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Maternal and Paternal Perinatal Affective Disorders and Couple Functioning

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I imagine that there are similarities between writing a dissertation and being an expectant mother.

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Contents

1. General introduction

1.1 Main aims and research questions

This thesis is based on four studies originating from a project in collaboration with ASL Roma 1.

The overall aim of the first three studies was to analyze in a dyadic perspective the role of couple functioning in the onset of maternal and paternal perinatal affective disorders.

The main goal of the fourth study was to define and identify paternal affective disorders according to a masked depression framework, that postulates that male depression signs and clinical expressions are different from those observed in maternal perinatal affective disorders since men often exhibit externalizing symptoms defined as depressive equivalents, to hide their depression condition.

Specifically, the research question that prompted the first study was:

1. Is a poor couple functioning perceived by both partners a risk factor in the development of Maternal and Paternal Perinatal Affective Disorders? If so, which dimensions of couple functioning are more influential for expectant mothers and fathers?

Regarding the second study, the research question was:

1. Can the perception of a poor couple functioning of one partner affect the mental health of the other during the perinatal period?

For the third study, the research questions were:

1. Can high levels of perceived stress by one partner affect the marital satisfaction of the other partner?
2. Is marital satisfaction of a partner a mediator of the relationship between own perceived stress and perinatal affective disorder of the other partner?

Finally, the main research question of the fourth study was:

1. According to a masked depression framework, is it possible to identify profiles of psychological distress in expectant fathers based on their levels of anxiety, addiction (substances and behaviors), depression, anger/hostility and somatization?

1.2 Background

1.2.1 Maternal Perinatal Affective Disorders

The perinatal period is a profound time of transition for women and their families; a myriad of determinants -including social, psychological, behavioral, environmental, and biological forces- shape pregnancy and the postpartum course (Misra, Guyer, & Allston, 2003; O'Connor, Rossom, Henninger, Groom, Burda, 2016.) Due to the complexity of this vulnerable time, psychiatric complications such as maternal depression and anxiety, often know as affective disorders, are common during the perinatal period with important public health implications (Wisner et al., 2013).

Moderate or severe episodes of affective disorders occurring in relation to childbirth have been recognized for centuries. The first description of mood symptoms in the perinatal period can be traced back to the *Corpus Hippocraticum* around the first half of the fourth century BC.

To date, although there have been more over 4000 publications on perinatal affective disorders in the last decade, the diagnosis and classification of such disorders are still subject to much debate.

DSM, authored by the American Psychiatric Association (APA), and ICD, by the World Health Organization (WHO), are the most widely used classification systems. They provide both researchers and clinicians with explicit criteria for disorders, improving communication and enabling better diagnostic agreement (APA,2013; WHO, 1992).

The ICD-11 (WHO, 2019) category "mental and behavioral disorders associated with pregnancy, childbirth or the puerperium, without psychotic symptoms" includes a syndrome associated with pregnancy or the puerperium (commencing within about 6 weeks after delivery) that involves significant mental and behavioral features, most commonly depressive symptoms.

The syndrome does not include delusions, hallucinations, or other psychotic symptoms. ICD emphasizes that if the symptoms meet the diagnostic requirements for a specific mental disorder, that diagnosis should also be assigned. This category should not be used to describe mild and transient depressive symptoms that do not meet the diagnostic requirements for a depressive episode, which may occur soon after delivery (so-called postpartum blues).

According to the Diagnostic and Statistical Manual of Mental Disorders -5 (DSM -5; APA, 2013), mood episodes (depressive, manic, hypomanic) with onset in pregnancy or within 4 weeks' postpartum can be recorded via the specifier "with peripartum onset". If a depressive episode presents at least three manic/hypomanic symptoms or a manic/hypomanic episode presents at least three depressive symptoms, the "mixed features specifier" should also be recorded. Also, DSM 5 does not distinguish between mood episodes occurring in pregnancy and those with a postpartum onset. Compared to the previous version, DSM-IV (APA, 2000), that included only a postpartum onset specifier, the DSM -5 acknowledges the clinical importance of mood disorders, especially depression, occurring during pregnancy. However, if there is something specific about childbirth as a trigger of episodes, by including pregnancy in addition to postpartum onset risks losing this specificity.

It also been argued that a 4-week window for a postnatal onset is too narrow and, at least for depression, not supported by research and clinical practice (Di Florio et al., 2013). Although DSM-5 mentions the presence of severe anxiety symptoms in perinatal depression and the association between anxiety in pregnancy and postpartum depression, the classification of anxiety disorders in DSM-5 does not include a peripartum onset specifier.

While the previous DSM-IV category Depressive Disorder NOS included "minor depression", DSM-5 introduces the category of "other specified disorders". This is intended to encourage the clinicians to record the reason why a depressive illness causing distress or impairment does not meet the criteria for the full-blown disorder. This category includes depressive episodes lasting more than 4 days but less than 15 and "depressive episodes with

insufficient symptoms" (depressed mood with at least one of the other eight symptoms of major depressive episode).

In summary, the diagnosis and classification of maternal perinatal affective disorders are still controversial.

1.2.2 Prevalence, Trajectory and Symptomatology

Perinatal depression and anxiety are clinical syndromes commonly described as the onset of a major depressive episode (MDE) or significant symptoms occurring during pregnancy and/or in the postpartum period (Gavin et al., 2005; O'Hara & Swain, 1996; Wisner et al., 2013). Symptoms that occur during pregnancy are often referred to as antenatal or prenatal depression or anxiety. While symptoms that occur in postpartum period are usually described as postpartum/postnatal depression or postnatal anxiety.

Maternal postnatal depression has been the most widely studied perinatal psychiatric illness, although controversy exist regarding how best to define the onset of symptoms in the postpartum period (Elliot, 2000). For this reason, a common broader definition of maternal "perinatal depression" (MPND) that includes onset of mood and anxiety symptoms occurring during pregnancy and in the first postpartum year was used throughout in this dissertation.

Antenatal depression affects between 7% and 13% of women (Bennett, Einarson, Taddio, Koren, & Einarson, 2004; Bowen & Muhajarine, 2006), whereas the prevalence of postpartum depression varies between 10% and 20% (Gavin et al., 2005; O'Hara & McCabe, 2013; Vigod, Villegas, Dennis, & Ross, 2010; Woody, Ferrari, Siskind, Whiteford, & Harris, 2017; Wikman, Mattsson, von Essen, & Hovén, 2018).

Depressive symptoms occur on a continuum of severity, and not all women will meet diagnostic categories. The clinical presentation of MPND is often characterized by mood symptoms that cause significant distress to women (Bernstein et al., 2008; O'Hara & McCabe, 2013). Sadness, weepiness, low mood, irritability, impaired concentration, and feeling overwhelmed are commonly reported symptoms (Hendrick, Altshuler, Strouse, & Grosser, 2000). Moreover, anxiety or agitation

is often a distinguishing feature of perinatal depression and can take the form of ruminating and obsessional thoughts, often about the pregnancy course or the infant (Abramowitz et al., 2010). In the postpartum period, women with PND can demonstrate sever hypervigilance about the baby and will be unable to sleep at night, even when baby is sleeping, due to concerns about the infant's well-being (Sedov & Tomfohr-Madsen, 2020; Swanson, Pickett, Flynn, & Armitage, 2011). Alternatively, some women can report feeling detached from the infant and/or can exhibit a lack of interest in holding, interacting, or caring for their baby. Another important clinical signal is that most women with perinatal mood symptoms report feelings of guilt for not being able to feel enjoying the baby (Yonkers, Vigod, & Ross, 2012).

The "baby blues" is a common, transient mood disturbance that can affect about 70% of new mothers for up to ten days following delivery (APA, 2000). Its symptoms consist of tearfulness, irritability, anxiety, emotional lability, interpersonal hypersensitivity, insomnia and sometimes elation but does not impair functioning (O'Hara, 2009).

The presence of distinct trajectories of PND has been suggested (i.e., Altemus et al., 2012; Putnam et al., 2017), although these are yet not distinguished in current clinical diagnostic criteria (APA, 2013). To date, no one single method for determining trajectories has been adopted. Whereas some studies use advanced statistical methods to determine trajectories, others employ methods based on symptom profiles and severity. Different trajectories, e.g., depression exclusively during pregnancy, exclusively in the postpartum period, or throughout the pregnancy and postpartum, may have different pathogenesis and consequences for the mother as well as for her family. A systematic review of 22 longitudinal studies including more than 38,000 women found between two and six different symptom trajectories (Santos, Tan, & Salomon, 2017). In studies adopting elaborate statistical modeling when determining PND trajectories, a three-trajectory classes solution is most reported, though many studies also support a five -trajectory classes solution. Notably, significant heterogeneity regarding onset, severity, and stability of trajectories has been identified across studies (Baron, Bass, Murray, Schneider, & Lund, 2017; Santos et al., 2017). Despite differences

observed between studies, the three most reported trends in PND trajectories are: (a) a rapid decline in depressive symptoms from onset through the first year postpartum, (b) depressive symptoms that increase from pregnancy to postpartum and then decline, and (c) increasing depressive symptoms over time. Several studies distinguish between a low and high symptom severity trajectory, where the low symptom trajectory is characterized by low levels of symptoms, remaining stable over time. Across studies, most women are classified as belonging to a low symptom level trajectory, suggesting this pattern may be normative. The high symptom trajectory, characterized by severe depressive symptoms that remain stable over time, is less common (Santos et al., 2017). In a recent study by Wikman et al., (2020) five distinct trajectories of perinatal depressive symptom onset were found: (a) *healthy*, (b) *pregnancy depression*, (c) *early postpartum onset*, (d) *late postpartum onset*, and (e) *chronic depression*. Results of the study showed how different MPND trajectories have different characteristics and risk factors and, they underlined the importance to consider them in the creation of individualized treatment for women with perinatal affective disorders.

1.2.3 Risk Factors for Maternal Perinatal Affective Disorders

Since MPND is a multifaceted disease that includes different times of onset and levels of symptoms severity, many studies have focused on identifying its risk factors.

With regard to risk factors for prenatal depression and anxiety, studies have found that women with marital issues are three times more likely than women who are not experiencing marital issues to have antenatal depression or anxiety (Agostini et al., 2015; Alipour, Kheirabadi, Kazemi, & Fooladi, 2018; Biaggi, Conroy, Pawlby, Pariante, 2016; Escribè-Agüir, Gonzalez-Galarzo, Barona-Vilar, & Artazcoz, 2008; Morse, Buist, & Durkin, 2000) In addition, women who are unmarried are at a significantly higher risk of developing antenatal depression (Koleva, Stuart, O'Hara, & Bowman-Reif, 2011). In a cross-sectional study, unmarried participants were 2.26 times more likely to have antenatal depression compared to their married counterparts (Faisal-Cury & Rossi Menezes, 2007). Similarly, support from family and friends significantly reduces the

likelihood of developing antenatal depression and anxiety (Glazier, Elgar, Goel, & Holzapfel, 2004; Kalra & Einarson, 2006).

There are other risk factors associated with antenatal depression and anxiety. Leigh and Milgrom (2008) recruited 367 participants to complete several questionnaires in their second and third trimesters to determine the factors associated with antenatal depression. They found that those who had experienced major negative life events, had low self-esteem, had a history of abuse, or had negative thought processes were significantly more likely to have antenatal depression.

Research demonstrates that a history of depression, unplanned pregnancy and history of abuse or domestic violence can significantly increase a woman's likelihood of developing antenatal depression (Abajobir, Maravilla, Alati, & Najman; 2016; Biaggi et al., 2016). Bunevicius et al., (2009) conducted a longitudinal study with 230 participants, screening them for depression at three time points (at 12-16 weeks, 22-26 weeks, and 32-36 weeks gestation). At all three time points, a history of depression and an unwanted or unplanned pregnancy significantly predicted the likelihood of antenatal depression. At 12-16 weeks, participants with an unplanned/unwanted pregnancy were 7.78 times more likely to experience depression and participants with a history of depression were 11.78 times more likely to have depression. Those with an unplanned/unwanted pregnancy at 22-26 weeks were 16.83 times more likely to have depression, and those who had a history of depression were 10.10 times more likely to experience depression. Finally, at 32-36 weeks, unplanned pregnancy (OR = 10) and history of depression (OR = 6.67) predicted depression.

Lee et al., (2007) found that younger, primiparous women (i.e., pregnant with their first child) with a history of smoking were 2.33 times more likely to have antenatal anxiety. Women who have a history of alcohol use and who have a lower level of completed education experience significantly more antenatal depression and/or anxiety (Faisal-Cury & Rossi Menezes, 2007; Lee et al, 2007).

Regarding risk factors of postpartum depression several meta-analyses and systematic reviews were completed (O'Hara & Swain, 1996; O'Hara & McCabe, 2013; Robertson, Grace,

Wallington, & Stewart, 2004). Based on these reviews, risk factors with moderate to strong associations with postpartum depression include history of depression, depression and anxiety during pregnancy, neuroticism, low self-esteem, postpartum blues, stressful life events, poor marital relationship, and poor social support (O'Hara & McCabe, 2013). Other relevant risk factors that have smaller associations with postpartum depression include low socioeconomic status, being single, unwanted pregnancy, obstetrical stressors, and difficult infant temperament (O'Hara & McCabe, 2013; Robertson et al., 2004). What these findings suggest is that three constellations of risk factors exist: history of psychiatric illness, which may range from mild to severe, life stress, and poor social relationships, especially a poor marital relationship.

1.2.4 Screening for Maternal Perinatal Affective Disorders

Since 2017, the Italian Ministry of Health has directed that screening for perinatal affective disorders is to be included in the care provided by Family Care Centers (FCCs) to women during pregnancy and after birth, for prevention purposes. This directive established for the first time a clinical awareness that the care provided to pregnant and postpartum women in the Italian NHS should encompass attention to their mental health**.** In 2018, the Ministry of Health supported a pilot study which implemented postpartum depression management initiatives in 16 Italian regions. The first results of these regional experiences will hopefully help to identify effective models for mental health promotion, prevention and intervention in the perinatal period (Grussu, Lega, Quatraro, Donati, 2019).

Evidences shows that routine screening for MPND are useful to improve outcomes, but it does not mean that screening and identification are ends in and of themselves (Liberto, 2012). Indeed, there must be a chain of evidence beginning with screening, going through the subsequent steps (assessment, diagnosis, therapy initiation, follow-up, and monitoring), and resulting in improvement in maternal depressive symptoms or amelioration of the negative outcomes for infants (Apter-Levy, Feldman, Vakart, Ebstein, & Feldman, 2013; Ierardi, Ferro, Trovato, Tambelli, &

Crugnola, 2019; O'Higgins, Roberts, Glover, & Taylor, 2013) and families (Letourneau et al., 2012) related to MPND (Rosenfield, 2007, Yawn et al., 2012).

The Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987) is the most widely used method to screen for MPND (Hewitt, Gilbody, Mann, & Brealey, 2010). The EPDS was developed specifically for use in the postnatal period to screen for depression, but it has been in wide use internationally in the prenatal period too (Bergink et al., 2011; Cox & Holden, 2003). It is a 10-item self -report instrument which requires women to respond to 10 statements relating to symptoms of depressed mood, anhedonia, anxiety, and self-harm in the previous week. For each item, there are four possible responses rated from 0 to 3 according to severity and frequency. Responses for the 10 items are summed to yield a maximum score of 30. Three items in the EPDS detect an anxiety factor in both prenatal and postnatal populations (Della Vedova & Matthey, 2016; Matthey, 2008; Matthey, Fisher, & Rowe, 2012), and the last item concerns thoughts of self-harm. The most used cutoff score for indicating possible depression is greater than or equal to 13. A synthesis of more than 40 studies located an optimal EPDS cutoff point of greater than or equal to 13 for major depression and 10 for major and minor depression combined (Hewitt et al., 2009). For the Italian validation of the EPDS (Benvenuti, Ferrara, Niccolai, Valoriani, & Cox, 1999) a cutoff of greater than or equal to 12 is used for detecting women at risk of MPND.

Several other instruments have also been used for screening MPND; these include generic and perinatal specific self-report questionnaires. Alternative methods include the use of clinician-rated scales and case-findings questions. Among the latter the *Whooley Questions* (Whooley, Avins, Miranda & Browner, 1997), a 2- question instrument, are widely used in the primary care by physicians to quickly assess the risk of MPND.

1.2.5 Paternal Perinatal Affective Disorders

The birth of a child can change a man forever. His relationships with his partner and his view of himself are permanently altered. Men's health has the potential to be influenced by the

transition to fatherhood. Becoming a father for many men signals a shift away from individualism and leads to an increasing sense of personal responsibility and self-reflection that initiates positive behavior changes (Philpott & Corcoran, 2018). Research has shown that fatherhood has a protective effect on men's health (Markey, Markey, Schneider, & Brownlee, 2005), but for some men, the inevitable stresses and adjustments of parenthood can overwhelm their coping ability, and as a result, their mental health suffers (Madsen, 2019; Philpott, Savage, Leahy-Warren & FitzGearld, 2020).

Thus, in the last decades there has been an increased interest in men's perinatal mental health (Baldoni, 2010; Garfield, 2015; Field, 2018; Philpott et al., 2020). In this scenario, Paternal Perinatal Depression (PPND) is considered a specific condition that affects many fathers between pregnancy and the first year after childbirth. PPND is associated with maternal depression (Baldoni, Baldaro & Benassi, 2009; Paulson, Bazemore, Goodman, & Leiferman, 2016) and adverse outcomes in children and adolescents, including externalizing and internalizing symptoms (Kane & Garber, 2004; Ramchandani and Psychogiou, 2009; Sweeney and MacBeth, 2016).

Unfortunately, PPND is not widely acknowledged or well researched, and it is not recognized as an official psychiatric disorder; according to the DSM-5, there are no official criteria to make a diagnosis of PPND (APA, 2013), and there is still a lack of agreement on its defining factors, probably reflecting the composite nature of PPND and methodological problems in assessment instruments.

Anyhow, fathers are not usually the focus of the prevention, screening and assessment of perinatal affective disorders, and PPND remains underestimated and undertreated compared to maternal depression. A possible explanation is that men tend to show a less clear clinical picture than women do and thus the use of screening questionnaires developed for mothers may be not appropriate (Baldoni & Giannotti, 2020). Another potential explanation could be that fathers are more reluctant than their female partners to seek help for psychological issues (Bruno, 2020; O'Brien, Hunt, & Hart, 2005; Rochlen et al., 2010).

1.2.6 Prevalence, Trajectory and Symptomatology

Studies that estimate the prevalence of PPND vary depending on the sample and measure of depression that is utilized. Two metanalyses showed a PPND prevalence in the word ranging from 10.4% (Paulson and Bazemore, 2010) to 8.4% (Cameron, Sedov, & Tomfohr-Madsen, 2016).

Another recent metanalysis showed different percentages of prevalence of PPND based on the time of assessment. Specifically, they found that the prevalence of prenatal depression in fathers was 9.76% in all three trimesters, 13.59% in the first, 11.31% in the second and 10.12% in the third one. The prevalence of postpartum depression was 8.75% within a whole year, 8.98% within one-month, 7.82% between one- and three months, 9.23% between three months and six months and 8.40% between six months to twelve months after childbirth (Rao et al., 2020).

The trajectory and symptomology of peripartum depression in fathers can look different than that of mothers. Depression in fathers may begin later during the first year of the baby's life, and some research suggests it manifests during the 3-6 months postpartum period (Bielawska-Batorowicz & Kossakowska-Petrycka, 2006; Kim & Swain, 2007; Paulson & Bazemore, 2010). Less is known about the trajectory of depression for fathers during their partner's pregnancy, even though longitudinal studies found that pregnancy is the most sensitive period for the onset of symptoms in both men and women (Condon, Boyce, & Corkindale, 2004; Figueiredo & Conde, 2011; Huang & Warner, 2005; Madsen and Juhl, 2007). One study found that half of men who were depressed before the birth of their child were also depressed 8 weeks postpartum, indicating the importance of attuning to a father's mental health both during and after their partner's pregnancy (Ramchandani et al., 2008). Fathers whose partners are depressed have reported feeling isolated, overwhelmed, scared and stigmatized (Davey, Dziurawiec, & O-Brien-Malone, 2006). Starting from the prenatal period a relation between depressive and anxious symptomatology has been observed in fathers (Chen, Huang, Au, & Chen 2019; Fletcher, Matthey, & Marley, 2006; O'Brien et al., 2017; Wee, Skouteris, Richardson, McPhie, & Hill, 2015). Anxiety disorder (GAD, panic

attacks, PTSD) may be even more frequent than typical depressive symptoms in men (Wynter, Rowe, Fisher, 2013). Recent findings showed a prevalence ranging from 4.1 to 16% before childbirth and a stable course across the perinatal period (Leach, Poyser, Cooklin, & Giallo 2016).

Considering clinical features, PPND differs from MPND, since men and women express depression and cope with it in different ways (Baldoni & Ceccarelli, 2010; O'Brien et al., 2017). For both men and women, depression presents as a dysphoric mood with reduced activity; however, in men, exhaustion, fatigue, self-criticism, irritability, restlessness, and anger attacks prevail over low mood. Depressive symptoms are often comorbid with anxiety and obsessive disorders, and a range of somatic symptoms and complaints, along with substance use (alcohol, smoking, or drugs) or other addictions (e.g., gambling, compulsive use of computer, smartphone, or internet), which can mask the main symptoms of PPND, are also frequent (Baldoni & Giannotti, 2020; Kim & Swain, 2017). Depressed men are also more likely to display hyperactive or avoidance behavior, interpersonal conflicts, and lower impulse control than depressed women (O'Brien et al, 2017).

Furthermore, PPND must be distinguished from the "Couvade Syndrome", a disorder characterized by somatic symptoms, such as nausea, swelling, tension, and abdominal pain and by the activation of regressive or passive feminine behaviors with peculiar concerns in pregnancy (Masoni, Maio, Trimarchi, de Punzio, & Fioretti, 1994).

Given the frequent comorbidities, Baldoni, Matthey, Agostini, Schimmenti, and Caretti (2016a, 2016b, 2018) proposed to replace the term PPND with Paternal Perinatal Affective Disorder using a more comprehensive definition to encompass the broad range of depressive equivalents associated with male psychological perinatal distress.

1.2.7 Risk Factors of Paternal Perinatal Affective Disorders

The development of paternal affective disorder has been associated with several psychosocial factors (Baldoni & Ceccarelli, 2010). Specifically, research has showed that maternal depression is the strongest predictor for the development of paternal depression, anxiety, and

psychological distress, with rates ranging from 24% to 50% (Goodman, 2004). There is accumulating evidence that partners of perinatal depressed women reported feelings of anger, helplessness, fear, confusion, along with a sense of isolation and uncertainty about the future, loss of intimacy, and disruption of family social and leisure activities (Goodman, 2008).

An unsatisfactory couple relationship emerged in studies conducted on both maternal (Morse et al., 2000) and paternal depression (Bergström, 2013). Low levels of satisfaction and marital cohesion associated with high levels of perinatal distress can occur (DeMontigny, Girard, Lacharité, Dubeau, Devault, 2013; Morse et al., 2000). An increase in the need for protection, with the activation of the attachment figure, is hypothesized as a trigger for anxiety and depression during the transition to parenthood, especially in couples with insecure attachment (Baldoni, 2010).

High levels of stress maintained throughout the pregnancy up to 18 months after childbirth are considered predictive of depressive symptomatology (Nilsen, Waldenström, Rasmussen, Hjelmstedt, Schytt, 2013).

Moreover, PPND seems to be influenced by several personality traits, psychological features, and childhood antecedents of both mother and father, such as the presence of depressive traits, neuroticism, low level of extraversion, immature defensive styles, low educational level, and history of physical or sexual abuse (Dudley, Roy, Kelk, Bernard, 2001). Other psychosocial risk factors are an unexpected pregnancy, previous abortions or the death of a child, frustrated expectations related to the birth (e.g., the desire of a child of a different sex), and insufficient information about childbirth and pregnancy, low self-esteem, and the perception of poor parenting skills (Boyce, Condon, Barton, Corkindale, 2007). In addition, fathers' sense of mastery influences the perception of family functioning (Ferketich, & Mercer, 1995) in such a way that being unemployed or having work-family conflicts are perceived as a failure to achieve paternal role competence and has been found to be significantly predictive of paternal mental health problems (Koh, Chui, Tang, Lee, 2014). Even the young or advanced ages represent a risk factor (DeMontigny et al., 2013; Nilsen et al., 2013).

1.2.8 Screening for Paternal Perinatal Affective Disorders

Given the widespread use of the EPDS for detecting probable depression and anxiety among mothers, screening for PPND with the EPDS would seem to offer a starting point. However, the reliance on traditional depression questions in the EPDS may need to be addressed. Indeed, the possibility of a male-specific type of depression suggest a need for both gender-sensitive screening tools and treatment options tailored to fathers (Martin, Neighbors, & Griffith 2013). Although measures to assess male-type depressive symptomatology are available, such as the Gotland Male of Depression Scale (GMDS, Zierau, Bille, Rutz & Bech, 2002), they have not been specifically developed for the perinatal period. Indeed, research and screening of perinatal affective disorders are based almost exclusively on self-report tools that only consider symptoms associated with MPND. In this regard, recent findings highlighted several limitations of traditional scales in capturing paternal psychological distress (Baldoni & Giannotti, 2020).

For instance, even if EPDS has been validated in fathers (Matthey, Barnett, Kavanagh, & Howie, 2001; Edmondson, Psychogiou, Vlachos, Netsi, & Ramchandani, 2010; Lai, Tang, Lee, Yip, & Chung 2010; Loscalzo, Giannini, Contena, Gori, & Benvenuti, 2015), there is still no agreement on the optimal cut-off scores for depression and anxiety, which vary across studies. Moreover, Nishimura and Ohashi (2010) revealed different rates of at-risk fathers using the Center for Epidemiological Study Depression Scale (CES-D, Radloff, 1977) (7.5%; cut-off $\geq$ 16) and the EPDS (11.6%; cut-off $\geq$ 9). A Danish study (Madsen & Jhul, 2007) documented that 20.6% of the at-risk fathers exceed the cut-off value on the GMDS but not on the EPDS. Similarly, Carlberg, Edhborg & Lindberg (2018) found that EPDS and GMDS were associated with different risk factors and prevalence of PPND. Interestingly, a specific subgroup of fathers only showed externalizing symptomatology without conventional depressive symptoms, proving that a multidimensional and gender-based screening should be used to cover different aspects of paternal perinatal distress.

Considering these limitations, the number of at-risk fathers may be often underestimated, especially when the screening process does not include the assessment of male-type depressive symptoms.

Recently, a team of researchers developed the Perinatal Assessment of Paternal Affectivity (PAPA) (Baldoni et al., 2016a, b, 2018) a new self-report questionnaire for the screening of affective symptoms in fathers. This tool is based on recent research on perinatal affective disorders and assesses different dimensions of paternal affective suffering: anxiety, depression, irritability/anger, couple and relational difficulties, somatic complaints, risky behaviors, and addictions (smoking, alcohol, drugs, gambling, internet abuse, physical or sexual compulsive, and risky behavior) considering also some ethnic and sociocultural factors.

1.2.9 Association between Maternal and Paternal Perinatal Depression

A meta-analysis of paternal depression found that 100% of articles that reported on the correlation between maternal and paternal depression found elevated depressive symptomatology in one partner to be significantly associated with corresponding increases in the other's (Paulson & Bazemore 2010). A recent paper described the course of depression in both mothers and fathers from the third trimester of pregnancy through 6 months postpartum and it examined the relationship between maternal and paternal depression. Results of this study showed that prenatal depression in fathers predicted worsening depressive symptom severity in mothers across the first six postpartum months but not vice versa. In both expecting/ new mothers and fathers, depression demonstrated a stable pattern of occurrence and symptom severity between 28- month gestation and 6 months postpartum. Although prenatal maternal depression was not predictive of symptom change in fathers, mothers with prenatally depressed partners showed significant worsening in overall symptom severity during the first six postpartum months (Paulson et al., 2016).

Most studies of perinatal affective disorders in parents have been conducted from two to three months after delivery up to the child's first year and include either the mothers or fathers. Research into parents with depressive symptoms and parental stress in a population-based sample after the first year of childbirth that includes both the fathers and the mothers is scarce. However,

there are a few studies that include younger children which demonstrate the importance of good mental health in both parents for supporting the parent-child relationship and the offspring's mental health (Cuijpers,Weitz, Karyotaki, Garber, & Andersson 2015, Goodman, 2004; Letourneau et al., 2019). The available reports indicate that parental stress and depressive symptoms are also related to caregiving in families with toddlers and older children (Goodman, 2004).

1.2.10 Parental stress during the perinatal period

Stress has been identified as a critical risk factor for the development of depression (Cohen and Janicki-Deverts, 2012; Parker, Schatzberg, & Lyons, 2003) and there is evidence that the onset and duration of depression is strongly linked to stress (Cohen, Janicki-Deverts, & Miller 2007). Moreover, stress is associated with the development of anxiety (Wee et al., 2015) which is more common than depression in the general population (Bandelow & Michaelis, 2015) and among mothers and fathers in the perinatal period (Bergstrom, 2013; Biaggi et al, 2016; Lancaster et al., 2010; Leach et al., 2016; Mazzeschi, Pazzagli, Radi, Raspa, & Buratta, 2015).

To date, stress has been identified as a very broad term. Lazarus and Folkman (1984) in their classic stress model distinguished between predecessors of stress and consequences of stress. They defined stress as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984). This model refers to stress as a transaction between an individual and the environment, in which stress is seen as an adaptive response to an event that may have positive or negative implications for well-being (Cronin, Becher, Christians, & Debb, 2015).

Specifically, parental stress during the perinatal period is defined as a discrepancy between parents' perceived abilities to cope with future parenting and the actual resources available to meet demands of parenting function (Deater-Deckard, 1998).

Several studies have shown that parental stress is a risk factor for developing perinatal depression. For example, Kinser et al., (2018) in a sample of 230 women of different ethnic groups,

found that perceived stress was associated with depressive symptoms detected during the 14th week of pregnancy. In a recent study, Mukherjee, Coxe, Fennie, Madhivanan,& Trepka (2017) found that women who had experienced all four types of stressful events (couple, traumatic, emotional, and financial) showed a higher probability of suffering from postpartum depression (AOR 5.43, 95% IC 5.36-5.51). The same study, exploring the impact of individual stressful life events, also found that couple factors (conflicts with the partner) contributed more to the occurrence of a subsequent postpartum depression condition (AOR 2.21, 95% IC 2.18-2.25).

A recent review on the fathers' stress during the perinatal period found that stress had a negative impact on fathers, with higher stress levels contributing to mental health issues such as anxiety, depression, psychological distress and fatigue (Philpott et al., 2020). Moreover, stress levels were found to increase from the antenatal period to the time of birth, with a decrease in stress levels from the time of birth to the later postnatal period (Wee et al., 2015). There are several factors that contribute to stress in fathers in the perinatal period and these included negative feelings about the pregnancy, role restrictions related to becoming a father, fear of childbirth and feelings of incompetence related to infant care (Hildingsson & Thomas, 2014).

Given evidence that parental stress seems to be correlated with increased depression during pregnancy (Dayan et al., 2010; Lancaster et al., 2010; Soliday, McCluskey-Fawcett and O'Brien, 1999), which has been associated with adverse birth outcomes (Grote et al., 2010) and postpartum depression (O'Hara & Swain, 1996; O'Hara & McCabe, 2013; Paulson, & Bazemore, 2010), it is important to implement interventions that can reduce the effects of stress on the mental health of both new parents.

1.2.11 Perinatal Affective Disorders and Couple Functioning

The birth of the first child and the changes that accompany the transition from a couple to a triad have been portrayed in the past as a constituting "crisis event" (Wallace & Gotlib, 1990). Indeed, the perinatal period is often associated with major changes in the couple relationship,

possibly leading to marital stress (Levy-Shiff, 1994), decline in marriage quality and satisfaction (Cowan & Cowan, 2000), and greater psychological distress. Poor marital quality (e.g., low marital satisfaction) and low partner support have been reported to predict high depression levels in both members of the couple (Leigh & Milgrom, 2008; McMahon, Barnett, Kowalenko, & Tennant, 2005). However, romantic relationships can even be a protector factor against the experience of stress and psychological distress during the transition to parenthood (Simpson, Rholes, Campbell, Tran, & Wilson, 2003).

Couple's satisfaction levels of both partners are often correlated during the transition to parenthood (Belsky, 1985), and may be negatively affected by one parent's affective disorder (Paulson & Bazemore, 2010). Several studies have shown a negative correlation between perinatal parental depression and a couple's satisfaction, especially in primary parents (Agostini et al., 2015; Bielawska-Batorowicz & Kossakowska-Pietrycka, 2006; Dudley, Roy, Kelk, & Bernard, 2001; Morse et al., 2000). Some authors suggested that important risk factors for maternal and paternal depression were dyadic maladjustment and couple's problems (Demontigny et al., 2013; O'Mahen, Flynn, & Nolen-Hoeksema, 2010; Ripley et al., 2018). These problems are common in primary parents, and are evident for maternal depression (Goodman, 2004; O'Mahen et al., 2010; Ripley et al., 2018) and even more for paternal depression (Bielawska-Batorowicz & Kossakowska-Pietrycka, 2006; Condon et al., 2004; Demontigny et al., 2013). In most cases, there is also a deterioration of intimate and sexual life (Seimyr, Edhborg, Lundh, & Sjögren, 2004).

Other researchers have instead focused on the negative impact that perinatal affective disorders of one or both partners had on marital quality, especially on marital and sexual satisfaction (Banker & LeCoursiere, 2014; Barnes, 2006; Malus, Szyluk, Galińska-Skok, & Konarzewska, 2016; Sipsma et al., 2016).

1.2.12 Family Systems and Family Stress Theories

Family Systems theory (Minuchin, 1985) can provide a framework from which one might understand how a family system is impacted by the conception and birth of a child and the issue of perinatal affective disorders of one or both members of the couple.

Family Systems theory is originally derived from General Systems theory (Bertalanffy (1969). Bertalanffy (1969) as a biologist, began the conversation around systems, introducing the idea that a system is greater than the sum of its parts. He was interested in how systems maintain themselves when new input is introduced, and the role of feedback within a system. He believed that systems tend to exhibit some predictability, and suggested that living organisms are all open systems, meaning that they can and will be influenced by their environment.

Bateson and his colleagues at the Mental Research Institute in Palo Alto (Bateson, 1956) contributed the idea that family systems seek homeostasis and have a constant pull towards a way of being that feels stable and familiar. Bateson's colleague, Jay Haley (1976), took an interest in the function of a person's symptoms within a system. He was interested in not only locating symptoms within a system but exploring the role and impact that the symptoms played.

Watzlawick, in his text *Pragmatics of Communication* (Watzlawick, Bavelas, & Jackson, 1967), provided many ideas influential to Family Systems theory, including the following: one cannot not communicate, all communication has larger meanings than the basics of what is being said, interpretations of the cause of behavior is going to depend on the position of a person, both non-verbal and verbal communication is important to pay attention to, and complementary communication is going to be influenced by differences in power.

Guiding family systems theory is the principle that an individual can only be understood by considering their context, as individuals within systems are necessarily interdependent and a member of several different subsystems (i.e., parent-parent, parent-child, child-sibling). Specific processes and rules govern interactions between individuals, both within and across different dyadic subsystems and these become well established over time and come to shape individual members of

the family system over time (Cox & Paley, 1997). Whilst features of any system may be relatively stable, an adaptive system is one that evolves in response to environmental demand and over time.

When a couple become parents for the first time, their family system expands and becomes more complex. New parents must learn how to interact with each other as co-parents in a way that is different from their romantic relationship, resulting in three transitions "his, hers and theirs" (Cowan et al., 1985). In addition to this, expectant and new parents must learn how to interact with their infant and establish boundaries between these three subsystems (i.e., mother-infant, father-infant, mother-father) (Minuchin, 1982). Other relationships connected to the couple change at this time, such as those with the new grandparents or aunts and uncles. These relationships and the community in which new parents find themselves can either facilitate or hinder an adaptive transition to parenthood, with the behavior of others acting as a support or stressor.

Hill (1949), in his classic work on the ABC-X model, the foundation of family stress theory, proposed that family crisis or stress (the X factor) results from a complex three-way interaction (or combination) among (1) the stressor event (the A factor), (2) the resources that families have available (the B factor), and (3) the definition or meaning that families assign to the stressor (the C factor). Originally, family stress theory examined only the circumstances of a "crisis" in which sudden, dramatic events occur (family grief, wars, illness of a family member, natural cataclysms) that incapacitates the family. In contrast, more recent conceptualizations of the X factor have dealt with more normative, cumulative, long-term changes, and, the systemic quality of parental stress within families can now be added to these evolving interpretations (Crnic, Gaze, & Hoffman 2005; Lavee, 2013). According to this theory, some families could perceive normative changes such as pregnancy and childbirth as particularly stressful and this could increase the risk of mental health problems for expectant parents, especially first-time parents (Bergstrom, 2013; Mazzeschi et al., 2015; Philpott, Leahy-Warren, FitzGerald & Savage, 2017; Wee et al., 2015).

In summary, Family Systems and Family stress theories would indicate that every member of the family system should be considered, particularly when a new member is being born and when one or both members of the couple are at risk of perinatal affective disorders.

1.2.13 The Couple and Family Discord Model of Depression

The Couple and Family Discord Model of depression (CFDM, Beach, 2014), formerly known as the marital discord model (Beach, Sandeen, & O'Leary, 1990), underlines the important role of couple dynamics in the development and maintenance of depression. This model suggests that marital discord precedes the development of depressive symptomatology and highlights interpersonal stress processes and the potentially discontinuous nature of marital discord. Moreover, CFDM suggests that consideration of couple and family relational problems may be central to effective interventions and long-term maintenance of gains for many depressed individuals.

