Support during birth interacts with prior trauma and birth intervention to predict postnatal post-traumatic stress symptoms

Background: Many women experience childbirth as traumatic and 2% develop post-traumatic stress disorder (PTSD). This study examined the role of health practitioner support and personal control during birth as predictors of PTS symptoms, adjusting for vulnerability factors of prior trauma, depression, control beliefs and birth intervention. It also investigated interactions between support, prior trauma and birth intervention and their association with PTS symptoms.

Methods: A prospective longitudinal survey of 138 women recruited from UK NHS maternity clinics. Measures were taken in pregnancy, three-weeks and three-months after the birth.

Results: Support and control during birth were not predictive of postnatal PTS symptoms. However, support was predictive of PTS symptoms in a subset of women with prior trauma (beta = -.41, R^2 = 16%) at both three-weeks and three-months postpartum. The interaction of birth intervention and support was associated with PTS symptoms three-months after birth, the relationship between support and PTS symptoms was stronger in women experiencing more intervention.

Conclusions: Low support from health practitioners is predictive of postnatal PTS symptoms in women who have a history of trauma. Longer-term effects of low support on postnatal PTS symptoms are also found in women who had more intervention during birth.

Keywords: Childbirth, PTSD, control, support, trauma, intervention

Following childbirth between 20 and 48% of women rate their experience of birth as traumatic (Alcorn, O'Donovan, Patrick, Creedy & Devilly, 2010; Ayers, Harris, Sawyer, Parfitt & Ford, 2009; Creedy, Shochet, & Horsfall, 2000; Soet, Brack, & Dilorio, 2003), and a similar number display one or more symptoms of post-traumatic stress disorder (PTSD; Maggioni, Margola, & Filippi, 2006). The full disorder affects between one and six percent of women in the first year following the birth of their child (Ayers & Pickering, 2001; Czarnocka & Slade, 2000; Maggioni et al., 2006; Olde, van der Hart, Kleber, & van Son, 2006; Soderquist, Wijma, & Wijma, 2006; Soet et al., 2003; White, Matthey, Boyd, & Barnett, 2006; Wijma, Soderquist, & Wijma, 1997). PTSD is characterised by three classes of symptoms: re-experiencing the event through flashbacks, nightmares and intrusive thoughts; avoiding reminders of the event; and hyperarousal e.g. being overly alert, jumpy and irritable (American Psychiatric Association, 2000). Given the large numbers of women who give birth every year (600,000 per year in the UK, Richardson & Mmata, 2007) the extent of post-traumatic stress responses in women following childbirth may be notable.

The fact that childbirth is a common event in society means it is viewed by most people as "normal". It therefore may be difficult to understand how it can be classed as a trauma for some women, and some authors suggest diagnosing PTSD in these women could risk over-pathologising emotional reactions to a normal event (see, for example, McNally, 2009). However, a small proportion of pregnancies and births involve events that most people would agree are potentially traumatic, such as stillbirth, life-threatening complications such as haemorrhage, or undergoing medical interventions without pain relief. Other women may have a seemingly normal birth but feel traumatized by aspects

such believing their baby will die, feeling violated by intimate examinations, or perceiving hostile or negative attitudes of people around them (Elmir, Schmied, Wilkes, & Jackson, 2010).

Several studies have attempted to identify aspects of childbirth associated with post-traumatic stress (PTS) symptoms. Evidence for the effect of birth events on PTS symptoms is currently inconsistent. In some studies assisted vaginal delivery (forceps) and emergency caesarean section are related to symptoms of PTS (Creedy et al., 2000; Maclean, McDermott, & May, 2000; Soderquist, Wijma, & Wijma, 2002). However, other studies find no relationship between type of delivery and subjective distress (Skari et al., 2002) or PTS symptoms (Ayers, 1999; Czarnocka & Slade, 2000). Other factors, such as pain and medical interventions have been associated with appraisal of birth as traumatic, although not with development of PTS symptoms (Soet et al., 2003). Evidence for the effect of birth events on PTS symptoms is therefore inconsistent and there is accumulating evidence that individual perceptions of health events are more important than objective severity in determining a traumatic response (Tedstone & Tarrier, 2003).

Charuvastra and Cloitre (2008) have argued that PTSD risk and recovery are highly dependent on social phenomena. They draw on a variety of evidence, such as that support can buffer the effect of stress and that interpersonal traumas are associated with poorer outcomes than non-interpersonal traumas (Kessler, Berglund & Demler et al., 2005). One meta-analysis of risk factors for PTSD following a range of traumatic events found that lack of support was the strongest predictor of PTSD symptoms (Brewin, Andrews, & Valentine, 2000). Similar evidence for social risk factors has been found in

research on PTSD following childbirth. Several studies have examined women's perceptions of care and support during birth and associations have been found between PTS symptoms and poor interaction with medical personnel (Soet et al., 2003), inadequate intrapartum care (Creedy et al., 2000), low staff and partner support (Czarnocka & Slade, 2000), feeling poorly informed and not listened to (Czarnocka & Slade, 2000), inadequate contact with the staff (Wijma et al., 1997), and low perceived and desired support or help (Cigoli, Gilli, & Saita, 2006; Maggioni et al., 2006). There is also evidence that support during the birth may have a greater effect on women's emotional response than the severity of events (Ford & Ayers, 2009). Experimental studies suggest that providing additional support during birth results in better physical outcomes for both mother and baby, less pain, higher maternal satisfaction with the birth experience, and less depression after birth. (Hodnett, Gates, Hofmeyr, & Sakala, 2003; Sauls, 2002; Scott, Klaus, & Klaus, 1999; Zhang, Bernasko, Leybovich, Fahs, & Hatch, 1996).

