Anxiety and Depression Symptoms in Fathers During their Partner's Pregnancy: How does this Impact Paternal Fetal Attachment?

Amy Beesley, Emma Karwatzki, and Keith Sullivan

Abstract: The transition of men into fatherhood is a period of adjustment and uncertainty. Research into expectant fathers is neglected in comparison to pregnant mothers. The aim of this study was to analyze the correlates of anxiety, depression, and the paternal-fetal attachment in expectant fathers. One hundred and sixty-six males were assessed using the Paternal Antenatal Attachment Scale (PAAS), the General Anxiety Disorder scale (GAD-7) and the Edinburgh Postnatal Depression Scale (EPDS). Other questions relating to sociodemographic and pregnancy variables were also collected. Anxiety and depression measures were found to be significantly correlated with each other; however, they did not appear to be significantly associated with fetal attachment levels. Multiple stepwise regression analysis identified the significant variables associated with paternal-fetal attachment to be relationship satisfaction and the gestational age of the pregnancy, which explained approximately 8% of the variance. The findings are reassuring for expectant fathers who may be experiencing psychological symptoms of anxiety or depression. Further research is needed into determining fathers who may be at risk of low fetal attachment or psychological distress during pregnancy.

Keywords: paternal-fetal attachment, expectant fathers, parenting

Research into the psychological wellbeing of expectant fathers is neglected in comparison to pregnant mothers. Contemporary research suggests that the psychological wellbeing during antenatal and postnatal periods is not only important for mothers, but fathers also. For fathers, pregnancy is a time of particular stress, more so than the post-birth period (Condon, Boyce, & Corkindale, 2004).

Dr Amy Beesley is a registered Clinical Psychologist (UK) and specializes in Child & Adolescent psychology. Amy has over ten years of experience of working with parents and children who have attachment disorders. Amy has taught on parenting, self-harm, anxiety & depression and has published articles on the use of social media when working with young people. Amy has a particular interest in pre- and perinatal psychology, and the impact on life course outcomes. **Dr Emma Karwatzki** is a Clinical Psychologist (University of Hertfordshire- UK) and **Dr Keith Sullivan** is a Clinical Tutor (University of Hertfordshire -UK).

The antenatal period has been described as a unique phase of adjustment for men (Finnbogadottir, Svalenuis, & Persson, 2003). During the transition to fatherhood, fathers anticipate a great time of change alongside feelings of not being prepared for such changes (Boyce, Condon, Barton, & Corkindale, 2007). For some fathers, this transition may simply require a period of adjustment to their change in circumstances; however, for others it can be a critical time characterized by stress, anxiety, or depression (Condon et al., 2004). The psychological symptoms and how they may impact the attachment process for expectant fathers appears a critical area of focus.

There may be many contributors to anxiety and depression levels for fathers during the pregnancy period. Men have been shown to have fewer support networks than women and are more likely to rely on their partners, putting them at greater risk of perinatal distress (Zelkowitz & Milet, 1997). Men tend not to seek support from services during the antenatal period due to them feeling they need to support and protect their partner and unborn baby; therefore, they modify their behaviors accordingly (Poh, Koh, Seow, & He, 2014). This finding suggests not only that the antenatal period is a potentially vulnerable time for men, but also that they feel largely unsupported or unable to ask for help.

Additionally, men are of significant importance to their partner's pregnancy and post-birth behaviors. Attitudes of the fathers have shown to be a significant determining factor in their pregnant partners' post-birth behaviors such as whether they choose to breastfeed (Scott, Landers, Hughes, & Binns, 2001). Men are now viewed as having a crucial role to play during their partners' pregnancy. This crucial role is viewed as being dependent on their ability to manage their own stress levels, as these can influence their partners' pregnancy (Chapman, Hobfoll, & Ritter, 1997). It is, perhaps, unsurprising that fathers who meet the criteria for an anxiety or depressive disorder during the perinatal period are twice as likely to have a partner who also meets this criteria (Matthey, Barnett, Howie, & Kavanagh, 2003).

Findings are unclear as to how many of these men (or their partners) may have experienced difficulties with mental health in the past. It is difficult to conclude whether the onset of anxiety took place during the prenatal period or whether it was present before this time (Leach, Poyser, Cooklin & Giallo, 2016). Additionally, a partner's mood may not just be a correlate, but also a factor in the etiology of depression (Bielawska-Batorowicz & Kossakowska-Petrycka, 2006; Paulson & Bazemore, 2010). A literature review (Wee, Skouteris, Pier, Richardson, & Milgrom, 2011) into the correlates of antenatal and postnatal depression in fathers found having a partner with depression was the most common correlate. This suggests the pregnant partner may play either a contributing or protective

factor in terms of experiencing psychological symptoms. Clinically, this can mean first-time fathers may be particularly vulnerable if they lack social support, or if their primary support is their partner who is also depressed, then the support is likely to be limited. More longitudinal research is needed to understand the associations and patterns of mental health in parents, pre- and post-pregnancy.

