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The effect of postnatal symptoms of post-traumatic stress and depression on the couple's relationship and parent-baby bond.

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ABSTRACT

Objectives: Research has shown that between 1 and 3% of women may suffer from post-traumatic stress disorder (PTSD) following childbirth. However, the potential effect of childbirth on fathers, and the implications of postnatal symptoms of PTSD for family relationships have received little attention. The current study therefore examined the potential effects of PTSD symptoms on the couple's relationship and parent-baby bond. **Design:** Internet based questionnaire study. **Methods:** One hundred and fifty two parents (126 women and 26 men) completed questionnaire measures of PTSD, depression, quality of the couple's relationship, and the parent-baby bond. **Results:** Symptoms of PTSD and depression were significantly correlated with the couples' relationship and parent-baby bond. Structural equation modelling found the model that best fitted the data was one where PTSD symptoms had a direct effect on the parent-baby bond, but the effect of PTSD on the couples' relationship was mediated by depression. **Conclusions:** The results indicate the importance of examining men and women's psychological reactions after birth; and suggest symptoms of PTSD have an effect on the parent-baby bond. However, methodological considerations mean further research is needed to replicate and extend this study before firm conclusions can be drawn.

INTRODUCTION

Childbirth is a complex experience, associated with a range of major changes for the couple, both positive and negative. Childbirth is also associated with increased vulnerability for maternal mental illness, such as postnatal depression. Recently childbirth has also been associated with PTSD (see Olde et al., 2006, for a review). Prevalence research suggests as many as one in three women giving birth may appraise their birth experience as traumatic (Creedy et al., 2000; Czarnocka & Slade, 2000; Soet et al., 2003), while Ryding et al. (1997) found stress related symptoms among 50% of women after emergency caesarean section. However, research indicates that only between 1 and 3% of women develop symptoms that fulfil diagnostic criteria for PTSD (e.g. Ayers, 2004; Olde et al., 2006).

Few studies have considered fathers' psychological reactions to witnessing the birth. Skari et al. (2002) found clinically psychological distress in 37% of mothers ($n = 127$) and 13% of fathers ($n = 122$) within the first days after the birth, with acute severe stress symptoms in 9% of women and 2 % of men, reducing to 2 % for both genders six months after birth. Ayers et al. (2007) surveyed 64 couples and found that 5% of men and women reported severe symptoms of PTSD. This is in contrast to evidence from general trauma literature, which shows that women are approximately twice as likely to develop PTSD as men (Breslau et al., 1997). Similar gender ratios have been found in depression research (e.g. Ramchandani et al., 2005). Depression studies have also indicated that men have a significantly higher risk of being depressed if their spouse was (Areias et al., 1996). High co-morbidity rates of PTSD with depression have been found after birth (Czarnocka & Slade, 2000; White et al., 2006). In a group of trauma survivors recruited from a hospital emergency department, Shalev et al. (1998) also discovered that co-morbidity of PTSD and depression was associated with greater severity of symptoms and lower levels of functioning.

Research into PTSD following childbirth suggests a large range of potential contributing prenatal, perinatal and postnatal risk factors in the development of PTSD. These include pre-existing psychological problems (Wijma et al., 1997), previous sexual abuse (Soet et al., 2003), invasive obstetric procedures, such as emergency caesarean (Ryding et al., 1997, Ryding et al., 1998; Menage, 1993), and feelings of lack of support during labour (Creedy et al., 2000), or in the postnatal period (Czarnocka & Slade, 2000).

Several longitudinal studies regarding the transition to parenthood have found a reduction in a couple's relationship satisfaction in the months following childbirth (e.g. Belsky et al., 1985; Cowan & Cowan, 1985, 1988, 2002; Levy-Shiff, 1994). Findings also indicate that the quality of marital relationship is associated with the parent-child relationship (e.g. Belsky, 1984; Erel & Burman, 1995; Levy-Shiff, 1994; Owen & Cox, 1997). There are a number of different measures of the quality and type of relationship between the parent and child. Parent-baby relationship is a broad term that can include both parent and infant measures of the relationship. More specifically, parent-baby bond denotes the emotional bond that the parent develops for the infant. This is usually measured by self-report questionnaire completed by the parent. Attachment denotes the bond the infant develops for the parent. This is usually measured using observation of the 'strange situation' in a laboratory. Bowlby's attachment theory emphasised the importance of early infant attachment for the child's continuous development and mental health. Deficient attachment patterns have also been shown to potentially have cross-generational negative effects on both the parent-child interaction and marital relationship (Cowan et al., 1996).

