Title: Depression in couples during pregnancy and postpartum: is there a concordance?

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Structured Abstract

Scope. An increase in mood disturbance in women during the pre- and postnatal periods has been well documented. However, research suggests that men experience a similar mood disorder to women at this time, although this is much less studied. Partner support has been suggested to play a role in the development of depression during pregnancy and postpartum. Consequently, if one partner is unable to offer support due to their own mood disorder, the impact on the other partner’s psychological functioning needs to be considered. Furthermore, research also suggests that parental depression increases in the first year after a child is born, suggesting that for undetermined reasons, mood vulnerability for new parents remains a concern long after the diagnostic criteria for postnatal depression purports. It has also been established that women with existing mental health issues, in particular anxiety are more susceptible to develop depression during these times. In addition, stress and coping style have also found to be influential in the onset of depression. Few studies have examined these factors on a lengthy longitudinal scale.

Purpose. The purpose of this study was to investigate mood concordance between couples during pregnancy and the postpartum period, while exploring changes to depression, stress and anxiety over time. Furthermore, this study attempted to identify predictors of depression throughout pregnancy and during the first year after birth.

Methodology. A repeated measures design was used, using self-report instruments examining demographic and psychological variables. Pregnant women presenting to General Practitioner surgeries in England were recruited with their partners (N=801 couples). Of those participants, 535 pregnancies resulted in a live birth, ensuing 535 couples available for the entirety of the study. Participants were requested to complete questionnaires that examined mood, anxiety, stress and coping via mail. The
questionnaires were delivered in Trimester 1 (time1), Trimester 3 (time2), 6 weeks postpartum (time3), 6 months postpartum (time4), and 12 months postpartum (time5).

**Results.** Pearson’s correlation showed there was no relationship between the moods of each member of the couple at any time. One-way repeated measures ANOVA’s demonstrated significant effects of sex and time on depression, with depression scores peaking at 6 weeks postpartum for women and 6 months postpartum for men, while time also showed a significant effect on stress and anxiety, with both peaking at 6 weeks postpartum. Stepwise linear regression identified the predictors of depression as sex, anxiety and stress.

**Conclusions.** This study failed to demonstrate a relational effect of mood between the members of each couple. However it is worth noting that the mean depression scores for both men and women did not qualify for a categorisation of “Major Depressive Disorder” and therefore did not meet the classification of postnatal depression that has been specified for women (men do not have a classification at this time). While depression scores continued to rise after birth, men appeared to continue to experience increments in the disorder when women’s scores commenced declining. This may suggest that as men continue to experience the pressures of a new baby and accommodating their partner’s elevated depression symptoms, their own resilience declines and depressive symptoms increased.

**Implications.** The findings of this study suggest that men experience a similar transition during pregnancy and postpartum to women, albeit in a somewhat different sequence. Although these results did not show clinically significant depression scores, nor an increase in depressive symptoms over the entire year after birth for either sex, men’s inclusion into mood disorder studies in the ante- and postnatal periods must be considered necessary. In addition, deliberation and review of the current classification
of postnatal depression must surely be warranted as this study adds to the growing body of research that suggests that women and men can experience depression for many months after the birth of a child.
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Critical Review

Major Depressive Disorder is estimated to occur in 10 to 25% of females and 5 to 12% of males in the general population (American Psychiatric Association, 2000). While the aetiology remains unclear, it is generally recognised that depression occurs within the context of an interaction of psychological, physiological and social factors (Kalia, 2005). It is characterised by symptoms including an ongoing low mood and loss of interest or pleasure of no less than two weeks duration. In addition to these criteria, there must also be at least four other symptoms of depression present, which may include appetite changes, sleep disturbance, psychomotor changes, reduction in energy, feelings of worthlessness or guilt, cognitive difficulties and thoughts of suicide (APA, 2000). While the DSM-IV-TR does not recognise depression during pregnancy as an explicit disorder, it does stipulate that if symptoms of depression occur within four weeks of childbirth then it is reclassified as Postpartum Onset Specifier (APA, 2000).

Pregnancy and the first postnatal year have consistently been associated with a higher rate of depression for both females and their male partners, than other times in the lifespan (Durkin, Morse & Buist, 2001; Wee, Skouteris, Pier, Richardson & Milgrom, 2011). The prevalence rate for depression during pregnancy ranges from 5.9 to 28% in women (Banti et al., 2011; Da Costa, Larouche, Dritsa & Brenda, 2000; Gavinet al., 2011; Felice, Saliba, Grech & Cox, 2004; Karacam & Ancel 2009; Leigh & Milgrom, 2007; Pottinger, Trotman-Edwards & Younger, 2009); and 5.3% in men whose partner is pregnant (Matthey, Barnett, Ungerer & Waters, 2000). During the first postnatal year, a new mother’s risk of developing depression ranges from 8.7 to 27.5% (Banti et al., 2011; Felice et al., 2004; Matthey et al., 2000). For her partner, his likelihood of developing depression will range between 1.2 and 25.5% (Edmondson, Psychogiou,
Vlachos, Netsi & Ramchandani, 2010; Goodman, 2004). Clearly, there is wide variation in these estimated prevalence rates. However for men, the increase from 12% of males in the general population experiencing Major Depressive Disorder to 25.5% experiencing a mood disorder in the postpartum period indicates that the period after the birth of a baby more than doubles a man’s likelihood of developing depression, than at other times during the lifespan. This suggests that a new baby can dramatically increase vulnerability for paternal depression.

However, it has also been suggested that the wide variation in these prevalence rates in the research literature is due to study-specific factors, such as the definition of depression; the measures that are used to assess for depression; the time of postnatal assessment; and the time-frame to which the questions relate (Matthey et al., 2000). Also, the process of diagnosis may be difficult, due to inconsistencies across the two main diagnostic resources: the DSM-IV-TR and the ICD-10. Specifically, for depression of a postnatal nature the DSM-IV-TR stipulates that symptoms must occur within four weeks of childbirth while the ICD-10 allows six weeks post-delivery to meet the classification of “Mental and behavioural disorders associated with the puerperium” (American Psychological Association, 2000; World Health Organisation, 2006). Much of the literature addressing postnatal depression incorporates a timeframe ranging from one month to one year (Hendrick, 2003), and it has been suggested that women are in fact vulnerable for developing depression throughout the first twelve months after childbirth (Morrell, 2006). Indeed, Matthey et al., (2000) found that 65.2% of women were depressed at only one assessment point within the first year after birth, 26% at two assessment points and 8.6% at three assessment points, demonstrating the need for repeated assessment over a period of time. In addition, it has been
suggested that depression requires screening intervals of no longer than two weeks
during the first three months post-partum to ensure detection (Campagne, 2004). This
may explain why many of the studies do not demonstrate a discernible difference in the
prevalence of depression at the time of pregnancy and postpartum, with rates in the
broaderr population. Furthermore, in the absence of a pregnancy-specific classification,
it is possible that studies of the “general population” may have included unidentified
pregnant women. Matthey and Ross-Hamid (2011) also suggest that the DSM symptom
criteria over-estimate the rates of depression during the antenatal period, due to overlap
of symptoms with general pregnancy-related issues. They found that after attributional
probe questioning, the rate of depression reduced from 6.8% to 1.7% and suggest that
rates in the postnatal period may also be exaggerated.

Another consideration is that many cases of depression remain undiagnosed (Hendrick,
2003). One large study gleaned that 14.7% of women reported experiencing postpartum
depressed symptoms, however almost two thirds did not seek help (McGarry, Kim,
Sheng, Egger & Baksh, 2009). This ratio of women seeking treatment was consistent
with an earlier study by Flynn, Blow and Marcus (2006). There are numerous
explanations for such a high rate of failure to seek treatment (such as current depression
severity, and previous experiences of depression and treating services) (Flynn et al.,
2006) but importantly this high ratio of avoidance can result in a lack of recognition
from a statistical perspective. Moreover, even if women do seek help, there is no
guarantee of an accurate diagnosis. Marcus, Barry, Flynn, Tandon and Greden (2001)
state that many women are not open about their symptoms and may instead describe
somatic complaints (such as gastrointestinal upset or sleep disturbance) or anxiety.
Therefore clinician variation (including experience with, or proficiency in diagnosing
depression) may also be responsible for the wide discrepancy in the recognition of depression in these populations.