Mental health factors influencing prenatal attachment for fathers appear to be linked to biological, psychological, and environmental components. The caregiving system of expectant fathers appears to undergo a marked shift at a biological level in which changes in the structure of the brain and hormonal levels can be identified (Kinsley et al., 2006). Expectant fathers show a decline in testosterone and estradiol levels (Edelstein et al., 2015). These hormonal and psychological changes during their partners' pregnancy appear to help prime males to care for their young (Storey, Walsh, Quinton, & Wynne-Edwards, 2000). The psychophysiological and hormonal changes need to be considered alongside expectant fathers' mental health and how this may contribute to their attachment to their unborn infant.

Some studies have shown first-time fathers to be particularly vulnerable to depression (Cowan, Cowan, Heming, & Miller, 1991). Other studies have shown second-time fathers to show greater levels of anxiety than first-time expectant fathers (Condon & Esuvaranathan, 1990). These increased levels of anxiety for second-time fathers may be due to having to incorporate a second baby into an already existing system or having to take care of two children at the same time (Figuerido & Conde, 2011).

A meta-analysis of research into the prevalence of anxiety and depression during the prenatal and postnatal period also suggests the lack of outcomes for fathers may be due to inconsistent methodology and varying prevalence rates for fathers compared to mothers (Paulson & Bazemore, 2010). These findings are likely to explain why there appears to be a historical bias in the literature that only mothers are affected by, or are the empirical focus of, prenatal and postnatal depression.

The prevalence of risk factors and effects of anxiety or depression among new fathers is poorly understood. Anxiety and depression levels appear highest during the period of pregnancy for fathers (Condon et al., 2004). Furthermore, the anxiety for an expectant father in the prenatal period can adversely impact themselves, their partner, and their infant (Leach et al., 2016; Ramchandani, Stein, Evans, O'Connor, & ALSPAC Study Team, 2005; Ramchandani et al., 2008). Further research is needed to establish which fathers are most vulnerable to psychological difficulties during the prenatal period and the potential outcomes this may have with the relationship to their unborn baby.

Research has suggested the psychological wellbeing of fathers during pregnancy is also associated with levels of attachment to their unborn baby (Condon, Corkindale, Boyce, & Gamble, 2013). More specifically, expectant fathers' attachment levels appear to hold a strong level of continuity throughout the pregnancy but the levels of preoccupation with regard to the attachment can vary according to their own psychological wellbeing (Condon et al., 2013). This appears to support wider research on parental levels of reflective functioning; that a caregiver's psychological capacity to understand and think of an infant's behaviors in terms of mental processes is likely to determine the attachment (Fonagy, Steele, Steele, Moran, & Higgitt, 1991). Expectant fathers who experience anxiety or depression during the prenatal period may experience difficulties in their capacity to be able to think about their unborn child and this may influence their ability to develop the attachment relationship towards their unborn child.

There are many reasons why the prenatal period may contribute to the vulnerability of poor mental health: increased stress and anxiety, significant life changes, and potentially the recurrence of pre-existing psychological difficulties (Leigh & Milgrom, 2008). Paternal mental health throughout the prenatal period and the development of the pre-birth attachment is under-researched. Although there is increasing recognition that parental mental wellbeing may be a requirement for optimal parental-fetal attachment, it is essential that we understand the wider variables which may influence the developing relationship in order to understand the implications. Therefore, it appears useful to explore expectant fathers' psychological wellbeing and the development of the attachment with their unborn baby as well other variables that may influence this relationship.

Until recently, many studies have included fathers alongside mothers and these studies using couples were statistically analyzed separately for men and women in order to control for non-independence. Given that the literature for expectant fathers is still emerging and relatively new, the need has emerged for expectant fathers to be studied in their own right to give a more accurate picture.

Rationale for the Study

Fathers are at increased risk of depression and anxiety around the pre- and postnatal period (Condon et al., 2004; Goodman 2004; Matthey, Barnett, Kavanagh, & Howie, 2001). However, the exact prevalence of this is unknown (Cox, 2005). Fathers appear less likely to communicate and report their difficulties compared to mothers and some argue that anxiety and depression in fathers may manifest itself differently, such as drinking

alcohol excessively or overworking (Angst et al., 2002). Knowledge about prenatal risk and protective factors that may be related to the quality of paternal prenatal attachment may lead to opportunities for early detection of fathers at risk for parenting problems in the postnatal period.

Feelings of attachment with the fetus may be adversely affected by the mental state of the parent. For example, it may be harder for parents to develop an attachment to their unborn child if they are overwhelmed by their own psychological difficulties. In addition, rates of anxiety and depression during the antenatal period have been shown to be one of the strongest predictors for experiencing these symptoms in the postnatal period (Leigh & Morgan, 2008; Paulson & Bazemore, 2010). A logical step is to investigate the correlates of anxiety, depression, and the paternal-fetal attachment in expectant fathers.