Currently there is limited evidence regarding the specific effects of PTSD following childbirth on the couple's relationship and the parent-baby relationship. Case studies suggest particular consequences of PTSD on the couple's relationship, such as sexual avoidance (Fones, 1996). Qualitative studies also suggest PTSD has strong effects on the couple's relationship and parent-baby bond (Allen, 1998; Ayers et al., 2006). These studies suggest that women may either have avoidant/rejecting or over-anxious/protective bond with their infants. However, Ayers et al. (2007) surveyed couples nine weeks after birth and found that PTSD symptoms were not associated with the couple's relationship or parent-baby bond. They discuss a number of possible explanations for this, including that they used a basic self-report measure of parent-baby bond that examined six behavioral aspects of parenting and did not include emotional aspects.

In contrast, research into PTSD in other populations provides evidence of possible effects on the marital and parent-baby relationships. For example, Carroll et al. (1985) found that a group of Vietnam veterans diagnosed with PTSD reported significantly more relationship problems than a group of veterans without PTSD. Caselli and Motta (1995) showed that PTSD in war veterans accounted for 51.8 % of the variance in their marital adjustment, and 33.6% of this sample perceived behaviour problems in their children. Interestingly, Samper et al. (2004) found that particular dimensions of PTSD (emotional numbing and avoidance) were significantly associated with poor parenting satisfaction in war veterans, but not the hyperarousal dimension. This research suggests that PTSD following childbirth will also affect the marital and parent-baby relationships, although research with war veterans includes children of a wide age range where the parent is likely to have chronic PTSD so results may differ to couples with a young infant.

Further indirect evidence that PTSD following childbirth might affect family relationships comes from other postpartum conditions. For example, Wenzel et al. (2005) found that postpartum psychopathology (e.g. depression, social anxiety) in women was associated with lower levels of relationship satisfaction. Other studies have highlighted the effects of postpartum psychiatric morbidity on the marital relationship and family functioning, also from the father's point of view. For example, Zerkowicz and Milet (1996) found a higher prevalence of psychiatric disorder and less marital satisfaction in a group of men, whose partners suffered from postpartum psychiatric disorders, compared to a control group of men with unaffected partners.

There is also a host of evidence that postnatal depression in women affects parenting behaviour and mother-baby interaction. For example, Field et al. (1990) found evidence of impaired communication between women with depression and their infants, with less synchrony, reciprocity and decreased emotional involvement and responsiveness from the mother. Murray (1992) found that 18 month-old infants of women with postnatal depression showed signs of being more insecurely attached, had more mild behavioural problems, and performed worse on an object recognition task, compared to a control group of infants with non-affected mothers. A recent review of postpartum psychiatric disorders concluded that disturbances of the mother-baby relationship were evident in 10-25% of women with disorders, such as depression (Brockington, 2004).

In summary there is evidence that suggests PTSD symptoms following childbirth may have negative effects on the couple's relationship and parent-baby relationship. However, to date the only quantitative study to explore these consequences in mothers and fathers has been inconsistent with other childbirth and general literature (Ayers et al., 2007), although this may be due to differences of

measurement. There is therefore a need for research to examine this in more detail; particularly the effects of depression and PTSD on family relationships, using more detailed measures of parent-baby bond.

The main aim of the current study was therefore to explore the association between symptoms of PTSD, depression, the couple's relationship and parent-baby bond. Additionally the study aimed to investigate PTSD symptoms in fathers, as well as in mothers. On the basis of all the research reported above, it was predicted that (1) high levels of PTSD and depression symptoms would be associated with poorer quality of the couple's relationship and parent-baby bond; (2) that high levels of PTSD symptoms would be associated with high levels of depression symptoms; (3) that low quality of the couple's relationship would be associated with low quality of the parent-baby bond; (4) that a proportion of fathers and mothers would present with symptoms of PTSD, with women expected to report higher levels of symptoms than men.

METHOD

Design

This was an Internet-based questionnaire study examining the association between symptoms of PTSD, depression, the quality of the couple's relationship, and the parent-baby bond in men and women after childbirth.

Sample

A convenience sample of 126 women aged between 19 and 45 years ($M = 30.92$ years, $SD = 4.8$) and 26 men, aged between 22 and 54 years ($M = 32.58$, $SD = 6.84$) recruited via the Internet. Inclusion criteria were that the participants were over 18 years old, English speaking, that the babies were between 1 month and 24 months old, for men, that they attended the birth. The mean age of the sample's babies was 10.76 months ($SD = 6.62$, median = 10).

Internet recruitment was used to over-sample people with symptoms of depression and PTSD, through targeting websites such as the Birth Trauma Association (www.birthtraumaassociation.org.uk), in order to collect data with a range of scores on affective measures. A review of data from Internet-based studies suggests data are generally stable across presentation formats, no more likely than other methods to be adversely affected by repeat or non-serious responders, and give responses that are consistent with more traditional methods of data collection (Gosling, Vazire, Srivastava, & John, 2004).