While postnatal depression is oft recognised by clinicians, a large number of women experience depression during the antenatal period only. While a portion of these continue to experience their depressed mood through to the postnatal period, it has been suggested that depression continuing into the postnatal period as an ongoing or recurrent disorder is different to depression occurring for the first time after childbirth (Da Costa et al., 2000). Indeed, the incidence of first onset depression during the postnatal period is low, ranging between 3.9 and 5.7% (Banti et al., 2011; Felice et al., 2004), with research continuing to demonstrate that women who experience depression during their pregnancy are likely to maintain their depressed mood through to the postnatal period (Heron, O’Connor, Evans, Golding & Glover, 2004; Rahman, Iqbal & Harrington, 2003). This suggests that psychosocial variables relevant to pregnancy and the postnatal period can play a determining role in the emergence of depression. Therefore, it would seem relevant to ensure that variables are measured not only throughout pregnancy and the postnatal period, but also prior to pregnancy to identify when first onset occurs. However, many studies commence assessment in the period after birth and since this is when detection is made, the depressed new mother is labelled as “postnatally depressed”, regardless of whether onset occurred prior to the postnatal period, again distorting the data.

Finally, the impact of pregnancy and the postnatal period has frequently been studied in the female population but there is a paucity of research examining the path to parenthood for fathers. As a result, studies that include men often have smaller sample
sizes (Wee, Skouteris, Pier, Richardson & Milgrom, 2011) which may account for some of the variation in male statistics. Further, it is suggested that the DSM diagnostic criteria lacks sensitivity to the symptoms that men may exhibit when depressed (for example, substance abuse and criminal behaviour), instead favouring feminine, acting-in descriptions of depression, leading to the diagnosis of more women than men (Kilmartin, 2005). Similarly, Rutz, Walinder, Von Knorring, Rihmer & Philgren (1997) argue that as males seldom report depression, alternative definitions of depression should be explored as there may be a unique “masculine depressive syndrome”. Also, a meta-analysis of 43 studies containing over 28000 participants conducted by Paulson and Bazemore (2010) found a large heterogeneity across rates of paternal depression, leading the authors to suggest that some cases of minor depression have been included when they should be excluded as they do not meet the criteria according to severity, number or duration of symptoms for major depression. Despite this, there is still sufficient evidence to suggest that men are affected by psychological symptoms including anxiety, depression, inadequacy and loneliness during pregnancy and the time immediately after birth (Clinton, 1987; Finnbogadottir, Crang Svalenius & Persson, 2003; Wee et al., 2011).

Women during pregnancy and the postnatal period

Depression in the antenatal period can lead to postpartum depression in women (Da Costa et al., 2000; Heron et al., 2004); adverse infant outcomes including preterm birth, small-for-gestational age, low birthweight, and higher cortisol and norepinephrine levels and lower dopamine and serotonin levels (Field et al., 2010; Steer, Scholl, Hediger & Fischer, 1992); and depression in adolescent offspring (Pawlby, Hay, Sharp, Waters & O’Keane, 2009). Depression that continues into or commences in the postnatal period
has been linked to an increased risk of ongoing depression in women (Halligan, Murray, Martins & Cooper, 2007); and for offspring an increased risk of internalising and externalising problems in the early school years (Fährer, McMahon & Taylor, 2009) and childhood anxiety disorders (Halligan et al., 2007).

Despite such profound negative outcomes, the causes of depression during pregnancy and the postnatal period continues to be debated among researchers. It has been hypothesised that hormonal changes may explain the onset of depression. Yim et al., (2009) state that high levels of placental corticotrophin-releasing hormone at 25 weeks gestation can be indicative of a high risk for postnatal depression. However, Bloch, Daly and Rubinow (2003) conducted a literature review of studies examining endocrine factors in the etiology of postnatal depression and concluded that abnormalities of corticotrophin-releasing hormone observed in women with postnatal depression were yet to be found causal in postnatal depression, querying whether the results were secondary to changes in mood or reflective of altered HPA axis regulation. Further, they concluded that there were no consistent differences in baseline hormonal levels between women who had experienced postnatal depression and those who had not experienced depression.

Indeed, Senecky et al., (2009) examined depression in adoptive mothers and found that 15.4 percent of new mothers experienced depression post-adoption, which is no different to the rate of depression observed in postnatal mothers (or, also the general population). Additionally, they noted that all of the women who developed depression post-adoption exhibited depressive symptoms prior to taking charge of the child. As pregnancy and birth-related hormonal changes are clearly not responsible for the onset
of depression in these mothers, this suggests that a cluster of biopsychosocial vulnerabilities is likely responsible for the onset of depression during the preceding and immediate adoption periods.

Within those vulnerabilities, mental health history has been of particular interest to researchers examining depression during these times. Specifically, anxiety has often been associated with higher levels of depression. Coelho, Murray, Royal-Lawson and Cooper (2011) found that Generalised Anxiety Disorder was a predictor of postnatal depression at approximately 2 weeks, and 3, 10, 14 and 24 months post-delivery. Further, they found that social phobia during pregnancy predicted depression at 10 months. They suggest that specific anxiety diagnoses may determine when the onset of depression occurs after childbirth, however it may be argued that by age 10 months the social phobic mother experiences more pressure to entertain her child in areas outside of the home (such as parks, mothers groups and so on) and failure to do so make invoke thoughts of guilt or worthlessness.

Additionally, a large Australian study by Milgrom et al., (2008) found that a previous history of depression, current experiences of depression or anxiety and low partner support during pregnancy were all predictive of postnatal depression. This research supports an earlier study by Durkin et al., (2001), who found that risk factors for negative experiences for a new mother in the first year of a child’s life include established psychological pathology such as anxiety, poorly developed self-esteem, lack of assertiveness, or a history of prior episodes of psychiatric illness.
Da Costa et al., (2000) conducted a study to determine if daily stress, pregnancy stress, anxiety, social support, and coping strategies influenced depression during the antenatal and early postnatal period. One quarter of the women in their study reported feeling depressed during pregnancy, while 16 percent reported depression 4-5 weeks post delivery. They found that depressed women also reported significantly higher levels of trait and state anxiety. Additionally, they found that coping repertoire was another predictor for depression, with those individuals who employed an emotional coping style during pregnancy experiencing significantly more depression. McMahon, Barnett, Kowalenko and Tennant (2005) also found that mothers who employed immature defence styles (such as passive aggressive, acting out, denial and somatisation) were significantly more likely to experience depression at twelve months postpartum. A further study examining the impact of coping style on pre- and postnatal depression found that the coping strategies most often associated with depressed women were distancing, denial, blame and substance abuse. Alternatively, non-depressed women utilised acceptance of the situation and humour (de Tychey et al., 2005).

Importantly, it has been found that some risk factors, including mental health history and less-functional coping strategies may be mediated by the presence of social support. Giurgescu, Penckofer, Maurer and Bryant (2006) found that women with high-risk pregnancies who used avoidant coping techniques experienced higher levels of distress. However, women who had higher social support used significantly less avoidance coping to manage their pregnancy.

While social support can occur within the context of many relationships and be provided in various circumstances (Morrell, 2006), Spoozak, Gotman, Smith, Belanger
and Yonkers (2009) found that the source, rather than the type or frequency of support held most bearing on the woman’s perception of support. They found that higher values of support from the woman’s father, mother, spouse, friends, and other relatives led to a significantly lower likelihood of depression during pregnancy. The only relationship not shown to have a significant impact was siblings.