Support and control during birth are likely to be highly related (Green & Baston, 2003; Lundgren, 2005; Melender, 2006; Nystedt, Hogberg, & Lundman, 2006). The often uncontrollable nature of labour and delivery means perceptions of control may be influenced by caregiver support during labour. Green and Baston (2003) found that feeling in control during labour was related to interpersonal variables such as receiving considerate and supportive behavior from staff. Several qualitative studies have also found that support from health practitioners increases perception of control (Lundgren, 2005; Melender, 2006; Nystedt et al., 2006). In turn, low perceived control has been associated with lower satisfaction with birth (Slade, MacPherson, Hume, & Maresh,

1993), postnatal depression (Goodman, Mackay, & Tavakoli, 2004; Green & Baston, 2003; Slade et al., 1993), perceiving the birth as traumatic (Soet et al., 2003) and PTS symptoms (Czarnocka & Slade, 2000).

Health-practitioner support and perception of control are therefore associated with PTS symptoms after birth and may be important risk factors for PTSD generally. The study of childbirth enables unique prospective examination of how support and control during birth contribute to the development of PTS symptoms whilst controlling for pre-event factors. However, research into health-practitioner support and perception of control in birth has been limited to date, examining the variables as single dimensions (Czarnocka & Slade, 2000; Soet et al., 2003), using scales that have not been validated (Creedy et al., 2000; Green & Baston, 2003; Slade et al., 1993), and failing to control for personality confounds such as self-efficacy and locus of control.

Pre-event factors that are likely to influence the relationship between support, control, and PTS symptoms after birth include a history of trauma (Cohen, Ansara, Schei, Stuckless, & Stewart, 2004; Kennedy & MacDonald, 2002; Soet et al., 2003), depression and anxiety (Cigoli et al., 2006; Cohen et al., 2004; Czarnocka & Slade, 2000; Maggioni et al., 2006; Soderquist et al., 2006; Wijma et al., 1997), low self-efficacy (Soet et al., 2003) and locus of control (Soet et al., 2003). The association between support and control during birth and postnatal PTS symptoms after controlling for these factors has not yet been studied. Furthermore, the relationship between health-practitioner support during birth and PTS symptoms may be more marked in certain groups of women. For example, the stress generation hypothesis (Hammen, 1991, 2005) suggests women with recurrent depression may have maladaptive interpersonal styles which increase stress

during interpersonal interactions. This may also be the case for a history of trauma, which may affect perceptions and responses to support (Charuvastra & Cloitre, 2008; Soderquist et al., 2006). One study found that women with PTS symptoms reported a decrease in social support in the first year after birth (Soderquist et al., 2006). Longer, more painful labours or those involving obstetric complications provide different challenges for the provision of, or need for, health-practitioner support, and the association between support and psychological outcome may be more prominent during a stressful birth.

This study prospectively examined the relationship between health-practitioner support and perception of control during birth and PTS symptoms after birth, whilst controlling for the vulnerabilities of previous trauma, depression during pregnancy, self-efficacy, external locus of control, and birth interventions. With the exception of birth interventions, all other vulnerability factors were measured in pregnancy so they would not be influenced by the experience of birth. It was hypothesized: 1) that support from health practitioners and perceived control during birth would be negatively associated with PTS symptoms, after controlling for the other risk factors; 2) that the association between support and PTS symptoms would vary depending on prior trauma status, where the association would be greater in women with prior trauma; and 3) that the association between support and PTS symptoms would vary depending on birth interventions, with the association greater in women with more intervention. These hypotheses were tested using data from a longitudinal questionnaire survey of women from the last trimester of pregnancy to three months after birth, and were analysed using hierarchical linear regression models.

Methods

Design

A longitudinal survey with questionnaires completed at three time points: 36 weeks of pregnancy (mean 36.5 weeks, SD 10 days), three weeks after the birth (mean 20 days; SD 11 days), and three months after the birth (mean 3.4 months; SD 21 days). The following measures were taken at each time point:

- Pregnancy: demographic information, trauma history, PTS symptoms, depression symptoms, self-efficacy, locus of control.

- Three weeks after birth: PTS symptoms, birth interventions, support and control during birth.

- Three months after birth: PTS symptoms.