Measures

Demographic and obstetric data of gender, age, education, ethnic group, education marital status, parity and mode of delivery were collected. Additionally three single-items measured participants' fulfilment of expectations ("Overall, what was the labour and birth like, compared to your expectations?"), control ("Overall, how much control did you feel that you and your partner had in labour and birth?"), and satisfaction ("Overall, how do you rate your birth experience?"). Responses were rated on a 5-point continuous scale from 0 to 4 with higher ratings indicating a better experience (e.g. 0 = very dissatisfying, 4 = very satisfying).

PTSD symptoms were measured using the Posttraumatic Stress Diagnostic Scale (PDS; Foa, 1995), which follows DSM-IV criteria for PTSD (American Psychiatric Association, 1994) and provides both a measure of diagnostic cases and

symptom severity. Symptoms are measured using 17 self-report items (5 intrusion, 7 avoidance and 5 arousal items), which are scored on a 4-point scale and total scores range from 0 – 51. Diagnostic criteria are met if participants indicate perception of life threat or physical injury, response of helplessness or horror, and report at least 6 symptoms, with a minimum of one intrusion, three avoidance and two arousal symptoms. Symptoms also have to have continued for at least one month and cause distress and disability. The PDS has been shown to have satisfactory test-retest reliability ($r = 0.83$), internal consistency (0.92) and convergent validity (0.65), with a sensitivity of 0.89 and specificity of 0.75 (Foa et al., 1997). For this study the scale was modified so that all symptoms were reported in relation to childbirth (i.e. the words ‘traumatic event’ were replaced with ‘birth’). The PDS also measures the extent to which symptoms interfere with life and history of previous traumatic events.

Symptoms of depression were measured using the Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987). This consists of 10 items, rated from 0-3, and has a total range of 0 – 30. High scores indicate more depressive symptoms. This study used a cut-off score of ≥ 12 as a definition for postpartum depression, based on recommendations by Cox et al. (Cox et al., 1987). The EPDS is a widely used screening measure of postnatal depression with a sensitivity of 86%, specificity of 78 % and high standardised α (0.87) and split-half reliability (0.88) (Cox et al., 1987).

Quality of the couple’s relationship was measured using the Dyadic Adjustment Scale (DAS; Spanier, 1976). This is a 32-item scale with four sub-scales. The dyadic consensus subscale includes 13 items, such as agreement on decisions, activities and views (range 0 to 65). The satisfaction scale consists of 10 items, such as ‘do you confide in your partner’ (range 0 to 50). The cohesion scale includes 5 items, such as ‘do you engage in outside interests together?’ (range 0 to 24) and the Affection Expression scale consists of 4 items, such as sex relations (range 0 to 12). The range of the total score is 0 - 151, with higher scores indicating better relationship adjustment.

Parent-baby bond was measured using the Postpartum Bonding Questionnaire (PBQ; Brockington et al., 2001), which is a screening instrument for parent-infant bonding disorders. It consists of 25 items, rated on a 6-point Likert scale (0 – 5) with high scores indicating more pathological parent-baby bond. There are four subscales: Impaired bonding consists of 12 items, (range 0 to 60, cut-off ≥ 12); Rejection and Anger consists of 7 items (range 0 – 35, cut-off ≥ 13); Infant focused anxiety consists of four items (range 0 – 20, cut-off ≥ 10); and Incipient abuse is addressed by two items (range 0 – 10, cut-off ≥ 2). Total score ranges from 0 to 125. Compared to the Birmingham Interview for Maternal Mental Health, the four subscales showed moderate sensitivity (1.0, 0.89, 0.56 and 0.28 respectively) and high specificity (0.85, 1.0, 0.96 and 1.0 respectively) for mother-infant bonding disorders. Test –retest reliability was 0.95, 0.95, 0.93 and 0.77 for the four subscales (Brockington et al., 2006; Brockington et al., 2001).

Procedure

Ethical approval was obtained then questionnaires were put on the Internet for 10 months between July 2005 and May 2006. Participants completed the questionnaires via the Internet. Prior to completing the questionnaires, participants were given information about the study and asked to indicate informed consent. After completing the questionnaires a short debriefing statement was included. Participants were recruited via local organisations (e.g. mother and toddler groups; university staff email lists), and websites of the following birth related organisations: The Birth

Trauma association, Birth crisis, Meet-a-mum Association, Baby Centre, Mum's net, UK parents, Men's Health, Families Online, Family magazine, Father's direct and UK birth research network. Internet adverts and flyers to local organisations asked for participants for a study looking at the potential effects of a traumatic birth experience on women, their partners, and babies.