The partner relationship appears to have particular importance. Burman and Gayla (1992) suggest that factors such as marital status (whether one is, or has been married), marital quality (spouse’s subjective evaluation of their marriages), and marital interaction (the way spouses interact with one another) may be a source of stress or support. While the presence of a partner may not dictate support in all circumstances, there may be some situations in which the partner can provide support (such as financially or emotionally). However, it is important to note that the unfulfilled expectation of support (low enacted support) from a partner may actually promote despair and depressive symptoms. For example, Pajulo, Savonlahti, Sourander, Helenius and Piha (2001) found that partnered women who were experiencing more difficulties in their relationship during pregnancy were more likely to experience depression, while those women who received more partner support experienced less depression during the antenatal period. Hildingsson, Tingvall and Rubertsson (2008) also found that women who were dissatisfied with partner support early in pregnancy were more likely to report depressive symptoms and major worries; and experience a higher rate of divorce one year after birth. Similarly, Durkin et al., (2001) report that if expectant parents feel a lack of support and emotionally distant from their partner, then they are likely to have a negative transition to parenthood. This poses a challenge for a couple where the man is depressed and perhaps unable to offer an adequate level of
support to his pregnant or newly postpartum partner. Arguably, this lack of support may manifest in the woman’s own depression.

Research examining the relationship between demographic variables and depression has often had confounding results. Those suggested to have a relationship with depression in pregnancy and/or the postnatal period include age (Pottinger et al., 2009); and unemployment (Bolton, Hughes, Turton & Sedgewick, 1998; Pottinger et al., 2009); second or subsequent pregnancies (Bolton et al., 1998), and lower attainment of education (Bolton et al., 1998). However, Da Costa et al., (2000) were unable to find a relationship between age, education, income or number of existing children and depressed mood during the pregnancy period. The discrepancy in the results of these studies may suggest less robust relationships with these variables, or differences in the study parameters.

**Men during pregnancy and the postnatal period**

A partner’s pregnancy and the birth of a new baby is a stressful time that requires adjustment and poses new challenges for men as they transition into parenthood (Condon, 2006). Furthermore, it is suggested that men and women encounter parallel psychological adjustment during the antenatal period (Teixeira, Figueiredo, Conde, Pacheco & Costa, 2009). Certainly if the transition is problematic, there are major implications for the depressed man and his family. For example, Ramchandani et al., (2008) found that children whose fathers experienced depression in the postnatal period had a significantly higher risk of demonstrating negative behaviours by age seven. They suggest that this may be reflective of the father’s role in socialising his children, or an association between depression in fathers and disruptive parenting. These
findings were similar to those found by Cummings, Keller and Davies (2005), who demonstrated that paternal and maternal depression impacted differently on their kindergarten children, depending on the child’s sex. Again, paternal dysphoria was negatively correlated with prosocial behaviour in sons.

It is important to note that the prevalence rate of depression in new fathers has been shown to fluctuate over time. For example, Areias, Kumar, Barros and Figueiredo (1996) found that in the first three months after childbirth, 4.8 percent of new fathers experienced depression. However, this rose to 28.6 % by the end of the first year, which suggests an ongoing risk and corresponds with Morrell’s (2006) argument that postnatal depression vulnerability for women continues well into the first year. The trend for depressive symptoms to increase in fathers as the first postnatal year progresses was replicated later by Matthey et al., (2000), albeit at a much lower percentage and highlights the importance of repeated assessment points for expectant and new fathers to detect depression.

As with women, the causes of depression in men in these periods still remain unclear. However, it is apparent that psychological and/or sociological variables are influential in its onset. Wee, Skouteris, Pier, Richardson and Milgrom (2011) conducted a literature review and found 26 studies that examined the correlates of depression in men during the antenatal and postnatal periods. Of these, one cross sectional study and fourteen longitudinal studies encompassed the antenatal period. It is worth noting that none of the longitudinal studies focused exclusively on the antenatal period, with each a precursor to the postnatal stage. This demonstrates the notion that symptoms in this epoch are inherently linked to (and arguably, since it hasn’t warranted its own isolated
body of research perhaps less serious than) symptoms during the postnatal period. Despite this, Wee et al., (2011) found that the most common correlates of depression during the antenatal period included having a depressed partner, a weak relationship between the partners, and low social support. During the postnatal period, they found that having a depressed partner was again the most likely risk factor for the father to develop depression. They do however acknowledge significant methodological limitations across the studies, including longitudinal study designs that only captured data at one gestational point; differing measures of depression; and small sample sizes.

Importantly, Wee et al., (2011) found a trend across studies for an interactional effect between the partners, where an increase in depression in one partner possibly led to an increase in the other’s depressive symptoms. This pattern was observed despite differences in the tools used to measure depressive symptoms between the studies. Further, they state that the cause of this co-morbidity is yet to be established, and it may suggest a similar trend at other times during the lifespan. Another large meta-analysis also supported this finding, reporting that there was a positive and moderate correlation between paternal and maternal depression but concluding that none of the studies included in their paper indicated direction of causal influence (Paulson & Bazemore, 2010).

Harvey and McGrath (1988) assessed the spouses of women who had been admitted to a psychiatric mother and baby unit for psychiatric morbidity. They found that 42% of partners experienced their own disorder, mostly major depressive episode and/or generalised anxiety disorder. They found that the concurrence was more likely to occur in couples that experienced poorer marital and social function. However, they do
acknowledge that their control group may have been biased toward lower morbidity (with just 4% reporting psychiatric symptoms) and they also used a 5% uncorrected significance level for multiple variables. Despite the possible effects on significance value, that 42% of the experimental group experienced symptoms remains unusual. Further, they suggest that the most likely explanation for this is that the mother and baby’s hospitalisation is the precipitating factor in the man’s illness, exacerbated by a poor relationship and social support networks.

A later study of a similar population by Lovestone and Kumar (1993) supported Harvey and McGrath’s findings, showing that 50% of men whose partner and baby were admitted to a mother and baby unit experienced psychiatric illness during her admission, typically immediately after the mother’s admittance to hospital. At follow-up they found that when the woman’s symptoms abated, their partner’s usually did as well. It is worth noting that the lifetime rate of psychiatric illness in those partners was 38% and was based on past episodes with only 8% ever receiving treatment. This highlights the high rate of untreated and therefore undiagnosed mental illness in the male population. As with Harvey and McGrath’s study, this study also had a relatively small sample size.

In a community based sample, Ballard, Davis, Cullen, Mohan and Dean (1994) found that at 6 weeks and 6 months postpartum, fathers were significantly more likely to experience depression when their partners were also depressed. They note that this effect was particularly pronounced at six months post-birth, with seven of the eight fathers who experienced psychiatric disorder also having a partner with a diagnosis. As
this study did not commence during pregnancy it is unclear whether symptoms displayed at six weeks postpartum were also present earlier.

Dudley, Roy, Kelke and Bernard (2001) also found that men are particularly vulnerable to the state of their partners, with paternal depression being accounted for by neuroticism, the mother’s personality difficulties and unresolved past events, and the mother’s current mental health and infant-related problems, and their relationship with their partner. Alternatively, the woman’s depression was influenced by neuroticism, her own personality, perinatal and infant-related factors. Dudley et al., found that 47.5% of mothers and 48.9% of fathers met the cut-off for depression, and mood disturbance in one partner was moderately correlated with depression in the other. It is worth noting that the time of assessment was varied, occurring when the infant ranged between 1 and 6 months of age. Further, another study found that while the incidence of paternal depression ranged from 1.2 to 25.5 percent in the first year after birth in the general population, it rose dramatically to 24 to 50 percent in fathers whose partner experienced depression (Goodman, 2004). This was the strongest predictor of paternal depression during the postnatal period in that analysis.

Matthey et al., (2000) found a significant correlation between females and males on the Beck Depression Inventory in the antenatal period (between 20-24 weeks gestation). It is worth noting however that there was only one point of measurement in the antenatal period, with the bulk of their study focusing on the postnatal period. After delivery, Matthey et al., (2000) demonstrated that depressed mood concordance within couples increased over time. Initially, the mood of both new parents was influenced most strongly by their relationships with their own parents but they suggest that partner
support becomes more pivotal over time and thus couple concordance increased as the year progressed.