Methodology

Design

This study design was quantitative, cross-sectional, and correlational, using non- experimental methodology. The independent variables included sociodemographic variables of the participants and their partners' pregnancy. Dependent variables included standardized measures of depression, anxiety, and paternal-fetal attachment.

Recruitment

The male participants for this study were recruited through a purposeful snowballing method via various social media websites regarding expectant fatherhood. Male participants were asked to click on an online link if they wished to take part in the survey. Filter questions were asked before completing the study to ensure the participants were male, aged over eighteen, and expectant fathers.

Ethics

Ethical approval was granted for this study from the University of Hertfordshire Health and Sciences department.

Measures/instruments

Sociodemographic and pregnancy variables were assessed during this study, including items on ethnicity, education level, employment, relationship status, relationship satisfaction, number of pregnancies,

previous contact with mental health services, planning of pregnancy, pregnancy behaviors, and previous pregnancy loss. Standardized measures used during the study included:

The Paternal Antenatal Attachment Scale (PAAS). The PAAS is a 16-item measure which can also be divided into two subscales: the quality of the attachment (eight items) and time spent in attachment mode (six items). Scores for global attachment can be obtained by adding the two subscales together as well as the two remaining items. Scores range from one to 80 with a higher score indicating a greater level of attachment (Condon, 1993). The PAAS has demonstrated good internal consistency with a Cronbach's alpha of .81 (Condon, 1993).

Edinburgh Postnatal Depression Scale (EPDS*).* The EPDS is a brief self-report questionnaire composed of 10 items scored on a four-point Likert scale (0–3), with a maximum score of 30 (Cox, Holden & Sagovsky, 1987). A cut-off score of 10 has been validated in the use with fathers (Matthey et al., 2001). Cronbach's alpha for the EPDS for men is 0.81 (Cox et al., 1987). This reliability has been replicated in other studies using the tool in relation to fathers (Edmondson, Psychogiou, Vlachos, Netsi & Ramchandani, 2010; Matthey et al., 2001).

The Generalized Anxiety Disorder (GAD-7). This measure is a brief seven item self-report questionnaire and items range from zero to three with total scores ranging from zero to 27. Scores of 10 or above indicate the probability of an anxiety disorder (Spitzer, Kroenke, Williams, & Lowe, 2006). The measure has been found to have particularly good specificity rates and accuracy of detecting anxiety within the perinatal population (Simpson, Glazer, Michalski, Steiner, & Frey, 2014). The GAD-7 measure has a sensitivity of 89% and a specificity of 82% for GAD (Kroenke, Spitzer, Williams, Monahan, & Lowe, 2007).

All questionnaires were completed online and the data downloaded via a secure server. Data was analyzed using SPSS (Version 24) for Windows. Correlations were used to identify any significant associations between the measures. A forward stepwise regression analysis was used to identify the variable within the PAAS measure.

Results

Sample

Participants included in the final analysis (N=166) were males aged between 21 and 41 years of age. Gestation of the expectant father's

partner's pregnancy ranged from five to 40 weeks. The sociodemographic variables of the sample can be found in table 1 below.

Table 1

Sociodemographic Characteristics of the Sample.

	Count (N=166)	Percentage %
Age (years) *M* (*SD*)	31.20 (4.04)	100%
First Language		
English First Language	156	94%
English not First Language	10	6%
Ethnicity		
White English/Welsh/Scottish/Northern Irish/British	125	75%
White Irish	6	4%
White gypsy or traveler	2	1%
White-Polish	11	7%
Mixed/Multiple ethnic- White and Black Caribbean	1	1%
Mixed/Multiple ethnic-White and Black African	2	1%
Mixed/Multiple ethnic- White and Asian	4	2%
Asian- British	5	3%
Asian Indian	6	4%
Asian Chinese	3	2%
Black African	1	1%
Education Level		
Postgraduate qualification	54	33%

Undergraduate qualification	77	46%
A-levels and equivalent	17	10%
GCSE/O level equivalent	5	3%
Other qualifications	7	4%
No qualification	6	4%
Employment Status		
Full-time employment (35+ hours per week)	153	92%
Part-time employment (-35 hours per week)	5	3%
Unable to work	2	1%
Full-time homemaker	2	1%
Unemployed	3	2%
Student	1	1%
Relationship status		
In a relationship with mother of child	28	17%
Married to the mother of my child	138	83%
Relationship Satisfaction		
Extremely satisfied	128	77%
Moderately satisfied	35	21%
Slightly satisfied	2	1%
Slightly dissatisfied	1	1%
Fatherhood status		
First-time father	152	92%
Second-time or again father	14	8%

Reliability Testing of Measures

Cronbach's alpha was acceptable for the PAAS (0.71). Reliability for the measures of anxiety (GAD-7) was acceptable (α =0.85) as was the measure for depression (EPDS, α =0.82).