Ample research supports robust concurrent and longitudinal associations between discord in one's intimate relationship and depression in both community and clinical samples, with meta-analyses revealing a large effect size (Whisman, 2001). Notably, this association remains significant when controlling for potential confounding factors such as gender, age, education, race, genetics, comorbid anxiety, and discord in other types of relationships (Cao, Zhou, Fang, & Fine, 2017; Whisman, 1999; Whisman et al., 2018; Whisman, Robustelli, & Labrecque, 2018; Whisman, Sheldon, & Goering, 2000; Whisman, Uebelacker, & Weinstock, 2004). Research focused on the perinatal period has also demonstrated notable links between intimate relationship discord and perinatal depression (Brock et al., 2014; Brock, Franz, & Ramsdell, 2020; Milgrom et al., 2008), underscoring the significance of examining intimate relationship processes during pregnancy and after childbirth.

References

Abajobir, A. A., Maravilla, J. C., Alati, R., & Najman, J. M. (2016). A systematic review and metanalysis of the association between unintended pregnancy and perinatal depression. *Journal of affective disorders*, *192*, 56-63.

Abramowitz, J. S., Meltzer-Brody, S., Leserman, J., Killenberg, S., Rinaldi, K., Mahaffey, B. L., & Pedersen, C. (2010). Obsessional thoughts and compulsive behaviors in a sample of women with postpartum mood symptoms. *Archives of women's mental health*, *13*(6), 523-530.

Agostini, F., Neri, E., Salvatori, P., Dellabartola, S., Bozicevic, L., & Monti, F. (2015). Antenatal depressive symptoms associated with specific life events and sources of social support among Italian women. *Maternal and child health journal*, *19*(5), 1131-1141.

Alipour, Z., Kheirabadi, G. R., Kazemi, A., & Fooladi, M. (2018). The most important risk factors affecting mental health during pregnancy: a systematic review. *Eastern Mediterranean health journal*, *24*(6), 549-559.

Altemus, M., Neeb, C. C., Davis, A., Occhiogrosso, M., Nguyen, T., & Bleiberg, K. L. (2012). Phenotypic differences between pregnancy-onset and postpartum-onset major depressive disorder. *The Journal of clinical psychiatry*, *73*(12), 1485-1491.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders, Text Revision* (4th ed., text rev.). Washington, DC: Author.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Author.

Apter-Levy, Y., Feldman, M., Vakart, A., Ebstein, R. P., & Feldman, R. (2013). Impact of maternal depression across the first 6 years of life on the child's mental health, social engagement, and empathy: the moderating role of oxytocin. *American Journal of Psychiatry*, *170*(10), 1161-1168.

Baldoni, F. (2010). Attachment, danger and role of the father in family life span. *Transilvanian Journal of Psychology (Erdélyi Pszichológiai Szemle, EPSZ)*, *4*, 375-402.

Baldoni, F., & Ceccarelli, L. (2010). La depressione perinatale paterna. Una rassegna della ricerca clinica ed empirica. *Infanzia e adolescenza*, *9*, 79–92.

Baldoni, F., & Giannotti, M. (2020). Perinatal Distress in Fathers: Toward a Gender-Based Screening of Paternal Perinatal Depressive and Affective Disorders. *Frontiers in Psychology*, *11*.

Baldoni, F., Baldaro, B., & Benassi, M. (2009). Affective disorders and illness behaviour in perinatal period: correlations between fathers and mothers. *Child Development & Disabilities*, *36*(3), 25-44.

Baldoni, F., Matthey, S., Agostini, F., Schimmenti, A., and Caretti, V. (2016a). Perinatal Assessment of Paternal Affectivity (PAPA): preliminary report on a new screening tool. World Association for Infant Mental Health (WAIMH) Congress (Prague, May 29–June 2). *Infant Mental Health Journal*, 37(1), 132–133.

Baldoni, F., Matthey, S., Agostini, F., Schimmenti, A., and Caretti, V. (2016b). Perinatal Assessment of Paternal Affectivity (PAPA) Manual (version 3.1). Bologna: Department of Psychology, University of Bologna.

Baldoni, F., Matthey, S., Agostini, F., Schimmenti, A., and Caretti, V. (2018). Perinatal Assessment of Paternal Affectivity (PAPA). First validation in Italian samples. 16thWorld Association for InfantMental Health (WAIMH) Congress (Rome, May 26–30). *Infant Mental Health Journal 39*, 311.

Bandelow, B., & Michaelis, S. (2015). Epidemiology of anxiety disorders in the 21st century. *Dialogues in clinical neuroscience*, *17*(3), 327.

Banker, J. E., & LaCoursiere, D. Y. (2014). Postpartum depression: risks, protective factors, and the couple's relationship. *Issues in mental health nursing*, *35*(7), 503-508.

Barnes, D. L. (2006). Postpartum depression: Its impact on couples and marital satisfaction. *Journal of Systemic Therapies*, *25*(3), 25-42.

Baron, E., Bass, J., Murray, S. M., Schneider, M., & Lund, C. (2017). A systematic review of growth curve mixture modelling literature investigating trajectories of perinatal depressive symptoms and associated risk factors. *Journal of Affective Disorders*, *223*, 194-208.

Bateson, G., Jackson, D. D., Haley, J., & Weakland, J. (1956). Toward a theory of schizophrenia. *Behavioral Science, 1*(4), 251-254.

Beach, S. R. (2014). The couple and family discord model of depression. *Interpersonal relationships and health: Social and clinical psychological mechanisms*, *1*, 133-155.

Beach, S. R., Sandeen, E., & O'Leary, K. D. (1990). *Depression in marriage: A model for etiology and treatment*. Guilford Press.

Belsky, J. (1985). Exploring individual differences in marital change across the transition to parenthood: The role of violated expectations. *Journal of Marriage and the Family*, 1037-1044.

Bennett, H. A., Einarson, A., Taddio, A., Koren, G., & Einarson, T. R. (2004). Prevalence of depression during pregnancy: systematic review. *Obstetrics & Gynecology*, *103*(4), 698-709.

Benvenuti, P., Ferrara, M., Niccolai, C., Valoriani, V., & Cox, J. L. (1999). The Edinburgh postnatal depression scale: validation for an Italian sample. *Journal of Affective Disorders*, *53*(2), 137-141.

Bergink, V., Kooistra, L., Lambregtse-van den Berg, M. P., Wijnen, H., Bunevicius, R., Van Baar, A., & Pop, V. (2011). Validation of the Edinburgh Depression Scale during pregnancy. *Journal of psychosomatic research*, *70*(4), 385-389.

Bergström, M. (2013). Depressive symptoms in new first-time fathers: Associations with age, sociodemographic characteristics, and antenatal psychological well-being. *Birth*, *40*(1), 32-38.

Bernstein, I. H., Rush, A. J., Yonkers, K., Carmody, T. J., Woo, A., McConnell, K., & Trivedi, M. H. (2008). Symptom features of postpartum depression: are they distinct? *Depression and anxiety*, *25*(1), 20-26.

Bertalanffy, L. V. (1969). *General system theory: Foundations, development, applications*. New York: George Braziller Inc.

Biaggi, A., Conroy, S., Pawlby, S., & Pariante, C. M. (2016). Identifying the women at risk of antenatal anxiety and depression: a systematic review. *Journal of Affective Disorders*, *191*, 62-77.

Bielawska-Batorowicz, E., & Kossakowska-Petrycka, K. (2006). Depressive mood in men after the birth of their offspring in relation to a partner's depression, social support, fathers' personality and prenatal expectations. *Journal of Reproductive and Infant Psychology*, *24*(1), 21-29.

Bowen, A., & Muhajarine, N. (2006). Prevalence of antenatal depression in women enrolled in an outreach program in Canada. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, *35*(4), 491-498.

Boyce, P., Condon, J., Barton, J., & Corkindale, C. (2007). First-time fathers' study: psychological distress in expectant fathers during pregnancy. *Australian & New Zealand Journal of Psychiatry*, *41*(9), 718-725.

Brock, R. L., Franz, M. R., & Ramsdell, E. L. (2020). An Integrated Relational Framework of Depressed Mood and Anhedonia During Pregnancy. *Journal of Marriage and Family*, *82*(3), 1056-1072.

Brock, R. L., O'Hara, M. W., Hart, K. J., McCabe, J. E., Williamson, J. A., Laplante, D. P., ... & King, S. (2014). Partner support and maternal depression in the context of the Iowa floods. *Journal of Family Psychology*, *28*(6), 832.

Bruno, A., Celebre, L., Mento, C., Rizzo, A., Silvestri, M. C., De Stefano, R., ... & Muscatello, M. R. A. (2020). When fathers begin to falter: a comprehensive review on paternal perinatal depression. *International journal of environmental research and public health*, *17*(4), 1139.

Bunevicius, R., Kusminskas, L., Bunevicius, A., Nadisauskiene, R. J., Jureniene, K., & Pop, V. J. (2009). Psychosocial risk factors for depression during pregnancy. *Acta Obstetricia et Gynecologica Scandinavica*, *88*(5), 599-605.

Cameron, E. E., Sedov, I. D., & Tomfohr-Madsen, L. M. (2016). Prevalence of paternal depression in pregnancy and the postpartum: an updated meta-analysis. *Journal of affective disorders*, *206*, 189-203.

Cao, H., Zhou, N., Fang, X., & Fine, M. (2017). Marital well-being and depression in Chinese marriage: Going beyond satisfaction and ruling out critical confounders. *Journal of Family Psychology*, *31*(6), 775.

Carlberg, M., Edhborg, M., & Lindberg, L. (2018). Paternal perinatal depression assessed by the Edinburgh Postnatal Depression Scale and the Gotland Male Depression Scale: Prevalence and possible risk factors. *American Journal of Men's Health*, *12*(4), 720-729.

Chen, Y. H., Huang, J. P., Au, H. K., & Chen, Y. H. (2019). High risk of depression, anxiety, and poor quality of life among experienced fathers, but not mothers: A prospective longitudinal study. *Journal of affective disorders*, *242*, 39-47.

Cohen, S., & Janicki-Deverts. (2012). Who's stressed? Distributions of psychological stress in the United States in probability samples from 1983, 2006, and 2009 1. *Journal of applied social psychology*, *42*(6), 1320-1334.

Cohen, S., Janicki-Deverts, D., & Miller, G. E. (2007). Psychological stress and disease. *Jama*, *298*(14), 1685-1687.

Condon, J. T., Boyce, P., & Corkindale, C. J. (2004). The first-time fathers' study: A prospective study of the mental health and wellbeing of men during the transition to parenthood. *Australian and New Zealand Journal of Psychiatry*, *38*(1-2), 56-64.

Cowan, C. P., & Cowan, P. A. (2000). *When partners become parents: The big life change for couples*. Mahwah, NJ: Erlbaum.

Cowan, C. P., Cowan, P. A., Heming, G., Garrett, E., Coysh, W. S., Curtis-Boles, H., & Boles III, A. J. (1985). Transitions to parenthood: His, hers, and theirs. *Journal of Family Issues*, *6*(4), 451-481.

Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression: development of the 10-item Edinburgh Postnatal Depression Scale. *The British journal of psychiatry*, *150*(6), 782-786.

Cox, J., & Holden, J. (2003). *Perinatal mental health: A guide to the Edinburgh Postnatal Depression Scale (EPDS)*. Royal College of Psychiatrists.

Cox, M. J., & Paley, B. (1997). Families as systems. *Annual review of psychology, 48*(1), 243-267.

Crnic, K. A., Gaze, C., & Hoffman, C. (2005). Cumulative parenting stress across the preschool period: Relations to maternal parenting and child behaviour at age 5. *Infant and Child Development: An International Journal of Research and Practice*, *14*(2), 117-132.

Cronin, S., Becher, E., Christians, K. S., & Debb, S. (2015). Parents and stress: understanding experiences, context, and responses. St. Paul, MN: University of Minnesota Extension, Children, Youth and Family Consortium.

Cuijpers, P., Weitz, E., Karyotaki, E., Garber, J., & Andersson, G. (2015). The effects of psychological treatment of maternal depression on children and parental functioning: a meta-analysis. *European child & adolescent psychiatry*, *24*(2), 237-245.

Davey, S. J., Dziurawiec, S., & O'Brien-Malone, A. (2006). Men's voices: postnatal depression from the perspective of male partners. *Qualitative health research*, *16*(2), 206-220.

Dayan, J., Creveuil, C., Dreyfus, M., Herlicoviez, M., Baleyte, J. M., & O'Keane, V. (2010). Developmental model of depression applied to prenatal depression: role of present and past life events, past emotional disorders and pregnancy stress. *PloS one*, *5*(9), e12942.

Deater-Deckard, K. (1998). Parenting stress and child adjustment: Some old hypotheses and new questions. *Clinical psychology: Science and practice*, *5*(3), 314-332.

Della Vedova, A. M., & Matthey, S. (2016). The relative risks, and the likelihoods, of becoming postnatally distressed in the presence of common psychosocial risks: a study with Italian-speaking mothers. *International Journal of Mental Health Promotion*, *18*(5), 276-290.

deMontigny, F., Girard, M. E., Lacharite, C., Dubeau, D., & Devault, A. (2013). Psychosocial factors associated with paternal postnatal depression. *Journal of affective disorders*, *150*(1), 44-49.

Di Florio, A., Forty, L., Gordon-Smith, K., Heron, J., Jones, L., Craddock, N., & Jones, I. (2013). Perinatal episodes across the mood disorder spectrum. *JAMA psychiatry, 70(2)*, 168-175.

Dudley, M., Roy, K., Kelk, N., & Bernard, D. (2001). Psychological correlates of depression in fathers and mothers in the first postnatal year. *Journal of reproductive and infant psychology*, *19*(3), 187-202.

Edmondson, O. J., Psychogiou, L., Vlachos, H., Netsi, E., & Ramchandani, P. G. (2010). Depression in fathers in the postnatal period: assessment of the Edinburgh Postnatal Depression Scale as a screening measure. *Journal of affective disorders*, *125*(1-3), 365-368.

Elliott, S. A. (2000). Report on the Satra Bruk workshop on classification of postnatal mental disorders. *Archives of Women's Mental Health*, *3*, 27-33.

Escribè-Agüir, V., Gonzalez-Galarzo, M. C., Barona-Vilar, C., & Artazcoz, L. (2008). Factors related to depression during pregnancy: are there gender differences? *Journal of Epidemiology & Community Health*, *62*(5), 410-414.

Faisal-Cury, A., & Menezes, P. R. (2007). Prevalence of anxiety and depression during pregnancy in a private setting sample. *Archives of women's mental health*, *10*(1), 25-32.

Ferketich, S. L., & Mercer, R. T. (1995). Predictors of role competence for experienced and inexperienced fathers. *Nursing Research*, *44*(2), 89–95.

Field, T. (2018). Paternal prenatal, perinatal and postpartum depression: A narrative review. *Journal of Anxiety and Depression*, *1*(1), 102-118.

Figueiredo, B., & Conde, A. (2011). Anxiety and depression in women and men from early pregnancy to 3-months postpartum. *Archives of women's mental health*, *14*(3), 247-255.

Fletcher, R. J., Matthey, S., & Marley, C. G. (2006). Addressing depression and anxiety among new fathers. *Medical Journal of Australia*, *185*(8), 461-463.

Garfield, C. F. (2015). Supporting fatherhood before and after it happens. *Pediatrics*, *135*(2), e528-e530.

Gavin, N. I., Gaynes, B. N., Lohr, K. N., Meltzer-Brody, S., Gartlehner, G., & Swinson, T. (2005). Perinatal depression: a systematic review of prevalence and incidence. *Obstetrics & Gynecology*, *106*(5), 1071-1083.

Glazier, R. H., Elgar, F. J., Goel, V., & Holzapfel, S. (2004). Stress, social support, and emotional distress in a community sample of pregnant women. *Journal of Psychosomatic Obstetrics & Gynecology*, *25*(3-4), 247-255.

Goodman, J. H. (2004). Paternal postpartum depression, its relationship to maternal postpartum depression, and implications for family health. *Journal of Advanced Nursing, 45*(1), 26–35.

Goodman, J. H. (2008). Influences of maternal postpartum depression on fathers and on father–infant interaction. *Infant Mental Health Journal: Official Publication of The World Association for Infant Mental Health*, *29*(6), 624-643.

Grote, N. K., Bridge, J. A., Gavin, A. R., Melville, J. L., Iyengar, S., & Katon, W. J. (2010). A meta-analysis of depression during pregnancy and the risk of preterm birth, low birth weight, and intrauterine growth restriction. *Archives of general psychiatry*, *67*(10), 1012-1024.

Grussu, P., Lega, I., Quatraro, R. M., & Donati, S. (2020). Perinatal mental health around the world: priorities for research and service development in Italy. *BJPsych International*, *17*(1), 8-10.

Haley, J. (1976). *Problem-Solving Therapy*. San Francisco, CA: Jossey-Bass.

Hendrick, V., Altshuler, L., Strouse, T., & Grosser, S. (2000). Postpartum and nonpostpartum depression: differences in presentation and response to pharmacologic treatment. *Depression and anxiety*, *11*(2), 66-72.

Hewitt, C. E., Gilbody, S. M., Mann, R., & Brealey, S. (2010). Instruments to identify post-natal depression: Which methods have been the most extensively validated, in what setting and in which language? *International Journal of Psychiatry in Clinical Practice*, *14*(1), 72-76.

Hildingsson, I., & Thomas, J. (2014). Parental stress in mothers and fathers one year after birth. *Journal of reproductive and infant psychology*, *32*(1), 41-56.

Hill, R. (1949). *Families under stress: Adjustment to the crises of war separation and reunion*. New York, NY: Harper & Brothers.

Huang, C. C., & Warner, L. A. (2005). Relationship characteristics and depression among fathers with newborns. *Social Service Review*, *79*(1), 95-118.

Ierardi, E., Ferro, V., Trovato, A., Tambelli, R., & Crugnola, C. R. (2019). Maternal and paternal depression and anxiety: their relationship with mother-infant interactions at 3 months. *Archives of women's mental health*, *22*(4), 527-533.

Kalra, S., & Einarson, A. (2006). Prevalence, clinical course, and management of depression during pregnancy. In *Psychiatric disorders in pregnancy and the postpartum* (pp. 13-40). Humana Press.

Kane, P., & Garber, J. (2004). The relations among depression in fathers, children's psychopathology, and father–child conflict: A meta-analysis. *Clinical psychology review*, *24*(3), 339-360.

Kim, P., & Swain, J. E. (2007). Sad dads: paternal postpartum depression. *Psychiatry (edgmont)*, *4*(2), 35.

Kinser, P. A., Thacker, L. R., Lapato, D., Wagner, S., Roberson-Nay, R., Jobe-Shields, L., ... & York, T. P. (2018). Depressive symptom prevalence and predictors in the first half of pregnancy. *Journal of Women's Health*, *27*(3), 369-376.

Koh, Y. W., Chui, C. Y., Tang, C. S. K., & Lee, A. M. (2014). The prevalence and risk factors of paternal depression from the antenatal to the postpartum period and the relationships between antenatal and postpartum depression among fathers in Hong Kong. *Depression research and treatment*, *2014,* 1-11.

Koleva, H., Stuart, S., O'Hara, M. W., & Bowman-Reif, J. (2011). Risk factors for depressive symptoms during pregnancy. *Archives of women's mental health*, *14*(2), 99-105.

Lai, B. P., Tang, A. K., Lee, D. T., Yip, A. S., & Chung, T. K. (2010). Detecting postnatal depression in Chinese men: a comparison of three instruments. *Psychiatry Research*, *180*(2-3), 80-85.

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. *American journal of obstetrics and gynecology*, *202*(1), 5-14.

Lavee, Y. (2013). Stress processes in families and couples. In *Handbook of marriage and the family* (pp. 159-176). Springer, Boston, MA.

Lazarus, R. S. & Folkman, S. (1984). *Stress, appraisal, and coping* (pp. 150-153). New York: Springer Publishing Company.

Leach, L. S., Poyser, C., Cooklin, A. R., & Giallo, R. (2016). Prevalence and course of anxiety disorders (and symptom levels) in men across the perinatal period: a systematic review. *Journal of affective disorders*, *190*, 675-686.

Lee, A. M., Lam, S. K., Lau, S. M. S. M., Chong, C. S. Y., Chui, H. W., & Fong, D. Y. T. (2007). Prevalence, course, and risk factors for antenatal anxiety and depression. *Obstetrics & Gynecology*, *110*(5), 1102-1112.

Leigh, B., & Milgrom, J. (2008). Risk factors for antenatal depression, postnatal depression and parenting stress. *BMC psychiatry*, *8*(1), 24.

Letourneau, N. L., Dennis, C. L., Benzies, K., Duffett-Leger, L., Stewart, M., Tryphonopoulos, P. D., ... & Watson, W. (2012). Postpartum depression is a family affair: addressing the impact on mothers, fathers, and children. *Issues in mental health nursing*, *33*(7), 445-457.

Letourneau, N., Leung, B., Ntanda, H., Dewey, D., Deane, A. J., & Giesbrecht, G. F. (2019). Maternal and paternal perinatal depressive symptoms associate with 2-and 3-year-old children's behaviour: findings from the APrON longitudinal study. *BMC pediatrics*, *19*(1), 435.

Levy-Shiff, R. (1994). Individual and contextual correlates of marital change across the transition to parenthood. *Developmental psychology*, *30*(4), 591.

Liberto, T. L. (2012). Screening for depression and help-seeking in postpartum women during well-baby pediatric visits: an integrated review. *Journal of Pediatric Health Care*, *26*(2), 109-117.

Loscalzo, Y., Giannini, M., Contena, B., Gori, A., & Benvenuti, P. (2015). The Edinburgh Postnatal Depression Scale for fathers: A contribution to the validation for an Italian sample. *General Hospital Psychiatry*, *37*(3), 251-256.

Madsen, S. A. (2019). Men and perinatal depression. *Trends in Urology & Men's Health*, *10*(2), 7-9.

Madsen, S. A., & Juhl, T. (2007). Paternal depression in the postnatal period assessed with traditional and male depression scales. *Journal of Men's Health and Gender*, *4*(1), 26-31.

Małus, A., Szyluk, J., Galińska-Skok, B., & Konarzewska, B. (2016). Incidence of postpartum depression and couple relationship quality. *Psychiatr Pol*, *50*(6), 1135-46.

Markey, C. N., Markey, P. M., Schneider, C., & Brownlee, S. (2005). Marital status and health beliefs: Different relations for men and women. *Sex roles*, *53*(5-6), 443-451.

Martin, L. A., Neighbors, H. W., & Griffith, D. M. (2013). The experience of symptoms of depression in men vs women: analysis of the National Comorbidity Survey Replication. *JAMA psychiatry*, *70*(10), 1100-1106.

Masoni, S., Maio, A., Trimarchi, G., de Punzio, C., & Fioretti, P. (1994). The couvade syndrome. *Journal of Psychosomatic Obstetrics & Gynecology*, *15*(3), 125–131.

Matthey, S. (2008). Using the Edinburgh Postnatal Depression Scale to screen for anxiety disorders. *Depression and anxiety*, *25*(11), 926-931.

Matthey, S., Barnett, B., Kavanagh, D. J., & Howie, P. (2001). Validation of the Edinburgh Postnatal Depression Scale for men, and comparison of item endorsement with their partners. *Journal of Affective Disorders*, *64*(2-3), 175-184.

Matthey, S., Fisher, J., & Rowe, H. (2013). Using the Edinburgh postnatal depression scale to screen for anxiety disorders: conceptual and methodological considerations. *Journal of Affective Disorders*, *146*(2), 224-230.

Mazzeschi, C., Pazzagli, C., Radi, G., Raspa, V., & Buratta, L. (2015). Antecedents of maternal parenting stress: the role of attachment style, prenatal attachment, and dyadic adjustment in first-time mothers. *Frontiers in psychology*, *6*, 1443.

McMahon, C., Barnett, B., Kowalenko, N., & Tennant, C. (2005). Vulnerability to chronic postnatal depression: low maternal care in childhood, marital dissatisfaction, immature defense styles and the mediating effect of insecure attachment styles. *Journal of Affective Disorders*, *84*, 15-24.

Milgrom, J., Gemmill, A. W., Bilszta, J. L., Hayes, B., Barnett, B., Brooks, J., ... & Buist, A. (2008). Antenatal risk factors for postnatal depression: a large prospective study. *Journal of affective disorders*, *108*(1-2), 147-157.

Minuchin, P. (1985). Families and individual development: Provocations from the field of family therapy. *Child development*, 289-302.

Minuchin, S. (1982). Reflections on boundaries. *American Journal of Orthopsychiatry*, *52*(4), 655-663.

Misra, D. P., Guyer, B., & Allston, A. (2003). Integrated perinatal health framework: A multiple determinants model with a life span approach. *American journal of preventive medicine*, *25*(1), 65-75.

Morse, C. A., Buist, A., & Durkin, S. (2000). First-time parenthood: influences on pre-and postnatal adjustment in fathers and mothers. *Journal of psychosomatic obstetrics & gynecology*, *21*(2), 109-120.

Mukherjee, S., Coxe, S., Fennie, K., Madhivanan, P., & Trepka, M. J. (2017). Stressful life event experiences of pregnant women in the United States: a latent class analysis. *Women's Health Issues*, *27*(1), 83-92.

Nilsen, A. B. V., Waldenström, U., Rasmussen, S., Hjelmstedt, A., & Schytt, E. (2013). Characteristics of first-time fathers of advanced age: a Norwegian population-based study. *BMC pregnancy and childbirth*, *13*(1), 29.

Nishimura, A., & Ohashi, K. (2010). Risk factors of paternal depression in the early postnatal period in Japan. *Nursing & health sciences*, *12*(2), 170-176.

O'Brien, A. P., McNeil, K. A., Fletcher, R., Conrad, A., Wilson, A. J., Jones, D., & Chan, S. W. (2017). New fathers' perinatal depression and anxiety—Treatment options: An integrative review. *American journal of men's health*, *11*(4), 863-876.

O'Brien, R., Hunt, K., & Hart, G. (2005). 'It's caveman stuff, but that is to a certain extent how guys still operate': men's accounts of masculinity and help seeking. *Social science & medicine*, *61*(3), 503-516.

O'Connor, E., Rossom, R. C., Henninger, M., Groom, H. C., & Burda, B. U. (2016). Primary care screening for and treatment of depression in pregnant and postpartum women: evidence report and systematic review for the US Preventive Services Task Force. *Jama*, *315*(4), 388-406.

O'Higgins, M., Roberts, I. S. J., Glover, V., & Taylor, A. (2013). Mother-child bonding at 1 year; associations with symptoms of postnatal depression and bonding in the first few weeks. *Archives of women's mental health*, *16*(5), 381-389.

O'Hara, M. W. (2009). Postpartum depression: what we know. *Journal of clinical psychology*, *65*(12), 1258-1269.

O'Hara, M. W., & McCabe, J. E. (2013). Postpartum depression: current status and future directions. *Annual review of clinical psychology*, *9*, 379-407.

O'Hara, M. W., & Swain, A. M. (1996). Rates and risk of postpartum depression—a meta-analysis. *International review of psychiatry*, *8*(1), 37-54.

O'Mahen, H. A., Flynn, H. A., & Nolen-Hoeksema, S. (2010). Rumination and interpersonal functioning in perinatal depression. *Journal of Social and Clinical Psychology*, *29*(6), 646-667.

Parker, K. J., Schatzberg, A. F., & Lyons, D. M. (2003). Neuroendocrine aspects of hypercortisolism in major depression. *Hormones and behavior*, *43*(1), 60-66.

Paulson, J. F., & Bazemore, S. D. (2010). Prenatal and postpartum depression in fathers and its association with maternal depression: a meta-analysis. *Jama*, *303*(19), 1961-1969.

Paulson, J. F., Bazemore, S. D., Goodman, J. H., & Leiferman, J. A. (2016). The course and interrelationship of maternal and paternal perinatal depression. *Archives of women's mental health*, *19*(4), 655-663.

Philpott, L. F., & Corcoran, P. (2018). Paternal postnatal depression in Ireland: Prevalence and associated factors. *Midwifery*, *56*, 121-127.

Philpott, L. F., Leahy-Warren, P., FitzGerald, S., & Savage, E. (2017). Stress in fathers in the perinatal period: A systematic review. *Midwifery*, *55*, 113-127.

Philpott, L. F., Savage, E., Leahy-Warren, P., & FitzGearld, S. (2020). Paternal Perinatal Depression: A Narrative Review. *International Journal of Mens Social and Community Health*, *3*(1), e1-e15.

Putnam, K. T., Wilcox, M., Robertson-Blackmore, E., Sharkey, K., Bergink, V., Munk-Olsen, T., ... & Apter, G. (2017). Clinical phenotypes of perinatal depression and time of symptom onset: analysis of data from an international consortium. *The Lancet Psychiatry*, *4*(6), 477-485.

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied psychological measurement*, *1*(3), 385-401.

Ramchandani, P. G., O'Connor, T. G., Evans, J., Heron, J., Murray, L., & Stein, A. (2008). The effects of pre-and postnatal depression in fathers: a natural experiment comparing the effects of exposure to depression on offspring. *Journal of Child Psychology and Psychiatry*, *49*(10), 1069-1078.

Ramchandani, P., & Psychogiou, L. (2009). Paternal psychiatric disorders and children's psychosocial development. *The Lancet*, *374*(9690), 646-653.

Rao, W. W., Zhu, X. M., Zong, Q. Q., Zhang, Q., Hall, B. J., Ungvari, G. S., & Xiang, Y. T. (2020). Prevalence of prenatal and postpartum depression in fathers: A comprehensive meta-analysis of observational surveys. *Journal of Affective Disorders*, *263*, 491-499.

Ripley, J. S., Worthington, E. L., Garthe, R. C., Davis, D. E., Hook, J. N., Reid, C. A., ... & Coetzer-Liversage, A. (2018). Trait forgiveness and dyadic adjustment predict postnatal depression. *Journal of Child and Family Studies*, *27*(7), 2185-2192.

Robertson, E., Grace, S., Wallington, T., & Stewart, D. E. (2004). Antenatal risk factors for postpartum depression: a synthesis of recent literature. *General hospital psychiatry*, *26*(4), 289-295.

Rochlen, A. B., Paterniti, D. A., Epstein, R. M., Duberstein, P., Willeford, L., & Kravitz, R. L. (2010). Barriers in diagnosing and treating men with depression: a focus group report. *American journal of men's health*, *4*(2), 167-175.

Rosenfield, A. I. (2007). *New research on postpartum depression*. New York, NY: Nova Publishers.

Santos, H., Tan, X., & Salomon, R. (2017). Heterogeneity in perinatal depression: how far have we come? A systematic review. *Archives of women's mental health*, *20*(1), 11-23.

Sedov, I. D., & Tomfohr-Madsen, L. M. (2020). Trajectories of Insomnia Symptoms and Associations with Mood and Anxiety from Early Pregnancy to the Postpartum. *Behavioral Sleep Medicine*, 1-12.

Seimyr, L., Edhborg, M., Lundh, W., & Sjögren, B. (2004). In the shadow of maternal depressed mood: experiences of parenthood during the first year after childbirth. *Journal of Psychosomatic Obstetrics & Gynecology*, *25*(1), 23-34.

Simpson, J. A., Rholes, W. S., Campbell, L., Tran, S., & Wilson, C. L. (2003). Adult attachment, the transition to parenthood, and depressive symptoms. *Journal of personality and social psychology*, *84*(6), 1172.

Sipsma, H. L., Callands, T., Desrosiers, A., Magriples, U., Jones, K., Albritton, T., & Kershaw, T. (2016). Exploring trajectories and predictors of depressive symptoms among young couples during their transition to parenthood. *Maternal and child health journal*, *20*(11), 2372-2381.

Soliday, E., McCluskey-Fawcett, K., & O'Brien, M. (1999). Postpartum affect and depressive symptoms in mothers and fathers. *American Journal of Orthopsychiatry*, *69*(1), 30-38.

Swanson, L. M., Pickett, S. M., Flynn, H., & Armitage, R. (2011). Relationships among depression, anxiety, and insomnia symptoms in perinatal women seeking mental health treatment. *Journal of Women's Health*, *20*(4), 553-558.

Sweeney, S., & MacBeth, A. (2016). The effects of paternal depression on child and adolescent outcomes: a systematic review. *Journal of Affective Disorders*, *205*, 44-59.

Vigod, S. N., Villegas, L., Dennis, C. L., & Ross, L. E. (2010). Prevalence and risk factors for postpartum depression among women with preterm and low-birth-weight infants: a systematic review. *BJOG: An International Journal of Obstetrics & Gynaecology*, *117*(5), 540-550.

Wallace, P. M., & Gotlib, I. H. (1990). Marital adjustment during the transition to parenthood: Stability and predictors of change. *Journal of Marriage and the Family*, 21-29.

Watzlawick, P., Bavelas, J. B., Jackson, D. D. (1967) *Pragmatics of communication: A study of interactional patterns, pathologies, and paradoxes.* New York: W. W. Norton & Company.

Wee, K. Y., Skouteris, H., Richardson, B., McPhie, S., & Hill, B. (2015). The inter-relationship between depressive, anxiety and stress symptoms in fathers during the antenatal period. *Journal of Reproductive and Infant Psychology*, *33*(4), 359-373.

Whisman, M. A. (1999). Marital dissatisfaction and psychiatric disorders: Results from the national comorbidity survey. *Journal of abnormal psychology*, *108*(4), 701.

Whisman, M. A. (2001). The association between depression and marital dissatisfaction. In S. R. H. Beach (Ed.), *Marital and family processes in depression: A scientific foundation for clinical practice* (pp. 3-24). Washington, DC: American Psychological Association.

Whisman, M. A., du Pont, A., Rhee, S. H., Spotts, E. L., Lichtenstein, P., Ganiban, J. M., ... & Neiderhiser, J. M. (2018). A genetically informative analysis of the association between dyadic adjustment, depressive symptoms, and anxiety symptoms. *Journal of affective disorders*, *237*, 18-26.

Whisman, M. A., Robustelli, B. L., & Labrecque, L. T. (2018). Specificity of the association between marital discord and longitudinal changes in symptoms of depression and generalized anxiety disorder in the irish longitudinal study on ageing. *Family process*, *57*(3), 649-661.

Whisman, M. A., Sheldon, C. T., & Goering, P. (2000). Psychiatric disorders and dissatisfaction with social relationships: Does type of relationship matter? *Journal of abnormal psychology*, *109*(4), 803.

Whisman, M. A., Uebelacker, L. A., & Weinstock, L. M. (2004). Psychopathology and marital satisfaction: the importance of evaluating both partners. *Journal of consulting and clinical psychology*, *72*(5), 830.

Whooley, M. A., Avins, A. L., Miranda, J., & Browner, W. S. (1997). Case-finding instruments for depression: Two questions are as good as many. *Journal of general internal medicine*, *12*(7), 439-445.

Wikman, A., Axfors, C., Iliadis, S. I., Cox, J., Fransson, E., & Skalkidou, A. (2020). Characteristics of women with different perinatal depression trajectories. *Journal of neuroscience research*, *98*(7), 1268-1282.

Wikman, A., Mattsson, E., von Essen, L., & Hovén, E. (2018). Prevalence and predictors of symptoms of anxiety and depression, and comorbid symptoms of distress in parents of childhood cancer survivors and bereaved parents five years after end of treatment or a child's death. *Acta Oncologica*, *57*(7), 950-957.

Wisner, K. L., Sit, D. K., McShea, M. C., Rizzo, D. M., Zoretich, R. A., Hughes, C. L., ... & Confer, A. L. (2013). Onset timing, thoughts of self-harm, and diagnoses in postpartum women with screen-positive depression findings. *JAMA psychiatry*, *70*(5), 490-498.

Woody, C. A., Ferrari, A. J., Siskind, D. J., Whiteford, H. A., & Harris, M. G. (2017). A systematic review and meta-regression of the prevalence and incidence of perinatal depression. *Journal of affective disorders*, *219*, 86-92.

World Health Organization. (1992). The ICD-10 classification of mental and behavioural disorders: clinical descriptions and diagnostic guidelines. *Weekly Epidemiological Record= Relevé épidémiologique hebdomadaire*, *67*(30), 227-227.

World Health Organization. (2019). ICD-11 Clinical Descriptions and Diagnostic Guidelines for Mental and Behavioural Disorders.

Wynter, K., Rowe, H., & Fisher, J. (2013). Common mental disorders in women and men in the first six months after the birth of their first infant: a community study in Victoria, Australia. *Journal of affective disorders*, *151*(3), 980-985.

Yawn, B. P., Dietrich, A. J., Wollan, P., Bertram, S., Graham, D., Huff, J., ... & Trippd Practices. (2012). TRIPPD: a practice-based network effectiveness study of postpartum depression screening and management. *The Annals of Family Medicine*, *10*(4), 320-329.

Yonkers, K. A., Vigod, S., & Ross, L. E. (2012). Diagnosis, pathophysiology, and management of mood disorders in pregnant and postpartum women. *Focus*, *10*(1), 51-66.

Zierau, F., Bille, A., Rutz, W., & Bech, P. (2002). The Gotland Male Depression Scale: A validity study in patients with alcohol use disorder. *Nordic journal of psychiatry*, *56*(4), 265-271.

2. First Study

Mangialavori, S., Terrone, G., Cantiano, A., Chiara Franquillo, A., Di Scalea, G. L., Ducci, G., & Cacioppo, M. (2019). Dyadic Adjustment and Prenatal Parental Depression: A Study with Expectant Mothers and Fathers. *Journal of Social and Clinical Psychology*, *38*(10), 860-881. https://doi.org/10.1521/jscp.2019.38.10.860

Abstract

Introduction: This paper evaluated the relationships between the dyadic adjustment of expectant parents and prenatal maternal and paternal depression. *Method:* Participants were 98 couples who were expectant parents in the third trimester of pregnancy. Most couples (97%) were primiparous. Participants' prenatal depression, psychiatric symptomatology, perinatal affectivity, and dyadic adjustment were evaluated. *Results:* Hierarchical regression and relative weight analyses showed the importance of various marital adjustment dimensions in predicting prenatal maternal and paternal depression. In particular, the marital relationship variables of dyadic consensus and affective expression of both partners were related to prenatal depression in expectant mothers, with the relationship even stronger in expectant fathers. The results suggested that for both partners, perception of marital relationship quality contributes to the development of depressive symptoms in new mothers and fathers to a greater degree than the single perception of one partner. *Discussion:* Clinically, the results suggest that clinicians should focus on partner relationships in the perinatal period. The provision of psychological interventions to improve a couple's functioning may help to protect new parents against depressive symptomatology.