As Matthey et al., (2000) suggest, quality support can be as important to men as it is to women for reducing the risk of developing depression, however there may be differences in the manner in which support is accessed. Fuhrer, Stansfeld, Chemali and Shipley (1999) found that women have a larger number of people close to them than men, while men are likely to report larger networks. However men receive most of their support from their closest person and are more likely to report their spouse as their closest person. Women are less likely to nominate their spouse as their closest person and are more likely to exclude their spouse altogether from their closest four relationships. If a woman experiences depression and reduces or withdraws support to nurture herself, then the man’s primary source of support becomes compromised which may explain why a depressed partner is the strongest risk factor for men to develop depression (Wee et al., 2011). This was highlighted in Everingham, Heading and Connor’s (2006) qualitative study that examined each partner’s experience of postnatal depression and found that fathers indicated that they felt unable to offer the support required by the depressed mother, resulting in their own frustration and distress and leading to a retreat from the relationship. Since 31% of fathers felt that having a baby disrupted their marriage and resulted in less satisfaction within the relationship (Chalmers and Meyer, 1996), an already stressed relationship between the couple may exacerbate feelings of dissatisfaction and add to the risk of developing depression, and even poorer support between the spouses.
Like women, men also may be difficult to diagnose with depression but rather than reporting ambiguous symptoms or failing to seek treatment, men are more likely to under-report symptoms. Matthey et al., (2000) found that men had higher rates of zero-symptom reporting than women and hypothesise that gender specific symptoms may be plausible and suggest that assessing symptoms of stress and anxiety, in addition to depression will garner a better understanding of the difficulties facing men during this time.

However, it is also possible that these men are engaging denial as part of a broader avoidant coping style. It is reported that denial may be either an adaptive or maladaptive response to a perceived threat or illness (Wheeler & Lord, 1999). When denial is counterproductive it can result in the failure to seek treatment when required (Wheeler & Lord, 1999). For example, Everingham et al., (2006) found that intervention by experts increased distress and stigma in fathers when mothers were undergoing psychological treatments for postnatal depression. Arguably, in these instances, it may be easier for the father to deny a problem and avoid treatment altogether than undergo the stress associated with intervention. Men are more likely to use denial than women, and those men who engage in denial are also more likely to score higher on the Neurotic scale (Leandro & Castillo, 2010). Additionally, they found that those individuals who demonstrated lower anxiety and depression were more likely to utilise a task-focused approach of coping. Beasley, Thompson and Davidson (2003) found similar results, concluding that when emotion-oriented strategies were used, depression scores were elevated in both men and women. Further, males were more likely to use task-oriented coping than females, therefore lowering their scores on anxiety.
Harvey and McGrath (1988) found that men whose partners experienced depression were more likely to experience anxiety. Further, Field et al., (2006) found that depressed fathers experienced higher levels of anxiety and depression during pregnancy than non-depressed fathers. These results suggest that anxiety in the antenatal period may also indicate a higher risk for depression in the postnatal period, however the coping style of the fathers was not assessed in either of these studies to determine if that variable could be predictive of these results.

Further, the general stress associated with a new baby can also impact on a father’s well-being. Ferketich and Mercer (1995) found that some new fathers who are inexperienced with caring for children may experience a decline in physical and psychological health. Other factors that may contribute to mood vulnerability in impending or new fathers include a history of depression (Areias et al., 1996; Escriba-Aguir, Gonzalez-Galarzo, Barona-Vilar & Artazcoz, 2007); poorer engagement between the father and child (Bronte-Tinkew, Moore, Matthews & Carrano, 2007); and higher aggravation or stress associated with parenting (Bronte-Tinkew et al., 2007).

Few studies have examined the trajectory of male depression in the pregnancy and postnatal periods, within the context of his partner’s mood, or other influencing factors such as comorbid psychological issues, coping style and stress over an extended longitudinal scale. This study aims to explore the concordance of depression in pregnancy and the early postpartum period; investigate if there are any changes in depression, stress and anxiety over time; and explore predictors of depression during pregnancy, early postpartum and over time.
References


Depression in couples during pregnancy and postpartum: is there a concordance?

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**Objective.** An increase in mood disturbance during the pre- and postnatal periods has been well documented. This study investigated mood concordance between couples during pregnancy and postpartum, explored changes to depression, stress and anxiety over time and examined predictors of depression.

**Design.** A repeated measures design using self-report instruments examining demographic and psychological variables.

**Methods.** Pregnant women presenting to General Practitioner surgeries in England were recruited with their partners (N=1070, 535 couples) and requested to complete questionnaires via mail that examined mood, anxiety, stress and coping. The questionnaires were delivered in Trimester 1 (time1), Trimester 3 (time2), 6 weeks postpartum (time3), 6 months postpartum (time4), and 12 months postpartum (time 5).

**Results.** Pearson’s correlation showed there was no relationship between the moods of each member of the couple at any time. One-way repeated measures ANOVA’s demonstrated significant effects of sex and time on depression, with depression scores peaking at 6 weeks postpartum for women and 6 months postpartum for men, while time also showed a significant effect on stress and anxiety, with both peaking at 6 weeks postpartum. Stepwise linear regression identified the predictors of depression as sex, anxiety and stress.

**Conclusions.** Findings suggest that as men continue to experience the pressures of a new baby and accommodating their partner’s elevated depression symptoms, their own depressive symptoms increased. This indicates that men may experience a similar transition during pregnancy and postpartum to women, albeit in a different timeframe. Deliberation and review of the current classification of postnatal depression to include fathers and a longer timeframe should be considered.
Introduction

When major depression occurs within four weeks of childbirth, it is reclassified as Postpartum Onset Specifier (American Psychiatric Association, 2000). However
pregnancy and the entire first year have consistently been associated with higher rates of depression than other times in the lifespan, not only for women but also for their male partners (Durkin, Morse & Buist, 2001; Wee, Skouteris, Pier, Richardson & Milgrom, 2011). While the prevalence rates during these times varies dramatically, it has been suggested that this often due to study specific factors, such as the definition of depression; the measures that are used to assess for depression; the time of postnatal assessment; and the timeframe to which the questions relate (Matthey, Barnett, Ungerer & Waters, 2000). Therefore there is evidence of increased psychopathology at these times, but also confounders regarding the above factors. This is not entirely unexpected, given the two main diagnostic resources also appear conflicted as to what constitutes reclassification of major depression to depression relating to childbirth: while the DSM-IV-TR offers a four week window, the ICD-10 allows six weeks for symptoms to appear, post-childbirth (American Psychiatric Association, 2000; World Health Organisation, 2006). Indeed, it has been suggested that women are in fact vulnerable for developing depression throughout the first twelve months after childbirth (Morrell, 2006).

It has been proposed that the incidence of first onset of depression after childbirth is low, ranging between 3.9 and 5.7% (Banti et al., 2011; Felice, Saliba, Grech & Cox, 2004) with research continuing to demonstrate that women who experience depression during their pregnancy are likely to maintain their depressed mood until after the birth (Heron, O’Connor, Evans, Golding, & Glover, 2004; Rahman, Iqbal & Harrington, 2003). This suggests that factors and vulnerabilities in the antenatal period may be pivotal in depression of a postnatal nature. Importantly, many studies do not measure mood in the antenatal period, commencing assessment only after birth and since this is
when detection is made, the depressed new mother is labelled as “postnatally depressed”, regardless of whether onset occurred prior to the postnatal period.

While the impact of pregnancy and the postnatal period has often been studied in women, research focusing on men in these periods is much less forthcoming. A meta-analysis also concluded that when men are included, studies often have smaller sample sizes, which may account for some variation in the prevalence rates in fathers (Wee, Skouteris, Pier, Richardson & Milgrom, 2011). Despite this, there is still sufficient evidence to suggest that men are affected by psychological symptoms including anxiety, depression, inadequacy and loneliness during pregnancy and the time immediately after birth (Clinton, 1987; Finnbogadottir, Crang Svalenius & Persson, 2003; Wee et al., 2011).

Although it is generally recognised that depression occurs within the context of an interaction between psychological, physiological and social factors (Kahlia, 2005), mental health history has been of particular interest to researchers examining depression during the antenatal and postnatal periods. Specifically, anxiety has often been associated with higher levels of depression (Coelho, Murray, Royal-Lawson & Cooper, 2011; Durkin et al., 2001; Milgrom et al., 2008).