Correlational Testing of Symptom Measures

Correlations were derived from Spearman and Pearson correlations tests. Using the standardized cut off points on the PAAS, EPDS and GAD-7. Table 2 below demonstrates very few of the sample exceeded the clinical cut-off points on the standardized measures of anxiety and depression during pregnancy.

Table 2

Symptoms measures of the Sample

	Count (n=166)	Percentage
GAD-7 *M* (*SD*)	4.45 (4.00)	100%
EPDS *M* (*SD*)	5.19 (4.13)	100%
EPDS- Risk of depression		
Low risk of depression	126	76%
High risk of depression	40	24%
GAD-7 caseness		
Normal	95	57%
Mild	55	33%
Moderate	9	5%
Severe	7	4%

Note: GAD-7 = Generalized Anxiety Disorder-7 measure, EPDS= Edinburgh Postnatal Depression Scale.

A significant positive correlation was found between anxiety and depression scores $r(166) = .697$, $p=.001$. However, no significant correlations were found amongst depression and fetal attachment scores $r(166) =-.136$, p=.80, or anxiety and fetal attachment scores, $r(166) =0.063$, $p=.418$.

A significant correlation was found between attachment levels and relationship satisfaction. However, no significant correlations were found for age, ethnicity, education, relationship status, employment status, or first-time fathers.

A significant correlation was found between the gestation of the fetus (in weeks) and fetal attachment levels. No other significant correlations were found amongst the pregnancy variables.

Regression Analysis of PAAS Scores.

The results of the regression analysis indicated that after all other variables have been entered into the regression model, relationship satisfaction and the number of weeks pregnant was the most significant model for predicting paternal-fetal attachment scores, ß= -3.319, t(4.17), $p=0.001$. The multiple correlation coefficient in this model was 57, which could explain approximately 8% of the variance of the PAAS t R2=0.179, $F(4,161) = 8.789$, $p=0.001$.

Discussion

The overall aim of this study was to analyze the correlates of anxiety and depression in expectant fathers. No significant associations were found between attachment levels and anxiety or depression levels. These findings suggest that neither anxiety nor depression were found to significantly associate or differentiate with fetal attachment scores. This finding was contrary to previous research which suggested that fetal attachment levels can be negatively influenced by depression and anxiety (Condon & Corkindale, 1997, Hart & McMahon, 2006). It is also contrary to findings that lower anxiety and depression levels are associated with higher prenatal attachment (van Bakel, Maas, Vreeswijk & Vingerhoets, 2013). There are two possible explanations for these findings.

First, only 10% of the sample scored within the moderate or severe range for anxiety and only 24% were considered at high risk of depression. This suggests the majority of participants in this sample were not within the clinical range for anxiety or depression. Therefore, the lack of association between anxiety/depression scores may be due to these variables not being clinically high and therefore not showing an association with the fetal attachment bond. The data did suggest a slight

negative correlation between depression scores and attachment levels but this was not significant at the 0.05 level. A significant amount of psychological adjustment is required during pregnancy as men prepare to become fathers. During this process, psychological effort is required and anxiety or depression can interfere with the process (Matthey, Barnett, Ungerer, & Waters, 2000). It has been shown in studies of mothers who have high levels of perinatal anxiety or depression that they tend to hold more negative cognitive biases towards their infant (Pearson, Lightman, & Evans, 2011). In this study, because symptoms of anxiety or depression were relatively low, this was not found to be significantly associated with paternal-fetal attachment levels.

Consistent with previous findings, this study showed anxiety and depression levels were significantly correlated with each other in the perinatal population (Field et al., 2003; Heron, O'Connor, Evans, Golding, & Glover, 2004; Littleton, Breitkopf, & Berenson, 2007; Meades & Ayers, 2011; Austin, Tully, & Parker, 2007). The global impact of anxiety and depression during the prenatal period has also been shown for fathers (Boyce et al., 2007; Matthey et al., 2003). The high correlation amongst anxiety and depression levels is also consistent with research outside of the pregnancy window (Kennedy, Schwab, Morris, & Beldia, 2001).

The overlap of anxiety and depression symptoms in pregnancy as found in this study has also been reported as a risk factor for postnatal depression (Heron et al., 2004). Although a significant correlation was not found in this study between anxiety and depression levels and attachment levels with the unborn child, those who did score highly on the anxiety and depression measures prenatally may be at greater risk for mental health difficulties after the baby is born. Further longitudinal studies are needed in relation to expectant fathers to substantiate this. This finding of comorbidity between anxiety and depression highlights the importance for screening fathers as well as mothers, and, also, for using separate measures as symptoms can overlap.

