et al., 2020). For example, fear that family members would catch COVID-19 was associated with higher levels of stress and anxiety. This was especially true for parents’ concerns about their children.

1.1. Containment measures

Most governments chose to impose containment measures so that people had to stay at home and thus avoid physical contact with others. Although containment reduced the spread of the pandemic, it had a clear psychological impact. Containment involved various types of stressor: the duration of the measures, a lack of information or the inaccuracy of information, the fear of infection, and levels of frustration and boredom (Brooks et al., 2020). For instance, a long duration of containment was associated with symptoms of depression and post-traumatic stress disorder (PTSD) (Hawryluck et al., 2004), as well as avoidance behaviors and emotional responses like anger (Mengin et al., 2020). The psychological impact of containment was particularly prominent for parents and children. Relative high prevalences of PTSD symptoms have been observed: in one study, 30% of the surveyed children and 25% of the surveyed parents met the diagnostic criteria for PTSD (Sprang & Silman, 2013). Although these self-
reported data must be considered with a degree of caution, it is still generally acknowledged that containment measures have a major impact on families and their mental health in general and some specific variables (such as sleep quality) in particular. Indeed, reductions in exposure to light (i.e. spending more time indoors) can cause daytime sleepiness or problems falling asleep. The current pandemic situation is also creating economic problems and accentuating constraints linked to work and family life. Greater workloads (children's homework, teleworking, etc.) may lead to voluntary reductions in sleep time (Guichard et al., 2020). A lack of sleep has a negative impact on emotion regulation, weakens the immune system (with greater susceptibility to viral infections), and leads to or worsens psychiatric and addictive disorders. Together, containment measures, lack of privacy, and the pandemic can cause particularly intense anxiety that affects sleep (Geoffroy, Tebeka, Blanco, Dubertret & Le Strat, 2020; Irwin, 2015). Furthermore, social isolation tends to lead to negative affect (Coan, 2010).

We hypothesized that for expecting and new mothers, the mood disorders already present during and after pregnancy were compounded by the anxiety linked to the COVID-19 pandemic.

### 1.2. Anxiety disorders

In normal times, it is thought that 1 in 5 women develops an anxiety disorder during the perinatal period (Furtado, Van Lieshout, Van Ameringen, Green & Frey, 2019). Women tend to be more anxious than usual during the perinatal period (Capponi & Horbacz, 2005). Anxiety is defined as the fearful anticipation of danger or misfortune to come; it is accompanied by feelings of worry and distress and/or somatic symptoms of tension (hypervigilance, concentration problems, sleep disturbance, etc.). Anxiety can be centered on an anticipated danger inside or outside the body (American Psychiatric Association, 2013).

Spielberger (1972) developed the concept of trait anxiety and state anxiety. He described trait anxiety (a more lasting, latent anxiety) as “relatively stable individual differences in the predisposition to perceive several situations as dangerous or threatening and to respond to these situations with elevated situational anxiety”. This contrasts with state anxiety (also referred to as temporary, situational anxiety) as “anxiety that affects sleep” (Geoffroy, Tebeke, Blanco, Dubertret & Le Strat, 2020; Irwin, 2015). Furthermore, social isolation tends to lead to negative affect (Coan, 2010).

1.3. Post-traumatic stress disorder

Post-traumatic stress disorder is defined as a set of cognitive and behavioral difficulties caused by a traumatic event. The fifth version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) states that the traumatic event in question may affect the person directly or a person they know (American Psychiatric Association, 2013).

Post-traumatic stress disorder is linked to a deterioration in quality of life, including the individual's social, physical and mental well-being (Schnurr, Lunney, Bovin & Marx, 2009). Indeed, Ehring and Quack (2010) have shown that the severity of symptoms associated with PTSD is linked to emotionally dysregulated behaviors, such as lack of clarity, emotional acceptance, and emotional suppression. Furthermore, PTSD is associated with an increase in marital conflict (Taft, Watkins, Stafford, Street & Monson, 2011). Indeed, Melvin, Gross, Hayat, Jennings and Campbell (2012) reported that higher levels of PTSD were associated with lower couple functioning and resilience.