Analysis

A range of descriptive and inferential statistics (SPSS: version 11.5) were used to measure and compare men and women's levels of PTSD and depressive symptoms, couples relationship and parent-baby bond and to explore the association between these. The data screening for normality variables, examining skewness, histograms, normality plots and using Kolmogorov – Smirnov (K-S) test revealed that the majority of the variables were significantly skewed. Therefore non-parametric statistical tests were used where possible.

Mann-Whitney U-tests were conducted to investigate the differences between men and women as well as differences between participants with and without PTSD. Chi square analyses were also applied to compare categorical variables, e.g. whether participants with PTSD and non-PTSD cases differed regarding interferences with areas of their daily life (e.g. work). Associations between continuous variables (i.e. test scores) were examined by using Spearman's (ρ) rank order correlation test. Finally, structural equation modelling was used on transformed data to model the relationships between PTSD, depression, dyadic adjustment and postpartum bonding.

RESULTS

Results are reported in four sections: the first section presents demographic and obstetric variables; the second section reports descriptive statistics for the main variables and examines gender differences. The third section presents prevalence rates of PTSD, depression, and bonding impairments. Finally, the fourth section reports findings related to the main aim of the study i.e. the associations between postnatal psychopathology, the couple's relationship and parent-baby bond.

Demographic and Obstetric Variables

Table 1 shows demographic characteristics of the sample. It can be seen that the majority of the participants were Caucasian and were living with their partner. The sample appears to be broadly representative of the UK childbearing population (www.statistics.gov.uk).

Table 2 summarises obstetric information and subjective perceptions of birth. Compared to UK norms, this sample reported higher rates of induction of labour, assisted delivery, and emergency caesarean section (NHS maternity statistics 2003-4). Subjective perceptions of birth are also negative with the majority of the sample rating their experience of birth as worse than expected and involving no control. There were no significant differences between men and women on any subjective perceptions of birth.

- Insert Tables 1 and 2 about here -

PTSD, Depression, Couples' Relationships and Parent-Baby bond.

Descriptive statistics for main study variables are given in Table 3 along with norms where available. As would be expected from our sampling strategy, this sample had more symptoms of PTSD and depression than samples in previous studies. As hypothesised, women reported significantly more symptoms of PTSD and depression

than men, but did not differ on ratings of the couple's relationship or parent-baby bond.

- Insert Table 3 about here –

Prevalence of PTSD, Depression and Impaired Bonding

Prevalence of PTSD, depression, and co-morbid PTSD and depression are given in Table 4, along with the proportion of people in each diagnostic category who reported impaired bonding with their baby. Using recommended cut-offs the following four categories were identified: participants with no diagnosis ($n = 93$, 61.2%), participants with PTSD only ($n = 8$, 5.3%), participants with depression only ($n = 28$, 18.4%) and participants with PTSD and depression ($n = 23$, 15.1%). There was a large amount of co-morbidity of PTSD and depression, with 74.2 % of participants with PTSD also suffering from depression. Thirty-five people (23%) met the criteria for some type of bonding disorder on one or more of the four subscales of the PBQ.

- Insert Table 4 about here –

Analysis of differences between participants with PTSD ($n = 31$) and without PTSD ($n = 121$) is given in Table 5. It can be seen that participants with PTSD differed to participants without PTSD on the majority of birth variables, such as higher rates of induction of labour, emergency caesarean, assisted labour, lower satisfaction, less control and ratings of birth as worse than expected. Participants with PTSD also reported significantly more symptoms of depression, a poorer relationship with their infant, and more interference of symptoms of PTSD with their life, i.e. household chores, relationships with friends, sex life, family relationships, general life satisfaction and functioning ($\chi^2 = 4.67$ to 19.88 , $p < .05$). However, there were no differences between participants with and without PTSD on previous trauma history ($U = 1586.50$, $p = .207$).

- Insert Table 5 about here –

Associations between Psychopathology, Couples' Relationships, and Parent-Baby Bond

This section addresses the main aim of the study, which was to look at the association between birth, psychopathology, the couple's relationship, and the parent-baby bond. Correlations between the main variables are summarised in Table 6 and it can be seen that, as hypothesised, PTSD and depression are significantly correlated with each other, are associated with the couple's relationship and parent-baby bond, and a poor relationship is associated with a lower quality parent baby bond. Age of the baby (i.e. time since birth) was not correlated with symptoms of depression or PTSD.