A significant positive correlation was found between relationship satisfaction and paternal-fetal attachment levels. This finding, however, should be treated with caution as only one question was used from the Relationship Assessment Scale (Hendrick, Dicke, & Hendrick, 1988) which is likely to have reliability and validity implications. The correlation found in this study does however appear to support previous findings which suggest that relationship satisfaction plays a significant role within the attachment relationship to the unborn child (Ahlqvist-Björkroth et al., 2016; Condon 2007; Condon et al., 2004; Condon et al., 2013). This finding also appears consistent with research that suggests expectant fathers who have conflicts in their relationships can have difficulties in developing their role as a father and have an adverse impact

on the attachment with their infant (Genesoni & Tallandini, 2009). Theoretically this is explained by the dynamics of the marital relationship and the quality of this relationship being important for the construction of the parental relationship (McHale, 1995). It follows that those with a good marital relationship are likely to be more attached to their child.

More recently, there is evidence of the biological and hormonal changes in expectant fathers (Storey et al., 2000). Moreover, these changes appear to correlate with the expectant mother's emotional states during pregnancy (Edelstein et al., 2015). These findings appear to support the positive correlation between relationship satisfaction and paternal-fetal attachment levels in this study; however, further research in this area is needed.

A significant positive correlation was found between fetal attachment levels and the gestation (weeks) of the pregnancy. This finding is consistent with previous research that attachment levels increase throughout the pregnancy (Habib & Lancaster, 2010). The increase in attachment scores appears to be explained by fathers becoming increasingly focused on their unborn child by the third trimester. This pattern is consistent with fathers' reported experiences throughout the pregnancy, which suggest ambivalence during the first trimester and the pregnancy becoming "real" as the time of birth approaches (Lemmer, 1987). Cognitively, fathers may conceptualize the fetus as becoming more human closer to the birth and hence the increase in attachment.

The results of the stepwise multiple regression analysis suggests relationship satisfaction was the strongest predicting variable in the stepwise regression model. This is consistent with previous studies that have identified this variable as key in the attachment relationship towards the unborn child (Ahlqvist-Björkroth et al., 2016; Condon et al., 2013). In this study, relationship status and length of gestation produced the statistically significant model to predict fetal attachment scores in expectant fathers, which explained 7.9% of the variance. These findings also appear consistent with research that shows attachment levels increase throughout pregnancy (Habib & Lancaster, 2010).

Additional findings.

A significant negative correlation was found between relationship satisfaction for both anxiety and depression levels. This suggested the greater the relationship satisfaction, the lower the scores on the anxiety and depression measures and vice versa. This finding is consistent with previous research, which suggests the quality of the partner relationship can have a strong influence on the psychological wellbeing of the expectant father (Condon et al., 2004).

It should be noted that this association does not indicate whether psychological distress is a consequence of poor relationship satisfaction or psychological distress contributes to poor relationship satisfaction. As this study did not include baseline measures prior to the pregnancy period, the extent of how much the pregnancy process may contribute to these variables is also unclear.

All participants in this study were either married to, or in a relationship with, the mother carrying their unborn child. There was a low number of expectant fathers scoring clinically for anxiety or depression. Research suggests marriage is associated with improved physical and mental health (Koball et al., 2010). In this regard, it could be considered that marriage, or being in a stable relationship, can act as a protective factor in terms of mental health. As the majority of fathers in this study considered themselves to be satisfied in their relationships, this may have reduced psychological symptoms. As a consequence, this did not impact on the fetal attachment and therefore no association was found. Further research is needed amongst expectant fathers who do score clinically for anxiety or depression to substantiate this assertion.

Clinical Implications

Although this study did not find an association between anxiety and depressive symptoms and the paternal-fetal attachment relationship, it did demonstrate a high correlation between anxiety and depression, suggesting that fathers who score clinically for depression are likely to score for anxiety and vice versa. This study supported findings that separate screening measures should be used to ensure that symptoms are not missed, particularly as fathers may display depression and anxiety symptoms differently than mothers.

The sample in this study who scored clinically for anxiety or depression was low. This study does, however, highlight the potential difficulties in assessing the psychological needs of fathers. Language is key when discussing mental health with men and professionals need to be aware of how commonly used terms may be interpreted differently for men as opposed to women (Stein, 2018). This study indicates that prenatal measures for psychological wellbeing and attachment can be used effectively with fathers.

Paying more attention to fathers' mental health in the transition to parenthood is likely to benefit the men, their partners, and their infants.

This study also indicates that, if fathers are to contribute to preventing adverse outcomes for their pregnant partner, their own psychological and relationship difficulties should be recognized and their needs met. The findings regarding the interface between prenatal

attachment and quality of partner relationship highlights the need to identify and intervene prenatally for expectant fathers. Expectant fathers need to be asked about their mental health.

The findings of this study suggest that relationship satisfaction amongst expectant fathers may be an important area to investigate further with regard to fetal attachment levels with their unborn child. It may be helpful for prenatal and perinatal services to consider relationship concord when working with mothers and fathers as it may be a potential complication in forming the most optimal fetal attachment relationship possible.