Sample

Women were recruited from public hospital and community antenatal clinics in one UK city. Women were eligible if they were between 33 and 37 weeks pregnant. Women were excluded if they were under 18 years of age, if their level of English was not sufficient to understand the questionnaires, or if the midwife indicated that it would not be appropriate to approach them (for example, one woman was not approached because her baby was going to be put on the child protection register).

A statistical power analysis suggested 109 women were needed to find an association between support and PTS symptoms of r = 0.3 significant at the 5% level. Allowing for 40% attrition, 215 women were recruited into the study and 138 (64%) completed and returned questionnaires. Among these women who responded, retention

rates were reasonable and questionnaires were returned by 136 (63.2% of the consented sample) participants in pregnancy; 125 (58.1%) three weeks postpartum; and 109 (50.6%) three months postpartum. Women who did not complete all questionnaires were more likely to be single (χ^2 (1) = 6.48, p< .025) and have more children (χ^2 (2) = 6.35, p< .05) but did not differ on psychological and obstetric measures. For 46 of the 71 women who did not send back any questionnaires, it was possible to obtain age, parity and mode of delivery from the hospital register of births. There were no differences between responders and non-responders in terms of age or caesarean rate, however responders were likely to have fewer previous children (χ^2 (2) = 11.63, p< .01).

Measures

Demographic information

This measure included information on age, marital status, accommodation, ethnic group, educational attainment, work, and obstetric history.

Prior trauma and PTS symptoms after the birth

Prior trauma and PTS symptoms were measured using the PTSD diagnostic scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997). Trauma history was measured with a checklist of 11 traumatic events (e.g. sexual assault, serious accident, natural disaster or other event). Seventeen PTS symptoms in a typical month following the traumatic event were measured according to DSM-IV criteria for PTSD, including criterion B (re-experiencing), C (avoidance), and D (arousal). Symptoms were rated on a four-point scale of frequency of occurrence. The PDS has internal consistency alphas of .92 for total symptom severity; .78 for re-experiencing; .84 for avoidance and .84 for arousal.

Sensitivity of the PDS was .89 and specificity .75 with diagnoses obtained from the standardised diagnostic interview (Foa et al., 1997).

Participants were categorised into two groups according to prior trauma. The "prior trauma" group endorsed one or more prior traumatic events and indicated they had experienced one or more symptom as a result. The "no prior trauma" group either had experienced no prior trauma or had not experienced any symptoms following a trauma. This broad definition of prior trauma allowed sufficient numbers in each group to retain statistical power for the analysis.

Postnatal measures were amended so PTS symptoms were measured in relation to childbirth by moving the trauma history section to the end and instructing participants to answer the same symptom questions about their experience of birth. Thus symptom questions were rephrased with "the birth" replacing "the event".

Depression

Depression was measured using the Edinburgh Postnatal Depression Scale (Cox, Holden, & Sagovsky, 1987), a 10-item scale where a high score indicates risk for postnatal or other depression. Items have a four-point response scale from "no never" (0) to "yes most of the time" (3). A score of ≥ 9 indicates possible depression and ≥ 13 high risk. The EPDS has a sensitivity of 86% and a specificity of 78%; split-half reliability is .88 and the standardised alpha-coefficient is .87 (Cox et al., 1987).

Locus of Control

Locus of control was measured using the Multidimensional Health Locus of Control scale (Wallston, Wallston, & Devellis, 1978). The 18-item Form A scale includes six items on each of three dimensions of locus of control: internal; powerful others; and

chance. These are scored using six point Likert scales. Alpha reliabilities range from .70 to .73, and test-retest reliability ranges from .63 to .75 (Hubley & Wagner, 2004). The subscales are independent of one another. Only the 6 items of the "powerful others" dimension were used in this study as the other scales were found to be unrelated to PTS symptoms.

Self-efficacy

Self-efficacy was measured using part of the Self-efficacy Scale (Sherer, Maddux, Mercandante et al., 1982). Seventeen items were included from the general self-efficacy factor of the full scale, using a six point Likert scale (instead of the usual 14-point Likert scale) for ease of response. This 17-item factor accounted for 26.5% of the variance, and has a Cronbach's alpha reliability coefficient of .86 (Sherer et al., 1982).

Birth intervention

Interventions during birth were measured using the Intrapartum Intervention Score (Clement, Wilson, & Sikorski, 1999) from self-reported information on intervention during birth. Scores were calculated for each participant for extent of intervention in their birth. The weighted sum was taken of the following interventions: pethidine; epidural; entonox; transcutaneous electrical nerve stimulation (TENS); oxytocin drip; external heartbeat monitor; internal heartbeat monitor; episiotomy; tearing; forceps; caesarean. The range of the intervention score in this study was 0-45 (mean intervention score 17.1, SD 10.49).