- Insert Table 6 about here -

Structural equation modelling was used to explore the best model of the relationships between symptoms of PTSD, depression, the couple's relationship and the parent-baby bond. First, a just identified model including all pathways was run and the Wald test examined to see if dropping parameters would improve the model. This suggested two pathways could be dropped without significantly affecting the model: (i) the path from PTSD to the couple's relationship; and (ii) the path from the couples relationship to the parent-baby bond. Two further models were therefore run with path (i) removed; then paths (ii) and (ii) removed. Fit indices suggested the model

shown in Figure 1 provided the best fit of the data (Model fit: $\chi^2 = 0.795$, df 1, $p = .372$; comparative fit index (CFI) = 1.00; root mean-square error of approximation (RMSEA) = .000; standardized mean square residual (RMR) = .017).

This model suggests that PTSD has a direct effect on the parent-baby bond but not on the couple's relationship. However, PTSD is strongly associated with depression which is significantly associated with a poorer relationship. Hence this model suggests that the parent-baby bond is most strongly associated with PTSD symptoms whereas the couples' relationship is most strongly associated with symptoms of depression. However, it is worth noting that the strength of the association between PTSD and the parent-baby bond on the one hand, and depression and the parent-baby bond on the other hand are very similar and are small effects. The largest effects in the model are the association between PTSD and depression; and between depression and the couples' relationship. Overall, symptoms of PTSD, depression, and the quality of the couple's relationship accounted for 16.6 % of the total variance of the parent-baby bond and, as the error terms indicate, a large proportion of the variance is not accounted for in this model.

- Insert Figure 1 about here -

DISCUSSION

The results of this study demonstrate that a proportion of both mothers and fathers report symptoms of PTSD, with 22 percent of the women and 12 percent of the men in this sample fulfilling diagnostic criteria for PTSD. Additionally, 38 percent of women and 12 percent of men suffered from depression. As expected, there were significantly higher levels of PTSD and depression among women than men. The present data also suggested that 74 % of people with PTSD following birth also suffer from depression. The main findings suggest symptoms of PTSD are associated with a poorer parent-baby bond; and symptoms of depression are associated with poorer quality of the couple's relationship. The following discussion addresses these findings in relation to previous research, methodological limitations and implications for future research.

PTSD and Depression in Mothers and Fathers

The results of this study confirm findings from previous studies that a proportion of women develop PTSD after childbirth. Additionally the present study suggests a proportion of men also fulfil the criteria for PTSD following childbirth. The rates of PTSD and depression were considerably higher in this study than the 1 to 3 % of PTSD and 10 to 15% of maternal depression reported in previous research (Ayers & Pickering, 2001; O'Hara & Swain, 1996; Wijma et al., 1997). This higher proportion of people with PTSD and depression in the current study is undoubtedly due to the sampling strategy, which aimed to recruit more people who had experienced a difficult or traumatic birth in order to ensure adequate variance in symptoms of depression and PTSD to make analysis meaningful. It is also possible that prevalence rates are inflated by the use of questionnaire measures. Questionnaire measures can produce a higher false-positive rate than clinical interviews, which are considered the gold standard for establishing prevalence of diagnostic disorders. From this study we can therefore conclude only that men and women report severe symptoms of PTSD or depression that suggest presence of diagnostic disorder. Establishing the exact prevalence rates of this requires clinical interviews in a representative sample.

The finding that women had higher levels of PTSD and depression than men is consistent with epidemiological research showing women are up to twice as likely to report PTSD and depression (Breslau et al., 1997; Ramchandani et al., 2005). High rates of co-morbidity between PTSD and depression are also comparable to previous epidemiological studies (Kessler et al., 1995) and childbirth studies (Czarnocka & Slade, 2000).

Effects of PTSD and Depression on the Couple's Relationship & Parent-baby Bond

A key finding of this study is that symptoms of PTSD have a direct effect on the parent-baby bond, but the effect of PTSD on the couple's relationship is mediated by symptoms of depression. The association between PTSD and the parent-baby bond is consistent with previous research into trauma in other groups. For example, Samper et al.'s (2004) findings among war veterans with PTSD showed that certain dimensions of PTSD (emotional numbing and avoidance) were significantly associated with poor parenting satisfaction. This suggests that certain PTSD profiles are associated with parenting problems. The results are also consistent with PTSD case studies, such as Ballard, et al. (1995) who report mother-infant attachment problems in two of four cases of mothers with PTSD.