Limitations of the study

First, it is noted that the majority of the data analysis in this study was correlational. This type of data can only demonstrate associations between the variables and it would be dubious to suggest causation. The significant correlation found between relationship satisfaction and paternal-fetal attachment is also limited. This was measured using a single question taken from the full RAS measure (Hendrick et al., 1988), which has implication in terms of the reliability and validity of this finding.

Second, it is acknowledged that the current data sample collected may not be truly representative as participation was voluntary, which may have led to a selection bias. Overall the participants in this study were a fairly homogenous group of white, well-educated, and employed individuals. Nevertheless, because the sample was fairly homogenous, this enabled a solid comparison amongst the variables.

The cut-off scores for anxiety and depression only indicate the likelihood of a psychological disorder. The use of the categorical terms "depression" and "anxiety," when only levels of depression, anxiety, and attachment were measured in this study, is a limitation.

Third, this study used self-report measures which assumed expectant fathers would report their "true" feelings. As highlighted by Condon, Corkindale, and Boyce (2008), reporting negative feelings towards an unborn child is less socially acceptable than positive ones and therefore some fathers may have withheld negative feelings. Inspections of the frequency distribution of the anxiety, depression, and attachment scores were primarily normally distributed, suggesting the scores were representative for those who took part.

Strengths of the Study

A common criticism of research carried out with fathers is that it relies on the mother's accounts of the father's intentions in a by-proxy

method (Bronte-Tinkew, Ryan, Carrano, & Moore, 2007). This research was targeted specifically at fathers and they were evaluated in their own right, therefore providing a shift in the research focus within the perinatal population.

This study used a community sample who had homogenous socio-economic status. Whilst this can be a difficulty in terms of overall generalizability, it does allow for good comparisons in the results.

This study was prospective in design. Previous research with fathers have collected data of their pregnancy experience retrospectively (Hjelmstedt, Widström, Wramsby & Collins, 2003). Hindsight is likely to influence results.

Suggestions for Further Research

In this study measures were only taken at one point in time for fathers during their partners' pregnancy. Administering the questionnaires at different points during the pregnancy may yield greater insight into the development of attachment throughout the pregnancy and to what extent anxiety and depressive symptoms impact at critical points.

Although mental health difficulties may impact some father's prenatal attachment, this study suggests their ability to form attachments in general (i.e. to their partner) may be a greater risk factor than mental health. The findings of this study appear to suggest there are important factors within an expectant couple's relationship which may impact on the paternal- fetal attachment. In order to gain a holistic understanding of all the biopsychosocial contributions towards the paternal-fetal attachment, future research needs to incorporate hormonal and psychophysiological measures.

Measures of the parents own attachment patterns would also be a valuable addition to future research. This would provide insight into which attachment patterns in fathers are associated with higher or lower attachment levels with their unborn infants. Theoretically, if an individual experiences difficulty with attachment and forming relationships based on their attachment to their parents, this is likely to continue with their later spouses and later again if they go on to have children (Farnfield, 2008). Further longitudinal research using the full RAS measure, a prenatal attachment measure, and an adult attachment measure such as the Adult Attachment Interview (George, Kaplan & Main, 1985) would allow for analysis of all three of these relationship patterns to be compared alongside each other. This type of study would provide an insight into what extent these past and present attachment relationships may have on the future attachment towards the unborn child.

Conclusion

Anxiety and depression levels were not found to significantly correlate with fetal attachment levels, however they were significantly correlated to each other suggesting that if an expectant father has symptoms of anxiety, he may also be likely to have symptoms of depression. This research indicated that, as the pregnancy progresses, the fetal attachment relationship grew stronger in expectant fathers. Relationship satisfaction was also found to be significantly associated with paternal-fetal attachment levels, suggesting that fathers who are more satisfied with their relationship have a higher fetal attachment with their unborn child.

Given that relationship satisfaction was significant in terms of attachment, and anxiety and depression levels, the relationship between a pregnant mothers and her partner appears important. By antenatal services addressing potential psychological difficulties with fathers during the prenatal period, this may not only improve outcomes for expectant fathers, but also for pregnant mothers and their unborn infants.

References

Ahlqvist-Björkroth, S., Korja, R., Junttila, N., Savonlahti, E., Pajulo, M., Räihä, H., & Aromaa, M. (2016). Mothers and fathers' prenatal representations in relation to marital distress and depressive symptoms. *Infant Mental Health Journal*, *37*(4), 388-400.

Angst, J., Gamma, A., Gastpar, M., Lépine, J.P., Mendlewicz, J., & Tylee, A. (2002). Gender differences in depression. *European Archives of Psychiatry and Clinical Neuroscience*, *252*(5), 201-209.

Austin, M. P., Tully, L., & Parker, G. (2007). Examining the relationship between antenatal anxiety and postnatal depression. *Journal of Affective Disorders*, *101*(1), 169-174.

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.

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.