Da Costa, Larouche, Dritsa and Brenda (2000) examined whether daily stress, pregnancy stress, anxiety, social support, and coping strategies influenced depression in women during the antenatal and early postnatal period. They found that depressed women reported significantly higher levels of trait and state anxiety. Additionally, they found that coping repertoire was another predictor for depression, and those individuals
who employed an emotional coping style during pregnancy experienced significantly more depression. A further study examining the impact of coping style on pre- and postnatal depression found that the coping strategies most often associated with depressed women were distancing, denial, blame and substance abuse. Alternatively, non-deressed women utilised acceptance of the situation and humour (de Tychey et al., 2005).

While there was a distinct absence of literature on men’s coping in pregnancy and after birth, research did indicate that men are in general more likely to use task-oriented coping than females, consequently reducing the level of anxiety they experienced (Beasley, Thompson & Davidson, 2003). Notably, Johnson and Baker (2004) found that men typically utilised an approach-coping style during pregnancy, however these strategies decreased after the birth of the child, and remained at lower levels one year after the pregnancy ceased. They suggest that this change may be due to the demands of the support role during childbirth.

Another factor that has been linked to depression in the ante- and postnatal periods is partner support. It has been suggested that factors such as marital status, marital quality, and marital interaction may be a source of stress or support (Burman & Gayla, 1992). The manner in which spouses interact appears to be particularly important. Durkin et al., (2001) report that if expectant parents feel a lack of support and emotionally distant from their partner, then they are likely to have a negative transition to parenthood. This poses a challenge for a couple where the man is depressed and perhaps unable to offer an adequate level of support to his pregnant or newly
postpartum partner. Arguably, this lack of support may manifest in the woman’s own depression.

Furthermore, it is suggested that men and women encounter parallel psychological adjustment during the antenatal period (Teixeira, Figueiredo, Conde, Pacheco & Costa, 2009). Therefore, the impact of a woman’s depression on her adjusting partner must also be considered when researching and reviewing the effect of pregnancy and childbirth on paternal mood. Furthermore, Wee et al., (2011) found that for men, the most common correlates of depression during the antenatal period included having a depressed partner, a weak relationship between the partners, and low social support. During the postnatal period, they found that having a depressed partner was again the most likely risk factor for the father to develop depression and importantly, interactional effects between the partners were trended. However causal influence remains undetermined.

As there are no guidelines for depression in men during the postnatal period, it is important to note that the prevalence rate of depression in new fathers has been shown to fluctuate over time. For example, Areias, Kumar, Barros and Figueiredo (1996) found that 4.8% of new fathers experienced depression in the first three months after childbirth. However, this rose to 28.6% by the end of the first year, which suggests an ongoing risk and corresponds with Morrell’s (2006) argument that women maintain vulnerability for postnatal depression well into the first year. The trend for depressive symptoms to increase in fathers as the first postnatal year progresses was replicated later by Matthey et al., (2000), albeit at a much lower percentage and highlights the
importance of repeated assessment points for expectant and new fathers to detect depression.

This study aims to explore the concordance of depression in pregnancy and the early postpartum period; investigate if there are any changes in depression, stress and anxiety over time; and explore predictors of depression during pregnancy, early postpartum and over time.

**Hypotheses**

1. There will be a correlation between male and female mood disturbance within couples, at corresponding times during pregnancy and the postpartum period.
2. Male and female depression will increase during the first 12 months postpartum.
3. There will be specific predictors of depression: specifically partner depression, stress, anxiety and avoidant coping will positively predict depression and approach coping will negatively predict depression.

**Method**
Participants

Eight hundred and one male/female couples were recruited into the study, of which 535 had live births. The final number of couples available for this study was 535 (N=1070). The age range of the men was 18-56 years, (mean= 32.1 years, sd=7.2). The age of female participants ranged from 18-51 years (mean = 30.5 years, sd=6.3).

Procedure

The sample were recruited via twelve large General Practitioners' surgeries who advertised “Well Woman” clinics with antenatal care in the Midlands and eight in the North East of England. Participating practices were given letters of introduction outlining the nature of the research and were requested to give them to pregnant women who were under their care and to women who presented themselves for pregnancy testing and received a positive result. The letter of introduction also requested the support of their male partner in the study. The questionnaire package consisted of the Beck Depression Inventory (BDI); The State-Trait Anxiety Inventory (STAI); The Coping Response Inventory (CRI); and the Impact of Event Scale (IES). Five time-points were used for administration to couples: trimester one and trimester three of pregnancy; and six weeks, six months and twelve months postpartum. The questionnaires were administered via postal service.

Measures

_The Beck Depression Inventory (BDI) (Beck, Rush, Shaw, & Emery, 1979)._

The BDI is designed to assess the severity of depression in adolescent and adult populations. It consists of 21 items and each item is scored on a 4 point scale ranging from 0-3. Zero represents the absence of the concept of the item and 1-3 represents a rise in the severity of the item. The BDI gives a depression score which is a simple summation of the weighting of each item. The maximum score available is 63. The
reliability of the inventory has been extensively reported (Beck, Steer & Garbin, 1988; Lightfoot & Oliver, 1985; Zimmerman, Coryell, Corenthal, & Wilson, 1986). Retest reliability with psychiatric populations range from .48 -.86, whereas with non-psychiatric populations the inventory is more stable with correlation of .60 -.0.83 reported. The validity of the inventory appears to be good, comparisons of severity of depression against clinical judgement correlates to 0.72 (Beck et al., 1988).

The Impact of Event Scale (IES) Horowitz, Wilner & Alvarez, (1979)
The Impact of Events Scale is a 15 item measure of the impact of a named stressor. The scale has two components, 'Intrusion' (7 items), and 'Avoidance' (8 items). Responses to items are weighted as follows: not at all (0), rarely (1), sometimes (3), often (5); the total score being the sum of these two subscales. The reliability and validity of this measure is reported as satisfactory (Hunfeld et al., 1993). The reliability analysis for the total scale is reported as r = .95, while internal consistency of the two sub-scales is reported as Intrusion 0.78, and Avoidance 0.82. The validity of the scale is reported in terms of percentage endorsement of each item, of a population seeking help for Post Traumatic Stress Disorder. The reliability of each item ranged from 0.35 - 0.65 (Horowitz et al., 1979). The questions and rubric on the scale were adapted for this study by the substitution of the word 'pregnancy' or ‘since the birth of your child’

The State Trait Anxiety Inventory (STAI) (Spielberger, Goruch, Lushene, Vagg & Jacobs, 1983).
The STAI is a 20 item measure of State and Trait anxiety, where State Anxiety is said to be how people feel 'right now' at a particular given moment. Each of the items on the STAI is weighted on a 4 point scale as follows; almost always (4), often (3), sometimes (2), almost never (1). For each of the scales the scale score is the summation of each item's weighted score after correction for reversal. The range of scores is 20-80
(Spielberger et al., 1983). The reliability analysis for the STAI with Cronbach's alpha is .93 & .91 for State and Trait scales respectively. The validity of the STAI is also reported to be good. Correlations against a battery of other measures produced a median correlation of .75 for females and .79 for males (Spielberger et al., 1983).

The Coping Response Inventory (CRI) Moos, (1990)

The CRI attempts to measure 8 specific coping responses. The questions on the scale were worded referring to a general event. For this study, the wording was changed so that they made reference to the pregnancy. The Coping Response Inventory consists of 48 items, 6 for each scale. Each question is rated on a four point scale, (0) no (representing the absence of the item), (1) once or twice, (2) sometimes, (3) fairly often, and the score range for each coping response is 0-18. Moos, (1990) reports the internal consistency and test-retest reliability to be satisfactory as with the validity on other measures of coping, CRI correlates within a range of .56 -.83 (Billings & Moos, 1981).

Analysis

Pearson’s correlations were performed to examine the intra-correlations of depression scores over and above other demographic and psychological variables between the men and women. One-way repeated measures ANOVAs were performed to determine if there was a change in depression, stress and anxiety during pregnancy, the postpartum period and over time, differentiated by sex. A stepwise multiple regression was performed to explore predictors of depression, and the predictors were anxiety, stress, coping, demographic variables and reproduction variables.