A meta-analysis has indicated that the prevalence of postpartum PTSD is 3.1% (Grekin & O'Hara, 2014). With regard to more specific symptoms, women with postpartum PTSD report constantly reliving their childbirth in the form of intrusive memories, nightmares, dreams, or flashbacks (Ayers & Pickering, 2001). The women may be unable or poorly able to walk past a hospital or to look at a pregnant woman. More specific avoidance symptoms are sometimes observed, such as an intense fear of becoming pregnant again (despite the wish to have another child) (Holdberg & Brockington, 2000) or not resuming sexual activity with the partner (Nicholls & Ayers, 2007). Postpartum PTSD has a clear, negative impact on the mother-baby relationship and the mother's view of the baby in the months following birth. More precisely, the baby is described as crying more, being less interested in the surroundings, and exhibiting more avoidance behaviors (Iorio & Di Blasio, 2014; Nicholls & Ayers, 2007).

Given that the effects of the COVID-19 pandemic might add to those already experienced during the anxigean pregnancy period, we sought to study the mothers' coping strategies and protective factors.

### 1.4. Coping strategies

Coping has been defined as “the process of managing demands (external or internal) that are appraised as taxing or exceeding the resources of the person” (Lazarus and Folkman, 1984). It is therefore a constantly evolving process. The various components of coping have been classified in different ways. One of the more ecological classifications is that published by Suls and Fletcher (1985). It is centered on two dimensions, namely attention coping (also referred to as vigilance coping) and the avoidance of sources of stress. In contrast to the avoidance strategy, the attention coping strategy focuses on problems, emotions, and social support, and gives better long-term outcomes.

Social support refers to the psychological and material resources received (or perceived as being available) from others in social networks and that help the person to cope with stress (Cohen, 2004; López-Martínez, Esteve-Zarazaga & Ramírez-Maestre, 2008). Received social support refers to the social network's behaviors that are actually implemented in the individual's life. Perceived social support is based on the individual's belief that social networks will provide the support required (if necessary) to cope with stress (Barrera, 1986). Social support can be a protective factor against certain psychopathological states during times of crisis (Cobb, 1976). Indeed, social support appears to mediate the relationship between stress on one hand and depression and anxiety symptoms on the other (Glazier, Elgar, Goel & Holzapfel, 2004). Furthermore, containment measures reduce the level of perceived social support.

Coping strategies can also correspond to emotion regulation, defined as “the process by which individuals influence their emotions, when they emerge, and how they experience and express these emotions” (Gross, 1998). Intrapersonal regulation involves self-regulation of emotions and has been extensively studied in the literature. Firstly, extrinsic interpersonal regulation allows a person to help another person regulate their emotions. Secondly, intrinsic interpersonal regulation involves regulating one's own emotions by using an outside person. To assess these phenomena, Hofmann, Carpenter and Curtiss (2016) developed the Interpersonal Emotion Regulation Questionnaire (IERQ). Other researchers have demonstrated the impact of emotion regulation on the development and maintenance of PTSD (Bardeen, Kumpula & Orcutt, 2013).
The aftermath of a crisis can be extremely challenging. However, a crisis can also lead to positive changes in an individual's life, i.e. "posttraumatic growth". Indeed, the literature data show that the perception of self, the perception of others, and the meaning of events can all be influenced by this growth (Tedeschi & Calhoun, 1996, 2004).

In normal times, pregnancy, labor, and childbirth are already trying, tiring and painful stages of life. They require increased medical surveillance, more frequent visits by or consultations with healthcare professionals, adaptation to a changed body image, and the need to face new and sometime unclear demands from the environment. The first weeks after childbirth can be extremely tiring and can give prompt the development of sometimes severe psychopathological symptoms. The containment and other health measures imposed by the COVID-19 pandemic have compounded this situation by creating additional risk factors. Women have had to deal with restricted social dialog, greater isolation, and less family support (e.g. from grandparents). The latter is particularly affected because containment is often stricter for older adults. Symptoms of anxiety are particularly comorbid with the onset of depressive symptoms, and so this variable must also be controlled for. In this specific context, the objectives of the present study were to (i) understand the potential impacts of concern about COVID-19 and containment measures on the psychological and emotional status of women during and after pregnancy, and (ii) identify factors associated with these impacts.