Bronte-Tinkew, J., Ryan, S., Carrano, J., & Moore, K.A. (2007). Resident fathers' pregnancy intentions, prenatal behaviors, and links to involvement with infants. *Journal of Marriage and Family*, *69*(4), 977-990.

Chapman, H.A., Hobfoll, S.E., & Ritter, C. (1997). Partners' stress underestimations lead to women's distress: A study of pregnant inner-city women. *Journal of Personality and Social Psychology*, *73*(2), 418.

Condon, J.T. (1993). The assessment of antenatal emotional attachment: development of a questionnaire instrument. *Psychology and Psychotherapy: Theory, Research and Practice*, *66*(2), 167-183.

Condon, J.T., & Corkindale, C. (1997). The correlates of antenatal attachment in pregnant women. *Psychology and Psychotherapy: Theory, Research and Practice*, *70*(4), 359-372.

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.

Condon, J.T., Corkindale, C.J., & Boyce, P. (2008). Assessment of postnatal paternal–infant attachment: development of a questionnaire instrument. *Journal of Reproductive and Infant Psychology*, *26*(3), 195-210.

Condon, J.T., Corkindale, C., Boyce, P., & Gamble, E. (2013). A longitudinal study of father-to-infant attachment: antecedents and correlates. *Journal of Reproductive and Infant Psychology*, *31*(1), 15-30.

Condon, J.T., & Esuvaranathan, V. (1990). The influence of parity on the experience of pregnancy: a comparison of first- and second-time expectant couples. *British Journal of Medical Psychology, 63*(4), 369–377.

Cowan, C.P., Cowan, P.A., Heming, G., & Miller, N. (1991). Becoming a family: marriage, parenting and child development. In P.A. Cowan & E.M. Hetherington (Eds.), *Family Transitions: Advances in Family Research (p.*79-109). Hillsdale, New Jersey: Lawrence Erlbaum.

Cox J. (2005). Postnatal depression in fathers. *Lancet. 29*, 248-54.

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.

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), 365-368.

Edelstein, R.S., Wardecker, B.M., Chopik, W.J., Moors, A.C., Shipman, E.L., & Lin, N.J. (2015). Prenatal hormones in first-time expectant parents: Longitudinal changes and within-couple correlations. *American Journal of Human Biology*, *27*(3), 317-325.

Farnfeld, S. (2008). A theoretical model for the comprehensive assessment of parenting. *The British Journal of Social Work, 28*(6), 1076-1099.

Field, T., Diego, M., Hernandez-Reif, M., Schanberg, S., Kuhn, C., Yando, R., & Bendell, D. (2003). Pregnancy anxiety and comorbid depression and anger: Effects on the fetus and neonate. *Depression and anxiety*, *17*(3), 140-151.

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.

Finnbogadóttir, H., Svalenius, E.C., & Persson, E.K. (2003). Expectant first-time fathers' experiences of pregnancy. *Midwifery*, *19*(2), 96-105.

Fonagy, P., Steele, M., Steele, H., Moran, G.S., & Higgitt, A.C. (1991). The capacity for understanding mental states: The reflective self in parent and child and its significance for security of attachment. *Infant Mental Health Journal*, *12*(3), 201-218.

Genesoni, L., & Tallandini, M.A. (2009). Men's psychological transition to fatherhood: an analysis of the literature, 1989–2008. *Birth*, *36*(4), 305-318.

George, C., Kaplan, N., & Main, M. (1985). Adult attachment interview. (Unpublished manuscript, University of California, Department of Psychology, Berkeley)

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.

Habib, C., & Lancaster, S. (2006). The transition to fatherhood: Identity and bonding in early pregnancy. *Fathering*, *4*(3), 235-253.

Habib, C., & Lancaster, S. (2010). Changes in identity and paternal–foetal attachment across a first pregnancy. *Journal of Reproductive and Infant Psychology*, *28*(2), 128-142.

Hart, R., & McMahon, C.A. (2006). Mood state and psychological adjustment to pregnancy. *Archives of Women's Mental Health 9*(6), 329-337.

Hendrick, S.S., Dicke, A., & Hendrick, C. (1998). The relationship assessment scale. *Journal of Social and Personal Relationships*, *15*(1), 137-142.

Heron, J., O'Connor, T.G., Evans, J., Golding, J., & Glover, V. (2004). The course of anxiety and depression through pregnancy and the postpartum in a community sample. *Journal of Affective Disorders*, *80*(1), 65-73.

Hjelmstedt, A., Widström, A. M., Wramsby, H., & Collins, A. (2003). Patterns of emotional responses to pregnancy, experience of pregnancy and attitudes to parenthood among IVF couples: a longitudinal study. *Journal of Psychosomatic Obstetrics & Gynecology*, *24*(3), 153-162.

Kennedy, B.L., Schwab, J.J., Morris, R.L., & Beldia, G. (2001). Assessment of state and trait anxiety in subjects with anxiety and depressive disorders. *Psychiatric Quarterly*, *72*(3), 263-276.