Although PTSD was the only variable in the model to have a significant effect on the parent baby bond the effect size was small (.20) and depression had a similar, but nonsignificant, effect on the parent-baby bond (.18). It is therefore hard to draw any firm conclusions about which symptoms have the stronger influence on the parent-baby bond. Separating out the influence of depression and PTSD on the parent-baby bond is complicated because of the high level of comorbidity between the two disorders. As the present study indicated, participants with co-morbid PTSD and depression reported the most severe difficulties in the parent-baby bond and couple's relationship. This is consistent with studies in other samples. For example Shalev et al.'s (1998) found that co-morbidity of PTSD and depression was associated with greater severity of symptoms and lower levels of functioning. This could indicate that while PTSD is the main contributor to difficulties in parent-baby bonding, these problems are exaggerated when the person also suffers from co-morbid depression. However, given the similar effect sizes for determinants of the parent-baby bond in this study, we suggest future research should substantiate this before any firm conclusions are drawn.

The couple's relationship was strongly associated with symptoms of depression. The effect of PTSD on the couple's relationship was fully mediated by depression. The finding that couple's relationship was negatively affected by depression is in line with previous research (e.g. Zerkowicz and Milet, 1996; Wenzel et al., 2005).

An important caveat is that the current model only accounted for 16.6% of the variance in the parent-baby bond, indicating factors that were not measured in this study are likely to be important. For example, deficient adult attachment patterns have been shown to have negative third generation effects on both the parent-child interaction and marital relationship (Cowan et al., 1996). These long-term consequences of poor parent-baby bonding and attachment further highlight the importance of early preventative measures and interventions. Research has shown that child characteristics, such as temperament (e.g. Cambell, 1979) may influence the parent-baby relationship and couple's relationship. The present study did not collect information on baby's characteristics, such as temperament, prematurity or physical

or psychological disabilities. These may also contribute to the quality of the parent-baby relationship and couple's relationship so should be examined in future research.

Methodological Issues

There are a few methodological issues that need to be considered because they limit the conclusions that can be drawn. The first is that the current sample did not include many men so analyses were only powered to identify large effect sizes for men, while the study was well powered for women, identifying small and medium effects. Problems recruiting men also excluded the possibility of within-couple comparisons. Secondly, this sample included a high proportion of people who had obstetric intervention and PTSD or depression. As discussed, this is due to the sampling strategy, which actively targeted web sites that might include people who had experienced a difficult or traumatic birth, in an effort to sample the range of postnatal mental health responses. However, this strategy means the sample are not representative of the UK birthing population in terms of obstetric intervention and mental health variables. Thus, future research may want to examine this in more representative samples. Finally, the use of questionnaires limits conclusions that can be drawn about prevalence of diagnostic disorder. Future research using clinical interviews in more representative samples is required for this.

Conclusion

In conclusion, this study suggests that there is an association between symptoms of PTSD and depression, and the parent-baby bond in mothers and fathers, but that the effects of PTSD on the couple's relationship are fully mediated by depression. The results also indicate that people with co-morbidity of depression and PTSD may be especially vulnerable and in need of interventions. The occurrence of PTSD and depression in men as well as in women highlights the importance of examining both partners' psychological reactions after the birth. Methodological issues, such as the small number of men in the sample and over-sampling of people who had difficult birth experiences limit the generalisability of these findings. Therefore further studies are needed in order to explore this more fully.

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Table 1. Sample characteristics for demographic variables

	Total Sample N = 152 No. (%)	Women n = 126 (82.9%) No. (%)	Men n = 26 (17.1%) No. (%)
Ethnicity			
Caucasian	145 (95.4%)	119 (94.4%)	26 (100.0%)
Black African	4 (2.6%)	4 (3.2%)	
Other	2 (1.3%)	2 (1.6%)	
Education			
Pre GCSE	20 (13.2%)	14 (11.1%)	6 (23.1%)
GCSE	13 (8.6%)	11 (8.7%)	2 (7.7%)
A-levels	15 (9.9%)	13 (10.3%)	2 (7.7%)
Diploma	31(20.4%)	28 (22.2%)	3(11.5%)
Degree	30 (19.7%)	25 (19.8%)	5 (19.2%)
Postgraduate	42 (27.6%)	35 (27.8%)	7 (26.9%)
Marital Status			
Married	109 (71.7%)	92 (73.0%)	17 (65.4%)
Cohabiting	35 (23.0%)	27 (21.4%)	8 (30.8%)
Living Apart	1 (0.7%)	1 (0.8%)	
Separated	3 (2.0%)	3 (2.4%)	
Single	32(1.3%)	2 (1.6%)	

Note: GCSE = General Certificate of Secondary Education (age 16); A'Level = Advanced Level Examinations (age 18).