Support and Control during Birth

Support and control in birth was measured using a 33-item questionnaire with subscales of internal control, external control, and support (Ford, Ayers, & Wright,

2009).The internal control subscale contained 10 items focussing on control of pain, emotions, behaviour e.g. 'I was overcome by the pain', 'I could control the sounds I was making'. The external control subscale contained 11 items on control over information, decisions and procedures e.g. 'I had control over when procedures happened', 'I had control over the decisions that were made'. The support subscale was formed of 12 items on attitude, patience, empathy, help with pain and coping e.g. 'the staff went out of their way to try to keep me comfortable', 'the staff dismissed things I said to them' (reverse scored). Items were scored on a 5-point Likert Scale (completely agree – completely disagree). The three components have high reliability (Cronbach's alphas of 0.86 to 0.93) and were inter-correlated between r=.51 and r=.69 (Ford et al., 2009). In this study the inter-correlations were lower at r=.25 to r=.54.

Procedure

Ethical approval was obtained from the University Research Governance committee and the NHS Local Research Ethics Committee. Women were approached in hospital and community antenatal clinics over a 14-week period. If they were willing to take part in the study, details were explained using an information sheet, informed consent was obtained, and participants took away the first questionnaire. Birth records at the hospital were checked for information on delivery dates and postnatal questionnaires sent out as soon as it was established mother and baby had been discharged home safely, but not less than one week after the birth. Three months from the date of the baby's birth, the third questionnaire was sent. At each time point, if the questionnaire was not returned after two weeks a reminder was sent. This was followed up by telephone as necessary.

Results

Data Screening

Missing data ranged from 0 to 6% of items and subscales. Randomly missing data were replaced with the individual's mean for that subscale (Tabachnick & Fidell, 2001). Cases where missing data exceeded 10% of a scale were excluded from the analysis. A number of variables were skewed so were transformed by logarithm if positively skewed and by square root of the reverse score if negatively skewed. Analyses were performed on the raw data and the transformed data. The results (in terms of significance) were not different, so the analyses with the raw data are presented, as it is conceptually more meaningful (Tabachnick & Fidell 2001).

Sample characteristics

Demographic characteristics of participants are shown in Table 1. Participants were predominantly of White European origin (92.6%), in their 30s and married or cohabiting with a partner (90.1%). This was also a highly educated sample, with 56% having continued education after age 18 and 55.2% having a degree or professional qualification. Sixty-three percent of participants already had one or more children.

- insert Table 1 about here -

Prevalence of PTSD (cases and symptoms)

In pregnancy, 52 women reported previously experiencing symptoms of PTS following a traumatic event and ten women (7.2% of total sample) fulfilled DSM IV criteria for having had PTSD at some point in their past. All 52 women who experienced

any prior symptoms formed the "prior trauma" group. Three weeks after birth, one woman (0.8%) fulfilled DSM IV criteria A to D (traumatic event plus symptoms) for PTSD related to birth, but at this time-point the duration criterion could not be met. Three months after birth one woman (0.9%) fulfilled all DSM IV criteria for PTSD related to birth (including duration, however this was not the same woman as at three weeks after the birth). The mean PTS symptom score recorded in pregnancy (relating to PTS symptoms in those who had experienced a trauma, in a typical month following the event, not to symptoms in pregnancy) was 16.4 (SD 14.1). At three weeks following the birth the mean symptom score, relating only to the birth, was 4.2 (SD: 6.0), and at three months following the birth the mean score was 4.2 (SD: 5.6). The mean scores of all variables are shown in Table 2.

Associations between vulnerability factors and PTSD

Correlations between all the variables are shown in Table 2. Several of the prior vulnerabilities were related to each other, notably depression in pregnancy, self-efficacy, and "powerful others" locus of control. For the correlations, prior PTS symptom score was used to increase power, and was not significantly associated with other vulnerabilities except weakly with depression in pregnancy. Several of the vulnerability factors measured in pregnancy were associated with PTS symptoms following the birth (depression, self-efficacy and "powerful others" locus of control). Prior PTS symptoms were associated with new PTS symptoms only at three months after the birth. Birth interventions were weakly associated with early postnatal PTS symptoms and not at all three months after the birth. Support and internal control were significantly associated with PTS symptoms at both three weeks and three months after the birth but external

control was not associated with symptoms. Internal control was also associated with birth interventions and self-efficacy.

- insert Table 2 about here -

Support and control during birth and PTS symptoms

Hierarchical multiple regressions were carried out according to study aims. Regression model parameters can be seen in Table 3. The vulnerability covariates entered in the first step (prior trauma, depression in pregnancy, self-efficacy, "powerful others" locus of control, and birth interventions) predicted 32% of the variance in PTS symptoms at three weeks but only 15% of the variance at three months. At three weeks following the birth, depression in pregnancy, "powerful others" locus of control, and birth interventions were significant individual predictors (betas = .39, .25 and .21 respectively). At three months post-birth, depression in pregnancy (beta = .28) was the only significant predictor of PTS symptoms.