Keywords: Prenatal Depression; Dyadic Adjustment; Prenatal Paternal Depression; Prenatal Maternal Depression; Couple Functioning.

Introduction

Recent research has highlighted the impact of the transition to parenthood on the psychological health of both parents (Baldoni, Baldaro, & Benassi, 2009; Cameron, Sedov, & Tomfohr-Madsen, 2016; Da Costa et al., 2017; Whisman, Davila, & Goodman, 2011). Expectant parents face major changes at an individual level and as members of a couple, which often result in the initiation of new coping mechanisms. These changes can affect the conjugal relationship, parental bond, and the child's attachment (Underwood, Waldie, D'Souza, Peterson, & Morton, 2016).

The incidence of depression in both mothers and fathers increases significantly during the prenatal period compared with the general population (O'Connor, Rossom, Henninger, Groom, & Burda, 2016). Maternal adjustment during pregnancy and following childbirth has been extensively studied, and postpartum depression is the most commonly recognized negative outcome, occurring in 13%–19% of women (O'Hara & McCabe, 2013). In addition, around 18.4% of women are depressed during pregnancy (Gavin et al., 2005). Depression during pregnancy has been identified as a strong predictor of maternal postpartum depression (O'Hara & McCabe, 2013; Verreault et al., 2014). During the perinatal period, affective alterations in fathers, such as paternal perinatal depression, are common, but present differently than in women (Baldoni, 2010; Edward, Castle, Mills, Davis, & Casey, 2015; Tuszyńska-Bogucka & Nawra, 2014). In particular, depressive symptoms in fathers tend to be less severe, less definite, and often comorbid with anxiety disorders, alteration of illness behavior, and behavioral acting out (e.g., addiction or anger attacks). Paternal perinatal depression is often under-assessed or undiagnosed because of these indefinite clinical features (Baldoni, 2010; Musser, Ahmed, Foli, & Coddington, 2013). When men are psychologically assessed using a self-report questionnaire, they tend to recognize themselves as being anxious or under stress or complain of somatic preoccupations or symptoms rather than reporting they have depressive symptoms (e.g., sadness, crying, feelings of failure or impotence). Most research on perinatal depression in fathers has been conducted using self-report instruments

that are not specific to men or do not consider sex differences; therefore, their data may have limited validity (Baldoni, 2016).

Although prenatal paternal depression has received little attention from researchers and clinicians, some investigators have examined paternal affective disorders. A meta-analysis estimated the rate of paternal antenatal and postpartum depression as approximately 10% (Paulson & Bazemore, 2010). Those authors noted that most studies in their meta-analysis were conducted with fathers during the first postpartum year, and fewer studies assessed paternal depression during the partner's pregnancy. More recently, four studies conducted in European countries (Portugal, Spain, Germany) reported rates of antenatal paternal depression from 6.4%–11.5% (Escribà-Agüir & Artazcoz, 2011; Figueiredo & Conde, 2011; Gawlik et al., 2014; Teixeira, Figueiredo, Conde, Pacheco, & Costa, 2009).

The emerging literature on paternal depression suggests that, similar to their maternal counterparts, fathers are at an increased risk for depression in the postpartum (Goodman, 2004) and gestational periods (Condon, Boyce, & Corkindale, 2004; Escribè-Agüir, Gonzalez-Galarzo, Barona-Vilar, & Artazcoz, 2008). Several studies have shown how one parent's affective disorder has a significant influence on the psychological condition of their partner. During pregnancy and in the period after childbirth, a woman's depressive symptomatology shows significant correlations with that observed in their male partners (Baldoni et al., 2009; Buist et al., 2002; Cameron et al., 2016; Paulson & Bazemore, 2010; Paulson, Bazemore, Goodman, & Leiferman, 2016). Some authors have also found that a woman's depressive symptomatology was the most important predictor for paternal depression (Cameron et al., 2016; Schumacher, Zubaran, & White, 2008). However, men may develop depressive symptoms in the perinatal period independently of any mood disorders in their partner (Fletcher, Matthey, & Marley 2006; Garfield et al., 2014). Although the affective states of both partners are correlated throughout the perinatal period (Baldoni, 2010; Paulson et al., 2016), depressive symptoms have been identified in more than 40% of partners of depressed mothers and future mothers (Harvey & McGrath, 1988). This influence is mutual; maternal depression may be

responsible for paternal suffering and vice versa (Baldoni & Ceccarelli, 2010; Cameron et al., 2016; Paulson et al., 2016; Paulson & Bazemore, 2010).

A couple's satisfaction levels are also often correlated during the transition to parenthood (Belsky, 1985), and may be negatively affected by one parent's affective disorder (Paulson & Bazemore, 2010). Several studies have shown a negative correlation between perinatal parental depression and a couple's satisfaction, especially in primary parents (Agostini et al., 2015; Bielawska-Batorowicz & Kossakowska-Pietrycka, 2006; Buist et al., 2002; Dudley, Roy, Kelk, & Bernard, 2001; Morse, Buist, & Durkin, 2000). Some authors suggested that important risk factors for maternal and paternal depression were dyadic maladjustment and the couple's problems (Demontigny, Girard, Lacharité, Dubeau, & Devault, 2013; O'Mahen, Flynn, & Nolen-Hoeksema, 2010; Ripley et al., 2018). These problems are common in primary parents, and are evident for maternal depression (Goodman, 2004; O'Mahen et al., 2010; Ripley et al., 2018) and even more for paternal depression (Bielawska-Batorowicz & Kossakowska-Pietrycka, 2006; Condon et al., 2004; Demontigny et al., 2013). In most cases, there is also a deterioration of intimate and sexual life (Seimyr, Edhborg, Lundh, & Sjögren, 2004). In fact, the perinatal period is often associated with major changes in the partner relationship, possibly leading to marital stress (Levy-Shiff, 1994), decline in marriage quality and satisfaction (Cowan & Cowan, 2000), and greater psychological distress. Poor marital quality (e.g., low marital satisfaction) and low partner support have been reported to predict high depression levels (McMahon, Barnett, Kowalenko, & Tennant, 2005; Milgrom et al., 2008). However, romantic relationships can protect against the experience of stress and distress (Simpson, Rholes, Campbell, Tran, & Wilson, 2003).

Marital relationships have been explored using an attachment framework. For example, Simpson Rholes, Campbell, Tran, and Wilson (2003) examined how a woman's attachment orientation can interact with her marital relationship and perceptions of spousal support to predict postnatal depression. That study found that women with high attachment-anxiety and who felt that their husband was angry or provided them with little support showed worse perinatal depression at 6-

months postpartum. Similarly, marital relationship quality, low partner support, and relationship adjustment have been implicated in the development of perinatal anxiety (Gourounti, Anagnostopoulos, & Sandall, 2014; Vythilingum, 2008). However, dyadic adjustment of both partners has not yet been examined in relation to maternal and paternal depression during pregnancy.

This study aimed to explore whether both partners' perceptions of dyadic adjustment could affect prenatal maternal and paternal depression. We investigated the role of dyadic adjustment in prenatal parental depression using relative weight analysis (RWA) (Johnson, 2000). This is a relatively new analytical strategy used to assess the importance of conceptually and empirically correlated predictors (Barni, 2015). Consistent with the available literature we expected that:

1. The perception of low and poor dyadic adjustment of both partners would predict the risk for prenatal maternal depression (Goodman, 2004).
2. The perception of low and poor dyadic adjustment of both partners would predict the risk for prenatal paternal depression (Demontigny et al., 2013).

Method

Participants

We recruited 104 couples who were expectant mothers and fathers. Couples who were at risk for psychiatric symptomatology (i.e., depression, anxiety) as indicated in the initial screening were excluded. In total, 98 couples participated in this study. All participants were European Caucasian. The average age of future mothers was 33.69 years (standard deviation [SD] = 5.23 years; range 22–49 years), and that of expectant fathers was 36.39 years (SD = 5.89 years; range 23–58 years). In total, 54.4% of expectant mothers had a degree, 41.8% had a high school diploma, and 3.8% had a middle school diploma. Among expectant fathers, 39.7% had a degree, 50% had a high school diploma, 9% had a middle school diploma, and 1.3% had an elementary school license. Most participants were married (women = 46.8%; men = 54.1%) or in a de facto relationship (women = 44.3%; men = 41.8%), although 8.9% of women and 4.1% of men were separated or divorced. Most

participants (97%) were about to have their first child. Participants were recruited in the gynecology and obstetrics Departments at the Santo Spirito and San Filippo Neri hospitals in Rome. The percentage of couples in which both expectant parents were at risk for prenatal depression was 20.4% (n = 20).

Study inclusion criteria were aged 18 years or older, in a de facto or marital relationship, and in the third trimester of pregnancy as a primiparous or multiparous expectant parent. Exclusion criteria were refusal to provide informed consent, presence of a diagnosis of intellectual disability or schizophrenia, poor knowledge of Italian, or other verbal communication limitations that compromised the participant's ability to follow the research protocol. Before being enrolled in this study, participants were informed of the nature and objectives of the study. Enrollment was voluntary, and both verbal and written consent was obtained.

Procedure

During birthing class in hospitals in the last trimester of pregnancy, expectant mothers and fathers were given self-report questionnaires that evaluated symptoms of depression, affective disorders, psychiatric symptomatology, and dyadic adjustment. Participants also completed a form gathering sociodemographic data. All instruments were administered in accordance with the norms regarding participants' privacy and anonymity, Italian laws of privacy and informed consent (Law Decree DL-196/2003), and the Italian Association of Psychology ethical guidelines.

Measures

Edinburgh Postnatal Depression Scale (EPDS). The EPDS is a 10-item screening instrument used primarily in healthcare facilities to identify postpartum depressive symptoms in mothers and fathers (Cox, Holden, & Sagovsky, 1987; Benvenuti, Ferrara, Niccolai, Valoriani, & Cox, 1999). The EPDS was originally developed to assess postpartum symptoms, but has been validated in prenatal samples (Adouard, Glangeaud-Freudenthal, & Golse, 2005). Each item is rated from 0–3, giving a total maximum score of 30. A higher score indicates more severe depressive symptoms. For this study, the cutoff score was 10 for expectant fathers (Loscalzo, Giannini, Contena, Gori, &

Benvenuti, 2015) and 12 for expectant mothers (Benvenuti et al., 1999). A score equal to or greater than these values was considered to indicate moderate to severe depression. The Cronbach's alphas in this study were .83 for expectant mothers and .88 for expectant fathers.

Perinatal Assessment for Maternal Affectivity (PAMA). The PAMA is a 10-item screening instrument used to assess perinatal maternal affective disorders (Baldoni, Matthey, Agostini, Schimmenti, & Caretti, 2018). A self-rating of 0–3 is given for nine scaled items, giving a total maximum score of 27. Item 9 is dichotomous and is not scored. A higher PAMA score indicates a greater risk for an affective disorder. The Cronbach's alpha in this study was .78.

Perinatal Assessment for Paternal Affectivity (PAPA). The PAPA is the first 10-item screening instrument developed to assess perinatal paternal affectivity disorders (Baldoni et al., 2018). A self-rating of 0–3 is given for nine scaled items, giving a total maximum score of 27. Item 9 is dichotomous and is not scored. A higher score indicates a greater risk for an affective disorder. The Cronbach's alpha in this study was .79.

Symptom Checklist-90-Revised (SCL-90-R). The SCL-90-R (Derogatis, 1983; Prunas, Sarno, Preti, Madeddu, & Perugini, 2012) is a 90-item instrument used to assess psychiatric symptomatology. The scale comprises somatization, depression, compulsions, general anxiety, social anxiety, phobic anxiety, psychoticism, paranoia, and hostility subscales and a Global Severity Index (GSI). In this study, we only used the GSI as a general index of psychopathology. The Cronbach's alpha was .96 for expectant mothers and .97 for expectant fathers.

Dyadic Adjustment Scale (DAS). This 32-item self-report questionnaire (Spanier, 1976) was designed to detect changes in the marital relationship. The DAS has four subscales: dyadic cohesion, dyadic satisfaction, dyadic consensus, and affective expression. Responses are on a 5-point scale ranging from "always disagree" = 0 to "always agree" = 5. High total and subscale scores indicate positive appraisal of the person's marriage. The Cronbach's alpha was .95 for expectant mothers and .93 for expectant fathers.

Data Analyses

We first described the study variables (dyadic adjustment subscales, prenatal depression, perinatal affective disorders, and psychiatric symptomatology of both partners) using means, SDs, and ranges. We also reported the frequencies of the number of children for both partners. Associations between the study variables were measured using bivariate Pearson's correlations. To investigate whether and how much expectant mother/father and partner dyadic adjustment predicted prenatal maternal and paternal depression, we performed two hierarchical regression (HR) analyses and two RWAs. These analyses were controlled for psychiatric symptomatology (GSI) and number of children in the first step, and maternal and paternal affectivity in the second step.

In the HR, we estimated the overall R^2 and determined the statistical significance of individual regression coefficients. Regression coefficients represent the extent to which the criterion variable changes based on a given increase in a predictor while other predictors are held constant (i.e., the unique contribution). If predictors are uncorrelated or orthogonal, standardized regression coefficients equal zero-order correlations; if the squared regression coefficients are summed, they equal R^2. However, when predictors are correlated (as is likely in the case of perception of dyadic adjustment of both partners and scales using the same construct), HR is insufficient to adequately divide the variance in the criterion among the predictors (Kraha, Turner, Nimon, Zientek, & Henson, 2012). Therefore, to address the issue of correlated predictors, we supplemented HR with RWA, which uses a variable transformation approach (Johnson, 2000). Specifically, RWA focuses on the impact of a particular predictor relative to others in the model; that is, the proportionate contribution each predictor makes to R^2, taking into account the unique relationship with the criterion and its relationship when combined with other predictors (i.e., the relative contribution). In other words, these analyses address issues related to prediction, such as identifying a set of correlated predictors that will maximize the amount of variance explained by the criterion (Tonidandel & LeBreton, 2010). Specifically, relative weights can be estimated by creating a set of variables that are highly related to the original variable but not correlated with each other. The

criterion variable can then be regressed on the new uncorrelated variables to approximate the relative weights of the original variables (for more detail, see Johnson, 2000). Important weights obtained by the analysis can then be scaled in the metric of relative effect size by dividing the relative weights by the model R^2 and then multiplying these values by 100. In this way, the rescaled weights are interpreted as the percentage of predicted criterion variance attributed to each predictor.

Results

Table 1 presents descriptive statistics for participants' characteristics. Most (97%) participants were having their first child. According to the cutoff point described by Cox (1987), expectant mothers did not show a significant risk for prenatal depression (M = 8.01; SD = 5.44; range 0–20). Based on the cutoff point described by Loscalzo (2015), expectant fathers did not show a significant risk for prenatal depression (M = 5.74; SD = 6.40; range 0–21). Pearson's bivariate correlations for the number of children, psychiatric symptomatology, perinatal affective disorders, dyadic adjustment, and prenatal depression in both partners are reported in Table 2. The correlation coefficients ranged from −.85 ($p < .01$) between prenatal paternal depression and paternal consensus to .93 ($p < .01$) between paternal and maternal consensus. That is, the dimensions of dyadic adjustment of each partner were strongly intercorrelated with each other and with prenatal paternal and maternal depression.

The correlation coefficients for the dyadic adjustment of both partners showed strong relationships with prenatal maternal and paternal depression, except for paternal cohesion. Maternal cohesion was not significantly related to prenatal paternal depression. The marital adjustment subscales for both partners were significantly related to each other. Paternal consensus was not related to paternal and maternal cohesion. Paternal cohesion was not related to paternal affectivity expression and maternal consensus, or affectivity expression and satisfaction. Paternal affectivity expression was not related to maternal cohesion. Finally, there was no significant correlation between maternal cohesion and maternal affectivity expression.

Table 3 reports the HR and RWA results for expectant mothers after adjustment for maternal number of children, GSI, and maternal and paternal affectivity. HR analysis was conducted to identify predictors of prenatal maternal depression. Three different models were examined to understand which predictor explained how much variance. All three models were statistically significant. In the first model, maternal number of children and GSI were predictors. This model explained 18% of the total variance ($F(2, 94) = 11.180$; $p > .001$). In the second model, maternal and paternal perinatal affectivity were predictors after controlling for the effect of number of children and GSI. This model significantly explained 17% of the total variance ($F(4, 92) = 5.920$; $p < .001$). The third model was controlled for number of children, GSI, and maternal and paternal perinatal affective disorders. A significant proportion of the variance in prenatal maternal depression (69%) was explained by perception of dyadic adjustment of both partners ($F(12,84) = 15.25$, $p < .001$). Inspection of β weights for expectant mothers revealed that only paternal consensus was significantly related to prenatal maternal depression ($p < .001$). Maternal affective disorders and psychiatric symptomatology were also significantly related to maternal depression. The more expectant mothers' perceived poor and low paternal consensus on matters of importance to dyadic functioning (i.e., friendships, free time, religion, money), the more they were at risk for prenatal depression.

The RWA results confirmed and reinforced the importance of paternal consensus in predicting prenatal maternal depression. This predictor explained 20% of the variance for maternal depression. Furthermore, the RWA highlighted the importance of maternal consensus and affective expression in predicting maternal depression. The contribution of these two predictors, which together explained 34% of the total variance, appeared to be more substantial than suggested by the analysis of β weights. This may be attributable to the fact that both maternal consensus and affective expression were significantly related to several other predictors (see Table 2). Therefore, we confirmed our first assumption that poor dyadic adjustment of both partners predicted the risk for

prenatal maternal depression. Paternal consensus was the most important predictor of prenatal maternal depression.

Table 4 shows the HR and RWA results for expectant fathers after adjustment for maternal number of children, GSI, and maternal and paternal affectivity. HR analysis was conducted to identify the predictors of prenatal paternal depression, with three different models examined to understand how the predictors explained the variance. All three models were statistically significant. In the first model, paternal number of children and GSI were the predictors. This model explained 28% of the total variance ($F(2, 95) = 20.020$; $p > .001$). In the second model, maternal and paternal perinatal affectivity were predictors after controlling for the effect of number of children and GSI. This model significantly explained 28% of the total variance ($F(4, 93) = 10.631$; $p < .001$). The third model was adjusted for number of children, GSI, and maternal and paternal perinatal affective disorders. A significant proportion of the variance in prenatal paternal depression (83%) was explained by perception of dyadic adjustment of both partners ($F(12,85) = 35.38$, $p < .001$). Inspection of β weights for expectant fathers revealed that paternal and maternal consensus was significantly related to prenatal paternal depression ($p < .05$). Psychiatric symptomatology was also related to paternal depression. Both poor paternal and maternal consensus were risk factors for prenatal paternal depression. The RWA results confirmed the importance of maternal and paternal consensus in predicting prenatal paternal depression. Moreover, the RWA indicated the importance of maternal and paternal affective expression in predicting prenatal paternal depression. These two predictors, which together explained 32% of the total variance, appeared to be more substantial than suggested by the analysis of β weights. This may be attributable to the fact that both paternal and maternal affective expression were significantly related to several other predictors (see Table 2). Therefore, we confirmed our second assumption that poor dyadic adjustment of both partners predicted the risk for prenatal paternal depression. The most important predictors of prenatal paternal depression were paternal and maternal consensus.

Discussion

The transition to parenthood requires adaptive changes in a couple's relationship (Hazan & Shaver, 1994). As observed by Durkin, Morse, and Buist (2001), if prospective parents feel emotionally distant from and unsupported by their partners, their adjustment to parenthood is likely to be negatively affected. Studies suggest that family functioning contributes to parenting satisfaction, and perception of negative marital quality is associated with a higher risk for prenatal depression (Bielawska-Batorowicz & Kossakowska-Pietrycka 2006; Condon et al., 2004; Demontigny et al., 2013; Goodman, 2004; O'Mahen et al., 2010; Ripley et al., 2018). This study contributes to parenting research among expectant mothers and fathers and confirms the important function of dyadic adjustment as a predictor of prenatal maternal and paternal depression. We found that both partners' perceptions of the couple's functioning can affect the risk for prenatal depression of each partner. Specifically, a major finding of this study was the role of dyadic consensus in predicting prenatal parental depression; the more a couple perceived poor consensus from their partner the greater their risk for prenatal depression.

Our data must be read from a dyadic and systemic perspective because dimensions of marital adjustment of both partners are conceptually and empirically intercorrelated. For this reason, the perception of poor dyadic adjustment in each partner can be considered a risk factor for prenatal depression for both members of the couple (O'Mahen et al., 2010). In our study, the most significant risk factor for prenatal maternal depression was paternal consensus on important matters for the couple.

An expectant father has to deal with problems of practical order, especially during the pregnancy period; for example, guaranteeing a comfortable and secure residence, furnishing economic and affective support, and providing food and other necessary goods (Baldoni, 2010). If this function becomes less, it increases the woman's risk for developing prenatal depression. Moreover, we also found that low maternal consensus on family issues and perceptions of the partner's poor affective expression were predictive of prenatal depression in women. For expectant fathers, the strongest predictor of prenatal depression was the perception of poor consensus and affective expression from

themselves and their partner. Therefore, dyadic consensus and affective expression of both partners influence each other and increase the depressive risk for both expectant parents (McMahon et al., 2005; Milgrom et al., 2008). Our results suggest that during pregnancy, the perception of low marital adjustment of both partners can affect the risk for prenatal depression in each member of the couple, but more for new fathers (Bielawska-Batorowicz & Kossakowska-Pietrycka, 2006; Condon et al., 2004; Demontigny et al., 2013; O'Mahen et al., 2010; Ripley et al., 2018).

Overall, our results suggest that the relationship between partners may be pivotal in its potential effect on the psychological health of new mothers and fathers. Dyadic consensus appears to be the most important predictor of both maternal and paternal prenatal depression. Low levels of dyadic consensus in both partners reflect poor marital satisfaction and rigid family roles that in turn may affect the expectant parents' mental health, especially in a sensitive period such as pregnancy (Widarsson, Engström, Berglund, Tydén, & Lundberg, 2014). However, further longitudinal research is required to evaluate the likely complex interplay between perception of dyadic adjustment of both partners and the risk for perinatal maternal and paternal depression.

Conclusions

This study provides evidence for concurrent relationships between perceptions of dyadic adjustment from both partners and the risk for prenatal maternal and paternal depression. Previous research focused separately on dyadic consensus and depression in mothers and fathers (Bielawska-Batorowicz & Kossakowska-Pietrycka, 2006; Condon et al., 2004; Demontigny et al., 2013; O'Mahen et al., 2010; Ripley et al., 2018). In contrast, our study considered the influence of dyadic adjustment in both partners on the onset of prenatal parental depression and highlighted the importance of dyadic consensus. Expectant parents' support needs may not be consistent with support offered by healthcare services. These services need to become more client-centered; for example, by offering customized individual and couple support and peer support in groups. Further, they should also meet the needs of expectant fathers, which can benefit the whole family. To promote parents' health and family stability, health professionals should consider the importance of

dyadic consensus, particularly as it seems to be a risk factor for prenatal depression in both partners. Health professionals should also consider the roles and different perceptions of marital adjustment of both partners to ensure parents are prepared for parenthood and receive adequate support during early parenthood (Widarsson et al., 2014).

This study has two strong points and several limitations. First, we investigated the perception of dyadic adjustment of both partners as predictors of prenatal parental depression, whereas existing literature focused on individual perceptions of marital adjustment in the onset of prenatal or postpartum depression (Bielawska-Batorowicz & Kossakowska-Pietrycka, 2006; Condon et al., 2004; Demontigny et al., 2013; O'Mahen et al., 2010; Ripley et al., 2018). Second, in doing this, we used RWA to supplement HR analyses, which has both theoretical and statistical benefits. Regression coefficients are well suited when one is mainly concerned with how much scores on an outcome would change based on a unit increase in a predictor while holding the other predictors constant. RWA extends beyond this to more fully understand the impact of a particular predictor within the context of other predictors (Tonidandel & LeBreton, 2010). Moreover, RWA contributes to making regression results more meaningful and interpretable, especially in the case of correlated predictors such as the dyadic adjustment subscales in both partners. In the face of multicollinearity, HR fails to appropriately partition variance to the predictors, and the classic interpretation of an individual regression coefficient as a unit change in the dependent variable due to a unit change in the predictor while holding all other variables constant may be meaningless or even misleading (e.g., Barni, 2015; Lipovetsky & Coklin, 2015). RWA deals with this limitation by a variable transformation approach to create a new set of predictors able to minimize the impact of associations between predictor variables (see Johnson, 2000 for details).

A limitation of our study was that we used self-report scales to collect data. Future researchers should integrate these measures with a clinical interview. All participants were selected with non-probability sampling and because the present study used a cross-sectional design, causal relationships among the variables cannot be identified. Further exploration of dyadic adjustment in

both partners could investigate actor-partner interactions to examine how mothers' and fathers' marital adjustment influences each other's depressive symptoms over time. Finally, multilevel linear modeling would allow the study of couples, such as actor-partner interaction modeling (Kenny & Ledermann, 2010). This would allow analysis of both parental partners' dyadic adjustment and their relationship with each other's depression. For example, the effects of a mother's marital adjustment on depression may be enhanced or mitigated by aspects of their partner's behavior, which may have self-perpetuating effects on depression.

Given evidence that expectant parents' adjustment to pregnancy may predict relationships and interactions with the infant (e.g., Arnott & Meins, 2007; Ierardi, Ferro, Trovato, Tambelli, Riva Crugnola, 2018; Siddiqui & Hagglof, 2000; Underwood et al., 2016), the present study confirms the need to identify depression in pregnancy and suggests that preventive interventions should target expectant parents' dyadic adjustment, especially dyadic consensus. Researchers and clinicians are challenged to consider dyadic consensus as a potentially important factor in the lives of expectant parents.

References

Adouard, F., Glangeaud-Freudenthal, N. M. C., & Golse, B. (2005). Validation of the Edinburgh Postnatal Depression Scale (EPDS) in a sample of women with high-risk pregnancies in France. *Archives of Women's Mental Health*, *8*(2), 89-95.

Agostini, F., Neri, E., Salvatori, P., Dellabartola, S., Bozicevic, L., & Monti, F. (2015). Antenatal depressive symptoms associated with specific life events and sources of social support among Italian women. *Maternal and Child Health Journal*, *19*(5), 1131-1141.

Arnott, B., & Meins, E. (2007). Links among antenatal attachment representations, postnatal mind–mindedness, and infant attachment security: A preliminary study of mothers and fathers. *Bulletin of the Menninger Clinic*, *71*(2), 132-149.

Baldoni, F. (2010). Attachment, danger and role of the father in family life span. *Transilvanian Journal of Psychology (Erdélyi Pszichológiai Szemle, EPSZ)*, *4*, 375-402.

Baldoni, F. (2016). I disturbi affettivi perinatali nei padri. In P. Grussu & A. Bramante (Ed.) *Manuale di Psicologia Perinatale. Profili psicologici e modalità d'intervento* (pp. 443-485). Milano: Erickson.

Baldoni, F., & Ceccarelli, L. (2010). La depressione perinatale paterna. Una rassegna della ricerca clinica ed empirica. *Infanzia e adolescenza*, *9*(2), 79-92.

Baldoni, F., Baldaro, B., & Benassi, M. (2009). Disturbi affettivi e comportamento di malattia nel periodo perinatale: correlazioni tra padri e madri. *Child Development and Disabilities-Saggi*, *3*, 25-44.

Baldoni, F., Matthey, S., Agostini, F., Schimmenti, A., & Caretti, V. (2018). Perinatal Assessment of Paternal Affectivity (PAPA). First validation in Italian samples. *Infant Mental Health Journal. 39(suppl.)*, 311.

Barni, D. (2015). Relative importance analysis for the study of the family: accepting the challenge of correlated predictors. *TPM: Testing, Psychometrics, Methodology in Applied Psychology*, *22*(2), 235-250.

Belsky, J. (1985). Exploring individual differences in marital change across the transition to parenthood: The role of violated expectations. *Journal of Marriage and the Family*, *47*(4), 1037-1044.

Benvenuti, P., Ferrara, M., Niccolai, C., Valoriani, V., & Cox, J. L. (1999). The Edinburgh Postnatal Depression Scale: validation for an Italian sample. *Journal of Affective Disorders*, *53*(2), 137-141.

Bielawska-Batorowicz, E., & Kossakowska-Pietrycka, K. (2006). Depressive mood in men after the birth of their offspring in relation to a partner's depression, social support, fathers' personality and prenatal expectations. *Journal of Reproductive and Infant Psychology*, *24*(1), 21-29.

Buist, A. E., Barnett, B. E., Milgrom, J., Pope, S., Condon, J. T., Ellwood, D. A., & Hayes, B. A. (2002). To screen or not to screen-that is the question in perinatal depression. *Medical Journal of Australia*, *177*(7), 101.

Cameron, E. E., Sedov, I. D., & Tomfohr-Madsen, L. M. (2016). Prevalence of paternal depression in pregnancy and the postpartum: an updated meta-analysis. *Journal of Affective Disorders*, *206*, 189-203.

Condon, J. T., Boyce, P., & Corkindale, C. J. (2004). The first-time fathers study: A prospective study of the mental health and wellbeing of men during the transition to parenthood. *Australian and New Zealand Journal of Psychiatry*, *38*(1-2), 56-64.

Cowan, C. P., & Cowan, P. A. (2000). *When partners become parents: The big life change for couples*. Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.

Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression: development of the 10-item Edinburgh Postnatal Depression Scale. *The British Journal of Psychiatry*, *150*(6), 782-786.

Da Costa, D., Zelkowitz, P., Dasgupta, K., Sewitch, M., Lowensteyn, I., Cruz, R., & Khalifé, S. (2017). Dads get sad too: Depressive symptoms and associated factors in expectant first-time fathers. *American Journal of Men's Health*, *11*(5), 1376-1384.

Demontigny, F., Girard, M. E., Lacharité, C., Dubeau, D., & Devault, A. (2013). Psychosocial factors associated with paternal postnatal depression. *Journal of Affective Disorders*, *150*(1), 44-49.

Derogatis, L. R. (1983). Manual for the SCL-90-R. Towson, MD: Clinical Psychometric Research.

Dudley, M., Roy, K., Kelk, N., & Bernard, D. (2001). Psychological correlates of depression in fathers and mothers in the first postnatal year. *Journal of Reproductive and Infant Psychology*, *19*(3), 187-202.

Durkin, S., Morse, C., & Buist, A. (2001). The factor structure of prenatal psychological and psychosocial functioning in first-time expectant parents. *Journal of Reproductive and Infant Psychology*, *19*(2), 121-134.

Edward, K. L., Castle, D., Mills, C., Davis, L., & Casey, J. (2015). An integrative review of paternal depression. *American Journal of Men's Health*, *9*(1), 26-34.

Escribà-Agüir, V., & Artazcoz, L. (2011). Gender differences in postpartum depression: a longitudinal cohort study. *Journal of Epidemiology & Community Health*, *65*(4), 320-326.

Escribè-Agüir, V., Gonzalez-Galarzo, M. C., Barona-Vilar, C., & Artazcoz, L. (2008). Factors related to depression during pregnancy: are there gender differences? *Journal of Epidemiology & Community Health*, *62*(5), 410-414.

Figueiredo, B., & Conde, A. (2011). Anxiety and depression in women and men from early pregnancy to 3-months postpartum. *Archives of Women's Mental Health*, *14*(3), 247-255.

Fletcher, R. J., Matthey, S., & Marley, C. G. (2006). Addressing depression and anxiety among new fathers. *Medical Journal of Australia*, *185*(8), 461.

Garfield, C. F., Duncan, G., Rutsohn, J., McDade, T. W., Adam, E. K., Coley, R. L., & Chase-Lansdale, P. L. (2014). A longitudinal study of paternal mental health during transition to fatherhood as young adults. *Pediatrics*, *133*(5), 836-843.

Gavin, N. I., Gaynes, B. N., Lohr, K. N., Meltzer-Brody, S., Gartlehner, G., & Swinson, T. (2005). Perinatal depression: a systematic review of prevalence and incidence. *Obstetrics & Gynecology*, *106*(5), 1071-1083.

Gawlik, S., Müller, M., Hoffmann, L., Dienes, A., Wallwiener, M., Sohn, C., & Reck, C. (2014). Prevalence of paternal perinatal depressiveness and its link to partnership satisfaction and birth concerns. *Archives of Women's Mental Health*, *17*(1), 49-56.

Goodman, J. H. (2004). Paternal postpartum depression, its relationship to maternal postpartum depression, and implications for family health. *Journal of Advanced Nursing*, *45*(1), 26-35.

Gourounti, K., Anagnostopoulos, F., & Sandall, J. (2014). Poor marital support associated with anxiety and worries during pregnancy in Greek pregnant women. *Midwifery*, *30*(6), 628-635.

Harvey, I., & McGrath, G. (1988). Psychiatric morbidity in spouses of women admitted to a mother and baby unit. *The British Journal of Psychiatry*, *152*(4), 506-510.

Hazan, C., & Shaver, P. R. (1994). Attachment as an organizational framework for research on close relationships. *Psychological Inquiry*, *5*(1), 1-22.

Ierardi, E., Ferro, V., Trovato, A., Tambelli, R., & Crugnola, C. R. (2018). Maternal and paternal depression and anxiety: their relationship with mother-infant interactions at 3 months. *Archives of Women's Mental Health*, 1-7.

Johnson, J. W. (2000). A heuristic method for estimating the relative weight of predictor variables in multiple regression. *Multivariate Behavioral Research*, *35*(1), 1-19.

Kenny, D. A., & Ledermann, T. (2010). Detecting, measuring, and testing dyadic patterns in the actor–partner interdependence model. *Journal of Family Psychology*, *24*(3), 359.

Kraha, A., Turner, H., Nimon, K., Zientek, L., & Henson, R. (2012). Tools to support interpreting multiple regression in the face of multicollinearity. *Frontiers in Psychology*, *3*, 44.

Levy-Shiff, R. (1994). Individual and contextual correlates of marital change across the transition to parenthood. *Developmental Psychology*, *30*(4), 591.

Lipovetsky, S., & Conklin, W. M. (2015). Predictor relative importance and matching regression parameters. *Journal of Applied Statistics*, *42*(5), 1017-1031.

Loscalzo, Y., Giannini, M., Contena, B., Gori, A., & Benvenuti, P. (2015). The Edinburgh Postnatal Depression Scale for Fathers: a contribution to the validation for an Italian sample. *General Hospital Psychiatry*, *37*(3), 251-256.

McMahon, C., Barnett, B., Kowalenko, N., & Tennant, C. (2005). Psychological factors associated with persistent postnatal depression: past and current relationships, defence styles and the mediating role of insecure attachment style. *Journal of Affective Disorders*, *84*(1), 15-24.

Milgrom, J., Gemmill, A. W., Bilszta, J. L., Hayes, B., Barnett, B., Brooks, J., & Buist, A. (2008). Antenatal risk factors for postnatal depression: a large prospective study. *Journal of Affective Disorders*, *108*(1-2), 147-157.

Morse, C. A., Buist, A., & Durkin, S. (2000). First-time parenthood: influences on pre-and postnatal adjustment in fathers and mothers. *Journal of Psychosomatic Obstetrics & Gynecology*, *21*(2), 109-120.

Musser, A. K., Ahmed, A. H., Foli, K. J., & Coddington, J. A. (2013). Paternal postpartum depression: what health care providers should know. *Journal of Pediatric Health Care*, *27*(6), 479-485.

O'Connor, E., Rossom, R. C., Henninger, M., Groom, H. C., & Burda, B. U. (2016). Primary care screening for and treatment of depression in pregnant and postpartum women: evidence report and systematic review for the US Preventive Services Task Force. *JAMA*, *315*(4), 388-406.

O'Hara, M. W., & McCabe, J. E. (2013). Postpartum depression: current status and future directions. *Annual Review of Clinical Psychology*, *9*, 379-407.

O'Mahen, H. A., Flynn, H. A., & Nolen-Hoeksema, S. (2010). Rumination and interpersonal functioning in perinatal depression. *Journal of Social and Clinical Psychology*, *29*(6), 646-667.

Paulson, J. F., & Bazemore, S. D. (2010). Prenatal and postpartum depression in fathers and its association with maternal depression: a meta-analysis. *JAMA*, *303*(19), 1961-1969.

Paulson, J. F., Bazemore, S. D., Goodman, J. H., & Leiferman, J. A. (2016). The course and interrelationship of maternal and paternal perinatal depression. *Archives of Women's Mental Health*, *19*(4), 655-663.

Prunas, A., Sarno, I., Preti, E., Madeddu, F., & Perugini, M. (2012). Psychometric properties of the Italian version of the SCL-90-R: a study on a large community sample. *European Psychiatry*, *27*(8), 591-597.

Ripley, J. S., Worthington, E. L., Garthe, R. C., Davis, D. E., Hook, J. N., Reid, C. A., & Coetzer-Liversage, A. (2018). Trait forgiveness and dyadic adjustment predict postnatal depression. *Journal of Child and Family Studies*, *27*(7), 1-8.

Schumacher, M., Zubaran, C., & White, G. (2008). Bringing birth-related paternal depression to the fore. *Women and Birth*, *21*(2), 65-70.

Seimyr, L., Edhborg, M., Lundh, W., & Sjögren, B. (2004). In the shadow of maternal depressed mood: experiences of parenthood during the first year after childbirth. *Journal of Psychosomatic Obstetrics & Gynecology*, *25*(1), 23-34.

Siddiqui, A., & Hägglöf, B. (2000). Does maternal prenatal attachment predict postnatal mother–infant interaction? *Early Human Development*, *59*(1), 13-25.

Simpson, J. A., Rholes, W. S., Campbell, L., Tran, S., & Wilson, C. L. (2003). Adult attachment, the transition to parenthood, and depressive symptoms. *Journal of Personality and Social Psychology*, *84*(6), 1172.

Spanier, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and the Family*, *38*(1), 15-28.