In order to assess these objectives, we formed five hypotheses. Firstly, we hypothesized that a low level of social support during the COVID-19 pandemic would be associated with greater concerns for the fetus/baby during pregnancy. Secondly, we hypothesized that a greater degree of concern about the fetus/baby during containment would be associated with higher antenatal levels of anxiety and depression symptoms. Thirdly, we hypothesized that the prevalence of anxiety and traumatic symptoms would be higher during the containment period than outside the containment period. Fourthly, we hypothesized that containment measures would impact emotional soothing as a regulatory strategy. Lastly, we hypothesized that the crisis would challenge points of view and trigger posttraumatic growth; in turn, this growth would prompt a positive reevaluation of situations and would influence emotion regulation strategies.

2. Methods

2.1. Participants

The study population comprised 90 pregnant women (M = 30, SD = 4) in the second or third trimester of pregnancy during France's first period of lockdown (from April 6th to May 11th, 2020). The study participants completed questionnaires at two different time-points: during pregnancy (T1) and one month after childbirth (T2). A total of 90 women completed the study questionnaires at T1 but 26 of them (28.5%) declined to participate further. Of the 64 women who had agreed to participate at T2, only 26 (40.6%) returned the completed study questionnaires.

2.2. Procedure

Participants were recruited through websites, forums and social networks. A link led the participants to a web page detailing the study's design, objectives, procedures, and measures for maintaining anonymity and confidentiality. Each participant gave their electronic informed consent prior to inclusion in the study. The study participants were informed that at T1, they would be invited to (i) give several items of personal information, and (ii) fill out Spielberger Trait Anxiety Inventory (STAI), the Edinburgh Postnatal Depression Scale (EPDS), and the Multidimensional Scale of Perceived Social Support (MSPSS).

One month after childbirth, the participants were contacted again by e-mail and asked to complete the City Birth Trauma Scale (CBTS), the Interpersonal Emotional Regulation Questionnaire (IERQ), and the Posttraumatic Growth Inventory (PGI). In order to guarantee their anonymity, and to match the two different timepoints' answers, the participants have been registered with an identification code. It consists of the first letter of the first name and the name and the last digit of their phone number. The study complied with the ethical principles of the Declaration of Helsinki.

2.2. Measures

Before the participants completed the specific scales and questionnaires, they filled out a sociodemographic and personal health questionnaire covering their age, profession, number of children, their family and personal medical and psychological history, and their specific knowledge and experience of the COVID-19 pandemic (the participant's degree of anxiety for herself and her baby about the pandemic situation, any family members who had caught or even died from COVID-19, place of residence during the lockdown, exposure to the media, access to information, and the place at which childbirth was scheduled).

The following instruments were used to assess anxiety, depression, and perceived social support.

The STAI (Spielberger, 1970) is a two-part self-questionnaire that measures current anxiety (state anxiety) and habitual anxiety (trait anxiety). It comprises 20 items rated on a 1-to-4 Likert scale ("hardly ever", "occasionally", "usually", or "nearly always"). The total score ranges from 20 to 80. By convention, the level of anxiety is quantified as very high (total score >65), high (56–65), medium (46–55), low (36–45) or very low (<35). In the present study, we used the French translation of STAI (Spielberger, Bruchon-Schweitzer & Paulhan, 1993).

The EPDS (Cox, Holden & Sagovsky, 1987) is a self-questionnaire that measures depressive symptoms during the antenatal period or the postnatal period. The antenatal and postnatal contain the same 10 items rated on a 0-to-3 Likert scale ("yes, all the time"; "yes, most of the time"; "no, not very often"; "no, not at all"). The total scores range from 0 to 30. With the French translations, the threshold score for depression is >14 for the antenatal version and >10.5 for the postnatal version (Guedeney and Fermonian, 1998).