- insert Table 3 about here –

Hypothesis 1: Support, Control and PTS symptoms

Support, internal and external control were added to the model in a second step. None of these three variables were found to be significant predictors of PTS symptoms at either time point. In a third model, support was added alone without control, as it was highly correlated with the control variables and therefore there may have been multi-colinearity between these variables. At three months support was a significant predictor of PTS symptoms (beta = .21, p <.05), explaining an extra 8% of the variance. It did not significantly predict PTS symptoms at three weeks post-birth.

Hypothesis 2: Association of support with postnatal PTS symptoms by prior trauma

The variation of the support – PTS symptom relationship by prior trauma was explored by adding an interaction term (support*prior trauma) to the model in the third step. This interaction term was significantly associated with of PTS symptoms at three weeks following the birth (beta = -.35, p < .001), and at three months following the birth (beta = -.35, p < .01). This suggests that the effect of low hospital staff support on PTS symptoms differs in women with different prior trauma status.

The simple slope of the regression line of support on PTS symptoms was plotted for the two levels of prior trauma (no prior trauma and prior trauma). These slopes are depicted in Figures 1 and 2. At three weeks post-birth there was no effect of support on postnatal PTS symptoms in women with no prior trauma (beta = .10, p > .05, additional R^2 = 1.0%, F change (1,60) = 1.05, p >.05). However there was a strong effect of support on postnatal PTS symptoms in the prior trauma group (beta = -.39, p = .001, additional R^2 = 16.2%, F change (1,37) = 10.35, p < .01).

The same effect was found at three months post-birth with no effect of support on PTS symptoms in the no prior trauma group (beta = .04, p = >.05, additional R^2 = 0.1%, F change (1,53) = 0.07, p > .05), but there was a strong effect of support on PTS symptoms in the prior trauma group (beta = -.46, p = .001, additional R^2 = 15.6%, F change (1,30) = 7.13, p = .01).

Hypothesis 3: Association of support with postnatal PTS symptoms by birth intervention

The variation of the support – PTS symptom relationship by birth intervention was explored by adding an interaction term (support*birth intervention) to the model in a third step. Three weeks following the birth, the interaction between birth intervention and support was not predictive of PTS symptoms, but at three months post-birth, it was a

significant predictor (beta = -.20, p<.05). This suggests that the impact of support during birth on later PTS symptoms does vary according to the level of intervention during the birth.

The simple slope of the regression line of support on PTS symptoms three months post-birth was plotted for the mean intervention score and for values one standard deviation above and below the mean (see Figure 3). A simple slopes analysis gave betas of -.01 (p = ns), -.20 (p < .05), and -.42 (p < .01) for low (-1 SD), mean and high (+1 SD) values of intervention, respectively. This suggests that support becomes more highly associated with postnatal PTS symptoms three months after the birth, as levels of birth intervention increase.

Discussion

This study examined women's perception of health-practitioner support and personal control during birth, and their effect on the development of postnatal PTS symptoms after controlling for previous mental health, control beliefs and birth intervention. The results suggest that control beliefs, level of intervention during birth and depression in pregnancy are likely to be risk factors for acute PTS symptoms following childbirth; and that depression in pregnancy and support during birth are risk factors for more chronic symptoms of PTS. The key finding of this study, however, was that support during birth is particularly important for women with a history of prior trauma or who have high levels of intervention during birth. In these women, support from health-practitioners may protect against the development of PTS symptoms or, conversely, a lack of support may contribute to PTS symptoms.

These findings are broadly consistent with previous research on PTSD following childbirth and other non-obstetric traumas. Childbirth research has demonstrated the importance of support in both physical and psychological outcomes (Hodnett et al., 2003) including symptoms of PTS after childbirth (Cigoli et al., 2006; Czarnocka & Slade, 2000; Maggioni et al., 2006). Meta-analyses of trauma in non-obstetric samples find associations between lack of support and PTSD, as well as smaller effects of prior trauma and trauma severity or life threat (Brewin et al., 2000; Ozer, Best, Lipsey & Weiss, 2003). Previous studies of variables that moderate these relationships suggest that prior trauma and severity of the event are more strongly associated with PTSD following interpersonal traumatic events (Ozer et al., 2003); and that the effect of severity of the event and support increases over time, which is consistent with results of the current study.

The interaction found between birth intervention and support is intuitively viable and consistent with the buffering hypothesis i.e. that support buffers against the negative effects of stressful events. However, these findings are in contrast with results from a recent experimental analogue study, which used birth stories to examine the interaction between stressful interventions or complications in birth and level of support. This study found no significant interaction between these variables in predicting changes in anxiety and mood (Ford & Ayers, 2009). This inconsistency is probably due to methodological differences i.e. the current study was on real birth events as opposed to imagined events, and measured PTSD symptoms rather than anxiety or mood. The experience of pain and obstetric intervention is potentially more frightening for women and may therefore result in more feelings of helplessness or horror (DSM IV criterion A for PTSD) and

subsequently symptoms of PTS. Reassurance and explanations from caregivers may therefore be of greater importance in these situations to ameliorate fear responses. However, more research is needed to unpick this interaction before firm conclusions can be drawn.