Teixeira, C., Figueiredo, B., Conde, A., Pacheco, A., & Costa, R. (2009). Anxiety and depression during pregnancy in women and men. *Journal of Affective Disorders*, *119*(1-3), 142-148.

Tonidandel, S., & LeBreton, J. M. (2010). Determining the relative importance of predictors in logistic regression: An extension of relative weight analysis. *Organizational Research Methods*, *13*(4), 767-781.

Tuszyńska-Bogucka, W., & Nawra, K. (2014). Paternal postnatal depression – a review. *Archives of Psychiatry and Psychotherapy*, *2*, 61-69.

Underwood, L., Waldie, K., D'Souza, S., Peterson, E. R., & Morton, S. (2016). A review of longitudinal studies on antenatal and postnatal depression. *Archives of Women's Mental Health*, *19*(5), 711-720.

Verreault, N., Da Costa, D., Marchand, A., Ireland, K., Dritsa, M., & Khalifé, S. (2014). Rates and risk factors associated with depressive symptoms during pregnancy and with postpartum onset. *Journal of Psychosomatic Obstetrics & Gynecology*, *35*(3), 84-91.

Vythilingum, B. (2008). Anxiety disorders in pregnancy. *Current Psychiatry Reports*, *10*(4), 331-335.

Whisman, M. A., Davila, J., & Goodman, S. H. (2011). Relationship adjustment, depression, and anxiety during pregnancy and the postpartum period. *Journal of Family Psychology*, *25*(3), 375.

Widarsson, M., Engström, G., Berglund, A., Tydén, T., & Lundberg, P. (2014). Parental stress and dyadic consensus in early parenthood among mothers and fathers in Sweden. *Scandinavian Journal of Caring Sciences*, *28*(4), 689-699.

Table 1. Means, Standard Deviations and Ranges for the Key Study Variables

Variables		*M*	*SD*	*Range*
Dyadic paternal adjustment	Consensus.p	46.61	18.66	2–65
	Satisfaction.p	40.11	4.77	28–47
	Cohesion.p	17.34	3.37	8–24
	Affective expression.p	9.10	3.40	8–24
Dyadic maternal adjustment	Consensus.m	47.50	17.62	7–65
	Satisfaction.m	38.60	6.00	20–47
	Cohesion.m	17.73	3.25	7–23
	Affective expression.m	8.84	3.13	1–12
PAPA		3.82	3.38	0–15
PAMA		6.01	3.61	0–15
GSI.p		.29	.31	0–1.29
GSI.m		.40	.33	0–1.79
EPDS.p		5.74	6.40	0–21
EPDS.m		8.12	5.44	0–20

EPDS, Edinburgh Postnatal Depression Scale; GSI, Global Severity Index; PAMA, Perinatal Assessment for Maternal Affectivity; PAPA, Perinatal Assessment for Paternal Affectivity; SD, standard deviation.

Table 2. Correlations for the Key Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. No. children.p	-	.10	.01	.06	−.03	.11	−.10	−.05	.08	.14	.11	.12	.06	.12	−.04	.12
2. No. children.m		-	.08	−.05	.11	.12	−.05	−.09	.00	.04	−.23*	−.05	.08	−.17	−.11	.10
3. GSI.p			-	.30**	.44**	.25*	.53**	.37**	−.32*	−.47**	−.31**	−.43**	−.29**	−.22*	−.18	−.41*
4. GSI.m				-	.24*	.50**	.11	.44**	−.10	−.29**	.01	−.07	−.11	−.19	−.18	−.23*
5. PAPA					-	.31**	.18	.15	−.03	−.28**	−.25*	−.16	.03	−.03	−.09	−.02
6. PAMA						-	.00	.30**	.03	−.15	−.18	−.01	.05	.00	−.19	−.09
7. EPDS.p							-	.72**	−.85**	−.60**	−.17	−.83**	−.84**	−.34**	−.18	−.79**
8. EPDS.m								-	−.70**	−.55**	−.15	−.60**	−.69**	−.26**	−.25*	−.70**
9. Consensus.p									-	.56**	.13	.89**	.93**	.30**	.19	.85**
10. Satisfaction.p										-	.37**	.59**	.51**	.34**	.22*	.57**
11. Cohesion.p											-	.17	.10	.17	.38**	.05
12. Affective expression.p												-	.85**	.24*	.18	.84**
13. Consensus.m													-	.34**	.21*	.87**
14. Satisfaction.m														-	.24*	.32**
15. Cohesion.m															-	.16
16.Affective expression.m																-

Note. $^{**}p < .01$, $^{*}p < .05$.

EPDS, Edinburgh Postnatal Depression Scale; GSI, Global Severity Index; PAMA, Perinatal Assessment for Maternal Affectivity; PAPA, Perinatal Assessment for Paternal Affectivity.

Table 3. Hierarchical Regression and Relative Weight Analysis for Future Mothers

	ß	t	*p*	Raw importance	Rescaled importance
No. children.m	−.05	−.72	.474	.008	1.1%
GSI.m	.20	2.61	.011	.083	12.1%
PAPA	.04	.67	.504	.008	1.1%
PAMA	.16	2.11	.037	.049	7.1%
Dyadic paternal adjustment					
Consensus.p	−.58	−2.73	.008	.134	19.5%
Satisfaction.p	−.09	−1.04	.300	.062	9.1%
Cohesion.p	−.02	−.32	.747	.006	.9%
Affective expression.p	.31	1.85	.067	.078	11.4%
Dyadic maternal adjustment					
Consensus.m	−.14	−.69	.490	.120	17.5%
Satisfaction.m	.03	.52	.603	.012	1.8%
Cohesion.m	−.03	−.52	.601	.014	2%
Affective expression.m	−.22	−1.52	.131	.113	16.4%
R^2				.69	100

Note. Rescaled importance (%) was computed by dividing the relative weights by the total R^2 and multiplying by 100.

GSI, Global Severity Index; PAMA, Perinatal Assessment for Maternal Affectivity; PAPA, Perinatal Assessment for Paternal Affectivity.

Table 4. Hierarchical Regression and Relative Weight Analysis for Future Fathers

	ß	t	*p*	Raw importance	Rescaled importance
No. children.p	−.04	−.79	.429	.003	.3%
GSI.p	.27	4.58	.000	.093	11.1%
PAPA	.05	1.05	.295	.015	1.9%
PAMA	−.04	−.94	.351	.004	.5%
Dyadic paternal adjustment					
Consensus.p	−.36	−2.34	.021	.175	21%
Satisfaction.p	−.08	−1.26	.209	.072	8.6%
Cohesion.p	.05	.89	.375	.005	.6%
Affective expression.p	−.06	−.53	.600	.143	17.1%
Dyadic maternal adjustment					
Consensus.m	−.39	−2.61	.011	.173	20.8%
Satisfaction.m	−.02	−.43	.667	.023	2.7%
Cohesion.m	.01	.25	.807	.005	.6%
Affective expression.m	.07	.64	.526	.122	14.6%
R^2				.83	100

Note. Rescaled importance (%) was computed by dividing the relative weights by the total R^2 and multiplying by 100.

GSI, Global Severity Index; PAMA, Perinatal Assessment for Maternal Affectivity; PAPA, Perinatal Assessment for Paternal Affectivity.

3. Second Study

Terrone, G., Mangialavori, S., Di Scalea, G., Cantiano, A., Temporin, G., Ducci, G., Gori, A., Cacioppo, M., Schimmenti, A., & Caretti, V. (2020). The Relationship Between Dyadic Adjustment and Psychiatric Symptomatology in Expectant Couples: An Actor–Partner Interdependence Model Approach. *Journal of Affective Disorders, 273(1),* 468-475. https://doi.org/10.1016/j.jad.2020.05.040

Abstract

Background. Many researchers who evaluated psychological distress during the transition to parenthood agree in identifying pregnancy as the most sensitive period for the onset of psychiatric symptomatology for both parents. Furthermore, research highlights a correlation between symptoms experienced by fathers in relation to those experienced by mothers. *Objective.* The aim of this study was to investigate whether dyadic functioning influences the level of psychiatric symptomatology in couples expecting their first child. Participants were 137 couples expecting their first child; they were recruited at the San Filippo Neri and the Santo Spirito hospitals in Rome. We used an Actor–Partner Interdependence Model (APIM) to test the interdependence of both partners and the effect of dyadic relationships on psychiatric symptoms in the couple. *Results.* The overall test of distinguishability yielded a chi square value of 122.167 (23 *df*; $p < .001$). The actor–partner interdependence model showed significant paths between couple coping and psychiatric symptomatology. Specifically, we found that the quality of couple coping perceived by the mother negatively predicted maternal psychiatric symptomatology, and the quality of couple coping perceived by the father negatively predicted paternal psychiatric symptomatology. Furthermore, the quality of couple coping perceived by the father negatively predicted maternal psychiatric symptomatology. *Conclusions.* The results of this study confirm that dyadic adjustment is an important element for the development of effective interpersonal relationships. These data highlight the importance of promoting psycho-educational and clinical courses and programs for the development of social support with future parents.

Keywords: prenatal risk factors; dyadic adjustment; expectant mothers/fathers; actor–partner interdependence model.

Introduction

It is well known that becoming a parent is a delicate evolutionary stage and, not coincidentally, that this transition period is closely linked to an increase of psychological vulnerability (Cameron et al., 2016). The arrival of a new member inevitably changes the structure of a family, and, not surprisingly, the incidence rates of psychological disorders in couples expecting a baby are greater than in the normative samples of the general population (O'Connor et al, 2016). Maternal adjustment during pregnancy and in the postpartum period has been extensively studied, and affective symptomatology is the most commonly recognized negative outcome (Gavin et al., 2005; O'Hara & McCabe, 2013), whereas affective alterations in fathers, such as paternal perinatal depression, are common but less studied (Baldoni, 2010).

Modern researchers have taken an interest in the symptoms experienced by fathers during the perinatal period (Underwood et al., 2017), drawing attention to the percentage of fathers (5–10%) that present anxiety, emotional distress, and other types of difficulties (Baldoni, 2016; Condon, 2004; LoScalzo et al., 2015; Paulson & Bazemore, 2010; Paulson et al., 2016). Over the last two decades, researchers have also paid attention to the correlation between the disorders experienced by the partners during the perinatal period (Baldoni et al., 2009; Tuszyńska-Bogucka, & Nawra, 2014). Indeed, depressive symptoms have been detected in more than 40% of partners of depressed mothers and expectant mothers (Cameron et al., 2016; Harvey & McGrath, 1988; Iearadi et al., 2018).

Contemporary researchers highlight a strong correlation between depressive symptoms experienced by fathers in relation to those experienced by mothers, although the symptomatological characteristics between perinatal paternal depression and perinatal maternal depression differ considerably (Baldoni, 2016; Schrodt et al., 2011; Sobolewski & King, 2005; Xian et al., 2019). Moreover, there seems to be a correlation with the depressive aspects experienced by the respective partner, even though no direct causality has yet been found (Paulson & Bazemore, 2010).

Some studies show significant correlations between female depressive symptomatology and that of the partner throughout the perinatal period (Baldoni et al., 2009; Buist et al., 2002; Deater-Deckard

et al., 1998; Matthey et al., 2000; Paulson & Bazemore, 2010; Paulson et al., 2016; Soliday et al., 1999). Other researchers see the mothers' depressive symptoms as the most important predictors of paternal depression (Cameron et al., 2016; Schumacher et al., 2008). However, this does not mean that men may not develop depression regardless of maternal mood (Garfield et al., 2014).

The reciprocal influence is most evident (Baldoni, 2016; Baldoni & Ceccarelli, 2010; Cameron et al., 2016; Paulson & Bazemore, 2010; Paulson et al., 2016), especially for those couples facing becoming parents for the first time, which also affects life satisfaction as a couple (Bielawska-Batorowicz & Kossakowska-Pietrycka, 2006; Buist et al., 2002; Dudley et al., 2001; Morse et al., 2000). This may range from a worsening of their sex life (Seimyr et al., 2004) to a conditioning of their affection for the child (Underwood et al., 2016). One of the risk factors appears to be the dyadic maladjustment in the maternal and paternal perinatal symptomatology (Agostini et al., 2015).

In the literature, the concept of parenting is emphasized mainly as a synergistic understanding between the evolution of the maternal and paternal function within the marital space (Goodman, 2004; Gourounti, 2014; Volling et al., 2015). A positive relationship with one's partner is an important source of social support for new mothers (Collins et al., 1993; Matthey et al., 2000). However, during this time, many men experience emotional problems that can negatively affect life as a couple and the pregnancy. These disorders generally tend to manifest themselves differently with respect to the woman and sometimes tend to be underestimated or undiagnosed (Baldoni, 2016; Formica et al., 2018).

Regarding the onset period of maternal and paternal psychopathological symptoms, most longitudinal studies that evaluated psychological distress during the transition to parenthood agree in identifying pregnancy as the most sensitive period for the onset of psychiatric symptomatology for both parents (Baldoni et al., 2009; Buist et al., 2002; Condon et al., 2004; Escribà-Aguir & Artazcoz, 2011; Figuereido & Conde, 2011; Keeton et al., 2008; Leathers & Kelley, 2000; Madsen & Juhl, 2007; Morse et al., 2000; Pinheiro et al., 2011; Ramchandani & Psychogiou, 2009; Ramchandani et al., 2005).

In the diagnosis of paternal affective alterations, it is helpful to consider that men's affective symptomatology tends to be less definite than women's symptomatology and often is in comorbidity with other disorders, such as alteration of illness behavior and behavioral acting out (e.g., addictions or anger attacks). As a result of these indefinite clinical features, paternal perinatal affective disorders are often under-assessed or undiagnosed (Baldoni, 2016; Baldoni & Ceccarelli, 2010; Raskin et al., 1990, Skari et al., 2002).

During the perinatal period, the emotional states of mothers and fathers are associated and reciprocally influenced. Notably, manifestations of depressive, anxious, and behavioral disorders in the father seem to encourage a depressive reaction in the mother. Furthermore, perinatal depressive disorders are often accompanied by a crisis in the relationship (Hanington et al., 2011).

Studies have shown that parental affective disorders, especially in the case of a first child, are often accompanied by decreased satisfaction in the couple's relationship. This is true for both the maternal (Monti et al., 2008; Righetti-Veltema et al., 2002) and paternal perinatal disorders (Bielawska-Batorowicz & Kossakowska-Pietrycka, 2006; Buist et al., 2002; Dudley et al., 2001; Morse et al., 2000; Santona et al., 2015), in which low levels of satisfaction, consensus, and couple cohesion (assessed by the Dyadic Adjustment Scale) were associated with high levels of perinatal stress. The levels of couple dissatisfaction between mother and father are correlated (Soliday et al., 1999), and short duration or bad quality of the relationship, and at the same time the situation of not being married, is correlated with the intensity of the depressive symptomatology (Deater-Deckard et al., 1998; Greenhalgh et al., 2000; Mangialavori et al., 2019; Morse et al., 2000).

Objectives and Hypotheses

The main objective of this study was to investigate whether dyadic adjustment influences the level of psychiatric symptomatology in couples expecting their first child. According to the literature, we report several assumptions below:

(a) good dyadic adjustment should act as a protective factor for the development of prenatal psychiatric symptomatology;

(b) good dyadic adjustment skills could reduce psychological suffering in the couple during pregnancy; and

(c) high levels of dyadic adjustment in one partner should positively influence the partner's psychological well-being during pregnancy, reducing the risk of psychiatric symptomatology.

Method

Participants

We recruited 137 couples expecting their first child at the Santo Spirito and San Filippo Neri hospitals in Rome (ASLROMA1). Women were aged from 20 to 58 years (M = 35.19, SD = 6.19). Of the female sample, 91.3% were employed and 8.7% were unemployed. Forty-eight percent of the women had a high school diploma, 42.8% had a degree, 6.5% had a middle school diploma, and 1.4% had finished elementary school. Men were aged from 20 to 49 years (M = 33.08, SD = 5.25). Of the men, 77.5% were employed and 22.5% were unemployed. 52.9% of men had a degree, 45.7% had a high school diploma, and 1.4% had a middle school diploma. Most participants were married (71%).

Procedure

Participation was voluntary. The recruited couples took part in birthing classes at the San Filippo Neri and Santo Spirito hospitals in Rome. The criteria for inclusion were (a) not having had any previous pregnancies, (b) being at least in the seventh or eighth month of pregnancy, (c) the future parents planning to live together, and (b) both parents agreeing to participate in the study. We administered the questionnaires separately to the fathers and the mothers. All the instruments were administered in accordance with the norms regarding the privacy and anonymity of participants. Participants provided written informed consent after a full description of the study. We also told participants that they were free to withdraw from the study at any time and that there would be no payment for participating. All participants completed the measures used in this study when the woman was in the seventh or eighth month of pregnancy. We collected data during a research fellowship program conducted between 2017 and 2018. With regard to ethical standards for research, the study adhered to the latest version of the Declaration of Helsinki revised in Fortaleza (World Medical Association, 2013).

Measures

Symptom Checklist-90 Revised (SCL-90-R)

We used the Italian translation (Prunas et al., 2012) of the Symptom Checklist-90 Revised (SCL-90-R; Derogatis, 1994) to assess global psychopathology. The SCL-90-R is a well-known 90-item questionnaire, scored on a Likert scale from 0 to 4, which assesses psychiatric symptomsSomatization (SOM); Obsessive-compulsive (O-C); Interpersonal sensitivity (I-S); Depression (DEP); Anxiety (ANX); Hostility (HOS); Phobic anxiety (PHOB); Paranoid ideation (PAR); and Psychoticism (PSY). Higher scores indicate a higher symptoms frequency. The Global Severity Index (GSI) of the SCL-90-R score, obtained by averaging all SCL-90-R items, was used to assess global psychopathology. The Global Severity Index is considered the most sensitive and robust indicator of a respondent's psychological distress status (Schmitz et al., 2000). In this study, Cronbach's alpha was .96 for future mothers and .97 for future fathers.

Dyadic Adjustment Scale (DAS)

The Dyadic Adjustment Scale is a 32-item self-report questionnaire (Spanier, 1976) that uses a 5-point scale ranging from 0 (*always disagree*) to 5 (*always agree*). High total and subscale scores indicate positive appraisal of the marriage. This scale was designed to detect changes in the marital relationship and includes four scales: dyadic cohesion, dyadic satisfaction, dyadic consensus, and affective expression. Cronbach's alpha was .95 for future mothers and .93 for future fathers.

Statistical Analysis

We used an actor–partner interdependency model (APIM; Kashy & Kenny, 2000; Kenny & Ledermann, 2010) to test the interdependence of both partners and the effect of dyadic relationships on psychiatric symptoms in the couple. The APIM measures the reciprocal influence that emotions, cognition, and/or the behavior of one partner have on those of the other partner. This approach focuses on both the actor's and the partner's effects concurrently and is also used to test their reciprocal effects (Cook & Kenny, 2005).

Results

Descriptive statistics are presented in Table 1. Furthermore, Table 1 shows the internal consistency of each scale (alpha value) and the Pearson's *r* correlations among the study variables.

To examine whether the dyadic adjustment of both partners could predict psychiatric symptomatology in each member of the couple, we used a structural equation model in the APIM. The APIM takes into account the no independent nature of the adjustment dyadic data and shows inter- and intrapersonal associations between variables in distinguishable dyads. Accordingly, the overall test of distinguishability yielded a chi square value of 122.167 (23 *df*), which is significant at $p < .001$. Because the test of distinguishability was significant, members can be statistically distinguished based on their gender.

In the APIM, we included education level and age as control variables. The estimate concerns a saturated model and therefore we do not report fit indices.

The partial intraclass correlation for psychiatric symptomatology controlling for the predictors was not statistically significant ($p = .062$). This means that when one subject scored high on psychiatric symptomatology after controlling for the predictor variables, the other member of the dyad also tended to score high. The regression intercept for women was statistically significant (B = .39; 95% CI [0.34, - 0.45]; $p < .001$), as was the intercept for men (B = .28; 95% CI [0.24, 0.33]; $p < .001$).

The overall actor effect and the effects for men and women were all significant ($p < .001$). The overall partner effect was also significant ($p = .014$); however, the partner effect from women to men was not statistically significant ($p = .266$), whereas the partner effect from men to women was statistically significant ($p = .014$).

The APIM showed significant paths between couple coping and psychiatric symptomatology. Specifically, we found that the quality of couple coping perceived by the mother negatively predicted maternal psychiatric symptomatology, and the quality of couple coping perceived by the father negatively predicted paternal psychiatric symptomatology. Furthermore, the quality of couple coping perceived by the father negatively predicted maternal psychiatric symptomatology.

In the model described, regarding the effects within the dyad covariates (age and education), age was negatively associated with psychiatric symptomatology in both men (B = -.01; 95% CI [-0.021, -0.001]; p = .027) and women (B = -.01; 95% CI [-0.019, -0.004]; p = .002). Education was not significantly associated with psychiatric symptomatology (p = .91 and p = .92 for men and women, respectively).

The standardized APIM estimates are summarized in Figure 1.

Furthermore, we analyzed the significant correlations between paternal and maternal dyadic functioning and specific psychiatric symptomatology.

The following statistical significance between the fathers' dyadic functioning and the psychiatric symptomatology of the mothers emerged: obsessive-compulsive disorder (p = .034), interpersonal sensitivity (p < .001), depression (p < .001), anxiety (p = .001), paranoid ideation (p < .001), and psychoticism (p < .001), (see Figure 2).

Discussion

The overall aim of the present study was to examine the role of dyadic functioning in the development of psychiatric symptomatology of both partners during pregnancy. The results of this study indicate that, in this sample, mothers and fathers presented psychiatric symptomatology, supporting the idea that pregnancy is a particularly difficult time for both members of the couple. As widely evidenced in the literature, pregnancy is a critical event that can interact with other psychological vulnerabilities in the future parents and that can trigger emotional problems, such as an affective disorder (Don et al., 2014; Ripley et al., 2016; Volling et al., 2015). However, there are psychological and psychosocial factors that can protect the future parents and help them to overcome the emotional problems related to pregnancy (Baldoni, 2016). Consistent with previous studies (Baldoni et al., 2009; Matthey et al., 2000, 2003; Paulson & Bazemore, 2010), our research suggests that good couple coping skills can play a key role in protecting the pregnant mother and her partner from psychiatric symptomatology. This result supports the importance of including both fathers and mothers in early assessments of

functional and dysfunctional emotional states to promote the well-being of the couples and the children.

In the current study, we specifically examined the relationship between couple coping and psychiatric symptomatology in couples expecting their first child. We conducted APIM analysis to confirm our hypothesis that low dyadic functioning might be related to the psychiatric symptomatology features of both the future father and future mother during pregnancy. In particular, the APIM analysis highlighted that in mothers, perceived low couple adjustment was associated with high levels of psychiatric symptomatology, specifically with greater levels of somatization, obsessive-compulsive disorder, depression, and anxiety symptoms. The quality of couple coping perceived by the father also predicted paternal psychiatric symptomatology. Low perception of dyadic functioning in the expectant father was associated with high levels of psychiatric symptomatology, especially with regard to somatization and obsessive-compulsive symptoms, low interpersonal sensitivity, and other psychopathological features, such as depression, anxiety, hostility, phobic anxiety, and paranoid ideation.

Taken all together, the results of the study suggest that, during pregnancy, the perception of low dyadic adjustment in both partners may increase the risk of developing prenatal psychiatric symptomatology in each member of the couple, and this is higher for the new fathers (Bielawska-Batorowicz & Kossakowska-Pietrycka, 2006; Condon et al., 2004; Demontigny et al., 2013; Mangialavori et al., 2019; O'Mahen et al., 2010; Ripley et al., 2018; Suto et al., 2017). The transition to paternity and his partner's psychological distress tend to be perceived by the man as a loss of his woman and of their life as a couple experienced up to that point (Baldoni, 2016; Meighan et al. 1999). Usually, this condition is accompanied by a high level of distress. Feelings of powerlessness and increased responsibilities, added to anger, resentment, loneliness, and frustration for the loss of psychological and sexual intimacy are very common (Soliday et al., 1999). Conversely, good dyadic adjustment accompanied by a nonconflictual relationship and shared interests and concerns encourages the partner to ask for help, and partner agreement regarding infant care can act as a

protective factor (Dennis & Ross, 2006). Therefore, partners' reliable and active support can foster satisfaction as well as psychological and relational gratification, improving parenting skills and reducing the risk of a perinatal affective disorder. Furthermore, the quality of couple coping perceived by the father negatively predicted maternal psychiatric symptomatology. In the case of a low dyadic functioning of the father, high levels of obsessive-compulsive disorder, anxiety, interpersonal sensitivity, depression, paranoid ideation, and psychoticism were evidenced in the mother. However, we did not observe an association between the couple coping perceived by the mother and the father's psychiatric symptomatology.

These results are consistent with research on perinatal depression conducted with an APIM approach, which reported no significant effect of the mother's adjustment on paternal psychopathology but a significant effect of the father's emotional intelligence on the mother's perceived social support (Formica et al., 2018). More generally, our results confirm the relevance of paternal emotional and cognitive functioning on maternal quality of life and symptomatology in the perinatal period (Lemola et al., 2007) and suggest that high levels of couple coping in fathers promote the perception of adequate couple support in mothers. In these cases, mothers can cope adequately with stress and negative affects related to pregnancy, reducing the risk of developing psychiatric symptomatology. On the other hand, when fathers show a low degree of couple coping, mothers may perceive minor couple support or feel unable to ask their partners for support. Under these conditions, mothers seem less likely to use dyadic support and feel the positive effects that can act as a buffer against a psychological suffering. Therefore, high levels of couple coping allow the father to be more sympathetic to his partner, who, in turn, can cope with the difficulties of pregnancy with lower levels of psychiatric symptomatology. All this occurs more frequently when mother, father, or both are very young. In particular, the young father's age seems to be negatively related to couple satisfaction and involvement in family and child issues. This finding is generally consistent with research showing that young age may represent a risk factor for maladjustment and psychopathology among parents (Van Lieshout et al., 2020) and that especially young fathers might display some difficulties during

transition to parenthood, likely because they still need to develop adequate relational competences that permit better adjustment to the new paternal role (Ngu & Florsheim, 2012).

Conclusions

The results of this study confirm that dyadic functioning is important for the development of effective interpersonal relationships and predicts the psychiatric symptomatology of a parent and his or her partner.

In particular, dyadic adjustment has a direct effect on the individual's emotional state and, in the case of the father, is directly related to the mental state of the mother. In fact, high levels of dyadic functioning in fathers can increase the perception of a sense of security and support in mothers, acting as a secure base effect (Baldoni, 2016). This feeling of security in a close relationship can reduce the risk of an affective disorder (Schimmenti, 2017, 2018), including depression or perinatal anxiety.

These results highlight the importance of promoting psycho-educational courses and programs to offer social to parents (e.g., psycho-educational programs during pregnancy, promoting couple communication, and mentalizing) to improve adequate support for future mothers, also through the adequate responses to their needs offered by partners. The study also suggests that, when a clinical intervention is required for perinatal depression or anxiety, or in every severe psychological suffering, the involvement of both partners is necessary. This need was underscored in this study by the interdependence of the two partners and by the complex relationship between psychiatric symptomatology in the mother and the father's ability to provide support to his partner. This study represents one of the few comprehensive studies that examined dyadic adjustment and psychopathology in expecting couples using an APIM approach and thus provided potentially relevant information on the effect of each member of a couple on personal and partner adjustment to parenthood. This information may prove critical for developing effective preventive actions and tailored clinical interventions that address parental adjustment and quality of life during pregnancy.

Limitations

The study comes with some limitations that need to be addressed in future research. First, the cross-sectional nature of the study calls for future longitudinal studies that are greatly needed in this field. Second, the limited sample size reduces the generalizability of our findings: More research with larger clinical and nonclinical samples are thus needed to better understand the actor and partner effect of perceived dyadic adjustment on the well-being of couples in the perinatal period. Third, participation in the study was voluntary, and the sample may not represent the characteristics of the general population.

References

Agostini, F., Neri, E., Salvatori, P., Dellabartola, S., Bozicevic, L., & Monti, F. (2015). Antenatal depressive symptoms associated with specific life events and sources of social support among Italian women. Maternal and child health journal, 19(5), 1131-1141. https://doi.org/10.1007/s10995-014-1613-x

Baldoni, F. (2010). Attachment, danger and role of the father in family life span. Transilvanian Journal of Psychology (Erdélyi Pszichológiai Szemle, EPSZ), 4, 375-402.

Baldoni, F. (2016). I disturbi affettivi perinatali nei padri. In Grussu, P., & Bramante, A. (Ed.) Manuale di Psicologia Perinatale. Profili psicologici e modalità d'intervento (pp 443-485). Milano: Erickson.

Baldoni, F., & Ceccarelli, L. (2010). La depressione perinatale paterna. Una rassegna della ricerca clinica ed empirica. Infanzia e adolescenza, 9(2), 79-92.

Baldoni, F., Baldaro,B., & Benassi M.(2009). Affective disorders and illness behavior in perinatal period: correlations between fathers and mothers. Child Development. Disabilities. 36, 25-44.

Bielawska Batorowicz, E., & Kossakowska Petrycka, K. (2006). Depressive mood in men after the birth of their offspring in relation to a partner's depression, social support, fathers' personality and prenatal expectations. Journal of Reproductive and Infant Psychology, 24(1), 21-29. https://doi.org/10.1080/02646830500475179

Buist, A. E., Barnett, B. E., Milgrom, J., Pope, S., Condon, J. T., Ellwood, D. A., & Hayes, B. A. (2002). To screen or not to screen-that is the question in perinatal depression. Medical Journal of Australia, 177(7), 101. https://doi.org/10.5694/j.1326-5377.2002.tb04866.x

Cameron, E. E., Sedov, I. D., & Tomfohr-Madsen, L. M. (2016). Prevalence of paternal depression in pregnancy and the postpartum: an updated meta-analysis. Journal of affective disorders, 206, 189-203. https://doi.org/10.1016/j.jad.2016.07.044

Collins, N. L., Dunkel-Scheetter, C., Lobel, M., & Scrimshaw, S. C. (1993). Social support in pregnancy: Psychosocial correlates of birth outcomes and postpartum depression. Journal of Personality and Social Psychology, 65, 1243-1258. https://doi.org/10.1037/0022-3514.65.6.1243

Condon, J. T., Boyce, P., & Corkindale, C. J. (2004). The first-time fathers study: A prospective study of the mental health and wellbeing of men during the transition to parenthood. Australian and New Zealand Journal of Psychiatry, 38(1-2), 56-64. https://doi.org/10.1177/000486740403800102

Cook, W. L., & Kenny, D. A. (2005). The actor-partner interdependence model: A model of bidirectional effects in developmental studies. International Journal of Behavioral Development, 29(2), 101-109. https://doi.org/10.1080/01650250444000405

Deater-Deckard, K., Pickering, K., Dunn, J.F., & Golding, J. (1998). Family structure and depressive symptoms in men preceding and following the birth of a child. The Avon Longitudinal Study of Pregnancy and Childhood Study Team. American Journal Psychiatry 155, 818-823.

Demontigny, F., Girard, M. E., Lacharité, C., Dubeau, D., & Devault, A. (2013). Psychosocial factors associated with paternal postnatal depression. Journal of affective disorders, 150 (1), 44-49. https://doi.org/10.1016/j.jad.2013.01.048

Dennis, C, & Ross, LE. (2006). Depressive symptomatology in the immediate postnatal period: identifying maternal characteristics related to true- and false-positive screening scores.

Canadian Journal Psychiatry. 2006; 51 (5): 265-73. https://doi.org/10.1177/070674370605100501

Derogatis, L. R. (1983). Manual for the SCL-90-R. Towson, MD: Clinical Psychometric Research.

Don, B. P., & Mickelson, K. D. (2014). Relationship satisfaction trajectories across the transition to parenthood among low-risk parents. Journal of Marriage and Family, 76, 677-692.

Dudley, M., Roy, K., Kelk, N., & Bernard, D. (2001). Psychological correlates of depression in fathers and mothers in the first postnatal year. Journal of Reproductive and Infant Psychology, 19 (3), 187-202. https://doi.org/10.1080/02646830124397

Escribà-Agüir, V., & Artazcoz, L. (2011). Gender differences in postpartum depression: a longitudinal cohort study. Journal of Epidemiology & Community Health, 65(4), 320-326. https://doi.org/10.1136/jech.2008.085894

Figueiredo, B., & Conde, A. (2011). Anxiety and depression in women and men from early pregnancy to 3-months postpartum. Archives of women's mental health, 14 (3), 247-255. https://doi.org/10.1007/s00737-011-0217-3

Formica, I, Barberis, N., Costa, S., Nucera, J., Falduto, M.L., Maganuco, N:R., Pellerone, M., Schimmenti, A., (2018) The role of social support and emotional intelligence on negative mood states among couples during pregnancy: An actor-partner interdependence model approach. Clinical Neuropsychiatry (2018) 15, 1, 19-26.

Garfield, C. F., Duncan, G., Rutsohn, J., McDade, T. W., Adam, E. K., Coley, R. L., & Chase-Lansdale, P. L. (2014). A longitudinal study of paternal mental health during transition to fatherhood as young adults. Pediatrics, peds-2013. https://doi.org/10.1542/peds.2013-3262

Gavin, N. I., Gaynes, B. N., Lohr, K. N., Meltzer-Brody, S., Gartlehner, G., & Swinson, T. (2005). Perinatal depression: A systematic review of prevalence and incidence. *Obstetrics & Gynecology*, *106*, 1071–1083. http://dx.doi.org/10.1097/01.AOG.0000183597.31630.db

Goodman, J. H. (2004). Paternal postpartum depression, its relationship to maternal postpartum depression, and implications for family health. Journal of advanced nursing, 45(1), 26-35. https://doi.org/10.1046/j.1365-2648.2003.02857.x

Gourounti, K., Anagnostopoulos, F., & Sandall, J. (2014). Poor marital support associate with anxiety and worries during pregnancy in Greek pregnant women. Midwifery, 30(6), 628-635. https://doi.org/10.1016/j.midw.2013.10.008

Greenhalg, R., Slade, P., Spiby, H. (2000). Fathers' coping style, antenatal preparation, and experiences of labor and the postpartum. Birth 27, 3, 177- 184. https://doi.org/10.1046/j.1523-536x.2000.00177.x

Hanington, L., Heron, J., Stein, A., & Ramchandani, P. (2011). Parental depression and child outcomes - is marital conflict the missing link? Child Care and Health Development 37, 4, 549-609. https://doi.org/10.1111/j.1365-2214.2011.01270.x

Harvey, I., & McGrath, G. (1988). Psychiatric morbidity in spouses of women admitted to a mother and baby unit. The British Journal of Psychiatry, 152(4), 506-510. https://doi.org/10.1192/bjp.152.4.506

Ierardi, E., Ferro, V., Trovato, A., Tambelli, R., & Crugnola, C. R. (2018). Maternal and paternal depression and anxiety: their relationship with mother-infant interactions at 3 months. Archives of women's mental health, 1-7. https://doi.org/10.1007/s00737-018-0919-x

Kashy, D.A., & Kenny, D.A. (2000). The analysis of data from dyads and groups. Handbook of Research Methods in Social and Personality Psychology 38, 451-477.

Keeton, C. P., Perry-Jenkins, M., & Sayer, A. G. (2008). Sense of control predicts depressive and anxious symptoms across the transition to parenthood. Journal of Family Psychology 22, 2, 212-221. https://doi.org/10.1037/0893-3200.22.2.212

Kenny, D. A., & Ledermann, T. (2010). Detecting, measuring, and testing dyadic patterns in the actor-partner interdependence model. Journal of family psychology, 24 (3), 359. https://doi.org/10.1037/a0019651

Leathers, S. J., & Kelley, M.A. (2000). Unintended pregnancy and depressive symptoms among first-time mothers and fathers. American Journal of Orthopsychiatry 70, 4, 523-31. https://doi.org/10.1037/h0087671

Lemola S, Stadlmayr W, Grob A (2007). Maternal adjustment five months after birth: the impact of the subjective experience of childbirth and emotional support from the partner. Journal of Reproductive and Infant Psychology 25, 3, 190-202

Lo Scalzo, Y., Giannini, M., Contenta, B., Gori, A., Benvenuti, P. (2015). The Edinburgh Postnatal Depression Scale for Fathers: A contribution to the validation for an Italian sample. General Hospital Psychiatry, 37 (3), 251-256. https://doi.org/10.1016/j.genhosppsych.2015.02.002

Madsen, S. A., & Juhl, T. (2007). Paternal depression in the postnatal period assessed with traditional and male depression scales. The Journal of Men's Health & Gender, 4 (1), 26-31. https://doi.org/10.1016/j.jmhg.2006.10.017

Maiko Suto, Kenji Takehara, Yumina Yamane, Erika Ota (2017). Effects of prenatal childbirth education for partners of pregnant women on paternal postnatal mental health and couple relationship: A systematic review. Journal of Affective Disorders 210, 115-121. http://doi.org/10.1016/j.jad.2016.12.025

Mangialavori, S., Terrone, G., Cantiano, A., Chiara Franquillo, A., Di Scalea, G. L., Ducci, G., & Cacioppo, M. (2019). Dyadic Adjustment and Prenatal Parental Depression: A Study with Expectant Mothers and Fathers. *Journal of Social and Clinical Psychology*, *38*(10), 860-881.