The MSPSS (Denis, Callahan & Bouvard, 2015) is a brief research tool designed to measure perceptions of support from three sources ("family", "friends", and "significant other"). The 12 items are rated on a 1-to-7 Likert scale ranging from "very strongly disagree" (1) to "very strongly agree" (7). The total score ranges from 12 to 84. The "significant other" subscale includes items 1, 2, 5 and 10, the "family" subscale includes items 3, 4, 8 and 11, and the "friends" subscale includes items 6, 7, 9 and 12.

At T2, the following scales were used to evaluate potential PTSD symptoms, changes over time in PTSD symptoms, and the women's coping strategies.

The CBTS (Ayers, Wright & Thornton, 2018) is a 29-item questionnaire developed to measure birth-related (postpartum) PTSD according to the DSM-5 criteria. The response scale measures the frequency of symptoms experienced over the previous week and ranges from 0 ("not at all") to 3 ("5 or more times"). To meet the criteria for PTSD, the participant must have been exposed to at least one traumatic event criterion (YES to Q1 or Q2), have re-experienced at least one symptom (a score above 1 in Q3 to Q7), and have at least one avoidance symptom (Q8 or Q9), at least one negative cognition or mood symptom (Q10 to Q16), and at least one hyperarousal symptom (Q17 to Q22) over a period of at least one month. To measure the duration of PTSD, the participant must score one or more for Q26 and show distress/impairment (a score of at least 1 on Q27 or Q28). If the participant scores 1 or more for Q29, a diagnosis of PTSD must be ruled out.
The IERQ (Hofmann et al., 2016) contains a total of 20 items (four factors containing five items each) and measures the strategies that people use to regulate their own emotions through others. The four factors are enhancing positive affect (items 3, 6, 8, 13, and 18), perspective taking (items 2, 7, 10, 14, and 17), emotional soothing (items 4, 9, 12, 16, 19), and social modeling (items 1, 5, 11, 15, and 20). For each item, the 1-to-5 response scale corresponds to “not true for me at all”, “a little bit”, “moderately”, “quite a bit” and “extremely true for me”, respectively.

The PGI (Tedeschi & Calhoun, 1996) is used to estimate positive outcomes reported by persons having experienced traumatic events. Its 21 items encompass 5 factors: new possibilities (5 items), relating to others (7 items), personal strength (4 items), spiritual change (2 items), and appreciation of life (3 items). Following on from the measurement of possible post-partum PTSD (using the CBTS), the PGI was used to measure the changes observed after childbirth.

2.3. Statistical analyses

In order to test the statistical significance of the association between the different variables, we used Spearman’s correlations. All data analyses were performed using Rstudio (RStudio Team, 2015). Independence between the assumptions was not respected, a Bonferroni correction was applied by dividing the p-value by the number of assumptions. Therefore, the alpha level of significance was set to 0.01.

3. Results

3.1. Descriptive analysis

At T1, 90 pregnant women were recruited (M = 30; SD=4). Two women had a history of psychological disorders (depression and anxiety). Only two women were single. Eighty-five participants (95%) reported that they usually lived with the father of their child. Sixty-six participants (73%) were in employment. Only 38 women (42%) had attended a prenatal course. At T1, the mean duration of containment was four weeks. Seventy-nine of the women (88%) lived in a house with a garden or a flat with a balcony or terrace. Thirty-three (37%) were on maternity leave, four (5%) were on sick leave for a high-risk pregnancy, 20 (22%) were teleworking, 10 (11%) were on sick leave for reasons unrelated to pregnancy, and 22 (24%) were on short time from work or study. One woman had COVID-19 and six had a friend or relative who had died from the disease. Eighty participants (89%) stated that childbirth had met their expectations.

The posttraumatic stress questionnaire scale goes up to 60 (M = 11.7, SD=9.6). The mean post traumatic growth score was 35.27 (SD=22.45).

The mean MPSS score was 71.46 (SD=13.49). The depression scores at T1 (M = 10.54, SD=4.61) and T2 (M = 8.3, SD=4.9) differed significantly. The mean prenatal anxiety symptom score during the COVID-19 epidemic was M = 42.77 (SD=12.06). The mean IERQ score was 54.81 (SD=13.65).