Table 2. Sample characteristics for obstetric variables

	Total Sample N = 152 No. (%)	Women n= 126 (82.9%) No. (%)	Men n = 26 (17.1%) No. (%)
Baby's gender			
Female	58 (38.2%)	45 (35.7%)	13 (50.0%)
Male	92 (60.5%)	79 (62.7%)	13 (50.0%)
Parity			
Nulli/primiparous	102 (67.1%)	83 (65.9%)	19 (73.1%)
Multiparous	50 (32.9%)	43 (34.1%)	7 (26.8%)
Induction of labour ^a			
Yes	55 (36.2%)	45 (35.7%)	10 (38.5%) ¹
No	95 (62.5%)	79 (62.7%)	16 (61.5%) ¹
Pain relief ²			
Epidural	64 (42.1%)	53 (42.1%)	11 (42.3%) ¹
Other pain relief	109 (71.7%)	92 (73.0%)	17 (65.4%) ¹
Delivery type			
Forceps / ventouse ^b	45 (29.6%)	32 (25.4%)	13 (50.0%) ¹
Emergency caesarean ^c	44 (28.9%)	35 (27.8%)	9 (34.6%) ¹
Planned caesarean ^d	7 (4.6%)	6 (4.8%)	1 (3.8%) ¹
Subjective perceptions			
Worse than expected	90 (59.2%)	71 (56.4%)	19 (73.1%)
Loss of control in birth	83 (54.6%)	67 (53.2%)	16 (61.6%)
Overall dissatisfaction	74 (48.6%)	64 (50.8%)	10 (38.5%)

Notes:

¹ These variables all refer to the partner's labour.² Percentages do not total 100% because some women had both epidural and other types of pain relief.National rates (N = 567,000): ^a 20 % ^b 12% ^c 12 % ^d 11 % (National Maternity Statistics 2003-4).

Table 3. Descriptive statistics for PTSD, depression, the couple's relationship and parent-baby bond

	Range	Total Sample Mean (SD) N = 152	Women Mean (SD) n = 126	Men Mean (SD) n = 31	Differences between men & women	Norms from previous studies Mean (SD)
PTSD symptoms	0 - 51	13.20 (12.23) ^a	14.35 (12.61) ^a	7.69 (8.41)	U = 1132.50*	9.88 (8.96) ¹
Depression	0 – 30	9.21 (6.79) ^a	9.78 (6.79) ^a	6.46 (6.18)	U = 1144.50*	4.38 (3.70) ²
Couple's relationship	0 –150	108.54 (22.36) ^b	108.88 (22.15) ^b	106.92 (23.75)	U = 1498.00	114.80 (17.80) ³
Parent-baby bond	0 –125	14.74 (11.79)	14.67 (11.90)	15.04 (11.43)	U = 1490.00	

^a n = 151 and 125, ^b n = 149 and 123 . * $p < .05$, ** $p < .01$, *** $p < .001$.

¹ Keogh, Ayers & Francis (2002).

² Cox, Holden & Sagovsky (1987).

³ Spanier (1976).

Table 4. Diagnostic criteria groups and bonding disorders

	PTSD only No (% ^a)	PTSD & Depression No (%)	Depression only No (%)	No diagnosis No (%)	Bonding disorder No (%)
Women	7 (5.6%)	21 (16.7%)	27 (21.4%)	71 (56.3%)	32 (25.4% ^b)
Men	1 (3.8%)	2 (7.7%)	1 (3.8%)	22 (84.6%)	3 (11.5% ^b)
Total sample	8 (5.3%)	23 (15.1%)	28 (18.4%)	93 (61.2%)	35 (23.0% ^d)
Impaired bonding	1(12.5% ^a)	13 (56.5% ^a)	9 (32.1% ^a)	10 (10.8% ^a)	33 (94.3% ^c)
Rejection & Anger	1 (12.5% ^a)	4 (17.4% ^a)	2 (7.1% ^a)	0 (0.0% ^a)	7 (20.0% ^c)
Anxiety	0 (0.0% ^a)	0 (0.0% ^a)	1 (3.6% ^a)	1 (1.1% ^a)	2 (5.7% ^c)
Abuse	0 (0.0% ^a)	2 (8.7% ^a)	2 (7.1% ^a)	0 (0.0% ^a)	4 (11.4% ^c)
Total bonding disorder	1 (12.5% ^a)	13 (56.5% ^a)	10 (35.7% ^a)	11(11.8% ^a)	35 (23.0% ^d)

Note: ^a% relates to cases within criteria ^b% relates to cases within gender ^c% relates to cases within bonding disorder ^d% relates to the total sample. N = 152 (126 women and 26 men).