Results
Group comparisons

The characteristics of the sample population are listed and compared (See Table 1). Demographic data collected included marital status, planning of pregnancy and number of children.

[Table 1 Here]

Statistical analysis

Pearson’s correlation was performed to examine if there was a relationship between the men and women’s depression scores at each time point. The results found that there was no relationship between men’s and women’s scores at any time (Trimester 1 r=-.40, p=.36; Trimester 3 r=-.03, p=.48; 6 weeks postpartum r=-.03, p=.47; 6 months postpartum r=-.02, p=.68; and 12 months postpartum r=-.03, p=.53).

A one-way repeated measures ANOVA was conducted to explore the effect of sex on depression, over time. Mauchly’s Test of Sphericity suggested the assumption of sphericity had been violated, \(X^2(9)=6563.56, p<.05\), thus a Greenhouse–Geisser correction was used. The results showed that there were significant effects of sex on depression, \(f(1,1068)=5.32, p=.021\). There were also significant effects of time \((f(1.225,1308.66)=406.63, p<.001)\) and of an interaction between sex and time \((f(1.225,1308.66)=25.41, p<.001)\). Pairwise comparisons indicated that all time points were significantly different from each other \((p<.001)\). Inspection of means indicated women’s depression peaked at 6 weeks postpartum and then declined, while men’s depression peaked at 6 months postpartum before declining (see Figure 1).

[Figure 1 here]
A one-way repeated measures ANOVA was also used to explore the effect of sex on stress, over time. Mauchly’s Test of Sphericity suggested the assumption of sphericity had been violated, $X^2(9)=9711.63$, $p<.05$, thus a Greenhouse–Geisser correction was used. The results showed that there was a significant effect of time $(f(1.883,2010.92)=581.62$, $p<.001)$ on stress, however there was not a significant effect for sex, $(f(1,1068)=.06$, $p=.81)$ nor sex by time $(f(1.88,2010.98)=.13$, $p=.87)$ in the prediction of stress. Pairwise comparisons indicated that all time points were significantly different from each other $(p<.001)$. Review of means indicated that scores peaked at 6 weeks (see Figure 2).

A further one-way repeated measures ANOVA was used to explore the effect of sex on avoidance, over time. Mauchly’s Test of Sphericity suggested the assumption of sphericity had been violated, $X^2(9)=13139.89$, $p<.05$, thus a Greenhouse–Geisser correction was used. The results showed that there was a significant effect of time $(f(1.02,1091.56)=137.05$, $p<.001)$ on avoidance. However, there was not a significant effect between sex and avoidance, $(f(1,1068)=.69$, $p=.41)$ nor an interaction of sex and time $(f(1.02,1091.56)=.27$, $p=.61)$ in the prediction of depression. Pairwise comparisons indicated that all time points were significantly different from each other $(p<.001)$. Figure 3 demonstrates that avoidance scores peaked at 6 months postpartum and then declined.
Another one-way repeated measures ANOVA was used to explore the effect of sex on intrusions, over time. Mauchly’s Test of Sphericity suggested the assumption of sphericity had been violated, thus a Greenhouse–Geisser correction was used. The results showed that there was a significant effect between time and intrusions ($f(1,1068)=635.39, p<.001$). However, there was not a significant effect between sex and intrusions, ($f(1,1068)=1.24, p=.27$) nor was there an interaction between sex and time and intrusions ($f(1,1068)=.003, p=.10$). Pairwise comparisons indicated that Trimester 1 is significantly different from Trimester 3 and 6 months postpartum; Trimester 3 is significantly different from 6 weeks postpartum, 6 months postpartum and 12 months postpartum; and 6 weeks postpartum is significantly different from 6 months postpartum (all $p<.05$). Inspection of means indicated intrusion scores peaked at six weeks postpartum (see Figure 4).

A final one-way repeated measures ANOVA was conducted to explore the effect of sex on state anxiety, over time. Mauchly’s Test of Sphericity suggested the assumption of sphericity had been violated ($X^2(9)=4128.07, p<.05$), thus a Greenhouse–Geisser correction was used. The results showed that there was a significant effect of time on anxiety ($f(1.34,1431.59)=246.34, p<.001$). However, there was not a significant effect between sex and anxiety ($f(1,1068)=.086, p=.77$), nor was there an interaction between sex and time and anxiety ($f(1.34,1431.59)=1.542, p=.22$). Pairwise comparisons indicated all time points were significantly different from one another ($p<.05$).
Inspection of means indicated that anxiety scores increased until 6 weeks postpartum (see Figure 5).

[Figure 5 here]

In order to examine the predictors of depression at Trimester 1, Trimester 3, 6 weeks postpartum, 6 months postpartum and 12 months postpartum, stepwise linear regressions were conducted. Analysis of Trimester 1 required two steps: 1) time, stress and cognitive variables, and 2) demographic and reproductive variables. Analysis showed that sex was the only significant predictor of depression in Trimester 1 (b=-1.085, SE=.408 p=.008) and explained 1% of the variance (adjusted R²=.006).

Trimester 3 required three steps: 1) trimester 1 time, stress and cognitive variables, 2) Trimester 3 time stress and cognitive variables, and 3) demographic and reproductive variables. Analysis showed that anxiety was the most significant predictor of depression in Trimester 3 (b=.057, SE=0.28 p=.046), and explained 0.3% of the variance (adjusted R²=.003). The other significant predictor of depression at Trimester 3 was sex (b=-1.007, SE=.408 p=.14) explaining 1% of the variance (adjusted R²=.008).

At 6 weeks postpartum the analysis required four steps: 1) Trimester 1 time, stress and cognitive variable, 2) Trimester 3 time, stress and cognitive variables, 3) 6 weeks postpartum time, stress and cognitive variables, and 4) demographic and reproductive variables. Analysis showed that sex was the only significant predictor of depression at 6 weeks postpartum (b=-1.437, SE=.623 p=.021) and explained 0.3% of the variance (adjusted R²=.003). At 6 months postpartum five steps were required for the analysis: 1) Trimester 1 time, stress and cognitive variables, 2) Trimester 3 time, stress and cognitive variables, 3) 6 week postpartum time, stress and cognitive variables, 4) 6 month time, stress and cognitive variables, and 5) demographic and reproductive
variables. Analysis showed that anxiety in Trimester 1 was the most significant predictor of depression at 6 months postpartum (b=.065, SE=.031 p=.036) and accounted for 0.3% of the variance (adjusted $R^2=.003$). The other significant predictor of depression at 6 months postpartum was sex (b=.910, SE=.443 p=.04) and explained 1% of the variance (adjusted $r^2=.006$). Six steps were required for the analyses at 12 months postpartum: 1) Trimester 1 time, stress and cognitive variables, 2) Trimester 3 time, stress and cognitive variables, 3) 6 weeks postpartum time, stress and cognitive variables, 4) 6 months postpartum time, stress and cognitive variables, 5) 12 months postpartum time, stress and cognitive variables, and 6) demographic and reproductive variables. Analysis showed that total stress score at 12 months postpartum was the only significant predictor of depression at 12 months postpartum (b=-.086, SE=.043 p=.044) and explained 0.3% of the variance (adjusted $R^2=.003$).
Discussion

This study explored the concordance of depression in pregnancy and the postpartum period; examined the changes in depression, stress and anxiety over time; and determined the predictors of depression during pregnancy, postpartum and over time. The results showed that there was no relationship between male and female depression within couples during the pregnancy and postnatal periods. Further, the results did not show an increase in depression over the entire 12 months postpartum, however they did show a peak in depression scores in within the first 12 months. Depression scores were influenced by both sex and time, with women experiencing a peak in depression scores at 6 weeks postpartum, and men at 6 months postpartum. The variables of stress, measured by the Impact of Events Scale and its two subscales (avoidance and intrusions); and anxiety were only affected by time. Stress, intrusions and anxiety all peaked at 6 weeks postpartum, while avoidance peaked at 6 months postpartum. This study also suggested that partner depression and coping style would predict depression, however they did not. Rather, sex, anxiety and stress were the only predictors of depression at any of the time points.