3.1.1. Correlation analyses

Spearman’s correlation test was used to assess all five starting hypotheses (Table 1). The first hypothesis related to the influence of social support on worry about the impact of COVID-19 on the fetus/baby. As expected, the level of worry about the baby generated by COVID-19 was significantly and negatively associated with the degree of perceived social support (Rho=−0.21; p<0.05).

Our second hypothesis related to concern for the fetus/baby due to COVID-19 vs. state anxiety and depression symptoms. The depression scores at T1 (M = 10.54, SD=4.61) and T2 (M = 8.3, SD=4.9) differed significantly. The scoring guide indicated possible depression in 9 women. As we had hypothesized, there was a significant positive correlation between the concern for the fetus/baby on one hand and the mother’s symptoms of anxiety (Rho=0.60; p<0.01) and depression (Rho=0.37; p<0.01) on the other.

Our third hypothesis concerned the relationship between perinatal stress during lockdown and the levels during normal (non-epidemic) periods. The posttraumatic stress questionnaire scale goes up to 60 (M = 11.7, SD=9.6). One of the 26 women at T2 met the criteria of PTSD with dissociative symptoms. Hence, the prevalence of postpartum PTSD in our study population was around 3%. The mean prenatal anxiety symptom score during the COVID-19 epidemic appeared to be higher than in a control population in the literature before the pandemic time (M = 42.77, SD=12.06).

Our fourth hypothesis concerned the relationship between emotion regulation via soothing and general concerns about COVID-19 levels. Unexpectedly, soothing ability was not linked significantly with worrying about COVID-19 (Rho=−0.35; p = 0.08).

Our fifth hypothesis concerned the impact of posttraumatic growth on the use of interpersonal emotion regulation. Posttraumatic growth was not significantly correlated with any of the interpersonal emotion regulation subscales (Rho=0.29, p = 0.16 for soothing; Rho=0.26, p = 0.20 for social modeling; Rho=0.28; p = 0.17 for perspective-taking; Rho=0.35; p = 0.08 for enhancing positive affect).

Table 1

| General concerns | Concerns baby COVID | STAI | MSPSS | EPDS T1 | EPDS T2 | IERQ Soothing | IERQ Perspective Taking | IERQ Positive Affect | IERQ Social Modeling | CBTQ |
|------------------|---------------------|------|-------|---------|---------|---------------|------------------------|---------------------|----------------------|-------|
| 1 - General concerns COVID | – | – | .76** | – | – | – | – | – | – | – |
| 2 - Concerns baby COVID | – | – | .59** | .60** | – | – | – | – | – | – |
| 3 - STAI | – | – | .23** | – | – | – | – | – | – | – |
| 4 - MSPSS | – | – | .32* | .21* | – | – | – | – | – | – |
| 5 - EPDS T1 | – | – | .64** | .37** | .64** | .51** | – | – | – | – |
| 6 - EPDS T2 | – | – | .19 | .08 | .02 | .17 | .22 | – | – | – |
| 7 - IERQ Soothing | .35 | .25 | – | .04 | .40 | .34 | .29 | – | – | – |
| 8 - IERQ Perspective Taking | .02 | .13 | .02 | .02 | .02 | .06 | .33 | .50** | – | – |
| 9 - IERQ Positive Affect | – | – | .01 | .07 | .37 | .24 | .09 | .28 | .29 | .41* |
| 10 - IERQ Social Modeling | – | – | .41* | .27 | .03 | .24 | .01 | .10 | .16 | .56** |
| 11 - CBTS | .04 | .19 | .24 | .09 | .40 | .26 | .23 | .12 | -.11 | .03 |
| 12 - PTGI | .12 | .10 | .17 | .03 | – | -.37 | -.55** | .29 | .28 | .35 |

* Correlation is significant at the 0.05 level.
** Correlation is significant at the 0.001 level.
3.2. Exploratory analysis

We tested the strongest correlations, such as the relationship between general concern about the COVID-19 pandemic and social support levels (Rho=-0.23, p<0.05). Unexpectedly, we found a lack of association between the respective depression scores at T1 and T2. (Rho=-0.22; p = 0.28). However, we found a correlation between the posttraumatic growth score and the T2 depression score (Rho= 0.55; p<0.01) but not with the T1 depression score (Rho=-0.37; p = 0.06) - even though the mean and maximum depression scores at T1 (M = 10.54, SD= 4.61, max=22) were higher than at T2 (M = 8.27, SD=4.91, max=18).