Koball, H.L., Moiduddin, E., Henderson, J., Goesling, B., & Besculides, M. (2010). What Do We Know about the Link between Marriage and Health?. *Journal of Family Issues*, *31*(8), 1019-1040.

Kroenke, K., Spitzer, R.L., Williams, J.B., Monahan, P.O., & Löwe, B. (2007). Anxiety disorders in primary care: prevalence, impairment, comorbidity, and detection. *Annals of Internal Medicine*, *146*(5), 317-325.

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.

Leigh, B., & Milgrom, J. (2008). Risk factors for antenatal depression, postnatal depression and parenting stress. *BMC psychiatry*, *8*(1), 24-35

Lemmer, C. (1987). Becoming a father: a review of nursing research on expectant fatherhood. *Maternal-child nursing Journal*, *16*(3), 261-275.

Littleton, H.L., Breitkopf, C.R., & Berenson, A.B. (2007). Correlates of anxiety symptoms during pregnancy and association with perinatal outcomes: a meta-analysis. *American Journal of Obstetrics & Gynecology*, *196*(5), 424-432.

Matthey, S., Barnett, B., Howie, P., & Kavanagh, D. J. (2003). Diagnosing postpartum depression in mothers and fathers: whatever happened to anxiety? *Journal of affective disorders*, *74*(2), 139-147.

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), 175-184.

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.

McHale, J.P. (1995). Coparenting and triadic interactions during infancy: The roles of marital distress and child gender. *Developmental Psychology*, *31*(6), 985-996.

Meades, R., & Ayers, S. (2011). Anxiety measures validated in perinatal populations: a systematic review. *Journal of Affective Disorders*, *133*(1), 1-15.

Paulson, J.F., & Bazemore, S.D. (2010). Prenatal and postpartum depression in fathers and mothers. *JAMA*, *304*(9), 961-962.

Pearson, R M., Lightman, S.L., & Evans, J. (2011). Attentional processing of infant emotion during late pregnancy and mother-infant relations after birth. *Archives of Women's Mental Health, 14*(1), 23-31.

Poh, H.L., Koh, S.S.L., Seow, H.C.L., & He, H.G. (2014). First-time fathers' experiences and needs during pregnancy and childbirth: a descriptive qualitative study. *Midwifery*, *30*(6), 779-787.

Ramchandani, P.G., Stein, A., O'connor, T.G., Heron, J.O.N., Murray, L., & Evans, J. (2008). Depression in men in the postnatal period and later child psychopathology: a population cohort study. *Journal of the American Academy of Child & Adolescent Psychiatry*, *47*(4), 390-398.

Ramchandani, P., Stein, A., Evans, J., O'Connor, T.G., & ALSPAC Study Team. (2005). Paternal depression in the postnatal period and child development: a prospective population study. *The Lancet*, *365*(9478), 2201-2205.

Scott, J.A., Landers, M.C.G., Hughes, R.M., & Binns, C.W. (2001). Factors associated with breastfeeding at discharge and duration of breastfeeding. *Journal of paediatrics and child health*, *37*(3), 254-261.

Simpson, W., Glazer, M., Michalski, N., Steiner, M., & Frey, B.N. (2014). Comparative efficacy of the generalized anxiety disorder 7-item scale and the Edinburgh Postnatal Depression Scale as screening tools for generalized anxiety disorder in pregnancy and the postpartum period. *The Canadian Journal of Psychiatry*, *59*(8), 434-440.

Spitzer, R.L., Kroenke, K., Williams, J.B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of internal medicine*, *166*(10), 1092-1097.

Stein, C. (2018). Mind your language. How men talk about Mental Health. *Mens Health Forum*. Accessed on 21.05.2018 available from https://www.menshealthforum.org.uk/mind-your-language-how-men-talk-about-mental-health

Storey, A.E., Walsh, C.J., Quinton, R.L., & Wynne-Edwards, K.E. (2000). Hormonal correlates of paternal responsiveness in new and expectant fathers. *Evolution and Human Behavior*, *21*(2), 79-95.

van Bakel, H.J., Maas, A.J.B., Vreeswijk, C.M., & Vingerhoets, A.J. (2013). Pictorial representation of attachment: measuring the parent-fetus relationship in expectant mothers and fathers. *BMC pregnancy and childbirth*, *13*(1), 138-147.

Wee, K.Y., Skouteris, H., Pier, C., Richardson, B., & Milgrom, J. (2011). Correlates of ante-and postnatal depression in fathers: a systematic review. *Journal of Affective Disorders*, *130*(3), 358-377.

Zelkowitz, P., & Milet, T. H. (1997). Stress and support as related to postpartum paternal mental health and perceptions of the infant. *Infant Mental Health Journal: Official Publication of The World Association for Infant Mental Health*, *18*(4), 424-435.