The interaction between prior trauma and support during birth is consistent with previous childbirth research. Women with a history of trauma or PTSD have been found to be at higher risk of PTSD following childbirth (Ayers et al., 2009; Cohen et al., 2004; Kennedy & MacDonald, 2002; Soet et al., 2003). Childbirth can involve pain, invasion of bodily integrity (for example pelvic examinations), and feelings of loss of control, so may remind women of previous traumas, thereby rekindling earlier symptoms (Kennedy & MacDonald, 2002). Various theories of PTSD suggest cognitive processing immediately after the event is important in whether symptoms are resolved or develop into PTSD (Horowitz, 1979; Ehlers & Clark, 2000). Positive social interactions may facilitate this processing and negative interactions may reinforce maladaptive beliefs or appraisals (Charuvastra & Cloitre, 2008). During birth, a perception of lack of care or neglect, or negative or hostile interactions with health-practitioners, may constitute additional stressors in themselves. Individuals with a history of PTSD may be more likely to react with greater fear to negative interactions in comparison with those who have no prior vulnerability (Charuvastra & Cloitre, 2008).

This study therefore confirms and extends previous research by providing prospective evidence of the importance of support in the development of PTSD after childbirth; and by showing this relationship is moderated by vulnerability factors of prior trauma and severity of birth events. It therefore adds to our knowledge of vulnerability

factors for PTS symptoms following childbirth, and extends our understanding of the relationship between health-practitioner support and postnatal outcomes. Findings suggest that women with a history of trauma are especially vulnerable to the effects of poor care during labour and birth. Screening for prior trauma during pregnancy could identify these women and a care plan could be put in place to ensure they receive the care they need during birth. This may help to reduce PTS symptoms following birth in this group of women.

Conclusions from this study are limited by the high rate of attrition and subsequent sample size, although analysis of non-completers suggests the only differences between women who completed the study and those who did not were having more children and not living with a partner. Reasons for attrition may include the length of the questionnaires, the face-to-face method of recruitment, or participants' babies being born before the first questionnaire was completed. Due to the high rate of attrition this study has limited statistical power and results cannot be generalized. Further studies should attempt to replicate the relationships between support and PTS symptoms in larger samples.

Another caveat is that associations found with PTS symptoms may not indicate the same relationships with cases of PTSD. Furthermore, PTSD diagnostic criteria (American Psychiatric Association, 2000) require one month duration before a diagnosis can be made so three weeks after birth only initial or acute stress reactions are being predicted. This time-point was chosen in order to achieve reports of birth interventions, support and control as close in time as possible to the event, given the postal survey. In several PTSD theories a distinction is made between symptom onset and symptom

maintenance (e.g. Ehlers & Clark, 2000). Therefore, despite not being able to learn about actual cases at two to four weeks post-event, we can gather data about symptom onset. This problem of the duration criterion for PTSD was partially resolved by including a three month follow-up. There is evidence that there is still some spontaneous resolution of PTS symptoms after one month but that cases presenting at three months post-event will generally be chronic (Koren, Arnon, & Klein, 1999; Rothbaum, Foa, Riggs, Murdock, & Walsh, 1992). Therefore, the results from the third time point can be assumed to show risk factors predicting chronic PTS symptoms (but not cases).

A further methodological issue which may be of importance is the significant correlation between support and external control. It is difficult to know whether the correlation between external control and support is due to measurement bias or the strong relationship between these variables under challenging conditions, such as birth. It could be argued these two constructs will always be overlapping due to the nature of childbirth, and the fact that the measurement is of health-practitioner support rather than partner or other support. However, in the development of the measure used for these constructs, support and external control formed distinct and separate factors (Ford et al., 2009) and therefore it appears it is worth examining them separately. Two further variables which were significantly correlated in this study and which may have introduced bias were depression in pregnancy and recall of number of prior traumas. Depressed participants may recall more traumatic experiences than non-depressed participants, although evidence for this is inconsistent (Brewin, Andrews, & Gotlib, 1993; Kuyken & Brewin, 1995). Current depression may have played a role in the association between prior trauma

and PTS symptoms following the birth. However, this issue was partly resolved by adjusting for depression in the regression analysis.

The finding that low support from health-practitioners during birth is predictive of PTS symptoms in certain groups of women or birth situations has implications for maternity care in the UK and elsewhere. Results suggest that priority should be given to the provision of individualised maternity care. To reduce the occurrence of PTS symptoms, health-practitioners should focus on providing support such as being empathetic, being woman-centred, listening and responding to women's communications, searching for ways to make women comfortable, and suggesting new ways of coping. Results suggest that supportive behaviour should be prioritised over giving women control, as control was not associated with PTS symptoms. As suggested, screening of women with prior trauma may be valuable to make sure women with this vulnerability are given appropriate levels of support.

In summary, low support during birth from health-practitioners is directly predictive of symptoms of PTS in women with prior trauma, even after controlling for previous mental health, control beliefs and birth intervention. At three months postpartum, the effect of low support on PTS symptoms is also greater in women with more births intervention. This study supports the notion that one-to-one supportive care during labour and birth is necessary to maximize positive psychological outcomes for women in the post-natal period.