Matthey, S., Barnett, B., Howie, P., & Kavanagh, D. J. (2003). Diagnosing postpartum depression in mothers and fathers: whatever happened to anxiety? Journal of Affective Disorder 74, 2, 139-147. https://doi.org/10.1016/S0165-0327(02)00012-5

Matthey, S., Barnett, B., Ungerer, J., & Waters, B. (2000). Paternal and maternal depressed mood during the transition to parenthood. Journal of Affective Disorders, 60, 75-85. https://doi.org/10.1016/S0165-0327(99)00159-7

Meighan, M., Davis, M. W., Thomas, S. P., & Droppleman, P. G. (1999). Living with postpartum depression: the father's experience. American Journal of Maternal and Child Nursing 24, 4, 202-208. https://doi.org/10.1097/00005721-199907000-00009

Monti, F., Agostini, F., Marani, G., & Lupi, F. (2008). The course of maternal depressive symptomatology during the first 18 months postpartum in an italian sample. Archives of women's Mental Health 1, 231-238. https://doi.org/10.1007/s00737-008-0017-6

Morse, C. A., Buist, A., & Durkin, S. (2000). First-time parenthood: influences on pre-and postnatal adjustment in fathers and mothers. Journal of psychosomatic obstetrics & gynecology, 21 (2), 109-120. https://doi.org/10.3109/01674820009075616

Ngu L, Florsheim P. The development of relational competence among young high-risk fathers across the transition to parenthood. Fam Process. 2011 Jun;50 (2): 184-202. doi: 10.1111/j.1545-5300.2011.01354.x.

O'Connor, E., Rossom, R. C., Henninger, M., Groom, H. C., & Burda, B. U. (2016). Primary care screening for and treatment of depression in pregnant and postpartum women: evidence report and systematic review for the US Preventive Services Task Force. Jama, 315 (4), 388-406. https://doi.org/10.1001/jama.2015.18948

O'Hara, M. W., & McCabe, J. E. (2013). Postpartum depression: Current status and future directions. *Annual Review of Clinical Psychology*, *9*, 379–407. DOI: 10.1146/annurev-clinpsy-050212-185612

O'Mahen, H. A., Flynn, H. A., & Nolen-Hoeksema, S. (2010). Rumination and interpersonal functioning in perinatal depression. Journal of Social and Clinical Psychology, 29 (6), 646-667. https://doi.org/10.1521/jscp.2010.29.6.646

Paulson, J. F., & Bazemore, S. D. (2010). Prenatal and postpartum depression in fathers and its association with maternal depression: a meta-analysis. Jama, 303 (19), 1961-1969. https://doi.org/10.1001/jama.2010.605

Paulson, J. F., Bazemore, S. D., Goodman, J. H., & Leiferman, J. A. (2016). The course and interrelationship of maternal and paternal perinatal depression. Archives of women's mental health, 19 (4), 655-663. https://doi.org/10.1007/s00737-016-0598-4

Pinheiro, K. A. T., da Cunha Coehlo, F. M., de Avila Quevedo, L., Jansen, K., de Mattos Souza, L., Oses, J. P., Lessa Horta, B., da Silva, R. A., da Silva, R. A., & Pinto, R. H. (2011). Paternal postpartum mood: bipolar episodes? Revista Brasilera de Psiquiatria 33, 3, 283-286. https://doi.org/10.1590/S1516-44462011000300012

Prunas, A., Sarno, I., Preti, E., Madeddu, F., & Perugini, M. (2012). Psychometric properties of the Italian version of the SCL-90-R: a study on a large community sample. European psychiatry, 27 (8), 591-597. https://doi.org/10.1016/j.eurpsy.2010.12.006

Ramchadani, P. G., Stein, A., Evans, J., O'Connor, T. G.,& ALPSPAC, study team (2005). Paternal depression in the postnatal period and child development:a prospective population study. The Lancet 1, 365, 2201-2205. https://doi.org/10.1016/S0140-6736(05)66778-5

Ramchandani, P. G., & Psychogiou, L. (2009). Paternal psychiatric disorders and children's psychosocial development. The Lancet 374, 646-653. https://doi.org/10.1016/S0140-6736(09)60238-5

Raskin, V., Richman, J. A., & Gaines C. (1990). Patterns of depressive symptoms in expectant and new parents. American Journal of Psychiatry 147, 5, 658-660. https://doi.org/10.1176/ajp.147.5.658

Righetti-Veltema, M., Conne-Perréaud, E., Bousquet, A., & Manzano, J. (2002). Postpartum depression and mother-infant relationship at three months old. Journal of affective disorders 70, 3, 291-306. https://doi.org/10.1016/S0165-0327(01)00367-6

Ripley, J. S., Garthe, R. C., Perkins, A., Worthington, Jr., E. L., Davis, D. E., Hook, J. N., Reid, C., Van Tongeren, D. R., Dwiwardani, C., Ord, A., Fennell, M., & Eaves, D. (2016). Perceived partner humility predicts subjective stress during transition to parenthood. Couple and Family Psychology: Research and Practice, 5, 157-167. https://doi.org/10.1037/cfp0000063

Ripley, J. S., Worthington, E. L., Garthe, R. C., Davis, D. E., Hook, J. N., Reid, C. A., & Coetzer Liversage, A. (2018). Trait Forgiveness and Dyadic Adjustment Predict Postnatal Depression. Journal of Child and Family Studies, 1-8. https://doi.org/10.1007/s10826-018-1053-0

Santona, A., Tagini, A., Sarracino, D., Carli, P. D., Pace, C. S., Parolin, L., & Terrone G. (2015). Maternal depression and attachment: the evaluation of mother-child interactions during feeding practice. Frontiers in Psychology, 6, -1235. https://doi.org/10.3389/fpsyg.2015.01235

Schimmenti, A. (2017a). The developmental roots of dissociation: A multiple mediation analysis. Psychoanalytic Psychology, 34, 1, 96-105. https://doi.org/10.1037/pap0000084

Schimmenti, A. (2018). The trauma factor: Examining the relationships among different types of trauma, dissociation, and psychiatric symptomatology. Journal of Trauma & Dissociation. doi: 10.1080/15299732.2017.1402400. https://doi.org/10.1080/15299732.2017.1402400

Schmitz, N., Hartkamp, N., & Franke, G. H. (2000). Assessing clinically significant change: Application to the SCL-90-R. Psychological Reports, 86(1), 263–274. doi:10.2466/pr0.2000.86.1.263

Schrodt, P., Miller, A. E., & Braithwaite, D. O. (2011). Ex-spouses' relational satisfaction as a function of coparental communication in stepfamilies. Communication Studies, 62, 272-290. https://doi.org/10.1080/10510974.2011.563453

Schumacher, M., Zubaran, C., & White, G. (2008). Bringing birth-related paternal depression to the fore. Women and birth, 21(2), 65-70. https://doi.org/10.1016/j.wombi.2008.03.008

Seimyr, L., Edhborg, M., Lundh, W., & Sjögren, B. (2004). In the shadow of maternal depressed mood: experiences of parenthood during the first year after childbirth. Journal of Psychosomatic Obstetrics & Gynecology, 25(1), 23-34. https://doi.org/10.1080/01674820410001737414

Skari, H., Skreden, M., Malt, U. F., Dalholt, M., Ostensen, A .B., Egeland, T., & Emblem, R. (2002). Comparative levels of psychological distress, stress symptoms, depression and anxiety after childbirth-a prospective population-based study of mothers and fathers. British Journal of

Obstetrics and Ginaecology 109, 10, 1154-1163. https://doi.org/10.1111/j.1471-0528.2002.00468.x

Sobolewski, J. M., & King, V. (2005). The importance of the coparental relationship for nonresident fathers' ties to children. Journal of Marriage and Family, 67, 1196-1212. https://doi.org/10.1111/j.1741-3737.2005.00210.x

Soliday, E., McCluskey Fawcett, K., & O'brien, M. (1999). Postpartum affect and depressive symptoms in mothers and fathers. American Journal of Orthopsychiatry, 69(1), 30-38. https://doi.org/10.1037/h0080379

Spanier, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. Journal of Marriage and the Family, 15-28. https://doi.org/10.2307/350547

Tang Xian, Lu Zhuo, Hu Dihui, Zhong Xiaoni (2019). Influencing factors for prenatal Stress, anxiety and depression in early pregnancy among women in Chongqing, China. Journal of Affective Disorders 253, 292-302. https://doi.org/10.1016/j.jad.2019.05.003

Tuszyńska-Bogucka, W., & Nawra, K. (2014). Paternal postnatal depression-a review. Archives of Psychiatry and Psychotherapy, 2, 61-69. https://doi.org/10.12740/APP/26286

Underwood, L., Waldie, K., D'Souza, S., Peterson, E. R., & Morton, S. (2016). A review of longitudinal studies on antenatal and postnatal depression. Archives of women's mental health, 19(5), 711-720. https://doi.org/10.1007/s00737-016-0629-1

Underwood, L., Waldie, KE, Peterson, E., D'Souza, S., Verbiest, M., McDaid, F., & Morton, S. (2017). Paternal Depression Symptoms During Pregnancy and After Childbirth Among Participants in the Growing Up in NewZealand Study. JAMA Psychiatry, 74 (4), 360. doi: 10.1001 / jamapsychiatry.2016.4234. https://doi.org/10.1001/jamapsychiatry.2016.4234

Van Lieshout RJ, Savoy CD, Boyle MH, Georgiades K, Jack SM, Niccols A, Whitty H, Lipman EL. The Mental Health of Young Canadian Mothers. J Adolesc Health. 2020 Apr;66 (4): 464-469. doi: 10.1016/j.jadohealth.2019.10.024

Volling, B. L., Oh, W., Gonzalez, R., Kuo, P. X., & Yu, T. (2015). Patterns of marital relationship change across the transition from one child to two. Couple and Family Psychology: Research and Practice, 4, 177-197. https://doi.org/10.1037/cfp0000046

World Medical Association (WMA) (2013). World Medical Association Declaration of Helsinki ethical principles for medical research involving human subjects. J. Am. Med. Assoc. 310, 2191-2194.

Table 1. Descriptive Analyses and Correlations (mother vs father)

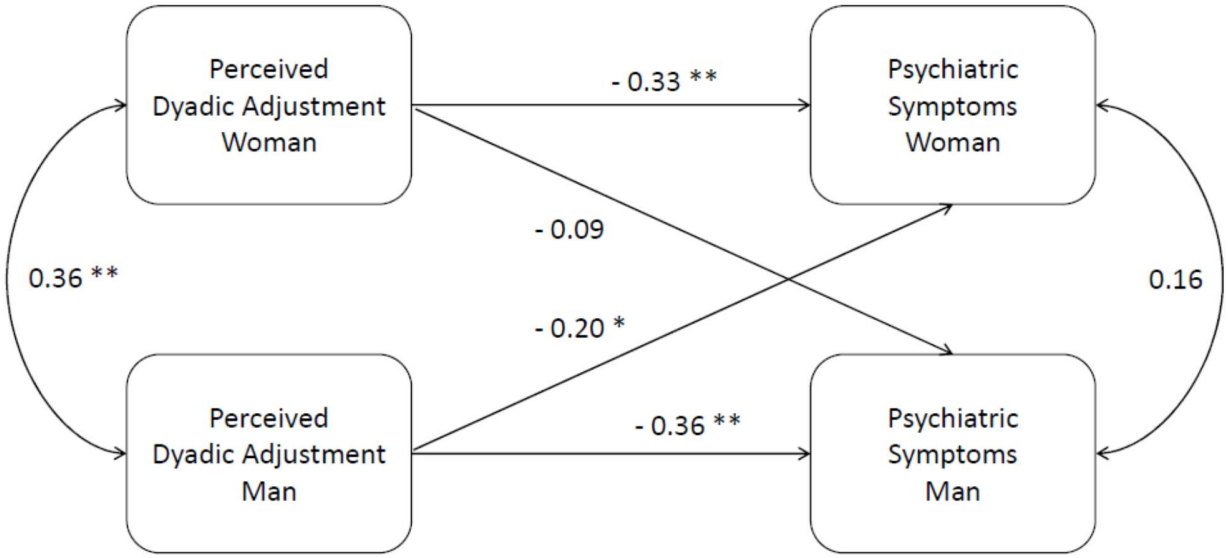
	M	SD	Skewness	Kurtosis	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1DAS_Tot_M	123,49	16,994	-3,118	19,431																					
2 GSI_M	,4027	,35550	2,030	5,647	-.249**																				
3 SOM_M	8,60	6,721	1,268	1,954	-.205**	.747**																			
4 0-C_M	4,38	4,550	1,687	3,815	-.267**	.884**	.593**																		
5 I-S_M	2,37	3,498	3,418	15,773	-.194**	.795**	.372**	.716**																	
6 DEP_M	6,65	6,313	2,017	5,680	-.266**	.912**	.571**	.821**	.782**																
7 ANX_M	4,02	4,949	2,528	8,101	-.268**	.870**	.595**	.699**	.650**	.800**															
8 HOS_M	1,73	2,143	2,514	8,865	-.179**	.658**	.449**	.649**	.489**	.579**	.472**														
9 FOB_M	1,29	2,661	3,719	19,103	-.222**	.701**	.591**	.539**	.412**	.567**	.706**	.309**													
10 PAR_M	1,70	2,804	2,780	8,999	-.220**	.762**	.368**	.724**	.827**	.726**	.542**	.589**	.344**												
11 PSY_M	1,38	2,788	3,282	12,450	-.228**	.809**	.388**	.707**	.780**	.720**	.696**	.571**	.482**	.760**											
12DAS_Tot_F	123,43	19,684	-3,042	15,469	.300**	-.314**	-.129	.244**	.401**	.329**	.323**	-.196*	-.170*	.331**	.335**										
13 GSI_F	,2729	,30177	2,084	5,408	-.185**	.266**	.112	.204*	.213*	.326**	.210*	.300**	.147	.268**	.266**	.393**									
14 SOM_F	4,30	5,001	1,979	4,995	-.121	.128	.027	.057	.118	.218*	.120	.061	.080	.095	.148	-.314**	.791**								
15 O-C_F	3,68	4,598	1,922	3,899	-.210**	.268**	.207*	.234**	.130	.268**	.178*	.368**	.194*	.228**	.233**	-.281**	.887**	.586**							
16 I-S_F	2,07	2,819	2,328	6,413	-.132	.253**	.133	.241**	.203*	.290**	.178*	.352**	.104	.230**	.193*	-.272**	.844**	.576**	.760**						
17 DEP_F	3,78	5,080	2,240	6,193	-.181**	.246**	.072	.178*	.241**	.307**	.218*	.234**	.112	.260**	.306**	-.487**	.916**	.709**	.754**	.711**					
18 ANX_F	2,42	3,192	2,032	4,906	-.092	.237**	.095	.180*	.181*	.299**	.192*	.245**	.145	.220**	.213*	-.354**	.882**	.629**	.740**	.701**	.861**				
19 HOB_F	1,90	2,816	2,473	7,863	-.172**	.228**	.071	.218*	.188*	.230**	.142	.376**	.112	.327**	.200*	-.387**	.662**	.394**	.645**	.525**	.512**	.520**			
20 FOB_F	,43	1,053	4,100	22,172	-.144	.148	.080	.091	.076	.224**	.112	.194*	.127	.105	.110	-.057	.629**	.446**	.615**	.507**	.559**	.526**	.261**		
21PAR_F	1,95	2,911	2,356	7,040	-.134	.148	.075	.125	.124	.166	.112	.196*	.057	.156	.130	-.247**	.783**	.532**	.707**	.817**	.624**	.597**	.586**	.434**	
22 PSY_F	1,16	2,271	3,192	12,618	-.177**	.255**	.129	.161	.167	.305**	.209*	.285**	.163	.280**	.244**	-.200*	.813**	.543**	.719**	.678**	.752**	.786**	.410**	.625**	.556**

**. La correlazione è significativa al livello 0,01

*. La correlazione è significativa al livello 0,05

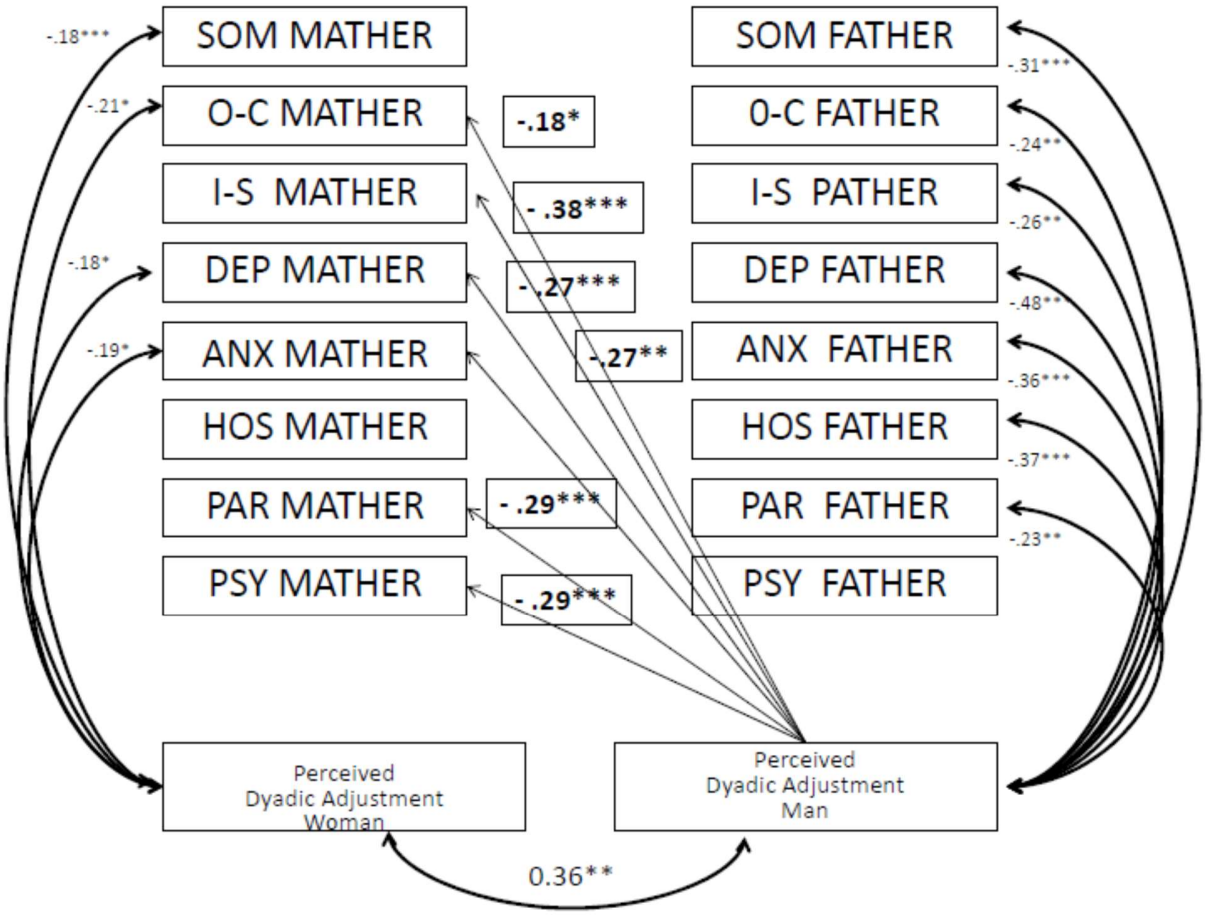
Notes. Somatization, SOM; Obsessive-compulsive, O-C; Interpersonal sensitivity, I-S; Depression, DEP; Anxiety, ANX; Hostility, HOS; Phobic anxiety, POB; Paranoid Ideation, PAR Psychoticism, PSY.

Figure 1. Actor–Partner Interdependence Model of Dyadic Adjustment and Psychological Symptoms in Couples



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

Figure 2. Actor–Partner Interdependence Model of Dyadic Adjustment and Psychiatric Symptomatology in Couples



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

4. Third Study

Mangialavori, S., Cacioppo, M., Terrone, G., O'Hara, M. W. (2021). A Dyadic Approach to Stress and Prenatal Depression in First-Time Parents: The Mediating Role of Marital Satisfaction. *Health & Stress,* 1-11. https://doi.org/10.1002/smi.3036

Abstract

In the field of perinatal clinical psychology, most studies focus on mothers' psychological states during pregnancy, neglecting the role of their partners. This study used an Actor-Partner Interdependence Mediation Model to evaluate the mediating role of dyadic satisfaction on the relationship between perceived stress and prenatal depressive symptomatology in both members of male-female-mixed-gender couples who were expecting their first child. 138 couples in their third trimester of pregnancy were asked to complete questionnaires about perceived stress, dyadic adjustment, and depression. The model revealed that there was an intrapersonal indirect effect of fathers' perceived stress on prenatal paternal depression through their marital satisfaction. Moreover, an interpersonal indirect effect was found with mothers' perceived stress being associated with prenatal paternal depression through fathers' dyadic satisfaction. Maternal indirect effects were all non-significant, suggesting that their dyadic satisfaction and that of their partner did not mediate the relation between their perceived stress and that of their partner and their prenatal depression. Findings support the importance of assessing the dyadic satisfaction of couples during pregnancy, especially in expectant fathers, and targeting it in the psychological support offered to couples as a way of improving their prenatal distress, and consequently, their mental health.

Keywords: perceived stress; prenatal depression; dyadic satisfaction; dyadic analysis; couples.

Introduction

Pregnancy, childbirth, and the transition to parenthood are generally recognized as periods of increased vulnerability often followed by stress (Morse, Buist, & Durkin, 2000). In particular, pregnancy is often a period of specific psychological distress for expectant parents, who have to cope with the intense emotional experiences linked to transition to parenthood (Boyce, Condon, Barton, Corkindale, 2007; Mazzeschi, Pazzagli, Radi, Raspa, & Buratta, 2015). Indeed, the transition to parenthood modifies a couple's life because the two partners need to develop appropriate parenting skills, adjust their life according to the baby's needs, and renegotiate their roles in the family (Doss & Rhoades, 2017).

According to family stress theory (Hill, 1958), some families could perceive normative changes such as pregnancy and childbirth as particularly stressful and this could increase the risk of mental health problems for expectant parents, especially first-time parents (Bergstrom, 2013; Mazzeschi et al., 2015; Philpott, Savage, Leahy-Warren & FitzGearld, 2020; Philpott, Leahy-Warren, FitzGerald & Savage, 2017; Wee, Skouteris, Richardson, McPhie, & Hill, 2015).

Originally, stress was defined as the product of a dynamic interaction between the individual and the environment (Lazarus & Folkman, 1984). According to this formulation, the stressful impact of events is mediated by appraisal. That is, stress has been conceptualized as a process in which individuals evaluate the significance of an event for their well-being and their ability to rally resources to manage its demands. In the same way, maternal and paternal stress, during pregnancy, is defined as a discrepancy between parents' perceived abilities to cope with future parenting and the actual resources available to meet demands of parenting function (Deater-Deckard, 1998). Some studies have identified prenatal stress as a possible risk factor for perinatal maternal and paternal depression (Bergstrom, 2013; Mazzeschi et al., 2015). The effects of stress are particularly evident during pregnancy. Indeed, especially in primiparous women, stressful life

factors seem to be correlated with increased depression during pregnancy (Dayan et al., 2010; Lancaster et al., 2010), which has been associated with adverse birth outcomes (Grote, Bridge, Gavin, 2010) and postpartum depression (O'Hara & Swain, 1996; O'Hara & McCabe, 2013; Paulson, & Bazemore, 2010). If left untreated, postpartum depression in both parents can negatively affect parent-infant bonding and child's emotional and cognitive development (Ierardi, Ferro, Trovato, Tambelli, Crugnola, 2019).

Stressors associated with maternal depression may have a similar effect on fathers but are less investigated (Mangialavori, Giannotti, Cacioppo, Spelzini & Baldoni, 2021; Paulson & Bazemore, 2010). Having a partner with severe depressive symptoms (Escriba-Aguir & Artazcoz, 2011), poor relationship satisfaction (Escriba-Aguir & Artazcoz, 2011), and a previous history of psychiatric disorders (Matthey, Barnett, Ungerer, Waters, 2000) are risk factors for depression in fathers. Research showed that some men display emotional problems during their partner's pregnancy that could negatively affect the couple's life, and later the mother-child relationship (Cameron, Sedov, & Tomfohr-Madsen, 2016).

Soliday, McCluskey-Fawcett and O'Brien (1999) consider parental stress the main risk factor in the development of perinatal depression in both parents, with adverse implications for couple's functioning. More recently, the scientific literature has shown how parental stress is associated with lower marital satisfaction in both members of the couple and how these two variables are associated with depressive symptoms (Beach, Katz, Kim, & Brody, 2003; Randall & Bodenmann, 2009; Robles, Slatcher, Trombello & McGinn, 2014).In particular, several studies and meta-analyses pointed out that high levels of perceived stress during pregnancy in both expectant parents (Dinvey et al., 2012; Underwood et al., 2017a; Underwood et al., 2017b] and lower marital satisfaction are related to high levels of prenatal depression in both men and women.

(Chhabra, McDermott, & Li, 2020; Dinvey et al., 2012; Lee, Kim, & Lee, 2021). Indeed, during the prenatal period, couples may perceived high levels of stress due to various factors such as pregnancy-related concerns (worries about the health of the fetus, fear of childbirth), concerns about the new role as a parent, financial and family related concerns (Darwin et al., 2017; Dinvey et al., 2012; Lancaster et al., 2010a; Lynn, Alderdice, Crealey, & McElnay, 2011). Moreover, the experience of stress in one domain of life can spillover into marital relationship causing stress within the relationship and lower dyadic satisfaction and eventually increasing the risk of negative mental health outcomes in both expectant parents (Lee et al., 2021).

Transition to parenthood may change the dynamics and boundaries of the marital relationship (Darwiche, Favez, Simonelli, Antonietti & Frascarolo, 2015), specifically affecting dyadic adjustment (Spanier, 1976). According to Spanier (1976; 2001), dyadic adjustment is a construct of marital quality and encompasses different aspects of intimate relationship such as dyadic consensus (the couple's agreement on friendships, free time, religion, money, etc.), dyadic cohesion (the sharing of pleasant activities), affective expression (satisfaction for couple's sexuality and couple's intimacy) and dyadic satisfaction. In particular, the latter is characterized by the level of happiness/unhappiness resulting from the relationship with the partner, including marital discord assessed by the frequency of disputes and by the consideration of separation or divorce. Moreover, previous research clearly highlighted how poor marital adjustment, especially poor dyadic satisfaction, is associated with depressive symptoms in both partners during the perinatal period (Demontigny, Girard, Lacharité, Dubeau & Devault, 2013; Mangialavori et al., 2019; Terrone et al., 2020). Terrone et al. (2020) underlined how poor marital adjustment was associated with high levels of psychiatric symptomatology in both expectant parents and how

fathers' positive dyadic adjustment decreased clinical symptoms of depression and anxiety in expectant mothers.

The Couple and Family Discord Model of depression (CFDM; Beach, 2014) underlines the important role of couple dynamics—including the dyadic satisfaction between partners—in the development and maintenance of depression. This model suggests that marital discord precedes the development of depressive symptomatology and highlights interpersonal stress processes and the potentially discontinuous nature of marital discord. Moreover, CFDM suggests that consideration of couple and family relational problems may be central to effective interventions and long-term maintenance of gains for many depressed individuals.

Research demonstrated the robustness and effectiveness of the Beach model with meta-analyses revealing a large effect size in both community and clinical samples (Whisman, 2001). In a recent study, associations between marital dissatisfaction and perinatal depression were also reported, emphasizing the importance of examining couple processes during pregnancy (Brock et al., 2014). Taken together, these results lead us to hypothesize that marital satisfaction of both expectant parents may link perceived stress and prenatal depression for both partners in a couple (Brandão, Brites, Hipólito, Pires, & Nunes, 2020). To date, the mediating role of interpersonal relationship with the partner linking stress and depressive symptomology has been examined only in two studies, but both of them have considered different aspects of intimate relationship (Glazier, Elgar, Goel, & Holzapfel, 2004; Lee et al., 2021). In the study of Glazier et al. (2004), the results highlighted how pregnant women who reported a poor support from family, friends and partner showed stronger relations between stress and symptoms of depression than women who reported high levels of family, friends and partner support - indicative of a mediating effect of interpersonal relationships on this association. The study of Lee et al. (2021), using a dyadic approach, examined

the effect of spouse-related stress in expectant couples on prenatal depression and investigated the mediating effects of marital intimacy (affective expression and caring for one's spouse) on this relationship. The results of this study revealed that marital intimacy and prenatal depression among expectant parents were affected by spouse-related stress. In addition, spouse-related stress in the expectant fathers completely mediated marital intimacy in their partner, demonstrating an interpersonal effect on prenatal depression in expectant mothers.

Although stress and many dimensions of dyadic adjustment are important factors influencing prenatal depression in both expectant parents, no study has ever examined the mediating role of dyadic satisfaction on the relationship between perceived stress and prenatal depression in first-time expectant couples.

Therefore, one of the aims of this study was to investigate the role of each partner's stress on their own prenatal depression (actor direct effects) and their partner's depression (partner direct effects) during pregnancy. Because of shared nature of pregnancy as period of potential distress for both expectant parents, we analyzed partner effects, that is the extent to which perceived stress in one partner is associated with depressive symptomology in the other partner.

Also, we explored the potential mediating role of their own and their partner's marital satisfaction (actor and partner indirect effects) on this association, using a dyadic statistical approach, namely the Actor–Partner Interdependence Mediational Model (APIMeM; Ledermann, Macho, & Kenny, 2011). In APIMeM, both partners' variables can be linked to each other. Associations between variables within an individual are called actor effects; associations between variables across individuals are called partner effects. In order to account for the interdependence of the two partners' variables, the predictor variables, the regression residuals of the mediating, and the regression residuals of the criterion variables are allowed to covary. Indeed, APIMeM

provides a framework for examining how dyadic satisfaction of both expectant parents might explain the relationship between own and partner's perceived stress and prenatal depression for both the individual and the partner (see Figure 1).

This study fills two missing pieces in the research literature by (1) examining the association among perceived stress, dyadic satisfaction and prenatal depression in first-time parents using a dyadic methodology and by (2) exploring the potential mediating role of own and partner's marital satisfaction on the association between own and partner's perceived stress and own and partner's prenatal depression. Accordingly, we hypothesized:

Hypothesis 1. Own perceived stress would be positively associated with own and partner's levels of prenatal depression in both expectant parents (Bergstrom, 2013; Mazzeschi et al., 2015).

Hypothesis 2. Own perceived stress would be negatively associated with own and partner's marital satisfaction in both expectant parents (Darwiche et al, 2015).

Hypothesis 3. Own marital satisfaction would be negatively associated with own and partner's levels of prenatal depression in expectant mothers and fathers (Brock et al., 2014; Mangialavori et al., 2019).

Hypothesis 4. Own and partner's marital satisfaction would mediate the relation between own and partner's perceived stress and own and partner's levels of prenatal depression in both expectant parents (Brandão et al., 2020; Glazier et al., 2004; Lee et al., 2021).

Method

Participants

We recruited a community sample of 154 expectant male-female-mixed-gender couples. The use of a community sample provided an opportunity to assess the association among perceived stress, dyadic satisfaction, and subclinical levels of prenatal depression in first-time

parents. For this reason, couples in which one of the partners had received a previous diagnosis of unipolar or bipolar depression or in which one of them was not primiparous as indicated in the initial screening were excluded. In total, 138 couples who were first-time parents participated in this study. All participants were White Europeans. The average age of expectant mothers was 33.09 years (*SD* = 5.25 years; range 20–49 years), and that of expectant fathers was 35.19 years (*SD* = 6.19 years; range 20–58 years). In total, 54.38% of expectant mothers had a college degree, 41.82% had a high school diploma, and 3.80% had a middle school diploma. Among expectant fathers, 39.66% had a college degree, 50.02% had a high school diploma, 9.01% had a middle school diploma, and 1.31% had an elementary school license. Participants were recruited in the Gynecology and Obstetrics ward at the Santo Spirito and San Filippo Neri Hospitals of Rome.

Study inclusion criteria were being 18 years or older, in a de facto or marital relationship, and in the third trimester of pregnancy as a primiparous expectant parent. Exclusion criteria were refusal to provide informed consent, presence of cognitive disability and/or psychiatric diagnosis, poor knowledge of Italian, or other verbal communication limitations that compromised the participant's ability to follow the research protocol. Before being enrolled in this study, participants were informed of the nature and objectives of the study. Enrollment was voluntary, and both verbal and written consent was obtained.

Procedure

The researchers collected data during a research fellowship program conducted between 2017 and 2018. During birthing classes at the hospitals, self-report paper-pencil questionnaires that evaluated levels of perceived stress, dyadic adjustment and depressive symptoms were given separately to expectant mothers and fathers in the last trimester of pregnancy. Participants also

completed a form gathering sociodemographic data. All instruments were administered in accordance with the norms regarding participants' privacy and anonymity, Italian laws of privacy and informed consent (Law Decree DL-101/2018), and the Italian Association of Psychology ethical guidelines. The study was conducted in line with the Code of Ethics of the World Medical Association (Declaration of Helsinki, 2013).

Measures

The *Perceived Stress Scale* (PSS; Cohen, Kamarck, & Mermelstein, 1983) was used to measure the perception of stress in the last six months. It is a measure of the degree to which situations in one's life are appraised as stressful. It contains 10 items that are rated on a 5-point scale that ranges from *never* to *very often*. High total scores indicate greater perceived stress. The PSS has been widely used during the perinatal period both for mothers and fathers (Gao, Chan, & Mao, 2009; Kantziari et al., 2019). In this study the Italian validation (Mondo, Sechi, & Cabras, 2019) was used and the Cronbach's alpha in this study was .78 for expectant mothers and .75 for expectant fathers.

The subscale Dyadic Satisfaction (DS) of *Dyadic Adjustment Scale* (DAS; Spanier, 1976) was used to assess the perception of marital satisfaction. The Dyadic Satisfaction subscale has 10 items scored on different Likert-type scales (item example: 'How often do you discuss, or have you considered divorce, separation, or terminating your relationship'). High subscale scores indicate high levels of marriage's satisfaction. In this study the Italian validation (Gentili, Contreras, Cassaniti, & D'Arista, 2002) was used and the alpha coefficients for this sample was .74 for expectant mothers and .72 for expectant fathers.

The *Center for Epidemiologic Studies Depression Scale* (CES-D; Radloff, 1977) is a 20 item self-report measure used to assess depressive symptomatology in the last week measured on

a 4-point Likert scale, ranging from 0 to 3. Summing responses to all items formed the depression score, with higher scores indicating more depressive symptoms. The CES-D has been used extensively in community settings and among pregnant populations (Lancaster et al., 2010). The Italian version of CES-D (Fava, 1983) was used in this study, showing good level of reliability for expectant mothers (.91) and for expectant fathers (.76).

Data Analysis

All statistical analyses were conducted with SPSS (Statistical Package for the Social Sciences) version 20. Descriptive statistics and paired-sample *t*-test were performed to describe the sample population and to examine whether differences existed between the two partners for our study variables (PSS, DS and CES-D). Bivariate correlations were computed in order to verify preliminary statistical relations.

Prior to testing our model, the Omnibus test of distinguishability (Kenny, Kashy, & Cook, 2006) demonstrated that expectant fathers and mothers were empirically distinguishable by gender: namely, the dyads in our study can be differentiated in a statistically significant way by their role (mothers and fathers). Therefore, the extended version of the Actor–Partner Interdependence Model (APIM, Kenny et al., 2006) with distinguishable dyads, the APIMeM (Ledermann et al., 2011) was tested using the MEDYAD (Coutts, Hayes & Jiang, 2019) SPSS macro. In this dyadic model, actor (direct and indirect) and partner (direct and indirect) effects are tested. Our APIMeM had six variables: two outcomes (mothers' and fathers' prenatal depression), two independent variables (mothers' and fathers' perceived stress) and two potential mediators (mothers' and fathers' marital satisfaction). Given that the implementation of analyses including or excluding potential confounds (such as maternal and paternal age and their levels of education) produced similar results, only the model excluding these variables is presented to ensure a

parsimonious and simplified interpretation of findings. Indeed, there were no statistically significant associations between these confounds and our main variables.

We estimated the direct and indirect effects of each actor's and partner's perceived stress on their own and their partner's prenatal depression through their own and their partner's dyadic satisfaction. Additionally, we estimated total effects of each actor's perceived stress on their own and their partner's levels of depressive symptoms. All estimates were obtained via ordinary least squares (OLS) regression; inference about indirect effects and contrasts between them were obtained via bootstrap resampling procedures (MacKinnon, Lockwood, & Williams, 2004). Bias-corrected 95% confidence intervals (CI) for the unstandardized effects were calculated based on 5000 bootstrap samples (MacKinnon et al., 2004). Pairwise contrasts were calculated between indirect effects.

A significance level of $p < .05$ was used throughout and a complete case analysis was conducted due to the small amount of missing data.

Results

Preliminary Analysis

Descriptive statistics and bivariate correlations of study variables for both expectant mothers and fathers are presented in Table 1. According to the cutoff point of CES-D (Baldoni & Giannotti, 2020; Lancaster, Flynn, Johnson, Marcus, & Davis, 2010b; Radloff, 1977), neither expectant mothers and nor expectant fathers showed, on average, significant levels of depressive symptoms (women: M = 11.30, SD = 7.32, range 0 - 40; men: M= 8.58, SD = 5.58, range 0 – 30). Only six couples (4.37%) scored ≥ 16 on the CES-D. Expectant mothers perceived more stress than their partners (women: M = 11.88, SD = 6.55 range 0-31; men: M= 10.94, SD = 5.97, range

0 – 28) and they obtained the same score in marital satisfaction as their counterpart did (women: M = 41.27, SD = 4.88, range 24 - 49; men: M= 41.27, SD = 6.63, range 0 – 50).

Regarding bivariate correlations, significant and positive associations were found between maternal and paternal perceived stress and depression for both expectant parents. Also, significant and positive correlations were found between mothers' perceived stress and perceived stress in their partners and between perceived stress and partner's depression in both expectant mothers and fathers. Moreover, depression and dyadic satisfaction scores in both partners were significantly and positively intercorrelated. Additionally, significant negative correlations were found between perceived stress and own and partner's dyadic satisfaction in both expectant parents. Finally, significant negative correlations were found between maternal and paternal depression and own and partner's marital satisfaction. Moreover, even though at the individual level stress was found to correlate more strongly with depressive symptoms than with dyadic satisfaction, when considering correlations within the couple, stress of one partner appeared to be more strongly associated with dyadic satisfaction than with depression of the other partner.

Paired-sample t-test analyses revealed that no differences existed between partners on perceived stress and dyadic satisfaction. However, statistically significant differences were detected for prenatal depression. Expectant mothers obtained higher depression scores than their counterpart ($t_{(136)} = -4.31$, $p < .001$).