The lack of concordance of mood between men and women is contrary to the literature, which suggests that such a relationship should exist. However, there is a possible explanation for this result. The cut-off points for the BDI place the peak mean scores for men and women in this study in the mild to moderate range (10-18) (mean scores 16.12 and 15.64, respectively). To obtain a postnatal depression classification, all of the criteria for a Major Depressive Disorder must be met, suggesting that these scores do not qualify. During pregnancy, the scores were even lower than the postnatal period and while they suggest elevated levels of depression, in the absence of a specific
pregnancy mood disorder classification, it must be queried whether these scores indicate clinical significance. Further, if they do not meet the criteria to be considered prenatally or postnatally depressed, it could be argued that concordance would not be observed. Paulson and Bazemore (2010) note the inclusion of minor depression in their meta-analysis and suggest that this may be the cause of unexplained heterogeneity across the studies, resulting in difficulty estimating the true prevalence of paternal depression. Arguably, if many of the studies examining this population do not reflect legitimate major depression then their subsequent conclusions regarding the pervasiveness of mood concordance between couples also becomes problematic. Also, Raskin, Richman and Gaines (1990) similarly found no relationship between depression and the individual members of the couple. They suggest that this pattern is “complementary”, with each partner offsetting a different depressive profile, however they did not offer a theoretical explanation for this conclusion and a database search by the present authors failed to find any reference to “complementary patterned depression”. Despite this, the notion that depressive profiles of partners may be relational, despite a lack of concordance offers an interesting proposition for the present study.

While women’s depression scores were consistently higher than men’s at four of the five time points, it is worth noting that at six months postpartum when women’s scores commence declining, the men’s scores not only peaked but superseded all of the women’s other scores for depression. This suggests that when men do become depressed after the birth of a child, their experience of the disorder is somewhat more severe than their female partner, whose experience is more chronic. This differing pattern may offer important insight into the aetiology of depression in men and women,
particularly in the postnatal period and may explain why in this study, depression was influenced by sex and time.

For example, Zelowitz and Milet (1997) interviewed the partners of women who were depressed between six to eight weeks postpartum. They report that when the mother is experiencing depression, the father may feel more pressure to undertake household responsibilities, resulting in the father feeling overburdened, and negatively impacting on work performance, his psychological well-being and his perception of family relationships. Similarly, Bartlett (2004) found that fathers reported feeling irrelevant, neglected and marginalised suggesting that they were not receiving the support they required. Within the context of the present study, these findings may explain the lag in men’s elevated depression scores, when compared to their partner’s. In the current study women’s scores peaked at six weeks postpartum and it is possible that at this time the father’s psychological well-being continued to be intact, with work-family life conflict, relationship changes, and additional pressures at a manageable level. However, by six months postpartum it is conceivable that the ongoing burden of these extra responsibilities and undesirable changes cumulate, resulting in the man experiencing his own form of depression, explaining the lack of mood concordance, but still possibly demonstrating a relationship between the moods within the couple.

While this may explain the peak in scores at six months for men, the unexpected finding that women’s scores did not continue to elevate for the first postnatal year may also accounted for by the “minor” rather than “major” classification of depression. Marchesi, Bertoni and Maggini (2009) evaluated the differences between major and minor depression in pregnancy and found that women experiencing minor depression
had an earlier onset (mean=3.5 months, SD=2.2) and shorter duration (mean=1.6 months, SD=0.7), than women with major depression (mean onset=5.6 months, SD=2.8 and mean duration=2.3 months, SD=1.7). Arguably, the lack of continuation of symptoms beyond early postpartum may be a manifestation of the profile of minor depression, rather than a representation of women who experience true postnatal depression.

However, it is also possible that this result is a reflection on the statements of the BDI, whereby among others, changes in sleep, appetite changes, and interest in sex are assessed. Hopkins, Campbell and Marshall, (1989) argue that many women, regardless of whether they are depressed or not, would report a large number of somatic changes, following childbirth. Given such close proximity to the birthing experience and the expected lack of sleep, loss of energy and tiredness that often accompanies the arrival of a new baby, high scores on these statements would be expected. Further, by six months postpartum those issues have generally improved and lower ratings for these statements would be likely. Perhaps this is what is being reflected in the changes to the scores, rather than a reduction of depressive symptoms. Nonetheless, it was interesting to note that in both men and women, depression scores began increasing from the first trimester and only commenced receding in the postnatal period, suggesting that mood vulnerability remained an issue throughout pregnancy.

The pattern of total stress scores over time also warrants discussion. Total stress peaked at six weeks postpartum and arguably, it appears logical that this would be the time of greatest transition for new parents, and that demanding emotional, behavioural and cognitive adjustments would result in higher stress overall. However, the use of the IES in the context of pregnancy and parenthood does require some consideration. It is
possible that the substitution of “pregnancy” or “since the birth of your baby” simply does not ‘fit’ into the context of the IES. For many people pregnancy and the time immediately after birth are times of mixed emotions possibly including joy, stress and worry. However, the IES statements were worded in a negative bias (for example “I stayed away from reminders of it” and “My feelings about it were kind of numb”) and it is possible that such strong and emotive wording may not have resonated with those people, especially since this particular population did not experience ongoing major depression. Also, substituting “since the birth of your baby” in place of the stressor may have led to ambiguous meanings. For example, the statement “pictures about it popped into my mind” may be interpreted by one person as the birthing process itself, while to another it may mean images of the baby. Finally, by categorising people’s responses as intrusive or avoidant, there is an implication that the intrusive thoughts are negative, when in fact a woman who is not experiencing stress relating to her pregnancy or new baby may experience many pleasurable intrusive thoughts. Each of these factors may have resulted in the instrument not capturing the true impact of the event.

The results also demonstrated that state anxiety followed an inverse “U” shape, peaking at six weeks postpartum, with a significant difference between the scores at all of the time points. This suggests that both men and women found the experience of pregnancy and early parenthood increasingly anxiety-provoking. The scores at six months postpartum suggest that the parents are less anxious than they were in the third trimester and by twelve months postpartum the level of anxiety is at the lowest. This may indicate that after a period of adjustment, the parent’s level of apprehension decreases, allowing them to relax into the parenting experience.
The process of predicting depression demonstrated no relationship with partner depression. Similarly there was no relationship between depression and coping style, which may suggest that external influences and interpersonal factors may be more predictive of and influential over depression within the context of pregnancy and transitioning to parenthood. However, a relationship was found between depression with sex, anxiety and stress, the influences of which appear to oscillate over the differing time points. It is worth noting that while these influences were significant they only accounted for a small percentage of the variance.

In trimester one, the only predictor of depression was sex. Females scored higher on depression scores than men, suggesting that the experience of early pregnancy renders women more susceptible to depression than men. This concurs with the findings from other studies. For example, Teixeira et al., (2009) found a significant association between sex and higher scores of depression in the first trimester, where women were 2.2 times more likely to experience depression than men. It has been suggested that this may be related to pregnancy-related symptoms (Perlen, Woolhouse, Gartland & Brown, in press; Kamysheva, Skouteris, Wertheim, Paxton & Milgrom, 2007); conflict with a partner or unwanted pregnancy (Marchesi et al., 2009).

In trimester three the most significant predictor of depression was anxiety, followed by sex. The finding that depression can be predicted by the presence of anxiety has been replicated elsewhere (for example, Karacam & Ancel, 2009; Mohammad, Gamble & Creedy, in press). Arguably, the impending birthing and labour process may be a major source of anxiety for parents and those that experience significant anxiety in this time
appear to also be more likely to experience a mood disorder, with women again more likely to experience depression than men.

By six weeks postpartum the only predictor of depression was sex, with women scoring higher than men on depression scores as previously discussed.

At six months postpartum the strongest predictor of depression was anxiety in trimester 1, followed again by sex, however at this time-point being male is the predictor for depression. Antenatal anxiety has often been linked with depression during the postnatal period, for example Mauri et al., (2010).