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Table 1: Participant Characteristics (N = 138)

Characteristic	N	%
Age	Mean: 32.12 years	SD: 5.57 years
Marital Status: Married	81	58.7
Living with partner	42	30.4
Separated	1	0.7
Divorced	3	2.2
Single	11	8.0
Ethnic Origin: White European	127	92.6
African	3	2.1
Indian	2	1.4
Filipino	2	1.4
Latin American	1	0.7
Nepali	1	0.7
Other	1	0.7
Level of Education: none	4	2.9
GCSE (at 16 years)	21	15.4
A level (at 18 years)	14	10.3
Diploma	22	16.1
Degree	30	22.1
Higher Degree	6	4.4
Professional Qualification	39	28.7
Other Children: 0	51	37.0
1	68	49.3
2	14	10.1
3 or more	5	3.5

Table 2: Correlations between risk factors and PTS symptoms

|	Mean Score (SD)	Prior PTS symptoms	Depression in Pregnancy	Powerful others HLoC	Self-Efficacy	Birth intervention	Hospital Staff Support	Internal Control	External Control	PTS symptoms (3 weeks)
Prior PTS symptoms (n = 52)	16.37 (14.07)									
Depression in Pregnancy	7.20 (5.13)	.21*								
Powerful others HLoC	13.81 (4.43)	.00	.28**							
Self-Efficacy	58.00 (11.06)	-.12	-.47***	-.22*						
Birth Intervention	16.91 (8.96)	.20*	.02	.14	.18*					
Hospital Staff Support	47.43 (10.60)	-.10	-.09	-.06	.03	-.15				
Internal Control	33.90 (8.95)	-.10	-.08	-.13	.26**	-.33***	.32**			
External Control	37.09 (11.02)	-.03	-.03	.01	.10	-.25**	.54***	.25**		
PTS symptoms (3 weeks)	4.15 (5.96)	.17	.38***	.40***	-.21*	.21*	-.29**	-.23**	-.15	
PTS symptoms (3 months)	4.20 (5.59)	.30**	.34***	.20*	-.24*	.12	-.24*	-.30**	-.19	.68***

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

Table 3: Regression models of PTS symptoms

Three weeks after birth (n = 109)	Model 1 Covariates only	Model 2 Support & Control	Model 3 Support only	Model 4 Support x Prior trauma	Model 5 Support x intervention
	β	β	β	β	β
Prior trauma	.03	.03	.03	.05	.02
Depression in pregnancy	.39***	.39***	0.39***	.39***	.38***
Self Efficacy	.08	.10	.08	.09	.07
Locus of control	.25**	.25**	.25**	.27**	.24**
Birth intervention	.21*	.17	.20	.19	.22*
Support		-.11	-.14	.10**	-.13
Internal control		.08			
External control		-.04			
Prior trauma*support				-.35***	
Birth intervention*support					-.13
R^2	.32	.35	.35	.41	.36
F	9.92***	6.75***	9.06***	9.90***	8.21***
Three months after birth (n = 99)					
Prior trauma	.07	.08	.09	.09	.06
Depression in pregnancy	.28*	.30*	.29*	.29*	.27*
Self Efficacy	-.07	-.04	-.08	-.08	-.11
"Powerful Others" Locus of control	.06	.09	.08	.11	.08
Birth intervention	.08	.00	.06	.04	.09
Support		-.14	-.21*	.04	-.20*
Internal control		-.17			
External control		-.08			
Prior trauma*support				-.35**	
Birth intervention*support					-.20*
R^2	.15	.19	.23	.29	.21
F	3.17*	3.79**	4.37**	5.08***	4.50***