Lastly, the Omnibus test of distinguishability (Kenny et al., 2006) demonstrated that dyad members are differentiated by their gender (χ^2 (2) = 18.14, $p < .001$), meaning that the dyads in our study were different by their role (mothers and fathers) and that they cannot be treated as indistinguishable (i.e. partner 1 and partner 2) in our model.

Direct and Indirect Effects on Prenatal Depression

Actor and partner direct and indirect effects are shown in Tables 2 and 3.

Hypothesis 1, that own perceived stress would be positively associated with own and partner's prenatal depression in both expectant parents, was partially supported only for actor effects for both expectant parents. Indeed, the intrapersonal effect of mothers' perceived stress on their levels of depressive symptoms was statistically significant (B = .77; $p < .001$; LCI = .63, UCI = .92) as well as the of the fathers' perceived stress on their own prenatal depressive symptomatology (B = .40; $p < .001$; LCI = .26, UCI = .54).

Hypothesis 2, that own perceived stress would be negatively associated with own and partner's marital satisfaction in both expectant parents, was totally confirmed for actor and partner effects both for expectant mothers and fathers. In particular, the actor effect of perceived stress on dyadic satisfaction for expectant mothers was statistically significant (B = - .23; $p < .001$; LCI = -.35, UCI = -.11) as well as the partner effect of mothers' perceived stress on paternal marital satisfaction (B = - .29; $p < .001$; LCI = -.45, UCI = -.13). Also, the actor effect of paternal perceived stress on their dyadic satisfaction was statistically significant (B = - .32; $p < .001$; LCI = -.45, UCI = -.13) as well as the partner effect (B = - .21; $p < .001$; LCI = -.34, UCI = -.08).

Hypothesis 3, that own marital satisfaction would be negatively associated with own and partner's prenatal depression in expectant mothers and fathers, was partially confirmed only for paternal actor effect. Paternal actor effect of dyadic satisfaction on their prenatal depression was statistically significant (B = - .27; $p < .001$; LCI = -.39, UCI = -.14).

Hypothesis 4, that own, and partner's marital satisfaction would mediate the relation between own and partner's perceived stress and own and partner's prenatal depression in both expectant parents, was partially confirmed. Specifically, concerning the indirect effects, we found an actor effect, indicating a partial mediation, in which paternal perceived stress was associated

with own prenatal depression via own levels of dyadic satisfaction (B = .09; $p < .001$); that means that higher levels of perceived stress in expectant fathers were associated with less marital satisfaction, which in turn was associated with high levels of prenatal depression. Furthermore, one partner effect was found, suggesting a full mediation between maternal perceived stress and prenatal paternal depression via paternal levels of marital satisfaction (B = .08; $p < .001$); that means that higher levels of maternal stress were associated with less paternal marital satisfaction, which in turn were associated with high levels of prenatal depression in expectant fathers.

Maternal indirect effects were all non-significant. In particular, we found that maternal dyadic satisfaction did not mediate the association between maternal perceived stress and their own prenatal depression ($p = .09$). Also, paternal dyadic satisfaction did not mediate the association between maternal perceived stress and maternal prenatal depression ($p = .09$). Moreover, maternal dyadic satisfaction did not mediate the link between maternal perceived stress and paternal prenatal depression ($p = .78$). We also found that maternal dyadic satisfaction did not mediate the associations between paternal perceived stress and paternal prenatal depression ($p = .77$) and between paternal perceived stress and maternal depression ($p = .07$). Finally, paternal dyadic satisfaction did not mediate the association between paternal perceived stress and maternal prenatal depression ($p = .08$).

Pairwise contrasts revealed no significant difference in magnitude between maternal and paternal perceived stress on prenatal paternal depression via paternal satisfaction. This means that the risk of developing paternal prenatal depressive symptomatology depends equally on both their own and maternal perceived stress via their own levels of dyadic satisfaction.

The percentage of explained variance for dyadic satisfaction was 21.67% for expectant mothers and 22.27% for expectant fathers, while it was 43.72% for paternal prenatal depression and 57.01% for maternal prenatal depression.

Discussion

The theoretical models of Hill (1958) and Beach (2014) provided the underpinning for the present work examining the role of a first pregnancy as a stressful event for expectant parents that impacts both their mental health and their dyadic adjustment. In particular, Beach's model suggests how marital dissatisfaction could be the pivotal link between the stress perceived during pregnancy and the onset of depressive symptoms during the perinatal period.

Even if most studies on the association among perceived stress, levels of depressive symptoms and dyadic satisfaction have employed an individual level of analysis, it was important to take into account both intrapersonal and interpersonal effects of such dimensions in both members of the couple because the experience of distress during the first pregnancy is shared by the two partners (Fu, Wilhelm, Wei, Zhou, & Schwarzer, 2020; Glazier et al., 2004).

Consistent with Escriba-Aguir and Artazcoz (2011) and Jonsdottir et al. (2017), our results showed how higher levels of perceived stress were associated with lower levels of dyadic satisfaction for both expectant parents. In addition, we found that stress in one partner was associated with less marital satisfaction in the other partner for both expectant mothers and fathers.

According to a dyadic perspective, partners within the same dyad are by nature interdependent (Kenny, Kashy, & Cook, 2006). Therefore, it is possible that one's perception of stress is linked not only to one's own marital satisfaction, but also to partner's one. Indeed, these findings are in line with previous studies that highlighted how perceived stress during pregnancy affect the levels of satisfaction of both partners (Randall & Bodenmann, 2009). Specifically,

during the first pregnancy both partners are confronted by the same stressful event and it is possible that the stress of one partner influences the intimate relationship and affects both partners' relationship satisfaction (Story & Bradbury, 2004; Randall & Bodenmann, 2017; Rollè et al., 2017). Indeed, the first pregnancy, rather than the postnatal period, seems to be the most stressful period not only for women, but especially for men undergoing the transition to parenthood (Baldoni & Giannotti, 2020; Boyce et al., 2007; Figueiredo & Conde, 2011, Philpott et al., 2017; Wee et al., 2015). Also, we found that poor satisfaction in marital relationship was associated with prenatal depressive symptomatology only in expectant fathers. These findings are in line with those from other studies with expectant fathers and new fathers (Boyce et al., 2007; Demontigny et al., 2013; Escribà-Agüir & Artazcoz, 2011; Mangialavori et al., 2019).

It is unclear whether elevated depressive symptoms are a consequence of marital dissatisfaction that is further exacerbated by the stress perceived during pregnancy or whether the perceived stress during pregnancy by itself triggers to a decline in the satisfaction with the relationship and consequently to an increase in depressive symptoms (Boyce et al., 2007). The key point is that it has been shown in previous studies that marital dissatisfaction during pregnancy is an important risk factor for mothers who subsequently develop postnatal depression (O'Hara & Swain, 1996; Yu et al., 2020). To date, there is a paucity of longitudinal studies that can confirm these findings with mothers and fathers.

For the reasons outline above, we tested our hypothesis of dyadic satisfaction as a potential mediator of the relation between perceived stress during pregnancy and prenatal depression in both expectant parents (Brandão et al., 2020; Glazier et al., 2004; Lee et al., 2021). Our results showed an actor effect of poor dyadic satisfaction mediating the link between paternal perceived stress and levels of depressive symptoms only in expectant fathers. Also, we found a significant partner effect

of poor dyadic satisfaction mediating the association between maternal perceived stress and levels of paternal perinatal symptomatology. Indeed, in their literature reviews Philpott et al. (2017; 2020) found that, especially during pregnancy, fathers were more sensitive to maternal high stress levels and that these have an impact on their marital quality. It is possible that this association was related to the time of assessment. The third trimester of pregnancy is the final stretch of the prenatal period, and maternal health is considered the primary focus of the couple. Thus, maternal perceived stress may have an impact not only on her partner's marital satisfaction but also on her partner's affective states due to their link with a safe and successful childbirth (Baldoni, Giannotti, Casu, Luperini, & Spelzini, 2020).

Interestingly, we did not find any mediation of maternal and paternal dyadic satisfaction on the association between paternal and maternal perceived stress and prenatal maternal depression. These findings revealed that, for expectant fathers, own and partners' perception of stress affects their levels of depressive symptoms via own level of marital dissatisfaction, suggesting that paternal depressive symptomatology in pregnancy is explained both by intrapersonal and interpersonal characteristics. Indeed, during the prenatal period, especially in the last trimester of pregnancy, fathers report higher levels of stress than their partner (Wee et al., 2015) and these high levels of stress could directly and, indirectly via less intimate satisfaction, impact on their mood (Philpott et al., 2020; Philpott et al., 2017; Mangialavori et al., 2019). In contrast, for mothers, it seems that only their levels of stress affected their risk of experiencing depressive symptoms during pregnancy (Dayan et al., 2010). This result may be due to the fact that depressive symptoms in pregnancy could be more related to intrapersonal variables (such as hormonal causes) than to interpersonal factors (Brummelte & Galea, 2010). In fact, hypothalamic-pituitary-adrenal (HPA) axis becomes gradually less responsive to stress as pregnancy progresses

(Serati, Redaelli, Buoli, Altamura, 2016). Alteration of the HPA axis is considered as a robust biomarker of anxiety and depression; mid-pregnancy depression has been significantly associated with increased cortisol (O'Connor et al., 2014). For example, a prospective study, which evaluated maternal self-report psychosocial distress at mid- and late gestation, found that cortisol levels were positively correlated with maternal depression, anxiety, and stress (Parcells, 2010).

Another explanation for our findings regarding maternal depression is that maternal stress is related to the imminent fear of childbirth which has been considered an important risk factor for perinatal depression in first-time mothers (Molgora et al., 2020).

A final possible explanation for our finding that marital satisfaction was not associated with depressive symptomatology is that it represents only one of several dimensions of marital adjustment. Indeed, in a recent study, Mangialavori et al. (2019) found that the variables of dyadic consensus and affective expression of both expectant parents were highly associated with maternal prenatal depression, while maternal and paternal marital satisfaction accounted respectively only for 2.7% and 8.6% of explained variance in maternal depression. Moreover, a growing body of evidence points to the importance of several distinct aspects of intimate relationship functioning for explaining symptoms of depression. These studies have focused on the role of support within one's relationship (i.e., supportive responses by one's partner in the context of stress) and suggest that higher partner support predicts lower perinatal depressive symptoms (e.g., Brock et al., 2014; Kofman et al., 2019). Thus, considering multiple dimensions of couple functioning is a critical step in the development of theoretical models explaining the role of intimate relationships in perinatal depression and improving the efficacy of couple-based interventions for depression.

Overall, our results suggest that marital satisfaction may be a potential mechanism linking prenatal maternal and paternal perceived stress to paternal prenatal depression and they underline

the importance of considering the role of both partners (i.e., the perceived stress and dyadic satisfaction of both members) in the potential development of depressive symptoms during pregnancy.

Our findings highlight the need to reconsider current approaches to perinatal psychological care, which are still predominantly mother-centered, and underscore the importance of screening both expectant mothers and their partners for depressive symptoms, especially during the first pregnancy.

Given evidence that expectant parents' adjustment to pregnancy is related to the parent-infant predict relationship (Ierardi et al., 2019), the present study also suggests that preventive interventions should target expectant parents' dyadic satisfaction and dyadic coping. In fact, it is possible that distressed expectant first-time parents are more vulnerable than multiparous parents to prenatal stress because they are less able to employ positive dyadic coping strategies (i.e. problem focused or emotional focused strategies) to deal with pregnancy-related changes so that they become more unsatisfied with their marital relationship (Alves, Fonseca, Canavarro, & Pereira 2018), which contributes to their risk of experiencing depressive symptoms (Gameiro, Moura-Ramos, Canavarro, Santos & Dattilio, 2011). Recent studies on first-time parents have demonstrated that positive dyadic coping strategies of both members of the couple are associated with both partners' marital satisfaction and their depressive symptoms (Alves et al., 2018; Molgora et al. 2019, Brandao et al. 2020). These findings highlight the importance of examining both partners' dyadic coping resources during pregnancy and targeting them in the psychological support offered to couples as a way of expanding clinical and empirical insights regarding their marital satisfaction and their mental health. In this regard, Bodenmann et al., (2008) suggested that couples may benefit from dyadic coping-enhancing-interventions to assist them in responding

sensitively to the other's stress, which in turn may have a positive effect on couples' overall dyadic adjustment. These interventions provided to people with clinical or sub-clinical levels of depression and their partners have previously been shown to be effective in improving depressive symptomatology, with additional benefits in increasing dyadic satisfaction within couples.

Strengths and limitations

The present study has strengths and limitations that should be recognized. This is the first study to examine the associations between prenatal perceived stress and depressive symptomatology during pregnancy and to explore marital satisfaction as a potential mechanism linking prenatal stress and depressive symptoms in both first-time parents. Second, in doing this, we used a strong data analytic strategy (i.e. APIMeM) that includes both intrapersonal and interpersonal effects of perceived stress on couples' marital satisfaction and depressive symptomatology. Third, the study had a large sample, which allowed for powerful tests of our hypotheses. Despite these strengths, the findings of the present study should be interpreted with caution. Indeed, the cross-sectional nature of the data prevents us from drawing conclusions about causal direction, even though the associations between variables in our study were invoked on a strong theoretical base because perceived stress during the past six months of pregnancy and poor marital satisfaction are thought to precede the risk of depressive states few weeks before the childbirth (Dayan et al., 2010). However, there have been dyadic studies that found that depression mediated the relation between stress and relationship satisfaction contrary to what we observed (Rollè et al., 2017; Baldoni et al. 2020). For this reason, future studies employing a longitudinal dyadic design should be conducted not only to identify the causal relationships among the variables, but also to clarify the impacts of perceived stress on marital satisfaction and levels of depressive symptoms over time (including several months after childbirth). To date, only Vismara

et al. (2016) examined the associations between prenatal stress and depression longitudinally in first time parents, but in doing this they did not use a dyadic approach and they did not consider the prenatal period and the marital adjustment of both members of the couple. Moreover, future studies should also consider the financial status of the couple as a possible factor influencing the relationship among perceived stress, marital satisfaction, and depressive symptoms.

A third limitation is that data were collected using self-report questionnaires. We used questionnaires that were validated in an Italian population. However, the use only of self-report data is not enough for studying these complex processes. Thus, other data-collection methodologies should be integrated with questionnaires in successive studies (e.g. clinical interviews, diaries, observational measures). In fact, a mixed methods design could improve the robustness of the results and could provide a more comprehensive understanding of the complex relations of parental stress, relationship satisfaction and depression in expectant couples (Tashakkori, Johnson & Teddlie, 2020).

Conclusions

In conclusion, our results suggest that when clinical intervention for perinatal depression is needed, both partners should be involved in the treatment because of the interdependence of the two partners, and the fact that depression symptoms are linked to mother's and father's perceived stress and dyadic satisfaction. Incorporating discussions about relationships and stress into prenatal care may help identify women and men in need of help. Psychological interventions that improve marital satisfaction and couple's distress may significantly reduce the negative impact of prenatal stressors on the mental health of expecting couples, especially of first-time fathers (Cohen & Schiller, 2017; Rominov, Pilkington, Giallo & Whelan, 2016).

References

Alves, S., Fonseca, A., Canavarro, M. C., & Pereira, M. (2018). Dyadic coping and dyadic adjustment in couples with women with high depressive symptoms during pregnancy. *Journal of Reproductive and Infant Psychology*, *36*(5), 504-518. https://doi.org/10.1080/02646838.2018.1490496

Baldoni, F., & Giannotti, M. (2020). Perinatal Distress in Fathers: Toward a Gender-Based Screening of Paternal Perinatal Depressive and Affective Disorders. *Frontiers in Psychology*,*11*. https://doi.org/10.3389/fpsyg.2020.01892

Baldoni, F., Giannotti, M., Casu, G., Luperini, V., & Spelzini, F. (2020). A Dyadic Study on Perceived Stress and Couple Adjustment During Pregnancy: The Mediating Role of Depressive Symptoms. *Journal of Family Issues*, *41*(11), 1935-1955.

Beach, S. R., Katz, J., Kim, S., & Brody, G. H. (2003). Prospective effects of marital satisfaction on depressive symptoms in established marriages: A dyadic model. *Journal of Social and Personal Relationships*, *20*(3), 355-371. https://doi.org/10.1177/0265407503020003005

Beach, S. R. (2014). The couple and family discord model of depression: updates and future directions. In: S.C. South & C.R. Agnew (Eds.), *Interpersonal Relationships and Health: Social and Clinical Psychological Mechanisms* (pp. 133-155). Oxford University Press, New York, NY, USA.

Bergström, M. (2013). Depressive symptoms in new first-time fathers: Associations with age, sociodemographic characteristics, and antenatal psychological well-being. *Birth*, *40*(1), 32-38. https://doi.org/10.1111/birt.12026

Bodenmann, G., Plancherel, B., Beach, S. R., Widmer, K., Gabriel, B., Meuwly, N., Charvoz, L., Hautzinger, M., & Schramm, E. (2008). Effects of coping-oriented couples therapy on

depression: A randomized clinical trial. *Journal of consulting and clinical psychology*, *76*(6), 944. https://doi.org/10.1037/a0013467

Boyce, P., Condon, J., Barton, J., & Corkindale, C. (2007). First-time fathers' study: psychological distress in expectant fathers during pregnancy. *Australian & New Zealand Journal of Psychiatry*,*41*(9), 718-725. https://doi.org/10.1080%2F00048670701517959

Brandão, T., Brites, R., Hipólito, J., Pires, M., & Nunes, O. (2020). Dyadic coping, marital adjustment and quality of life in couples during pregnancy: an actor–partner approach. *Journal of Reproductive and Infant Psychology*, *38*(1), 49-59. https://doi.org/10.1080/02646838.2019.1578950

Brock, R. L., O'Hara, M. W., Hart, K. J., McCabe, J. E., Williamson, J. A., Laplante, D. P., Chunbo, Y. & King, S. (2014). Partner support and maternal depression in the context of the Iowa floods. *Journal of Family Psychology*, *28*(6), 832-843. https://doi.org/10.1037/fam0000027

Brummelte, S., & Galea, L. A. (2010). Depression during pregnancy and postpartum: contribution of stress and ovarian hormones. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, *34*(5), 766-776. https://doi.org/10.1016/j.pnpbp.2009.09.006

Cameron, E. E., Sedov, I. D., & Tomfohr-Madsen, L. M. (2016). Prevalence of paternal depression in pregnancy and the postpartum: an updated meta-analysis. *Journal of Affective Disorders*, *206*, 189-203. https://doi.org/10.1016/j.jad.2016.07.044

Chhabra, J., McDermott, B., & Li, W. (2020). Risk factors for paternal perinatal depression and anxiety: A systematic review and meta-analysis. *Psychology of Men & Masculinities*, *21*(4), 593. https://doi.org/10.1037/men0000259

Cohen, M. J., & Schiller, C. E. (2017). A theoretical framework for treating perinatal depression using couple-based interventions. *Psychotherapy*, *54*(4), 406. https://doi.org/10.1037/pst0000151

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*(4) 385-396. https://doi.org/10.2307/2136404

Coutts, J. J., Hayes, A. F., & Jiang, T. (2019). Easy statistical mediation analysis with distinguishable dyadic data. *Journal of Communication*, *69*(6), 612-649. https://doi.org/10.1093/joc/jqz034

Darwiche, J., Favez, N., Simonelli, A., Antonietti, J. P., & Frascarolo, F. (2015). Prenatal coparenting alliance and marital satisfaction when pregnancy occurs after assisted reproductive technologies or spontaneously. *Family Relations*, *64*(4), 534-546. https://doi.org/10.1111/fare.12131

Darwin, Z., Galdas, P., Hinchliff, S., Littlewood, E., McMillan, D., McGowan, L., & Gilbody, S. (2017). Fathers' views and experiences of their own mental health during pregnancy and the first postnatal year: a qualitative interview study of men participating in the UK Born and Bred in Yorkshire (BaBY) cohort. *BMC pregnancy and childbirth*, *17*(1), 1-15. https://doi.org/10.1186/s12884-017-1229-4

Dayan, J., Creveuil, C., Dreyfus, M., Herlicoviez, M., Baleyte, J. M., & O'Keane, V. (2010). Developmental model of depression applied to prenatal depression: role of present and past life events, past emotional disorders and pregnancy stress. *PloS one*, *5*(9).

Deater-Deckard, K. (1998). Parenting stress and child adjustment: Some old hypotheses and new questions. *Clinical Psychology: Science and Practice*, *5*(3), 314-332. https://doi.org/10.1111/j.1468-2850.1998.tb00152.x

Demontigny, F., Girard, M. E., Lacharité, C., Dubeau, D., & Devault, A. (2013). Psychosocial factors associated with paternal postnatal depression. *Journal of Affective Disorders*, *150*(1), 44-49. https://doi.org/10.1016/j.jad.2013.01.048

Divney, A. A., Sipsma, H., Gordon, D., Niccolai, L., Magriples, U., & Kershaw, T. (2012). Depression during pregnancy among young couples: the effect of personal and partner experiences of stressors and the buffering effects of social relationships. *Journal of pediatric and adolescent gynecology*, *25*(3), 201-207. https://doi.org/10.1016/j.jpag.2012.02.003

Doss, B. D., & Rhoades, G. K. (2017). The transition to parenthood: Impact on couples' romantic relationships. *Current Opinion in Psychology*, *13*, 25-28. https://doi.org/10.1016/j.copsyc.2016.04.003

Escribà-Agüir, V., & Artazcoz, L. (2011). Gender differences in postpartum depression: a longitudinal cohort study. *Journal of Epidemiology & Community Health*, *65*(4), 320-326. http://dx.doi.org/10.1136/jech.2008.085894

Fava, G. A. (1983). Assessing depressive symptoms across cultures: Italian validation of the CES-D self-rating scale. *Journal of Clinical Psychology*, *39*(2), 249-251. https://doi.org/10.1002/1097-4679(198303)39:2<249::AID-JCLP2270390218>3.0.CO;2-Y

Figueiredo, B., & Conde, A. (2011). Anxiety and depression in women and men from early pregnancy to 3-months postpartum. *Archives of women's mental health*, *14*(3), 247-255. https://doi.org/10.1007/s00737-011-0217-3

Fu, W., Wilhelm, L. O., Wei, Y., Zhou, G., & Schwarzer, R. (2020). Emotional intelligence and dyadic satisfaction buffer the negative effect of stress on prenatal anxiety and depressive

symptoms in Chinese women who are pregnant with twins. *Anxiety, Stress, & Coping*, 1-13. https://doi.org/10.1080/10615806.2020.1745193

Gameiro, S., Moura-Ramos, M., Canavarro, M. C., Santos, T. A., & Dattilio, F. M. (2011). Congruence of the marital relationship during transition to parenthood: A study with couples who conceived spontaneously or through assisted reproductive technologies. *Contemporary Family Therapy*, *33*(2), 91-106. https://doi.org/10.1007/s10591-011-9153-7

Gao, L. L., Chan, S. W. C., & Mao, Q. (2009). Depression, perceived stress, and social support among first-time Chinese mothers and fathers in the postpartum period. *Research in nursing & health*, *32*(1), 50-58. https://doi.org/10.1002/nur.20306

Gentili, P., Contreras, L., Cassaniti, M., & D'arista, F. (2002). La Dyadic Adjustment Scale: Una misura dell'adattamento di coppia. *Minerva Psichiatrica; 43*(2), 107–116.

Glazier, R. H., Elgar, F. J., Goel, V., & Holzapfel, S. (2004). Stress, social support, and emotional distress in a community sample of pregnant women. *Journal of Psychosomatic Obstetrics & Gynecology*, *25*(3-4), 247-255. https://doi.org/10.1080/01674820400024406

Grote, N. K., Bridge, J. A., Gavin, A. R., Melville, J. L., Iyengar, S., & Katon, W. J. (2010). A meta-analysis of depression during pregnancy and the risk of preterm birth, low birth weight, and intrauterine growth restriction. *Archives of General Psychiatry*, *67*(10), 1012-1024. https://doi:10.1001/archgenpsychiatry.2010.111

Hill, R. (1958). Generic features of families under stress. *Social Casework*, *39*(1-2), 139−150. https://doi.org/10.1177/1044389458039002-318

Ierardi, E., Ferro, V., Trovato, A., Tambelli, R., & Crugnola, C. R. (2019). Maternal and paternal depression and anxiety: their relationship with mother-infant interactions at 3 months.

Archives of Women's Mental Health, *22*(4), 527-533. https://doi.org/10.1007/s00737-018-0919-x

Folkman, S., & Lazarus, R. S. (1984). *Stress, appraisal, and coping*. New York: Springer Publishing Company.

Jonsdottir, S. S., Thome, M., Steingrimsdottir, T., Lydsdottir, L. B., Sigurdsson, J. F., Olafsdottir, H., & Swahnberg, K. (2017). Partner relationship, social support and perinatal distress among pregnant Icelandic women. *Women and Birth*, *30*(1), e46-e55. https://doi.org/10.1016/j.wombi.2016.08.005

Kantziari, M. A., Nikolettos, N., Sivvas, T., Bakoula, C. T., Chrousos, G. P., & Darviri, C. (2019). Stress management during the second trimester of pregnancy. *International Journal of Stress Management*, *26*(1), 102. https://doi.org/10.1037/str0000078

Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *Dyadic Data Analysis*. New York, NY: Guilford Press

Kofman, Y. B., Eng, Z. E., Busse, D., Godkin, S., Campos, B., Sandman, C. A., Wing, D., & Yim, I. S. (2019). Cortisol reactivity and depressive symptoms in pregnancy: The moderating role of perceived social support and neuroticism. *Biological Psychology*, *147*, 107656. https://doi.org/10.1016/j.biopsycho.2019.01.016

Lancaster, C. A., Gold, K. J., Flynn, H. A., Yoo, H., Marcus, S. M., & Davis, M. M. (2010a). Risk factors for depressive symptoms during pregnancy: a systematic review. *American Journal of Obstetrics and Gynecology*, *202*(1), 5-14. https://doi.org/10.1016/j.ajog.2009.09.007

Lancaster, C. A., Flynn, H. A., Johnson, T. R., Marcus, S. M., & Davis, M. M. (2010b). Peripartum length of stay for women with depressive symptoms during pregnancy. *Journal of Women's Health*, *19*(1), 31-37.

Ledermann, T., Macho, S., & Kenny, D. A. (2011). Assessing mediation in dyadic data using the actor-partner interdependence model. *Structural Equation Modeling: A Multidisciplinary Journal*, *18*(4), 595-612. https://doi.org/10.1080/10705511.2011.607099

Lee, M., Kim, Y. S., & Lee, M. K. (2021). The Mediating Effect of Marital Intimacy on the Relationship between Spouse-Related Stress and Prenatal Depression in Pregnant Couples: An Actor–Partner Interdependent Model Test. *International Journal of Environmental Research and Public Health*, *18*(2), 487. https://doi.org/10.3390/ijerph18020487

Lynn, F. A., Alderdice, F. A., Crealey, G. E., & McElnay, J. C. (2011). Associations between maternal characteristics and pregnancy-related stress among low-risk mothers: An observational cross-sectional study. *International journal of nursing studies*, *48*(5), 620-627. https://doi.org/10.1016/j.ijnurstu.2010.10.002

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research*, *39*(1), 99-128. https://doi.org/10.1207/s15327906mbr3901_4

Mangialavori, S., Terrone, G., Cantiano, A., Chiara Franquillo, A., Di Scalea, G. L., Ducci, G., & Cacioppo, M. (2019). Dyadic Adjustment and Prenatal Parental Depression: A Study with Expectant Mothers and Fathers. *Journal of Social and Clinical Psychology*, *38*(10), 860-881. https://doi.org/10.1521/jscp.2019.38.10.860

Mangialavori, S., Giannotti, M., Cacioppo, M., Spelzini, F., & Baldoni, F. (2021). Screening for early signs of paternal perinatal affective disorder in expectant fathers: a cluster analysis approach. *Journal of personalized medicine*, *11*(1), 10. https://doi.org/10.3390/jpm11010010

Matthey, S., Barnett, B., Ungerer, J., & Waters, B. (2000). Paternal and maternal depressed mood during the transition to parenthood. *Journal of Affective Disorders*, *60*(2), 75-85. https://doi.org/10.1016/S0165-0327(99)00159-7

Mazzeschi, C., Pazzagli, C., Radi, G., Raspa, V., & Buratta, L. (2015). Antecedents of maternal parenting stress: the role of attachment style, prenatal attachment, and dyadic adjustment in first-time mothers. *Frontiers in Psychology*, *6*, 1443. https://doi.org/10.3389/fpsyg.2015.01443

Molgora, S., Fenaroli, V., & Saita, E. (2020). Psychological distress profiles in expectant mothers: What is the association with pregnancy-related and relational variables? *Journal of Affective Disorders*, *262(1)*, 83-89. https://doi.org/10.1016/j.jad.2019.10.045

Molgora, S., Acquati, C., Fenaroli, V., & Saita, E. (2019). Dyadic coping and marital adjustment during pregnancy: A cross-sectional study of Italian couples expecting their first child. *International Journal of Psychology*, *54*(2), 277-285. https://doi.org/10.1002/ijop.12476

Mondo, M., Sechi, C., & Cabras, C. (2019). Psychometric evaluation of three versions of the Italian Perceived Stress Scale. *Current Psychology*, 1-9. https://doi.org/10.1007/s12144-019-0132-8

Morse, C. A., Buist, A., & Durkin, S. (2000). First-time parenthood: influences on pre-and postnatal adjustment in fathers and mothers. *Journal of Psychosomatic Obstetrics & Gynecology*, *21*(2), 109-120. https://doi.org/10.3109/01674820009075616

O'Connor, T. G., Tang, W., Gilchrist, M. A., Moynihan, J. A., Pressman, E. K., & Blackmore, E. R. (2014). Diurnal cortisol patterns and psychiatric symptoms in pregnancy: short-term longitudinal study. *Biological psychology*, *96*, 35-41. https://doi.org/10.1016/j.biopsycho.2013.11.002

O'Hara, M. W., & McCabe, J. E. (2013). Postpartum depression: current status and future directions. *Annual Review of Clinical Psychology*, *9*, 379-407. https://doi.org/10.1146/annurev-clinpsy-050212-185612

O'Hara, M. W., & Swain, A. M. (1996). Rates and risk of postpartum depression—a meta-analysis. *International Review of Psychiatry*, *8*(1), 37-54. https://doi.org/10.3109/09540269609037816

Parcells, D. A. (2010). Women's mental health nursing: depression, anxiety and stress during pregnancy. *Journal of psychiatric and mental health nursing*, *17*(9), 813-820. https://doi.org/10.1111/j.1365-2850.2010.01588.x

Paulson, J. F., & Bazemore, S. D. (2010). Prenatal and postpartum depression in fathers and its association with maternal depression: a meta-analysis. *Jama*, *303*(19), 1961-1969. https://doi.org/10.1001/jama.2010.605

Philpott, L. F., Leahy-Warren, P., FitzGerald, S., & Savage, E. (2017). Stress in fathers in the perinatal period: A systematic review. *Midwifery*, *55*, 113-127. https://doi.org/10.1016/j.midw.2017.09.016

Philpott, L. F., Savage, E., Leahy-Warren, P., & FitzGearld, S. (2020). Paternal Perinatal Depression: A Narrative Review. *International Journal of Mens Social and Community Health*, *3*(1), e1-e15. https://doi.org/10.22374/ijmsch.v3i1.22

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*(3), 385-401. https://doi.org/10.1177/014662167700100306

Randall, A. K., & Bodenmann, G. (2017). Stress and its associations with relationship satisfaction. *Current opinion in psychology*, *13*, 96-106.

Randall, A. K., & Bodenmann, G. (2009). The role of stress on close relationships and marital satisfaction. *Clinical Psychology Review*, *29*(2), 105-115. https://doi.org/10.1016/j.cpr.2008.10.004

Robles, T. F., Slatcher, R. B., Trombello, J. M., & McGinn, M. M. (2014). Marital quality and health: A meta-analytic review. *Psychological Bulletin*, *140*(1), 140. https://doi.org/10.1037/a0031859

Rollè, L., Prino, L. E., Sechi, C., Vismara, L., Neri, E., Polizzi, C., ... & Ierardi, E. (2017). Parenting stress, mental health, dyadic adjustment: a structural equation model. *Frontiers in psychology*, *8*, 839. https://doi.org/10.3389/fpsyg.2017.00839

Rominov, H., Pilkington, P. D., Giallo, R., & Whelan, T. A. (2016). A systematic review of interventions targeting paternal mental health in the perinatal period. *Infant Mental Health Journal*, *37*(3), 289-301. https://doi.org/10.1002/imhj.21560

Serati, M., Redaelli, M., Buoli, M., & Altamura, A. C. (2016). Perinatal major depression biomarkers: a systematic review. *Journal of Affective Disorders*, *193*, 391-404. https://doi.org/10.1016/j.jad.2016.01.027

Soliday, E., McCluskey-Fawcett, K., & O'Brien, M. (1999). Postpartum affect and depressive symptoms in mothers and fathers. *American Journal of Orthopsychiatry*, *69*(1), 30-38. https://doi.org/10.1037/h0080379

Spanier, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and the Family*, *38*(1), 15-28. https://doi.org/10.2307/350547

Spanier, G. B. (2001). Dyadic adjustment scale (DAS). User's manual. New York: Multi-Health Systems Inc.

Story, L. B., & Bradbury, T. N. (2004). Understanding marriage and stress: Essential questions and challenges. *Clinical psychology review*, *23*(8), 1139-1162. https://doi.org/10.1016/j.cpr.2003.10.002

Tashakkori, A., Johnson, R. B., & Teddlie, C. (2020). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. SAGE Publications, Incorporated.

Terrone, G., Mangialavori, S., Di Scalea, G., Cantiano, A., Temporin, G., Ducci, G., Gori, A., Cacioppo, M., Schimmenti, A., & Caretti, V. (2020). The Relationship Between Dyadic Adjustment and Psychiatric Symptomatology in Expectant Couples: An Actor–Partner Interdependency Model Approach. *Journal of Affective Disorders, 273(1),* 468-475. https://doi.org/10.1016/j.jad.2020.05.040

Underwood, L., Waldie, K. E., Peterson, E., D'Souza, S., Verbiest, M., McDaid, F., & Morton, S. (2017a). Paternal depression symptoms during pregnancy and after childbirth among participants in the growing up in New Zealand study. *JAMA psychiatry*, *74*(4), 360-369.

Underwood, L., Waldie, K. E., D'Souza, S., Peterson, E. R., & Morton, S. M. (2017b). A longitudinal study of pre-pregnancy and pregnancy risk factors associated with antenatal and postnatal symptoms of depression: evidence from growing up in New Zealand. *Maternal and child health journal*, *21*(4), 915-931.

Vismara, L., Rollè, L., Agostini, F., Sechi, C., Fenaroli, V., Molgora, S., ... & Polizzi, C. (2016). Perinatal parenting stress, anxiety, and depression outcomes in first-time mothers and fathers: a 3-to 6-months postpartum follow-up study. *Frontiers in Psychology*, *7*, 938. https://doi.org/10.3389/fpsyg.2016.00938

Wee, K. Y., Skouteris, H., Richardson, B., McPhie, S., & Hill, B. (2015). The inter-relationship between depressive, anxiety and stress symptoms in fathers during the antenatal period. *Journal of Reproductive and Infant Psychology*, *33*(4), 359-373. https://doi.org/10.1080/02646838.2015.1048199

Whisman, M. A. (2001). The association between depression and marital dissatisfaction. In S. R. H. Beach (Ed.), *Marital and family processes in depression: A scientific foundation for clinical practice* (pp. 3-24). Washington, DC: American Psychological Association

Yu, M., Li, H., Xu, D. R., Wu, Y., Liu, H., & Gong, W. (2020). Trajectories of perinatal depressive symptoms from early pregnancy to six weeks postpartum and their risk factors—a longitudinal study. *Journal of Affective Disorders*, *275(1)*, 149-156.

Table 1. Correlations, means, standard deviations and ranges of the study variables

	1	**2**	**3**	**4**	**5**	**6**
1 CESD Fathers	1	.341**	.579**	.339**	-.513**	-.295**
2 CESD Mothers		1	.218*	.740**	-.366**	-.381**
3 PSS Fathers			1	.350**	-.387**	-.364**
4 PSS Mothers				1	-.388**	-.400**
5 DS Fathers					1	.306**
6 DS Mothers						1
M (SD)	8.58 (5.58)	11.30 (7.32)	10.94 (5.97)	11.88 (6.55)	41.27 (6.63)	41.27 (4.88)
Range	0-30	0-40	0-28	0-31	0-50	24-49

Notes. CESD, Center for Epidemiologic Studies Depression Scale; PSS, Perceived Stress Scale; DS, Dyadic Satisfaction; M, mean; SD, standard deviation.
** $p < .001$; * $p < .05$.