Lastly, we observed a significant, inverse relationship between the level of social support and the level of depression symptoms at T1 (Rho=0.51; p < 0.01); the high the level of social support reported by a mother, the lower her depression symptom score.

4. Discussion

4.1. Theoretical objectives

The objectives of the present longitudinal study were to (i) understand the potential impacts of concern about the COVID-19 epidemic and containment measures (e.g. lockdown) on the psychological and emotional status of women during pregnancy and after childbirth, (ii) identify factors associated with these impacts, and (iii) to study the mothers’ coping strategies and protective factors. We assessed the mothers-to-be’s emotional state and levels of anxiety and depression. The intensity of the crisis was assessed in terms of the level of posttraumatic stress level and the level of concern about COVID-19 (in general and regarding the fetus/baby in particular). The postpartum status and coping strategies were tested through the constructs of social support, posttraumatic growth, and the ability to adopt a new perspective when confronted with a crisis.

4.2. Summary of the results

Firstly, the relationship between social support and the level of worry about the fetus/baby during the COVID-19 pandemic was statistically significant. This finding was consistent with the literature data. Indeed, it has been reported that social support protects against postpartum anxiety (Aktan, 2012).

Our results confirmed the hypothesized correlation between concern for the fetus/baby because of COVID-19 on one hand and symptoms of anxiety and depression on the other; the more the mother worried about the impact of the pandemic on their baby, the higher her anxiety and depression scores. This is again consistent with the literature, since high levels of stress during a crisis may trigger the development of anxiety and depression (Biaggi, Conroy, Pawlby & Pariente, 2016).

The third hypothesis compared the study participants’ anxiety and PTSD scores with normative (control) data collected outside a pandemic period (McLaughlin, Mennin & Farach, 2007) and during the perinatal period (Marques, Monteiro, Canavarro & Fonseca, 2018). Our study participants did not report an anxiety disorder. It is therefore possible that none of the participants had difficulty regulating her emotions. The changes in the scores were small and nonsignificant. It would be interesting to focus on emotion regulation strategies other than soothing.

The last hypothesis was not confirmed; we did not observe a significant correlation between posttraumatic growth and interpersonal emotion regulation. This lack of significance might be due to the absence of a link between postpartum PTSD and posttraumatic growth. Only one woman met the criteria PTSD, and the questionnaires were completed only a month after childbirth.

In fact, the literature data show that posttraumatic growth does not stabilize until six months after its diagnosis (Moore et al., 2011).

Due to the sample size associated with the Spearman’s correlations, the results of this study should be considered with caution. As a result, the study should be defined as exploratory.

4.3. Limitations

The present study had a number of limitations and biases. Firstly, we cannot rule out the presence of social desirability bias. We did not control for this potential bias, and social desirability is known to particularly influence young parents (Bornstein et al., 2016). Secondly, the participants were not recruited from a population with a confirmed diagnosis of postpartum PTSD, which may explain the lack of some significant relationships. It is possible that low severity led to smaller effects. Thirdly, the drop-out rate between T1 and T2 was significant, this may be due in part to the psychological difficulties encountered by some mothers after giving birth which led them to withdraw from the study. It would be interesting to replicate this study with more participants in a second phase. Fourthly, the one-month time interval between T1 and T2 might have been too short. Fifthly, some information was not asked to the new mothers, such as the presence or type of anesthesia, the presence of the father. It could have an impact on postpartum PTSD. Lastly, on a methodological level, the study data were self-reported; the participating mothers may therefore have been influenced by cognitive distortions that were specific to their experiences (Bates, & Bayles, 1984; Foreman & Henshaw, 2002). In turn, this might have weakened the objectivity and reliability of the results.

Declaration of Competing Interest

The authors declares that there is no conflict of interest regarding the publication of this article.

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