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

Figure 1: Slopes of support during birth on PTS symptoms three weeks after birth by Prior trauma group (N = 109)
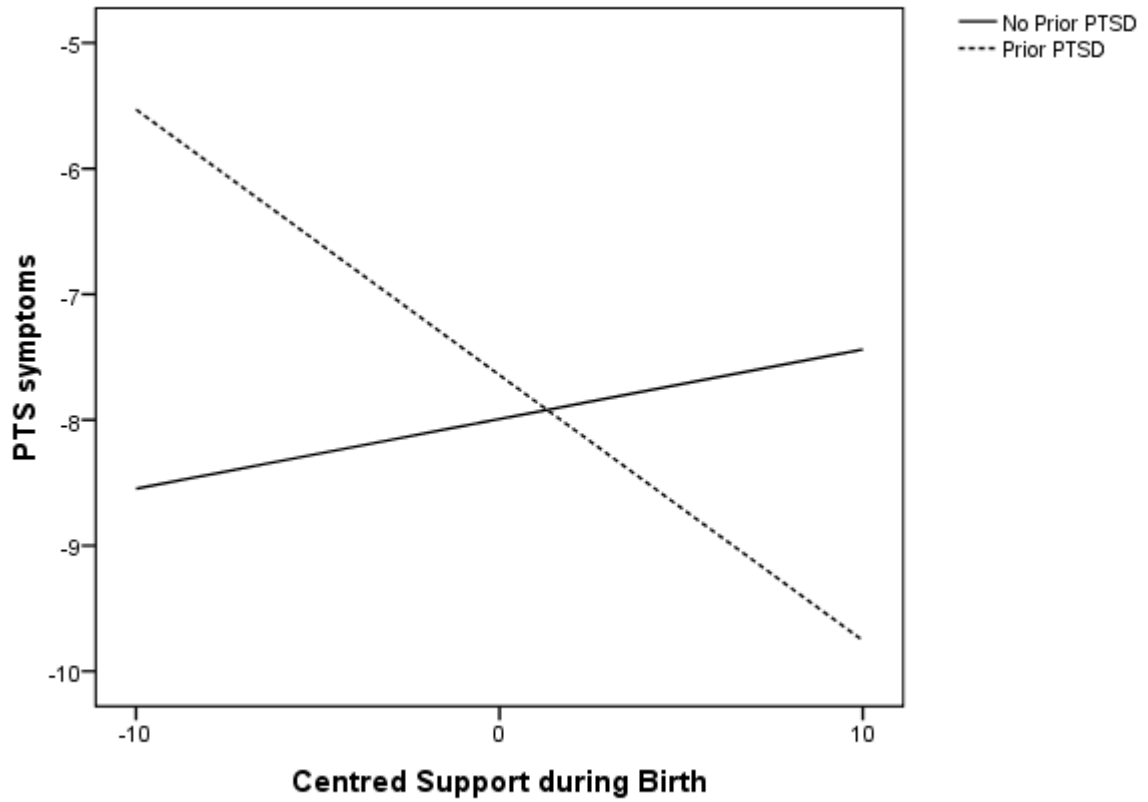
Figure 2: Slopes of support during birth on PTS symptoms three months after birth by Prior trauma group (N = 95)
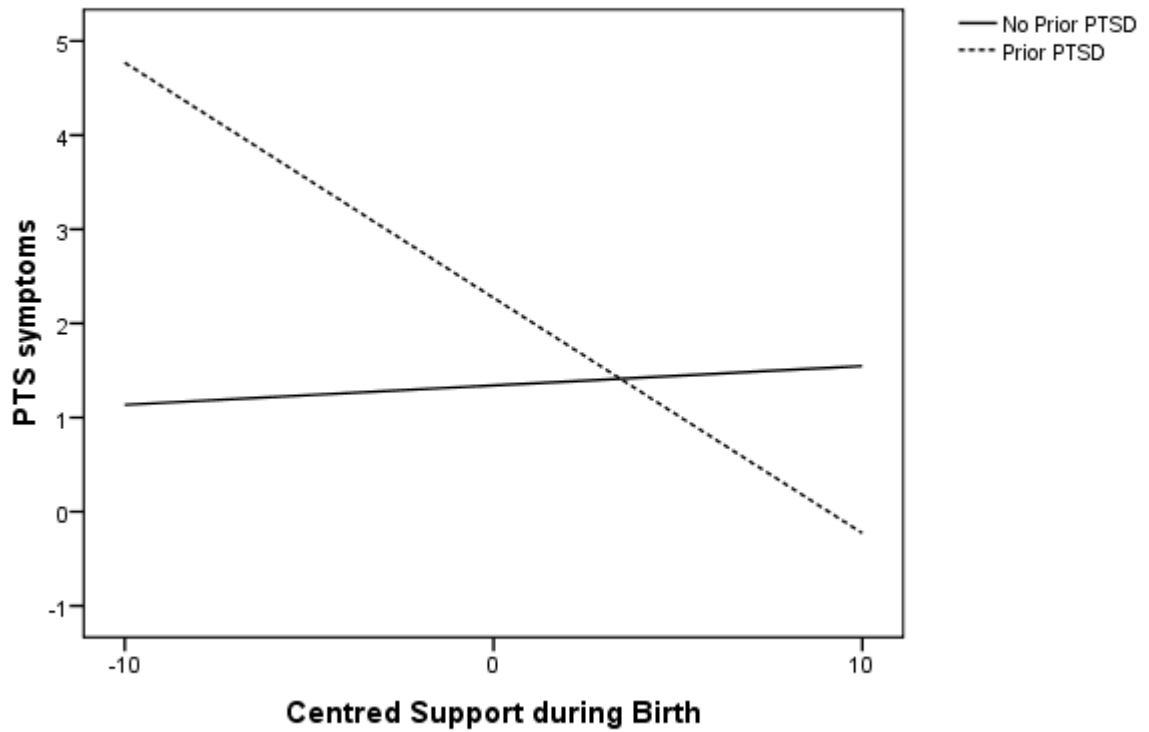
Figure 3: Simple Slopes of support during birth on PTS symptoms at three months after birth by level of birth intervention