Table 2. Significant and not significant direct effects of study variables

Effect predictor → Outcome	B	SE	*p*	LCI	UCI
Actor effect					
PSS_M →CESD_M	.77	.07	<.001	.63	.92
PSS_P→CESD_P	.40	.07	<.001	.26	.54
PSS_M →DS_M	-.23	.60	<.001	-.35	-.11
PSS_P →DS_P	-.32	.09	<.001	-.45	-.13
DS_M→CESD_M	-.17	.10	.09	-.36	.03
DS_P→CESD_P	-.27	.06	<.001	-.39	-.14
Partner effect					
PSS_M →CESD_P	.05	.07	.44	-.08	.18
PSS_P →CESD_M	-.13	.08	.11	-.29	.03
PSS_M →DS_P	-.29	.08	<.001	-.45	-.13
PSS_P →DS_M	-.21	-.06	<.001	-.34	-.08
DS_M→CESD_P	-.02	.09	.81	-.19	.15
DS_P→CESD_M	-.12	.07	.11	-.26	.03

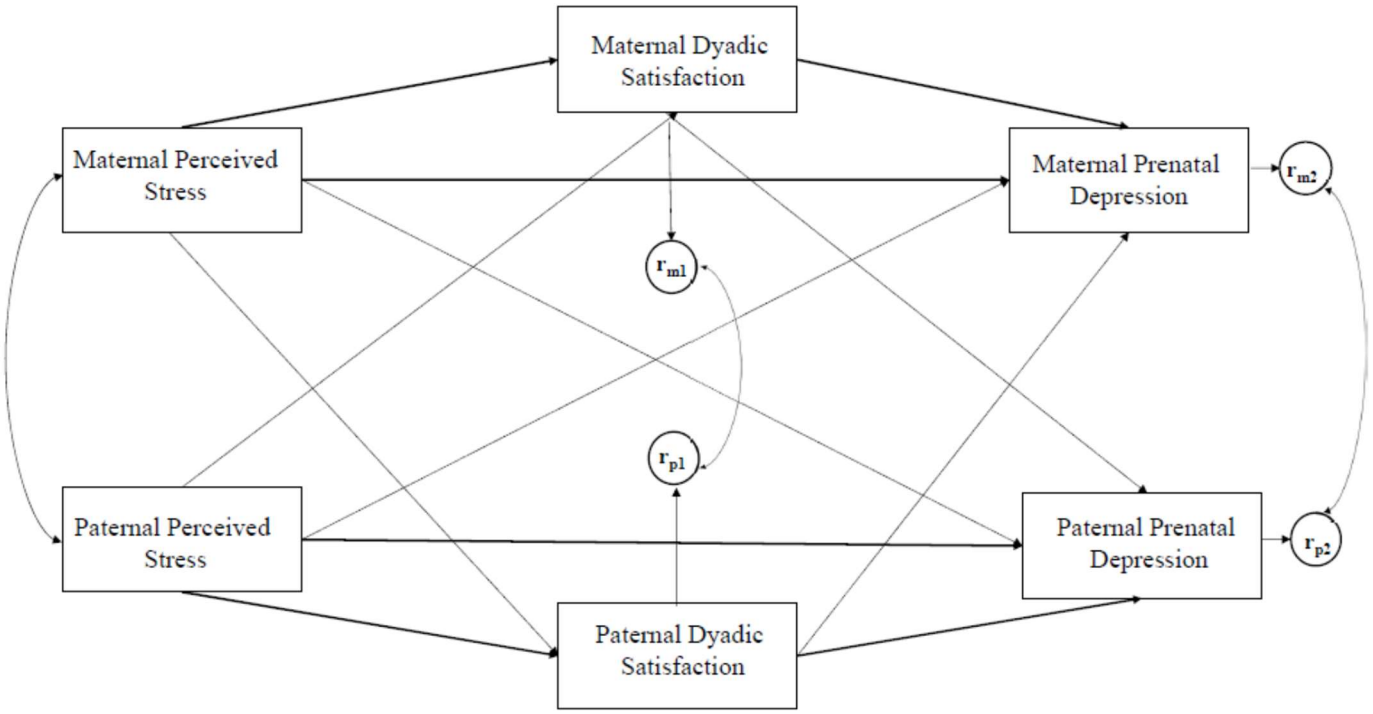
Notes. CESD_M, Maternal Center for Epidemiologic Studies Depression Scale; CESD_P, Paternal Center for Epidemiologic Studies Depression Scale; PSS_M, Maternal Perceived Stress Scale; PSS_P, Paternal Perceived Stress Scale; DS_M, Maternal Dyadic Satisfaction; DS_P, Paternal Dyadic Satisfaction; B, unstandardized estimate; SE, Standard Error; LCI, Lower Confidence Interval; UCI, Upper Confidence Interval.

Table 3. Bootstrap test for indirect effects for the APIMeM with perceived stress as independent variable, dyadic satisfaction as mediator, and prenatal depression as outcome.

	B	SE	*p*	LCI	UCI
Actor effect					
PSS_M→DS_M→CESD_M	.04	.03	.09	-.01	.10
PSS_P→DS_P_CESD_P	.09	.03	<.001	.02	.14
Partner effect					
PSS_M→DS_P→CESD_P	.08	.05	<.001	.01	.20
PSS_M→DS_M→CESD_P	.00	.02	.78	-.04	.06
PSS_M→DS_P→CESD_M	.03	.03	.09	-.02	.10
PSS_P→DS_M→CESD_P	.00	.02	.77	-.04	.05
PSS_P→DS_P→CESD_M	.04	.03	.08	-.02	.10
PSS_P→DS_M→CESD_M	.03	.02	.07	-.01	.08

Notes. CESD_M, Maternal Center for Epidemiologic Studies Depression Scale; CESD_P, Paternal Center for Epidemiologic Studies Depression Scale; PSS_M, Maternal Perceived Stress Scale; PSS_P, Paternal Perceived Stress Scale; DS_M, Maternal Dyadic Satisfaction; DS_P, Paternal Dyadic Satisfaction; B, unstandardized estimate; SE, Standard Error; LCI, Lower Confidence Interval; UCI, Upper Confidence Interval.

Figure 1. The Actor-Partner Interdependence Mediation Model (APIMeM) of our study variables.



Notes. r_m, maternal residual; r_p, paternal residual.

5. Fourth Study

Mangialavori, S., Giannotti, M., Cacioppo, M., Spelzini, F., Baldoni, F. (2021). Screening for Early Signs of Paternal Perinatal Affective Disorder in Expectant Fathers: A Cluster Analysis Approach. *Journal of Personalized Medicine,11*(1), 10. *https://doi.org/10.3390/jpm11010010*

Abstract

Previous studies documented gender-related differences in the expression of Perinatal Affective Disorders. However, little attention has been paid to screening the male population during the perinatal period. This study was based on three aims: (1) to investigate the mental health of expectant fathers based on their levels of depression, anxiety, addiction, anger attacks/hostility, and somatization, identifying psychological profiles; (2) to analyze the association between these profiles and the individual variable of perceived stress; (3) and to examine the association between these profiles and the couple's variable of marital adjustment. A total of 350 Italian expectant fathers in the last trimester of pregnancy were asked to fill in questionnaires concerning perceived stress, dyadic adjustment, psychiatric symptomatology, and depression. Three different clusters were found: "psychologically healthy men" (68%) with low levels of symptoms on all the scales; "men at risk of externalized behavioral problems" (17.1%), characterized by one or more addictive or risky behaviors and moderate levels of scales scores; and "men experiencing psychological distress" (14.9%), with the highest scores on all the scales. A significant association emerged among the perceived stress, marital adjustment, and cluster membership. These results highlight the importance of screening fathers in perinatal health services, which are still predominantly mother-centered, and underscore the necessity to create tailored and personalized interventions.

Keywords: affective disorder; perinatal period; fatherhood; prevention; gender; screening

Introduction

Although being a father for most men is a joyful and fulfilling journey [1], the transition to parenthood, or the arrival of an additional child, can also be perceived as overwhelming and demanding [2]. Indeed, it has been widely recognized that adjustment to fatherhood may negatively affect the men's mental health, increasing psychological distress, depression, and anxiety from the prenatal period [3,4].

In the last decades, an ever-growing number of studies have addressed the impact of transition to parenthood on fathers' mental health [5–7]; however, evidence to propose an appropriate gender-based screening for fathers is lacking [1–8]. In this regard, Walsh, Davis, and Garfield [9] highlighted the urgency of increased attention to screening for Paternal Perinatal Depression (PPND), stating that it is inappropriate to consider the identification, prevention, and treatment interventions of PPND as optional.

PPND is considered a specific disorder that many fathers may suffer from between pregnancy and the first year after childbirth. PPND is related to maternal perinatal depression [10–12] and poor outcomes in offspring, including externalizing and internalizing symptoms [13–15].

Several studies identified significant associations between PPND and some individual variables such as high levels of perceived stress [16,17], multiparity [2,18,19], having a previous history of psychiatric disorders [20], and experiencing stressful life events (e.g., job loss, divorce, mourning) [21,22]. Other studies have highlighted the positive correlation between PPND and risk of perinatal depression in their partners [23,24] and the negative association between PPND and marital adjustment [11,25,26].

Two recent meta-analyses showed a PPND prevalence in the world ranging from 8.4% [27] to 10.4% [23]. In addition, longitudinal studies have shown that pregnancy is a period of high risk for the onset of depressive symptoms in both expectant parents [19,28].

1.1. PPND Clinical Expression

According to the masked depression framework, PPND signs and clinical expression are different from those observed in Maternal Perinatal Depression (MPND), since men often exhibit externalizing symptoms defined as depressive equivalents to hide their depression condition [8,29]. In fact, depressive symptoms can be milder and less defined and are often comorbid with anxiety, somatic symptoms and complaints, hostility and/or anger attacks, substance use (alcohol and drugs), or other addictions or risky behaviors (e.g., gambling, compulsive use of computer/smartphone, or internet, driving very fast, extra marital affairs) [8,30,31]. For this reason, Baldoni [32] proposed to replace the term PPND with Paternal Perinatal Affective Disorder (PPAD) using a more inclusive definition to embrace the broad range of depressive symptoms related to male psychological perinatal distress. Clinicians treating men for depression have also confirmed, based on their clinical experience, that the men's tendency to externalize their distress and provoke interpersonal conflict are "masculine-specific manifestations of depression" [33].

Since perinatal depression risks and psychological responses differ significantly based on gender [31,34,35], it would be helpful to consider the wide array of paternal affective symptoms. Thus, identifying fathers' psychological distress profiles could help mental health professionals better recognize the condition of these men and to develop gender-sensitive screening tools and treatment options tailored to fathers.

1.2. Screening for Early Signs of PPND

Previous studies documented gender-related differences in the manifestation of perinatal depression, [31,36]; however, little attention has been paid to the screening practice in the male population, especially during the perinatal period [5,37]. However, during the occasional perinatal screening visits for expectant fathers, when participants are interviewed to assess if their symptomatology truly indicates depression, the researchers and clinicians use the Diagnostic and Statistical Manual of Mental Disorders(DSM) diagnostic criteria of five or more symptoms from the list of nine potential symptoms for depression [38]. These symptoms are identical for both men and

women. Thus, to date, there is no acknowledgement in this diagnostic system that the two genders may experience and/or exhibit depression differently.

Although measures to assess male-type depressive symptomatology are available, such as the Gotland Male Depression Scale (GMDS) [39], they have not been specifically developed for the perinatal period. Indeed, research and screening of perinatal affective disorders are based almost exclusively on self-report scales that only consider symptoms associated with MPND. In this regard, recent findings highlighted several limitations of traditional scales in capturing paternal psychological distress.

For instance, even if the Edinburgh Postnatal Depression Scale (EPDS) [40] has been validated in fathers [41–44], there is not yet a shared consensus on the optimal cut-off scores for depression and anxiety, which change across studies. Moreover, Nishimura and Ohashi [45] revealed different rates of at-risk fathers using the CES-D (Center for Epidemiological Study Depression Scale) (7.5%; cut-off ≥ 16) and the EPDS (11.6%; cut-off ≥ 9). A Danish study [46] revealed that 20.6% of the at-risk fathers exceed the cut-off value on the GMDS but not on the EPDS. Similarly, Carlberg et al. [47] found that EPDS and GMDS were related to different risk factors and prevalence of PPND. Interestingly, a specific subgroup of fathers only showed externalizing symptomatology without conventional depressive symptoms, proving that a multidimensional and gender-based screening should be used to cover different clinical features of paternal perinatal distress. Considering these limitations, the number of at-risk fathers may be often underestimated, especially when the screening process does not include the assessment of male-type depressive symptoms.

The analysis of different profiles of psychological distress during pregnancy has only been investigated in primiparous women [48]. In this study, three different profiles were found: (1) “psychologically healthy women” with low levels of symptoms of depression, anxiety and fear of childbirth; (2) “women experiencing pregnancy- and childbirth-related anxiety”, with an average state anxiety above the clinical value; and (3) “psychologically distressed women”, that included women who reported high levels of depressive and anxious symptoms, some above the clinical cut-

offs. These findings underlined the importance of early psychological screening in order to understand the diverse experience of expectant parents and to develop person-centered interventions [48].

Hence, based on an integrative and gender-based perspective, the present study was based on three aims: (1) to investigate the mental health of expectant fathers based on their levels of depression, anxiety, addiction, anger attacks/hostility, and somatization by identifying psychological profiles; (2) to analyze the association between the emergent psychological profiles and the individual variable of perceived stress; and (3) to examine the association between these profiles and the couple's dimension of marital adjustment.

2. Materials and Methods

2.1. Procedure and Participants

We initially recruited 423 expectant fathers. After this preliminary recruitment, 21 were excluded for not giving informed consent, 38 were excluded because they did not complete the questionnaire entirely, 9 were excluded because the participants had poor knowledge of Italian and, after a screening by the gynecologist, 14 were excluded because the partner had a pregnancy at risk. We decided to exclude those with a partner with a high-risk pregnancy because the literature highlights that these fathers may have greater psychological distress due to this partner's condition [49,50].

In total, this cross-sectional study involved 350 Italian expectant fathers (Mean age = 35.63, Standard Deviation = 6.32, range = 20–58) in the last trimester of pregnancy. Participants were recruited at the OB/GYN Department of the "Infermi" hospital of Rimini, and of the "Santo Spirito" and San "Filippo Neri" hospitals of Rome where they attended antenatal classes or routine visits between 2016 and 2019. Expectant fathers were informed about the aims and methodology of the study before signing the written consent form. Informed consent was obtained from all subjects involved in the study.

The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of Infermi Hospital (Nº 3691/2016).

Study inclusion criteria were being 18 years or older, in a de facto or marital relationship, and in the third trimester of pregnancy. Exclusion criteria were having a partner with a high-risk pregnancy defined as the presence of one or more maternal and/or fetal health problems including pregnancy-induced hypertension, multiple gestations, medical disorder complicating pregnancy (such as diabetes), previous miscarriages, chromosomal abnormalities in the fetus, pregnancy complications (such as abnormal placenta position, fetal growth restriction) and threatened premature labor; refusal to provide informed consent; presence of cognitive disability and/or current psychiatric diagnosis; poor knowledge of Italian, or other verbal communication limitations that compromised the participant's ability to follow the research protocol.

2.2. Measures

The Center for Epidemiologic Studies Depression Scale (CES-D) [51] is a 20-item self-report measure used to assess depressive symptomatology in the last week measured on a 4-point Likert scale, ranging from 0 to 3. Summing responses to all items formed the depression score, with higher scores indicating more depressive symptoms. The CES-D has been used extensively in community settings and among expectant parents [52]. The Italian version of CES-D [53] was used in this study, showing a satisfactory level of internal consistency ($\alpha = 0.71$).

The Symptom Checklist-90-Revised (SCL-90-R) [54] is a well-known 90-item questionnaire, scored on a Likert scale from 0 to 4, that is used to assess psychiatric symptomatology. In this study, Anxiety (ANX); Somatization (SOM); and Hostility (HOS) subscales were used, with higher scores indicating higher symptoms frequency. The Italian version of SCL-90-R [55] was used, showing a fair level of internal consistency for all the subscales respectively $\alpha = 0.72$ for ANX, $\alpha = 0.78$ for SOM, and $\alpha = 0.75$ for HOS.

The Perceived Stress Scale (PSS) [56] was used to measure the perception of stress in the last six months. It is a measure of the degree to which situations in one's life are appraised as stressful. It contains 10 items that are rated on a 5-point scale that ranges from never to very often. High total scores indicate greater perceived stress. The PSS was widely used during the perinatal period both

for mothers and fathers [57]. In this study, the Italian validation [58] was used, showing a good level of internal consistency (α = 0.76).

The Dyadic Adjustment Scale (DAS) [59] was used to assess a couple's functioning. It is composed of 32 items, 31 of which are related to the specific dimension of marital adjustment while one item refers to the overall perceived happiness with the relationship. In this study, the Italian validated version [60] showed a very good internal consistency (α = 0.89).

Addictions and other risky behaviors were assessed with ad hoc categorical (yes or no) item "In the previous two weeks, I smoked, drank alcohol, used drugs, gambled or used the internet more than usual; or I have taken risks more than usual (e.g., driving very fast, doing dangerous sports, unnecessary risks at work, etc.) (one or more of these)".

Finally, Sociodemographic information (age, education, occupation, number of children) and individual information about the previous history of psychiatric disorders and the presence of stressful life events (e.g., job loss, divorce, mourning) in the previous six months were investigated.

2.3. Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences, version 23 (SPSS Inc., Chicago, IL, USA) and are presented as means, standard deviations (SD), ranges and percentages (%). The correlation index between study variables (CES-D, ANX, SOM, HOS, PSS, and DAS) was calculated.

As suggested by Kent, Jensen and Kongsted [61], in order to identify different sub-groups of psychological distressed men characterized by high within-cluster homogeneity and high between-cluster heterogeneity, a Two-Step cluster analysis was performed on the continuous variables of CES-D, ANX, SOM, and HOS together with the categorical addiction/risky behaviors variable. The Two-Step cluster analysis is a statistical approach that first uses a distance measure to separate groups and then a probabilistic approach to select the optimal sub-group model [61]. Two-Step cluster analysis is also considered more reliable and accurate when compared to traditional clustering methods such as the k-means clustering algorithm [62,63]. This technique presents

several advantages compared to more traditional techniques, such as determining automatically the number of clusters based on a statistical measure of fit (AIC or BIC) rather than on an arbitrary choice, using categorical and continuous variables simultaneously, analyzing atypical values (i.e., outliers), and being able to handle large datasets [61,64]. Comparative studies regarded Two-Step cluster analysis as one of the most reliable in terms of the number of subgroups detected, the classification probability of individuals to subgroups, and the reproducibility of findings on clinical data [61,65]. In the first step (pre-clustering), a sequential approach is used to pre-cluster the cases with the aim to reduce the size of the matrix that contains distances between all possible pairs of cases. In the second step (clustering), the pre-clusters are clustered using the hierarchical clustering algorithm. No prescribed number of clusters was suggested, and the log-likelihood criterion was used for distance measure. Schwarz's Bayesian criterion (BIC) and the silhouette coefficient were used to compare cluster solutions. Silhouette measures of less than 0.2 were classified as poor; between 0.2 and 0.5 were classified as fair; and greater than 0.5 were classified as good solution quality, with fair or higher considered acceptable clustering [64].

Regarding the second and third aims of the study, the association among psychological profiles, perceived stress (PSS), and dyadic adjustment (DAS) was tested through two univariate ANOVAs with the Bonferroni correction in the post hoc tests.

The level of statistical significance was set at $p < 0.05$.

Moreover, to provide a more comprehensive descriptive analysis, the association between psychological profiles and some individual variables (being or not a primiparous parent, previous psychiatric conditions, and the presence of stressful life events) was investigated through chi-square statistics with the standard residual method, as post hoc, to identify those specific cells making the greatest contribution to the chi-square test result [66]. In line with Field [67], since, in our case, the inspection of residuals was used as a guide to what cells might be of interest, we preferred to choose a more conservative alpha value than 0.05 such 0.01 (z value +/− 2.58).

3. Results

Descriptive variables of the study sample (sociodemographic characteristics, being or not a primiparous parent, previous psychiatric diagnosis, presence of stressful life events) are presented in Table 1. Descriptive statistics of the psychological dimensions (CES-D, ANX, SOM, HOS, PSS, DAS, addiction/risky behavior item) are presented in Table 2. All the variables were normally distributed. Correlation coefficients among the variables of interests are reported in Table 3. All the variables were significant for each cluster (Table 4). The composition of the clusters and the importance of variables within a cluster have been examined.

When we only consider the CES-D cut-off [51], the rate of men at risk of depression was 8.2% (n = 29; cut-off ≥ 16).

Regarding the SCL-90 mean scores, when we compared the mean scores of the subscales anxiety (ANX), somatization (SOM), and anger/hostility (HOS) to the Italian norms, only the anxiety mean score was higher than the general male population mean score, but it did not reach clinical significance (T < 45) [55].

With respect to the first aim of the study, the Two-Step cluster analysis yielded three clusters (BIC = 817.04; ratio of distance measure = 2.28), with no exclusion of cases. The Schwarz BIC was selected as the final clustering criterion because it provides a more precise cluster estimate [63] and the three-cluster solution provided a silhouette coefficient S(i) of 0.6, which indicates a good amount of separation and cohesion between data points within the clusters and overall goodness of fit cluster solution [64,68,69].

In term of predictive variables, depressive, anxious, and somatic symptomatology together with anger/hostility and addictive/risky behaviors were the five input variables for the generation of the clusters.

The first cluster included 68% of the total sample (n = 238), and it was characterized by low levels of anxiety, depression, hostility, somatization, and the absence of any reported addictive or risky behaviors. We defined it as a "psychologically healthy men" cluster. In the second cluster (14.9% of the study sample; n = 52), expectant fathers reported the higher scores for anxious and depressive

symptoms, hostility as well as somatization, whereas the majority of them (n = 43, 82.7%) did not fit in the addictive and risky behaviors category. Thus, this cluster was named “men experiencing psychological distress”. The third cluster included 60 expectant fathers (17.1% of the total sample), and it comprised primarily the presence of one or more addictive or risky behaviors in the last two weeks with perceived anxiety, depression, hostility, and somatization represented to a moderate degree. We named this cluster as “men at-risk of externalized behavioral problems”. The ratio of sizes, largest cluster to smallest cluster, was 4.68.

For the first cluster, anxious symptoms emerged as main predictor for the group membership with a predictor importance (PI) of 0.93, followed by hostility (PI = 0.50), somatization (PI = 0.49), addictive/risky behaviors (PI = 1.00), and depressive symptoms (PI = 0.38). For the second cluster, anxious symptoms emerged as the main predictor (PI = 0.93), followed by depressive symptoms (PI = 0.38), somatization (PI= 0.49), hostility (PI = 0.50), and addictive/risky behaviors (PI = 1.00). Considering the third cluster, the main predictor was addictive/risky behaviors dimension (PI = 1.00), followed by hostility (PI = 0.50), depressive symptoms (PI = 0.38), anxious symptoms (PI = 0.93), and somatization (PI = 0.49).

According to our second aim, the findings revealed a significant association between cluster membership and perceived stress (F (2, 347) = 56.53, $p < 0.001$). In particular, perceived stress was significantly different between psychologically healthy men and psychologically distressed men, with men in the first cluster reporting an average score on PSS that was significantly lower than psychologically distressed men (mean difference = −7.52; standard error = 0.75; $p < 0.001$) and men at-risk of externalized behavioral problems (m.d. = −3.94; s.e. = 0.71; $p < 0.001$). Moreover, men in the second cluster obtained a higher average score on the PSS than men at-risk of externalized behavioral problems (m.d. = 3.58; s.e. = 0.93; $p < 0.001$).

Finally, as regards the third research aim, findings revealed a significant association between marital adjustment and cluster membership (F (2, 347) = 16.88, $p < 0.001$). Specifically, psychologically healthy men reported an average DAS score that is significantly higher than men

at-risk of externalized behavioral problems (m.d. = 10.30; s.e. = 2.22; $p < 0.001$) and psychologically distressed men (m.d. = 9.05; s.e. = 2.09; $p < 0.001$); whereas no differences emerged between men at-risk of externalized behavioral problems and psychologically distressed men.

Regarding the descriptive analysis between the three emergent psychological profiles and individual variable of being or not a primiparous parent, the chi square test was not significant ($\chi2(2) = 1.44$, $p = 0.48$). The association between the three clusters and the presence of previous psychiatric disorders was statistically significant ($\chi2(2) = 19.22$, $p < 0.01$), while most of the individuals in the cluster of "psychologically healthy men" did not have previous psychiatric disorders ($n = 220$, 92.43%). The highest percentage of those who had previous psychiatric history was from individuals in the cluster of "psychologically distressed men" ($n = 15$, 28.84%), while the percentage of individuals who had previous psychiatric history of cluster of "men at-risk of externalized behavioral problems" was 16.66% ($n = 10$). A chi-square post-hoc test via the standard residual method confirmed that the standard residuals in the "psychologically healthy men" group category with previous psychiatric disorders significantly contributed to a significant omnibus chi-square statistic ($\chi2 = 15.37$; $p < 0.001$). In addition, the inspection of standard residuals in the "psychologically distressed men" group category with the presence of previous psychiatric disorders significantly contributed to a significant omnibus chi-square statistic ($\chi2 = 15.52$; $p < 0.001$), while it was observed that the standard residuals of "men at-risk of externalized behavioral problems" group with the variable of previous psychiatric disorders did not contribute to significant omnibus chi-square statistic ($\chi2 = 1.28$; $p = 0.77$).

Furthermore, the association between the three clusters and the presence of stressful life events was statistically significant ($\chi2(2) = 18.27$, $p < 0.01$) with individuals of cluster "psychologically distressed men" had a higher percentage of negative past events than the other two groups ($n = 31$, 59.61%), whereas the men in the third cluster had a percentage of 31.66% ($n = 19$). Most of the men in the first cluster (66.80%; $n = 159$) had reported no presence of stressful life events in the previous

six months. A chi-square post-hoc test via the standard residual method showed that only the standard residuals in the "psychologically distressed men" category with the stressful life events variable significantly contributed to significant omnibus chi-square statistic ($\chi 2 = 13.59$; $p < 0.001$).

Discussion

The expression of father psychological distress during the perinatal period tends to be multifaceted compared to maternal depressive symptomatology, including a wide range of symptoms as depressive equivalents. Thus, the conventional self-report questionnaires used for the screening of perinatal depression in mothers may be not sufficient to capture paternal psychological distress during transition to parenthood. In particular, the manifestation of male-type symptoms may be overlooked, leading to an underestimation of at-risk fathers. Therefore, it becomes essential to consider depressive equivalents, especially externalizing behaviors, for the screening of early signs of PPND. To this purpose, the current study examined psychological distress profiles in expectant fathers, using a cluster-analysis approach and testing their associations with individual and couple dimensions.

Firstly, the percentage of at-risk fathers in our sample is relatively in line with the rates of PPND emerged in previous studies [27,70]. Notably, we found that a greater number of fathers (32%) might be at-risk of developing a paternal affective disorder when other types of symptoms related to the expression of paternal perinatal distress were considered. Therefore, in these cases, a prevalence of depression in mothers and fathers can be similar, consistently with a previous study showing no differences between gender in rates of depression [31].

It has been argued that the underestimation of perinatal depression in men compared to women could be related to the type of measurements, which have been developed to address maternal mental health issues. This discrepancy highlighted the need to cover a wide range of clinical manifestations in fathers to address the impact of transition to fatherhood on paternal mental health [8,37].

Specifically, we found three profiles of paternal psychological distress during the prenatal period. The larger group included expectant fathers who reported lower levels of symptoms across the different investigated domains (anxiety, depression, hostility, and somatization). None of the expectant fathers of the “psychologically healthy men” reported addictive or risky behaviors during the last two weeks before the assessment. This finding confirms that most men perceived the transition to fatherhood as an adaptive process, without reporting specific symptoms of clinical significance during the screening process.

Focusing on the at-risk groups, the third cluster of expectant fathers defined as “men at risk of externalizing behaviors" is characterized primarily for the manifestation of one of more addictive or risky behaviors during the third trimester of pregnancy. Thus, expectant fathers may feel the need to express their psychological distress reacting with externalizing symptoms such as substance use, gambling, internet addiction, self-disruptive, and other risky behaviors as highlighted by previous research [1,31,37]. A possible explanation is that the adherence to traditional masculinity norms may pose a challenge for men who are less likely to express their psychological vulnerabilities through internalizing symptoms or clear expression of weakness. This finding supports the idea that males may often mask their depression condition showing a wide range of alternative symptoms, in particular externalizing behavior [71,72]. In particular, a large body of research revealed that substance use, including smoking, during pregnancy is one of the most relevant associated factors with PPND [17,73,74] and should be considered as a fundamental aspect in the screening of early signs and symptoms of paternal affective disorder. Substance use disorder in new parents has been linked to adverse effects for parenting, which may compromise adequate caregiving. Research has widely documented the association between substance abuse and child negative outcome, including insecure attachment, maltreatment as well as emotional, behavioral, and health problems [75,76]. Moreover, in the group of “men at risk of externalizing behaviors”, hostility emerged as an important predictor to discriminate groups. Prior research highlighted the significance of the hostility, resentment, anger, and irritability as a relevant clinical manifestation of depression in men

[33,77]. In this regard, it has been documented that irritability in men is associated with poor impulse control, anger attacks and aggression, substance misuse, and risk-taking or escape behaviors [78,79]. Hostility and substance use in fathers could also negatively affect parenting and couple relationships, leading to poor father–child interaction, aggressive parenting behaviors, and increasing the risk for engaging in intimate partner violence [80].

With respect to the second cluster defined as “psychologically distressed men”, we found that one father out of ten reported higher levels of depression and anxiety before childbirth.

Interestingly, anxiety rather than depressive symptoms emerged as the most important predictor for this group. Evidence has shown that anxious symptoms during the perinatal period are common in men, suggesting the need to assess both depression and anxiety in expectant fathers [81]. A recent systematic review showed that the rates of anxiety disorders during the prenatal period ranged from 4.1% to 16% and remain substantially stable across the transition to parenthood [82]. This finding underlined that anxiety may be frequent in men who experience internalizing symptoms before childbirth, including those without significant depressive symptoms. Importantly, even in the case of men who experience internalizing distress, the assessment of depression could be limited, since anxiety is not adequately addressed. Both depression and anxiety in fathers have been associated with an increased risk for maternal and child health [81,83]. According to our results, fathers in this cluster could also show somatization symptoms experiencing the perception of physical dysfunction. This is consistent with previous studies showing that new fathers can express physical distress through somatic complaints and abnormal illness behaviors (the so-called Couvade Syndrome), which are considered to be part of the complex clinical picture of paternal perinatal distress [8,37].

Moreover, the association between the emerged psychological profiles and perceived stress was significant, with psychological health men reported a lower score in the scale of perceived stress than the other two clusters. Moreover, our results showed that psychologically distressed men

reported higher perceived stress than the men at risk of externalized behavioral problems. According to previous studies, high perceived stress is associated to paternal affective disorders, especially with depressive and anxious symptomatology [3,26,27,84].

Finally, focusing on the association between the psychological profiles and marital adjustment, our findings revealed a significant relationship, with psychologically healthy men reporting the highest levels of marital adjustment and psychologically distressed men reporting the lowest levels. The lack of differences on dyadic adjustment between men at risk of externalized behavioral problems and psychologically distressed men, suggests that a poor intimate relationship is a common thread among men experiencing perinatal affective symptomatology. This result highlights the relationship between individual and couple's functioning during pregnancy [11,25,85,86] and confirms the importance to consider dyadic and relational aspects as potential risk for men's health both in case of externalizing and internalizing symptoms. Indeed, other authors have focused on the negative impact that perinatal affective disorders had on marital quality, especially on marital and sexual satisfaction [87–89].

Furthermore, in our sample, the presence of symptoms of psychological distress is not related to be a first-time father. Whereas some studies have revealed that multiparous parents exhibit a higher level of anxiety, depression symptoms, and a poor health-related quality of life than primiparous parents [18,19], others have reported that parity was unassociated with an increased risk of anxiety and depression or lower health-related quality of life scores during the perinatal period [27,90].

With the respect to the association between the psychological profiles and previous psychiatric disorders, our findings revealed a significant relationship, with psychologically distressed men reporting the highest percentage of previous psychiatric disorders compared with psychologically healthy men. These findings are consistent with previous studies that have identified the presence of previous psychiatric history related to the onset or the exacerbation of affective symptomatology during the perinatal period [84,91,92].

Similarly, the association between our psychological profiles and the presence of stressful life events in the preceding six months was statistically significant, with individuals of cluster "psychologically distressed men" having a higher percentage of stressful life events than the other two groups. This finding is supported by previous studies that identified the presence of stressful life events as a potential risk factor for perinatal affective disorders [20,27,85,93].

Our findings have relevant clinical implications. Prevention programs should be implemented including both parents from the prenatal period. Given that the quality of marital adjustment can be negatively affected by perinatal affective symptoms, a partner inclusive approach needs to be adopted throughout perinatal period [94]. For the screening and diagnosis, it is essential to consider the manifestation of externalizing behavior as depressive equivalents. We encourage extending the assessment by including non-traditional symptoms of perinatal affective disorder, following a gender-sensitive perspective. In this regard, it becomes crucial to raise the awareness of perinatal practitioners with respect to the clinical expression of paternal psychological distress. Fathers at risk of externalizing behavioral problems require a more in-depth diagnostic assessment, and a personalized treatment if needed. Interventions should be tailored to specific needs and clinical manifestations of the fathers, promoting partner reciprocal support.

Conclusions

The present study has strengths and limitations that should be addressed. This is the first pioneering study to examine the mental health of expectant fathers based on their levels of depression, anxiety, addiction, anger attacks/hostility and somatization by identifying psychological profiles. Second, in doing this, we also examined the association among these psychological profiles, perceived stress, and marital adjustment. Third, most of the studies on PPND have focused on first-time fathers and postnatal period, whereas we examined paternal mental health before childbirth, also including fathers with one or more children.

Despite these strengths, the findings of the present study should be interpreted with caution. Indeed, the cross-sectional nature of the data prevents us from drawing conclusions about causal direction. In the future, it could be useful for the research to implement a longitudinal design that makes it possible to expand the study to the postpartum period, analyzing the association between these psychological profiles and individual and couple variables during the postnatal period. Furthermore, it could be useful to anticipate the assessment during pregnancy to the first trimester. Indeed, data about prevalence rates of depression and anxiety and changes over time during the perinatal period vary widely [6,70]; thus, an early screening could make it possible to identify not just the presence of a symptomatology but also the trajectories of change over time [94]. Moreover, since our study was conducted on expectant fathers in their third trimester of partner's pregnancy, it could be useful in the future to also obtain information on gestation weeks to assess if expectant fathers in their final weeks are at greater risk of PPAD than others.

Another limitation of the study was to have few subjects with psychiatric history and stressful life events; future studies should better investigate the association between these variables and men at risk of PPAD.

Finally, we used self-report instruments that are not specifically developed to assess men's perinatal distress. Future studies could include, for example, clinical interviews that can better capture the complexity and the variety of early signs of paternal perinatal affective symptomatology. Moreover, it is essential to develop new measures to evaluate a broad range of depressive equivalents increasing the sensitivity and specificity of the screening in the perinatal period. [1,8,37,41]. In this perspective, a team of researchers recently created the Perinatal Assessment of Paternal Affectivity (PAPA) [32,95] a self-report instrument for the screening of affective symptomatology in fathers based on recent research on perinatal affective disorders. This tool assesses different dimensions of paternal perinatal distress (anxiety, depression, irritability/anger, couple and relational difficulties, somatic complaints, risky behaviors, and addictions). Above all, an early diagnosis of Paternal

Perinatal Affective Disorder (PPAD) may reflect a more comprehensive viewpoint to assess mental health of fathers during the perinatal period and avoid potential consequences on mothers' mental health and children's development [8].

In conclusion, our findings highlight the need to design an effective and also inclusive perinatal service for fathers' psychological care, and they point out the importance of an appropriate gender-sensitive screening for detecting fathers' affective symptoms given the impact of men psychological distress on the whole family well-being.

References

1. Madsen, S.A. Men and perinatal depression. *Trends Urol. Men's Heal.* **2019**, *10*, 7–9, doi:10.1002/tre.681.
2. Philpott, L.F.; Savage, E.; Leahy-Warren, P.; Fitzgearld, S. Paternal Perinatal Depression: A Narrative Review. *Int. J. Mens Soc. Community Heal.* **2020**, *3*, e1–e15, doi:10.22374/ijmsch.v3i1.22.
3. Bruno, A.; Celebre, L.; Carmela, M.; Rizzo, A.; Silvestri, M.C.; De Stefano, R.; Zoccali, R.A.; Muscatello, M.R.A. When Fathers Begin to Falter: A Comprehensive Review on Paternal Perinatal Depression. *Int. J. Environ. Res. Public Heal.* **2020**, *17*, 1139, doi:10.3390/ijerph17041139.
4. Field, T.; Diego, M.; Hernandez-Reif, M.; Figueiredo, B.; Deeds, O.; Contogeorgos, J.; Ascencio, A. Prenatal paternal depression. *Infant Behav. Dev.* **2006**, *29*, 579–583, doi:10.1016/j.infbeh.2006.07.010.
5. Baldoni, F. Attachment, danger and role of the father in family life span. *Transilv. J. Psychol.* **2010**, *4*, 375–402.
6. Field, T. Paternal Prenatal, Perinatal and Postpartum Depression: A narrative review. *J. Anxiety Depress.* **2018**, *1*, 102-118. doi:10.46527/2582-3264.102.

7. Fletcher, R.; Matthey, S.; Marley, C.G. Addressing depression and anxiety among new fathers. *Med. J. Aust.* **2006**, *185*, 461–463, doi:10.5694/j.1326-5377.2006.tb00650.x.
8. Baldoni, F.; Giannotti, M. Perinatal Distress in Fathers: Toward a Gender-Based Screening of Paternal Perinatal Depressive and Affective Disorders. *Front. Psychol.* **2020**, *11*, 1892, doi:10.3389/fpsyg.2020.01892.
9. Walsh, T.B.; Davis, R.N.; Garfield, C. A Call to Action: Screening Fathers for Perinatal Depression. *Pediatrics* **2019**, *145*, e20191193, doi:10.1542/peds.2019-1193.
10. Baldoni, F., Baldaro, B., Benassi, M. Affective disorders and illness behaviour in perinatal period: Correlations between fathers and mothers. *Child Dev. Disabil.* **2009**, *36*, 25–44.
11. Mangialavori, S.; Terrone, G.; Cantiano, A.; Franquillo, A.C.; Di Scalea, G.L.; Ducci, G.; Cacioppo, M. Dyadic Adjustment and Prenatal Parental Depression: A Study with Expectant Mothers and Fathers. *J. Soc. Clin. Psychol.* **2019**, *38*, 860–881, doi:10.1521/jscp.2019.38.10.860.
12. Paulson, J.F.; Bazemore, S.D.; Goodman, J.H.; Leiferman, J.A. The course and interrelationship of maternal and paternal perinatal depression. *Arch. Women's Ment. Heal.* **2016**, *19*, 655–663, doi:10.1007/s00737-016-0598-4.
13. Gentile, S.; Fusco, M.L. Untreated perinatal paternal depression: Effects on offspring. *Psychiatry Res.* **2017**, *252*, 325–332, doi:10.1016/j.psychres.2017.02.064.
14. Letourneau, N.; Apron the APrON Team; Leung, B.; Ntanda, H.; Dewey, D.; Deane, A.J.; Giesbrecht, G.F. Maternal and paternal perinatal depressive symptoms associate with 2- and 3-year-old children's behaviour: Findings from the APrON longitudinal study. *BMC Pediatr.* **2019**, *19*, 1–13, doi:10.1186/s12887-019-1775-1.
15. Sweeney, S.; Macbeth, A. The effects of paternal depression on child and adolescent outcomes: A systematic review. *J. Affect. Disord.* **2016**, *205*, 44–59, doi:10.1016/j.jad.2016.05.073.