Table 5. Comparison of participants with and without PTSD

	PTSD Mean (SD) n = 31	No PTSD Mean (SD) n = 121	Mann Whitney U-test	p-value
Birth variables				
Induction	0.55 (0.51)	0.32 (0.47)	1422.00	.019*
Epidural	0.55 (0.51)	0.40 (0.49)	1561.50	.125
Other pain relief	0.77 (0.43)	0.72 (0.45)	1730.50	.548
Assisted labour	0.52 (0.51)	0.25(0.43)	1334.50	.004**
Emergency caesarean	0.52 (0.51)	0.24 (0.43)	1319.00	.003**
Planned caesarean	0.03 (0.18)	0.05 (0.22)	1754.50	.694
Expectations	0.06 (0.25)	1.86 (1.53)	555.00	< .001***
Perceived control	0.55 (0.96)	2.05 (1.47)	762.00	< .001***
Satisfaction	0.42 (0.81)	2.40 (1.59)	592.00	< .001***
Postnatal variables				
Depression	14.26(5.60)	7.91 (6.47)	827.50	< .001***
Couple's relationship	99.52 (28.84)	110.72 (20.04)	1344.00	.058
Parent-baby bond	23.29 (16.50)	12.55 (9.11)	1096.50	< .001***

* $p < .05$, ** $p < .01$, *** $p < .001$.

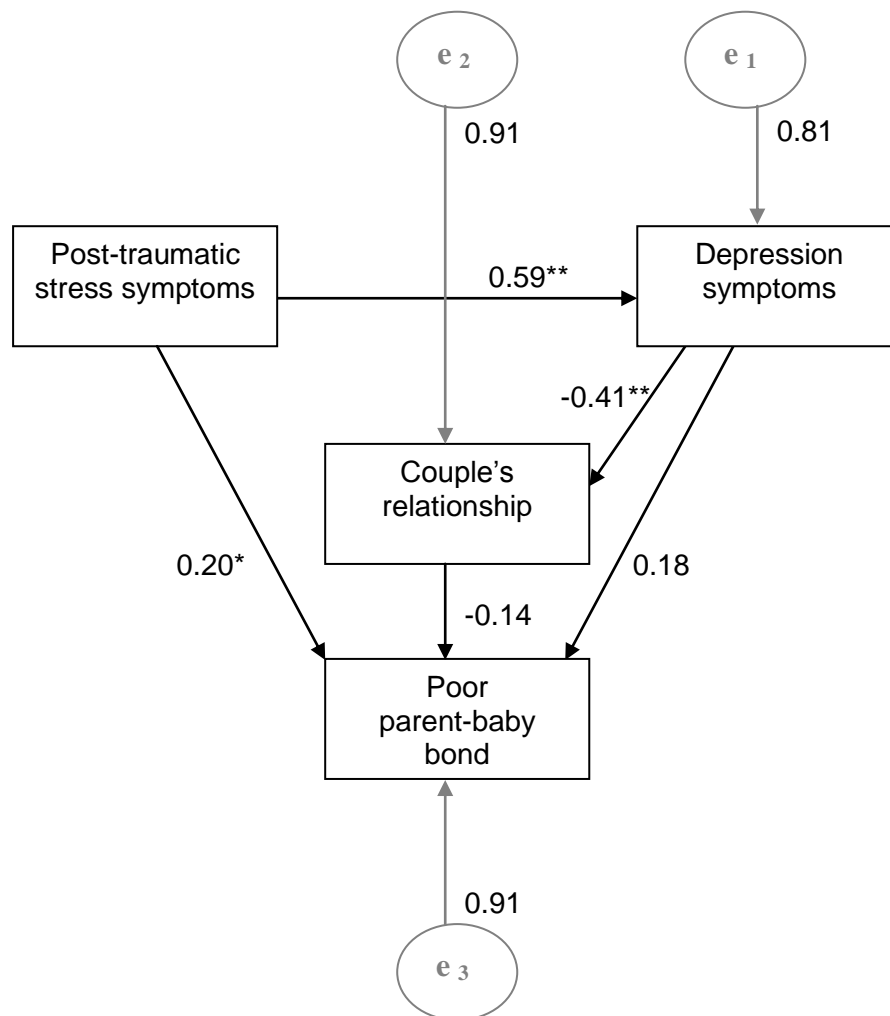
Table 6. Correlations between postnatal variables

	Depression	PTSD	Relationship	Parent-baby bond
Depression				
PTSD	.63***			
Couple's relationship	-.40***	-.30***		
Parent-baby bond ¹	.40***	.36***	-.26***	

n = 148 to 151. * *p* < .05, ** *p* < .01, *** *p* < .001 (1-tailed)

¹ A higher score on the parent-baby bond measure indicates a more negative bond.

Figure 1. Structural equation model of the relationship between symptoms of PTSD, depression, the couple's relationship and parent-baby bond



Note: N = 150; * $p < .05$, ** $p < .001$

Model fit: $\chi^2 = 0.795$, df 1, $p = .372$. Comparative fit index (CFI) = 1.00. RMSEA = .000. Standardized RMR = .017.