By 12 months postpartum, the only predictor of depression was the current total stress score. This suggests that all prior influences have been negated by this stage. In the instance where the first year has been fraught with challenges and perceived as a negative process with lifestyle and intimate relationships becoming highly disrupted, the ability of stress to predict depression becomes apparent.

This study contained a number of limitations. First the lack of a clinical interview may have prevented accurate inclusions or exclusions in this study. Also, in the absence of specific instruments, existing instruments were adapted to use with the pregnant and postnatal population. However, without validated norms for this specific population, it must be queried whether the data captured was actually what the current researchers were trying to elicit in this study.
Nevertheless, these findings do present some interesting implications for future research. Firstly, this field would clearly benefit from the development of specific and relevant tests for use in this special population. The experience of pregnancy and new parenthood is often a time of conflicting emotions and responses, so the instruments measuring psychological wellbeing should be different at these times to other stages in a person’s life. Secondly, the results of this study did not demonstrate concordance between couples for depression, however the results suggest that there may be similarities in the way that men and women experience stress and anxiety during pregnancy and postpartum. The exploration of how stress and anxiety interplay between couples may be an area of interest for future research. Finally, it certainly seems that for fathers, the postnatal period is a vulnerable time for developing a mood disorder. It is therefore concerning to acknowledge that without a proper classification these men are not differentiated from the depressed general population. Genuine consideration should be given to the parameters of inclusion and diagnosis for men and women.

Although no individual factor appears to be predictive of depression throughout pregnancy and the postnatal periods, a combination of factors seems to emerge in the prediction of vulnerability. The predictors may not only assist with the identification of those individuals at risk (both people with a recurrent depression and de novo depression) but also help focus early intervention and treatment direction.
References


Appendices

Appendix 1  British Journal of Health Psychology Aims, Scope and Author Guidelines

Appendix 2  Figure 1. Line plot of means and standard error for depression over time

Appendix 3  Figure 2. Line plot of means and standard error of total Impact of Events Scale score over time

Appendix 4  Figure 3. Line plot of means and standard error of Impact of Events Scale – Avoidance score over time

Appendix 5  Figure 4. Line plot of means and standard error of Impact of Events Scale – Intrusion score over time

Appendix 6  Figure 5. Line plot of means and standard error of State- Trait Anxiety Inventory (state scale) score over time
Appendix 1

British Journal of Health Psychology

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Overview

Aims and Scope

The British Journal of Health Psychology publishes original research on all aspects of psychology related to health, health-related behaviour and illness across the lifespan including:

• psychosocial mediators of health-related behaviours
• influence of emotion on health and health-related behaviours
• psychosocial processes relevant to disease outcomes
• psychological interventions in health and disease
• emotional and behavioural responses to ill health, screening and medical procedures
• psychological aspects of prevention

It encourages submissions of papers reporting experimental, theoretical and applied studies and research carried out at the individual, group and community levels is welcome. Submissions concerning clinical applications and interventions are particularly encouraged.
The following types of paper are invited:

• papers reporting original empirical investigations
• theoretical papers which may be analyses or commentaries on established theories in health psychology, or presentations of theoretical innovations
• review papers, which should aim to provide systematic overviews, evaluations and interpretations of research in a given field of health psychology
• methodological papers dealing with methodological issues of particular relevance to health psychology

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Author Guidelines

The aim of the British Journal of Health Psychology is to provide a forum for high quality research relating to health and illness. The scope of the journal includes all areas of health psychology across the life span, ranging from experimental and clinical research on aetiology and the management of acute and chronic illness, responses to ill-health, screening and medical procedures, to research on health behaviour and psychological aspects of prevention. Research carried out at the individual, group and community levels is welcome, and submissions concerning clinical applications and interventions are particularly encouraged.
The types of paper invited are:

- papers reporting original empirical investigations;
- theoretical papers which may be analyses or commentaries on established theories in health psychology, or presentations of theoretical innovations;
- review papers, which should aim to provide systematic overviews, evaluations and interpretations of research in a given field of health psychology; and
- methodological papers dealing with methodological issues of particular relevance to health psychology.

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The circulation of the Journal is worldwide. Papers are invited and encouraged from authors throughout the world.

2. Length

Papers should normally be no more than 5000 words (excluding the abstract, reference list, tables and figures), although the Editor retains discretion to publish papers beyond this length in cases where the clear and concise expression of the scientific content requires greater length.

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- the methods and/or sample size are appropriate for the questions being addressed
- research with student populations is appropriately justified
- the word count is within the stated limit for the Journal (i.e. 5000 words)

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• **Statement of Contribution:** All authors are required to provide a clear summary of ‘what is already known on this subject?’ and ‘what does this study add?’. The 2-3 (maximum) sentences for each point should identify existing research knowledge relating to the specific research question/topic and a summary of the new knowledge added by your study. Under each of these headings, please provide 2-3 clear outcome statements (not process statements of what the paper does); the statements for ‘what does this study add?’ should be presented as bullet points of no more than 100 characters each. The Statement of Contribution should be a separate file.

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Figure 1. Line plot of Means and Standard Error for Depression over Time by Sex
Figure 2. Line Plot of Means and Standard Error of Total Impact of Events Scale Score over Time
Figure 3. Line Plot of Means and Standard Error of Impact of Events Scale - Avoidance Score over Time
Appendix 5

Figure 4. Line Plot of Means and Standard Error of Impact of Events Scale – Intrusion Score over Time
Appendix 6

Figure 5. Line Plot of Means and Standard Error of State-Trait Anxiety Inventory (State Scale) Scores over Time
### Table 1

**Overall Sample Characteristics**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>1070</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
</tr>
<tr>
<td><em>Married</em></td>
<td>78.9%</td>
</tr>
<tr>
<td><em>Living with partner</em></td>
<td>18.0%</td>
</tr>
<tr>
<td><em>Single</em></td>
<td>3.1%</td>
</tr>
<tr>
<td><strong>Planned Pregnancy</strong></td>
<td></td>
</tr>
<tr>
<td><em>Yes</em></td>
<td>77.8%</td>
</tr>
<tr>
<td><em>No</em></td>
<td>22.2%</td>
</tr>
<tr>
<td><strong>First Pregnancy</strong></td>
<td></td>
</tr>
<tr>
<td><em>Yes</em></td>
<td>39.4%</td>
</tr>
<tr>
<td><em>No</em></td>
<td>60.6%</td>
</tr>
<tr>
<td><strong>Number of Prior Pregnancies</strong></td>
<td></td>
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<tr>
<td>0</td>
<td>39.4%</td>
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<tr>
<td>1</td>
<td>36.7%</td>
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<tr>
<td>2</td>
<td>14.4%</td>
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<tr>
<td>3</td>
<td>7.3%</td>
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<tr>
<td>4</td>
<td>0.9%</td>
</tr>
<tr>
<td>6</td>
<td>1.2%</td>
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<tr>
<td><strong>Living Children</strong></td>
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</tr>
<tr>
<td><em>Yes</em></td>
<td>46.5%</td>
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<tr>
<td><em>No</em></td>
<td>53.5%</td>
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<tr>
<td><strong>Incidence of Prior Miscarriage</strong></td>
<td></td>
</tr>
<tr>
<td><em>Yes</em></td>
<td>22.2%</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td><strong>Number of Prior Miscarriage</strong></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>77.8%</td>
</tr>
<tr>
<td>1</td>
<td>18.3%</td>
</tr>
<tr>
<td>2</td>
<td>1.8%</td>
</tr>
<tr>
<td>4</td>
<td>0.9%</td>
</tr>
<tr>
<td>6</td>
<td>1.2%</td>
</tr>
<tr>
<td><strong>Previous Stillbirth</strong></td>
<td></td>
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<tr>
<td><em>Yes</em></td>
<td>4.6%</td>
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<tr>
<td><em>No</em></td>
<td>95.4%</td>
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<tr>
<td><strong>Previous Ultrasound</strong></td>
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<td><em>Yes</em></td>
<td>70.4%</td>
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<tr>
<td><em>No</em></td>
<td>29.6%</td>
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