16. Chhabra, J.; McDermott, B.; Li, W. Risk factors for paternal perinatal depression and anxiety: A systematic review and meta-analysis. *Psychol. Men Masc.* **2020**, *21,* 593-611. doi:10.1037/men0000259.
17. Underwood, L.; Waldie, K.E.; Peterson, E.; D'Souza, S.; Verbiest, M.; McDaid, F.; Morton, S. Paternal Depression Symptoms During Pregnancy and After Childbirth Among Participants in the Growing Up in New Zealand Study. *JAMA Psychiatry* **2017**, *74*, 360–410, doi:10.1001/jamapsychiatry.2016.4234.
18. Chen, Y.-H.; Huang, J.-P.; Au, H.-K. High risk of depression, anxiety, and poor quality of life among experienced fathers, but not mothers: A prospective longitudinal study. *J. Affect. Disord.* **2019**, *242*, 39–47, doi:10.1016/j.jad.2018.08.042.
19. Figueiredo, B.; Conde, A. Anxiety and depression in women and men from early pregnancy to 3-months postpartum. *Arch. Women's Ment. Heal.* **2011**, *14*, 247–255, doi:10.1007/s00737-011-0217-3.
20. Wee, K.Y.; Skouteris, H.; Pier, C.; Richardson, B.; Milgrom, J. Correlates of ante- and postnatal depression in fathers: A systematic review. *J. Affect. Disord.* **2011**, *130*, 358–377, doi:10.1016/j.jad.2010.06.019.
21. Da Costa, D.; Zelkowitz, P.; Dasgupta, K.; Sewitch, M.; Lowensteyn, I.; Cruz, R.; Hennegan, K.; Khalifé, S. Dads Get Sad Too: Depressive Symptoms and Associated Factors in Expectant First-Time Fathers. *Am. J. Men's Heal.* **2017**, *11*, 1376–1384, doi:10.1177/1557988315606963.
22. Philpott, L.F.; Corcoran, P. Paternal postnatal depression in Ireland: Prevalence and associated factors. *Midwifery* **2018**, *56*, 121–127, doi:10.1016/j.midw.2017.10.009.
23. Paulson, J.F.; Bazemore, S.D. Prenatal and Postpartum Depression in Fathers and Its Association with Maternal Depression. *JAMA* **2010**, *303*, 1961–1969, doi:10.1001/jama.2010.605.

24. Pinheiro, R.T.; Magalhaes, P.V.S.; Horta, B.L.; Pinheiro, K.A.T.; A Da Silva, R.; Pinto, R.H. Is paternal postpartum depression associated with maternal postpartum depression? Population-based study in Brazil. *Acta Psychiatr. Scand.* **2006**, *113*, 230–232, doi:10.1111/j.1600-0447.2005.00708.x.
25. Terrone, G.; Mangialavori, S.; Di Scalea, G.L.; Cantiano, A.; Temporin, G.; Ducci, G.; Gori, A.; Cacioppo, M.; Schimmenti, A.; Caretti, V. The relationship between dyadic adjustment and psychiatric symptomatology in expectant couples: An actor–partner interdependency model approach. *J. Affect. Disord.* **2020**, *273*, 468–475, doi:10.1016/j.jad.2020.05.040.
26. Baldoni, F.; Giannotti, M.; Casu, G.; Luperini, V.; Spelzini, F. A Dyadic Study on Perceived Stress and Couple Adjustment During Pregnancy: The Mediating Role of Depressive Symptoms. *J. Fam. Issues* **2020**, *41*, 1935–1955, doi:10.1177/0192513x20934834.
27. Cameron, E.E.; Sedov, I.D.; Tomfohr-Madsen, L.M. Prevalence of paternal depression in pregnancy and the postpartum: An updated meta-analysis. *J. Affect. Disord.* **2016**, *206*, 189–203, doi:10.1016/j.jad.2016.07.044.
28. Nakano, M.; Sourander, A.; Luntamo, T.; Chudal, R.; Skokauskas, N.; Kaneko, H. Early risk factors for postpartum depression: A longitudinal Japanese population-based study. *J. Affect. Disord.* **2020**, *269*, 148–153, doi:10.1016/j.jad.2020.03.026.
29. O'Brien, A.P.; McNeil, K.A.; Fletcher, R.; Conrad, A.; Wilson, A.J.; Jones, D.; Chan, S.W. New Fathers' Perinatal Depression and Anxiety-Treatment Options: An Integrative Review. *Am. J. Men's Heal.* **2016**, *11*, 863–876, doi:10.1177/1557988316669047.
30. Kim, P.; Swain, J.E. Sad Dads: Paternal Postpartum Depression. *Psychiatry* **2007**, *4*, 35–47.
31. Martin, L.A.; Neighbors, H.W.; Griffith, D.M. The Experience of Symptoms of Depression in Men vs Women. *JAMA Psychiatry* **2013**, *70*, 1100–1106, doi:10.1001/jamapsychiatry.2013.1985.

32. Baldoni, F.; Matthey, S.; Agostini, F.; Schimmenti, A.; Caretti, V. Perinatal assessment of paternal affectivity (PAPA): Preliminary report on a new screening tool. *Infant Ment. Health J.* **2016**, *37*, 132–133.

33. Cochran, S.V.; Rabinowitz, F.E. Gender-sensitive recommendations for assessment and treatment of depression in men. *Prof. Psychol. Res. Pr.* **2003**, *34*, 132–140, doi:10.1037/0735-7028.34.2.132.

34. Danielsson, U.; Johansson, E.E. Beyond weeping and crying: A gender analysis of expressions of depression. *Scand. J. Prim. Heal. Care* **2005**, *23*, 171–177, doi:10.1080/02813430510031315.

35. Habib, C. Paternal perinatal depression: An overview and suggestions towards an intervention model. *J. Fam. Stud.* **2012**, *18*, 4–16, doi:10.5172/jfs.2012.18.1.4.

36. Magovcevic, M.; Addis, M.E. The Masculine Depression Scale: Development and psychometric evaluation. *Psychol. Men Masc.* **2008**, *9*, 117–132, doi:10.1037/1524-9220.9.3.117.

37. Psouni, E.; Agebjörn, J.; Linder, H. Symptoms of depression in Swedish fathers in the postnatal period and development of a screening tool. *Scand. J. Psychol.* **2017**, *58*, 485–496, doi:10.1111/sjop.12396.

38. *Diagnostic and Statistical Manual of Mental Disorders: DSM-5*, 5th ed.; American Psychiatric Association (APA), Eds.; American Psychiatric Association: Washington, DC, USA, 2013.

39. Zierau, F.; Bille, A.; Rutz, W.; Bech, P. The Gotland Male Depression Scale: A validity study in patients with alcohol use disorder. *Nord. J. Psychiatry* **2002**, *56*, 265–271, doi:10.1080/08039480260242750.

40. Cox, J.L.; Holden, J.M.; Sagovsky, R. Detection of Postnatal Depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *Br. J. Psychiatry* **1987**, *150*, 782–786.

41. Matthey, S.; Barnett, B.; Kavanagh, D.J.; Howie, P. Validation of the Edinburgh Postnatal Depression Scale for men, and comparison of item endorsement with their partners. *J. Affect. Disord.* **2001**, *64*, 175–184, doi:10.1016/s0165-0327(00)00236-6.
42. Edmondson, O.J.; Psychogiou, L.; Vlachos, H.; Netsi, E.; Ramchandani, P.G. Depression in fathers in the postnatal period: Assessment of the Edinburgh Postnatal Depression Scale as a screening measure. *J. Affect. Disord.* **2010**, *125*, 365–368, doi:10.1016/j.jad.2010.01.069.
43. Lai, B.P.; Tang, A.K.; Lee, D.T.; Yip, A.S.; Chung, T.K. Detecting postnatal depression in Chinese men: A comparison of three instruments. *Psychiatry Res.* **2010**, *180*, 80–85, doi:10.1016/j.psychres.2009.07.015.
44. Loscalzo, Y.; Giannini, M.; Contena, B.; Gori, A.; Benvenuti, P. The Edinburgh Postnatal Depression Scale for Fathers: A contribution to the validation for an Italian sample. *Gen. Hosp. Psychiatry* **2015**, *37*, 251–256, doi:10.1016/j.genhosppsych.2015.02.002.
45. Nishimura, A.; Ohashi, K. Risk factors of paternal depression in the early postnatal period in Japan. *Nurs. Heal. Sci.* **2010**, *12*, 170–176, doi:10.1111/j.1442-2018.2010.00513.x.
46. Madsen, S.A.; Juhl, T. Paternal depression in the postnatal period assessed with traditional and male depression scales. *J. Men's Heal. Gend.* **2007**, *4*, 26–31, doi:10.1016/j.jmhg.2006.10.017.
47. Carlberg, M.; Edhborg, M.; Lindberg, L. Paternal Perinatal Depression Assessed by the Edinburgh Postnatal Depression Scale and the Gotland Male Depression Scale: Prevalence and Possible Risk Factors. *Am. J. Men's Heal.* **2018**, *12*, 720–729, doi:10.1177/1557988317749071.
48. Molgora, S.; Fenaroli, V.; Saita, E. Psychological distress profiles in expectant mothers: What is the association with pregnancy-related and relational variables? *J. Affect. Disord.* **2020**, *262*, 83–89, doi:10.1016/j.jad.2019.10.045.

49. Azam Hajikhani, N.; Mahmoodi, Z.; Nasiri, M.; Rahnemaei, F.A.; Ozgoli, G. Predictors of Fathers' Worry about High Risk Pregnancy of Their Wife: A Path Analysis. *Int J Pediatr*. **2020**. doi:10.22038/IJP.2020.52062.4139

50. McCain, G.C.; Deatrick, J.A. The Experience of High-Risk Pregnancy. *J. Obstet. Gynecol. Neonatal Nurs.* **1994**, *23*, 421–427, doi:10.1111/j.1552-6909.1994.tb01899.x.

51. Radloff, L.S. The CES-D Scale. *Appl. Psychol. Meas.* **1977**, *1*, 385–401, doi:10.1177/014662167700100306.

52. Field, T.; Hernandez-Reif, M.; Diego, M. Risk factors and stress variables that differentiate depressed from nondepressed pregnant women. *Infant Behav. Dev.* **2006**, *29*, 169–174, doi:10.1016/j.infbeh.2005.09.005.

53. Fava, G.A. Assessing depressive symptoms across cultures: Italian validation of the CES-D self-rating scale. *J. Clin. Psychol.* **1983**, *39*, 249–251, doi:10.1002/1097-4679(198303)39:23.0.co;2-y.

54. Derogatis, L.R. *Symptom Checklist-90-R (SCL-90-R): Administration, Scoring and Procedures Manual*, 3rd ed.; National Computer Systems: Minneapolis, MN, USA, 1984.

55. Prunas, A.; Sarno, I.; Preti, E.; Madeddu, F.; Perugini, M. Psychometric properties of the Italian version of the SCL-90-R: A study on a large community sample. *Eur. Psychiatry* **2012**, *27*, 591–597, doi:10.1016/j.eurpsy.2010.12.006.

56. Cohen, S.; Kamarck, T.; Mermelstein, R. A global measure of perceived stress. *J. Health Soc. Behav.* **1983**, *24*, 385, doi:10.2307/2136404.

57. Gao, L.-L.; Chan, S.W.-C.; Mao, Q. Depression, perceived stress, and social support among first-time Chinese mothers and fathers in the postpartum period. *Res. Nurs. Heal.* **2009**, *32*, 50–58, doi:10.1002/nur.20306.

58. Mondo, M.; Sechi, C.; Cabras, C. Psychometric evaluation of three versions of the Italian Perceived Stress Scale. *Curr. Psychol.* **2019**, 1–9, doi:10.1007/s12144-019-0132-8.

59. Spanier, G.B. Measuring Dyadic Adjustment: New Scales for Assessing the Quality of Marriage and Similar Dyads. *J. Marriage Fam.* **1976**, *38*, 15, doi:10.2307/350547.

60. Gentili, P.; Contreras, L.; Cassaniti, M.; D Arista, F. A measurement of dyadic adjustment: The Dyadic Adjustment Scale. *Minerva Psichiatr.* **2002**, *43*, 107–116.

61. Kent, P.; Jensen, R.K.; Kongsted, A. A comparison of three clustering methods for finding subgroups in MRI, SMS or clinical data: SPSS TwoStep Cluster analysis, Latent Gold and SNOB. *Bmc Med Res. Methodol.* **2014**, *14*, 113, doi:10.1186/1471-2288-14-113.

62. Norusis, M. *Cluster Analysis*; Upper Saddle River, NJ, Prentice Hall, USA, 2008; pp. 361–391.

63. Tkaczynski, A. *Segmentation in Social Marketing*; Springer Science and Business Media LLC: Berlin/Heidelberg, Germany, 2016; pp. 109–125.

64. Sarstedt, M.; Mooi, E. *A Concise Guide to Market Research*; Springer Science and Business Media LLC: Berlin/Heidelberg, Germany, 2014.

65. Gelbard, R.; Goldman, O.; Spiegler, I. Investigating diversity of clustering methods: An empirical comparison. *Data Knowl. Eng.* **2007**, *63*, 155–166, doi:10.1016/j.datak.2007.01.002.

66. Sharpe, D. Chi-Square Test Is Statistically Significant: Now What? *Pract. Assess. Res. Eval.* **2015**, *20.* 8. doi:10.7275/tbfa-x148

67. Discovering Statistics Using IBM SPSS Statistics. And Sex and Drugs and Rock'n'Roll. *Pflege* **2014**, *27*, 430, doi:10.1024/1012-5302/a000397.

68. Cohen, J.R.; Spiro, C.N.; Young, J.F.; Gibb, B.E.; Hankin, B.L.; Abela, J.R.Z. Interpersonal Risk Profiles for Youth Depression: A Person-Centered, Multi-Wave, Longitudinal Study. *J. Abnorm. Child Psychol.* **2015**, *43*, 1415–1426, doi:10.1007/s10802-015-0023-x.

69. Kaufman, L.; Rousseeuw, P.J. *Finding Groups in Data: An Introduction to Cluster Analysis*; Wiley Series in Probability and Mathematical Statistics; Wiley: Hoboken, NJ, USA, 2005.

70. Rao, W.-W.; Zhu, X.-M.; Zong, Q.-Q.; Zhang, Q.; Hall, B.J.; Ungvari, G.S.; Xiang, Y.-T. Prevalence of prenatal and postpartum depression in fathers: A comprehensive meta-analysis of observational surveys. *J. Affect. Disord.* **2020**, *263*, 491–499, doi:10.1016/j.jad.2019.10.030.
71. Rutz, W.; Von Knorring, L.; Pihlgren, H.; Rihmer, Z.; Wålinder, J. Prevention of male suicides: Lessons from Gotland study. *Lancet* **1995**, *345*, 524, doi:10.1016/s0140-6736(95)90622-3.
72. Lynch, J.; Kilmartin, C. *The Pain behind the Mask: Overcoming Masculine Depression; The Haworth Press Advances in Psychology and Mental Health*; Haworth Press: New York, NY, USA, 1999.
73. Epifanio, M.S.; Genna, V.; De Luca, C.; Roccella, M.; La Grutta, S. Paternal and Maternal Transition to Parenthood: The Risk of Postpartum Depression and Parenting Stress. *Pediatr. Rep.* **2015**, *7*, 38–44, doi:10.4081/pr.2015.5872.
74. Recto, P.; Champion, J.D. Psychosocial Factors Associated with Paternal Perinatal Depression in the United States: A Systematic Review. *Issues Ment. Heal. Nurs.* **2020**, *41*, 608–623, doi:10.1080/01612840.2019.1704320.
75. Osborne, C.; Berger, L.M. Parental Substance Abuse and Child Well-Being. *J. Fam. Issues* **2009**, *30*, 341–370, doi:10.1177/0192513x08326225.
76. Eiden, R.D.; Edwards, E.P.; Leonard, K.E. Mother–infant and father–infant attachment among alcoholic families. *Dev. Psychopathol.* **2002**, *14*, 253–278, doi:10.1017/s0954579402002043.
77. Oliffe, J.L.; Phillips, M.J. Men, depression and masculinities: A review and recommendations. *J. Men's Heal.* **2008**, *5*, 194–202, doi:10.1016/j.jomh.2008.03.016.
78. Winkler, M.U.D.; Pjrek, E.; Kasper, S. Anger Attacks in Depression-Evidence for a Male Depressive Syndrome. *Psychother. Psychosom.* **2005**, *74*, 303–307, doi:10.1159/000086321.

79. Cavanagh, A.; Wilson, C.J.; Kavanagh, D.; Caputi, P. Differences in the Expression of Symptoms in Men Versus Women with Depression. *Harv. Rev. Psychiatry* **2017**, *25*, 29–38, doi:10.1097/hrp.0000000000000128.

80. Stover, C.S.; Kiselica, A. Hostility and substance use in relation to intimate partner violence and parenting among fathers. *Aggress. Behav.* **2015**, *41*, 205–213, doi:10.1002/ab.21548.

81. Matthey, S.; Barnett, B.; Howie, P.; Kavanagh, D.J. Diagnosing postpartum depression in mothers and fathers: Whatever happened to anxiety? *J. Affect. Disord.* **2003**, *74*, 139–147, doi:10.1016/s0165-0327(02)00012-5.

82. Leach, L.; Poyser, C.; Cooklin, A.R.; Giallo, R. Prevalence and course of anxiety disorders (and symptom levels) in men across the perinatal period: A systematic review. *J. Affect. Disord.* **2016**, *190*, 675–686, doi:10.1016/j.jad.2015.09.063.

83. Ramchandani, P.G.; Psychogiou, L. Paternal psychiatric disorders and children's psychosocial development. *Lancet* **2009**, *374*, 646–653, doi:10.1016/s0140-6736(09)60238-5.

84. Ramchandani, P.G.; O'Connor, T.G.; Evans, J.; Heron, J.; Murray, L.; Stein, A. The effects of pre- and postnatal depression in fathers: A natural experiment comparing the effects of exposure to depression on offspring. *J. Child Psychol. Psychiatry* **2008**, *49*, 1069–1078, doi:10.1111/j.1469-7610.2008.02000.x.

85. Boyce, P.; Condon, J.T.; Barton, J.; Corkindale, C.J. First-Time Fathers' Study: Psychological Distress in Expectant Fathers During Pregnancy. *Aust. New Zealand J. Psychiatry* **2007**, *41*, 718–725, doi:10.1080/00048670701517959.

86. De Montigny, F.; Girard, M.-E.; Lacharité, C.; Dubeau, D.; DeVault, A. Psychosocial factors associated with paternal postnatal depression. *J. Affect. Disord.* **2013**, *150*, 44–49, doi:10.1016/j.jad.2013.01.048.

87. Banker, J.E.; Lacoursiere, D.Y. Postpartum Depression: Risks, Protective Factors, and the Couple's Relationship. *Issues Ment. Heal. Nurs.* **2014**, *35*, 503–508, doi:10.3109/01612840.2014.888603.

88. Małus, A.; Szyluk, J.; Galińska-Skok, B.; Konarzewska, B. Incidence of postpartum depression and couple relationship quality. *Psychiatr. Pol.* **2016**, *50*, 1135–1146, doi:10.12740/PP/61569.

89. Sipsma, H.L.; Callands, T.; Desrosiers, A.; Magriples, U.; Jones, K.; Albritton, T.; Kershaw, T. Exploring Trajectories and Predictors of Depressive Symptoms Among Young Couples During Their Transition to Parenthood. *Matern. Child Heal. J.* **2016**, *20*, 2372–2381, doi:10.1007/s10995-016-2064-3.

90. Breitkopf, C.R.; Primeau, L.A.; Levine, R.E.; Olson, G.L.; Wu, Z.H.; Berenson, A.B. Anxiety symptoms during pregnancy and postpartum. *J. Psychosom. Obstet. Gynecol.* **2006**, *27*, 157–162, doi:10.1080/01674820500523521.

91. Condon, J.T.; Boyce, P.; Corkindale, C.J. The First-Time Fathers Study: A prospective study of the mental health and wellbeing of men during the transition to parenthood. *Aust. New Zealand J. Psychiatry* **2004**, *38*, 56–64, doi:10.1111/j.1440-1614.2004.01298.x.

92. Matthey, S.; Barnett, B.; Ungerer, J.; Waters, B. Paternal and maternal depressed mood during the transition to parenthood. *J. Affect. Disord.* **2000**, *60*, 75–85, doi:10.1016/s0165-0327(99)00159-7.

93. Da Costa, D.; Danieli, C.; Abrahamowicz, M.; Dasgupta, K.; Sewitch, M.; Lowensteyn, I.; Zelkowitz, P. A prospective study of postnatal depressive symptoms and associated risk factors in first-time fathers. *J. Affect. Disord.* **2019**, *249*, 371–377, doi:10.1016/j.jad.2019.02.033.

94. Kiviruusu, O.; Pietikäinen, J.T.; Kylliäinen, A.; Pölkki, P.; Saarenpää-Heikkilä, O.; Marttunen, M.; Paunio, T.; Paavonen, E.J. Trajectories of mothers' and fathers' depressive

symptoms from pregnancy to 24 months postpartum. *J. Affect. Disord.* **2020**, *260*, 629–637, doi:10.1016/j.jad.2019.09.038.

95. Baldoni, F.; Matthey, S.; Agostini, F.; Schimmenti, A.; Caretti, V. Perinatal Assessment of Paternal Affectivity (PAPA). First validation in Italian samples. 16th World Association for Infant Mental Health (WAIMH) Congress. *Infant Ment. Health J.* **2018**, *39*, 311.

Table 1. Sample's descriptive characteristics.

(N = 350)	
Education	%
Elementary school	0.6%
Middle school diploma	12.2%
High school diploma	53.1%
Graduate degree	34.1%
Occupation	
Unemployed	0.9%
Student	1.5%
White/Blue collar	69.3%
Self-employed (professional/business owner)	26.9%
Executive/manager	1.2%
Marital Status	
Married	50.6%
Cohabitant	49.4%
Number of children	
Primiparous	72.2%
Not Primiparous	27.8%
Negative past events [a]	
None	63.4%
One	32.4%
More than two	4.3%
Previous Psychiatric Diagnosis	
No	87.5%
Yes	12.5%

[a]. (job loss, serious financial problems, serious problems at work, divorce, mourning, family conflicts, fights, own illness, illness of loved ones).

Table 2. Descriptive statistics of our study variables.

	Mean	SD	Range
CES-D	8.13	4.95	0-30
ANX	2.10	2.65	0-17
SOM	3.48	4.02	0-29
HOS	1.63	2.44	0-17
PSS	10.97	5.66	0-30
DAS	124.47	15.27	0-151
Addiction/risky behaviors	%		
No	80.1%		
Yes	19.9%		

Note. CES-D, The *Center for Epidemiological Studies Depression Scale;* ANX, Anxiety; SOM, Somatization; HOS, Hostility; PSS, The *Perceived Stress Scale*; DAS, the *Dyadic Adjustment Scale;* SD, Standard Deviation.

Table 3. Bivariate correlations among the variables.

	CES-D	ANX	SOM	HOS	PSS	DAS
CES-D	1	,575**	,447**	,450**	,551**	-,341**
ANX		1	,572**	,533**	,584**	-,274**
SOM			1	,386**	,365**	-,149**
HOS				1	,496**	-,354**
PSS					1	-,381**
DAS						1

**. $p < .01$

Note. CES-D, The *Center for Epidemiological Studies Depression Scale;* ANX, Anxiety; SOM, Somatization; HOS, Hostility; PSS, The *Perceived Stress Scale*; DAS, the *Dyadic Adjustment Scale.*

Table 4. Cluster analysis: ANOVA and Chi squared test.

	Cluster		Error		F – χ2	Sig.
	Mean Square	df	Mean Square	df		
CES-D	1215.91	2	17.63	347	68.80	<.001
ANX	683.85	2	3.16	347	215.71	<.001
SOM	990.45	2	10.66	347	92.87	<.001
HOS	371.1	2	3.90	347	95.14	<.001
Addiction/risky behaviors		2			302.97	<.001

Note. CES-D, The *Center for Epidemiological Studies Depression Scale;* ANX, Anxiety; SOM, Somatization; HOS, Hostility.

6. General discussion and conclusions

The common thread of the first three studies was the role played by the couple functioning in the development of maternal and paternal perinatal affective disorders and, to investigate how one partner perception of dyadic adjustment can affect the mental health of the other during pregnancy. The results of these studies, in agreement with previous literature, highlighted how perinatal affective disorders in both partners are associated with intimate relationship maladjustment (Bielawska-Batorowicz & Kossakowska-Pietrycka, 2006; Brock & Lawrence, 2011; Buist et al., 2002; Milgrom et al., 2008; O'Hara & Swain, 1996; Whisman, Weinstock, & Tolejko, 2006). Taken together these findings suggest that couple dysfunction may be a driving force in the onset of perinatal affective disorders in both expectant parents.

Specifically, the first study, consistent with previous studies that highlighted the importance of considering specific aspects of marital adjustment (Beach, 2002; Brock & Lawrence, 2011), has examined various dimensions of couple functioning in predicting maternal and paternal prenatal depression. The results suggested that the perception of a poor dyadic consensus and affective expression of both partners contributed to the development of depressive symptomatology in expectant parents to a greater degree than the single perception of one partner, especially for expectant fathers. Moreover, low levels of dyadic consensus appeared to be the most important predictor of both maternal and paternal prenatal depression. Dyadic consensus can be conceptualized as the degree to which the couple agrees on matters of importance to the relationship; the perception of a poor dyadic consensus means that for both expectant parents their relationship is characterized by less perceived control, power asymmetry and rigid family roles. More in depth, a poor dyadic consensus may be manifested in two different ways. First, it may be in the form of partner being the "head of the household" such that he or she has most of the responsibilities in the relationship, leading him or her to feel anxious and overwhelmed. Alternatively, a poor consensus may be characterized in the opposite manner, with one partner having little say over what happens in the relationship and little control over how he or she spend

his or her time, how the household is run, or how money is spent, which, in turn, may lead to feelings of helplessness or hopelessness and isolation.

Concerning clinical implications, the first study underscored that relationship processes can be directly targeted in interventions. For both expectant parents, it may be enough to focus on enhancing emotional intimacy to prevent the development of symptoms and helping expectant couples to build relationships characterized by mutual respect and a balance of control and decision making appears to be an optimal starting point.

The second study highlighted not only that a poor dyadic adjustment had a direct effect on own perinatal affective symptomatology, but also that fathers' positive dyadic adjustment decreased clinical symptoms in mothers. These findings are in line with previous studies that showed how the emotional states of expectants parents are intercorrelated during all the perinatal period (Baldoni & Ceccarelli, 2010; Cameron, Sedov, & Tomfohr-Madsen, 2016; Paulson & Bazemore, 2010; Paulson, Bazemore, Goodman, & Leiferman, 2016) and highlighted how a positive, active and emotional paternal involvement could act as a protective factor for maternal affective symptomatology. Indeed, a good father's dyadic adjustment accompanied by a nonconflictual relationship and shared interests can foster maternal global marital satisfaction as well as her psychological and relational gratification, reducing the risk of a perinatal affective disorder.

The clinical implications of the second study underlined the importance of involving fathers in the perinatal health services that are still mother-centered, and showed that when clinical psychological intervention is needed, fathers should be more considered and included, given the fact that they can increase the perception of a sense of security and support in expectant mothers, acting as a secure base effect (Baldoni, 2010), with positive results on maternal mental health.

The third study examined the role of each partner's stress on their own prenatal depression and their partner's depression and explored the potential mediating role of their own and their partner's marital satisfaction on this association. The results showed how high levels of parental stress are related to own and partner's marital dissatisfaction in both expectant parents (Randall &

Bodenmann, 2009). Moreover, findings revealed that fathers' marital satisfaction was a mediator for the relationship between own and partner's levels of perceived stress and their prenatal depression. Indeed, previous studies found that, especially during the first pregnancy, fathers are more sensitive to own and maternal high stress levels and that these have an impact on their marital quality, which in turn can affect their mental health (Philpott, Leahy-Warren, FitzGerald, & Savage, 2017; Philpott, Savage, FitzGerald, & Leahy-Warren, 2019). On the other hand, in mothers only their levels of stress were associated with their levels of prenatal depression.

Regarding clinical implications, this study underlined the importance of examining both partners' dyadic coping resources during pregnancy and targeting them in the psychological support offered to couples. Indeed, expectant couples may benefit from dyadic coping-enhancing-interventions to assist them in responding sensitively to the other's stress, which in turn may have a positive effect on couples' overall dyadic adjustment and their mental health.

It appears clear from these three studies the importance of considering in a dyadic perspective different dimensions of couple functioning (such as dyadic consensus, marital satisfaction, parental stress, affective expression) particularly in expectant couples seeking treatment. From a prevention standpoint, it might prove beneficial to implement skill building modules targeting these domains in programs such as parenting and birthing classes.

Lastly, there is some indication that, when working with expectant couples, it could be beneficial to tailor the treatment to their parenthood status. For example, it could be beneficial to normalize the challenges and discomfort experienced by first-time fathers, promote relationship behaviors that lead fathers to feel valued, and facilitate mutual decision-making around the transition into parenthood. While for mothers could be useful focus the interventions on enhancing emotional intimacy and dyadic coping skills to prevent the development of affective symptoms.

While the first three studies have highlighted the role of couple functioning in the onset of both maternal and paternal perinatal affective disorders, the fourth study stressed the importance of effective and targeted perinatal screening in the detection of paternal affective symptoms. As of

today, few studies focused on gender-based screening for fathers is lacking (Baldoni & Giannotti; Madsen, 2019). The fourth study aimed to identify profiles of psychological distress in expectant fathers considering not only the traditional depressive symptoms, as per the masked depression framework. Findings revealed three profiles of paternal psychological distress during the prenatal period. The larger group included expectant fathers who reported lower levels of symptoms across the different investigated domains (anxiety, depression, hostility, and somatization, addictive or risky behaviors). With respect to the second cluster defined as “psychologically distressed men” results showed that one father out of ten reported higher levels of depression and anxiety before childbirth and most men in this group did not reported addictive or risky behaviors. The third cluster of expectant fathers defined as “men at risk of externalizing behaviors" was characterized primarily for the manifestation of one of more addictive or risky behaviors during the third trimester of pregnancy. This finding supports the idea that males may often mask their depression condition showing a wide range of alternative symptoms, especially externalizing behaviors (Rutz, von Knorring, Pihlgren, Rihmer, & Wålinder, 1995; Lynch & Kilmartin, 1999).

Regarding the clinical implications, this study addresses the need to develop measures that can detect the wide paternal perinatal symptomatology often overlooked or assimilated to maternal one. Moreover, findings underscore the importance of an appropriate screening of at-risk fathers that should constitute an essential prerequisite for perinatal health services, given the impact of men psychological distress on the whole family functioning.

6.1 Future directions

The studies discussed above have several limitations, that could be addressed in future research.

First, the studies in this thesis focused only on the prenatal period, so longitudinal dyadic research is needed in order to learn more about the course, the trajectories and the intercorrelation between maternal and paternal perinatal affective disorders over the postnatal period. Also, future

research with a longitudinal dyadic design could better explain the role of multiple features of the intimate relationship on the onset and on the course of maternal and paternal affective symptomatology.

Secondly, it would be useful in the future to assess other couple's dimensions (such as dyadic coping, partner's perceived support, sexual satisfaction, communication patterns) in order to develop psychological couples-based interventions that can enhance these intimate processes and reduce levels of depression in one or both partners. For this purpose, an intervention study based on these findings could be carried out in the antenatal clinic in a case-control fashion. A supportive couple intervention might consist of 1–2 visits during pregnancy and 1–2 visits after delivery. Expectant couples' mental status and couple functioning should be assessed, and interventions should be arranged, for example emotional support from the partner, positive dyadic coping strategies and communication and conflict management skills. After supportive couple interventions depression should be evaluated in both partners, for example, at a postpartum follow-up examination.

Moreover, in an article revisiting the couple and family discord model (Beach, 2014), genetic moderation was explored as a new direction. Considering biobehavioral and genetic indicators of risk might facilitate the identification of interpersonal pathways contributing to depression during the perinatal period.

Thirdly, given the impact that perinatal affective disorders have on the emotional and cognitive development of offspring, future research could use video-feedback interventions (i.e. Video-feedback Intervention to promote Positive Parenting and Sensitive Discipline, VIPP-SD; Juffer, Bakermans- Kranenburg, & Van Ijzendoorn, 2018) to promote a secure attachment bond between a depressed parent and child.

In addition, future studies should involve not only first-time parents, and analyze the possible differences in the rates of depression and couple functioning in parents who conceived via IVF and adoptive parents.

Moreover, since our studies have used only self-report questionnaires, future studies could adopt a mixed method design using for example clinical interviews to assess affective symptomatology and overall family functioning.

Finally, future studies should consider during the perinatal period not only parents who manifest affective symptomatology, but also those who suffer from other mental disorders (i.e. eating disorders, borderline or antisocial personality, substances addiction) to understand the impact of these on the whole family system, especially for the newborn.

References

Baldoni, F. (2010). Attachment, danger and role of the father in family life span. *Transilvanian Journal of Psychology (Erdélyi Pszichológiai Szemle, EPSZ)*, *4*, 375-402.

Baldoni, F., & Ceccarelli, L. (2010). La depressione perinatale paterna. Una rassegna della ricerca clinica ed empirica. *Infanzia e adolescenza*.

Baldoni, F., & Giannotti, M. (2020). Perinatal Distress in Fathers: Toward a Gender-Based Screening of Paternal Perinatal Depressive and Affective Disorders. *Frontiers in Psychology*, *11*.

Beach, S. (2002). Affective disorders. In D. H. Sprenkle (Ed.), *Effectiveness research in marriage and family therapy* (pp. 289–309). Alexandria, VA: The American Association for Marriage and Family Therapy.

Beach, S. R. (2014). The couple and family discord model of depression. *Interpersonal relationships and health: Social and clinical psychological mechanisms*, *1*, 133-155.

Bielawska-Batorowicz, E., & Kossakowska-Petrycka, K. (2006). Depressive mood in men after the birth of their offspring in relation to a partner's depression, social support, fathers'

personality and prenatal expectations. *Journal of Reproductive and Infant Psychology*, *24*(1), 21-29.

Brock, R. L., & Lawrence, E. (2011). Marriage as a risk factor for internalizing disorders: Clarifying scope and specificity. *Journal of consulting and clinical psychology*, *79*(5), 577.

Buist, A. E., Milgrom, J., Barnett, B. E., Pope, S., Condon, J. T., Ellwood, D. A., ... & Hayes, B. A. (2002). To screen or not to screen—that is the question in perinatal depression. *Medical Journal of Australia*, *177*, S101-S105.

Cameron, E. E., Sedov, I. D., & Tomfohr-Madsen, L. M. (2016). Prevalence of paternal depression in pregnancy and the postpartum: an updated meta-analysis. *Journal of affective disorders*, *206*, 189-203.

Juffer, F., Bakermans- Kranenburg, M. J., & Van Ijzendoorn, M. H. (2018). Video-fedback intervention to promote positive parenting and sensitive discipline. *Handbook of attachment-based interventions. New York: Guilford*.

Lynch, J., Kilmartin, C. (1999). *The Pain behind the Mask: Overcoming Masculine Depression*; The Haworth Press advances in psychology and mental health; Haworth Press: New York.

Madsen, S. A. (2019). Men and perinatal depression. *Trends in Urology & Men's Health*, *10*(2), 7-9.

Milgrom, J., Gemmill, A. W., Bilszta, J. L., Hayes, B., Barnett, B., Brooks, J., ... & Buist, A. (2008). Antenatal risk factors for postnatal depression: a large prospective study. *Journal of affective disorders*, *108*(1-2), 147-157.

O'Hara, M. W., & Swain, A. M. (1996). Rates and risk of postpartum depression—a meta-analysis. *International review of psychiatry*, *8*(1), 37-54.

Paulson, J. F., & Bazemore, S. D. (2010). Prenatal and postpartum depression in fathers and its association with maternal depression: a meta-analysis. *Jama*, *303*(19), 1961-1969.

Paulson, J. F., Bazemore, S. D., Goodman, J. H., & Leiferman, J. A. (2016). The course and interrelationship of maternal and paternal perinatal depression. *Archives of women's mental health*, *19*(4), 655-663.

Philpott, L. F., Leahy-Warren, P., FitzGerald, S., & Savage, E. (2017). Stress in fathers in the perinatal period: A systematic review. *Midwifery*, *55*, 113-127.

Philpott, L. F., Savage, E., FitzGerald, S., & Leahy-Warren, P. (2019). Anxiety in fathers in the perinatal period: A systematic review. *Midwifery*, *76*, 54-101.

Randall, A. K., & Bodenmann, G. (2009). The role of stress on close relationships and marital satisfaction. *Clinical psychology review*, *29*(2), 105-115.

Rutz, W., von Knorring, L., Pihlgren, H., Rihmer, Z., & Wålinder, J. (1995). Prevention of male suicides: lessons from Gotland study. *The Lancet*, *345*(8948), 524.

Whisman, M. A., Weinstock, L. M., & Tolejko, N. (2006). Marriage and depression. *Women and depression: A handbook for the social, behavioral, and biomedical sciences*, 219-240.