

A prospective longitudinal study of the prevalence of post-traumatic stress disorder resulting from childbirth events

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Background. Childbirth has been linked to postpartum impairment. However, controversy exists regarding the onset and prevalence of post-traumatic stress disorder (PTSD) after childbirth, with seminal studies being limited by methodological issues. This longitudinal prospective study examined the prevalence of PTSD following childbirth in a large sample while controlling for pre-existing PTSD and affective symptomatology.

Method. Pregnant women in their third trimester were recruited over a 12-month period and interviewed to identify PTSD and anxiety and depressive symptoms during the last trimester of pregnancy, 4–6 weeks postpartum, 12 weeks postpartum and 24 weeks postpartum.

Results. Of the 1067 women approached, 933 were recruited into the study. In total, 866 (93%) were retained to 4–6 weeks, 826 (89%) were retained to 12 weeks and 776 (83%) were retained to 24 weeks. Results indicated that, uncontrolled, 3.6% of women met PTSD criteria at 4–6 weeks postpartum, 6.3% at 12 weeks postpartum and 5.8% at 24 weeks postpartum. When controlling for PTSD and partial PTSD due to previous traumatic events as well as clinically significant anxiety and depression during pregnancy, PTSD rates were less at 1.2% at 4–6 weeks, 3.1% at 12 weeks and 3.1% at 24 weeks postpartum.

Conclusions. This is the first study to demonstrate the occurrence of full criteria PTSD resulting from childbirth after controlling for pre-existing PTSD and partial PTSD and clinically significant depression and anxiety in pregnancy. The findings indicate that PTSD can result from a traumatic birth experience, though this is not the normative response.

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Introduction

Evidence suggests that childbirth is an event that could be psychologically traumatic, leading to the development of post-traumatic stress disorder (PTSD) and subsyndromal PTSD (Wijma *et al.* 1997; Olde *et al.* 2005). A traumatic birth can interfere with a mother's attachment to her infant and her overall adjustment (Ballard *et al.* 1995; Allen, 1998; Soet *et al.* 2003; Beck, 2004a), negatively affect the relationship with her partner (Fones, 1996; Allen, 1998; Beck, 2004a) and overshadow decisions about having additional children (Fones, 1996; Saisto *et al.* 2001; Bailham & Joseph,

2003; Ryding *et al.* 2003; Beck, 2004b). Aside from the impact on the mother and her family, traumatic birth could impact negatively on the healthcare system by increasing use of medical services (Switzer *et al.* 1999) by both the parents and the offspring.

Studies have suggested a prevalence rate of PTSD following birth from 1% to 6% (Creedy *et al.* 2000; Ayers & Pickering, 2001). However, aside from the debate regarding the broadening of the conceptual boundaries of what qualifies as a traumatic event (Baldwin *et al.* 2004), drawing firm conclusions about the prevalence of PTSD resulting from childbirth is difficult due to a number of methodological shortcomings (Johnston-Robledo & Barnack, 2004). For example, there have only been two prospective, longitudinal studies of PTSD resulting from childbirth. In the seminal study by Ayers & Pickering (2001), there was a relatively small sample ($n < 300$)

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and no assessment for pre-existing PTSD using diagnostic criteria before the birthing event. In the second study, Söderquist *et al.* (2006) assessed a large number of prospective mothers with a longitudinal design and also assessed fear of birth during pregnancy. This study was a subset of Wijma *et al.* (1997) and found a 3% trauma rate (assessing symptomatic criteria B, C and D) at some point up to 11 months postpartum. The authors suggested that the low rate may be due to birth on the whole being considered a positive experience, yet noted that negative birthing events can lead to PTSD. Major drawbacks of this study, however, included the utilization of a non-validated measure of PTSD, not using DSM-IV criteria to assess for 'trauma' (criterion A could be met if the mothers found the birthing experience as merely 'trying'), no assessment of pre-existent PTSD and the assessment of functional impairment at an individual symptom level rather than a diagnostic level.

The present study is the first large, prospective, longitudinal study assessing the full diagnostic criteria for PTSD following childbirth while also controlling for pre-existing PTSD and affective symptomatology. The potential confound of having a diagnosis of PTSD from any event prior to birth has not been examined systematically nor has the possible contribution of other antenatal factors and mood disorders on the subsequent development of birth-related PTSD (Bailham & Joseph, 2003). This prevents a determination of whether the observed PTSD symptoms developed from a childbirth event or are an expression of pre-existing disequilibria (Ayers & Pickering, 2001).

Further, without assessing the traumatic nature of the birth event, it is also unknown whether postpartum PTSD symptoms are truly reflective of PTSD or reflective of 'trauma-like symptoms'. This is particularly relevant given that PTSD, anxiety and depression share symptomatic expressions of general distress (Engelhard *et al.* 2003). With debate on whether birthing events can even lead to the development of PTSD, the purpose of this article is to report accurate prevalence rates for PTSD caused by birthing events, rather than present a model explaining these rates.

It is notable that few studies have used established measures of PTSD (Ayers & Pickering, 2001), an omission when investigating a disorder (Foa & Meadows, 1997). Furthermore, while there are a number of single case studies reported in the literature (e.g. Ballard *et al.* 1995; Fones, 1996) and several studies with a small sample size (i.e. <200, e.g. Allen, 1998; Keogh *et al.* 2002; Soet *et al.* 2003), the relatively low life-time prevalence rate of PTSD would indicate that a large intake sample is necessary.

Finally, there is a need to consider the prevalence of diagnosable PTSD as distinct from the prevalence of women who have subclinical symptoms (i.e. partial PTSD). There is also evidence that the prevalence of partial PTSD is much higher than PTSD and that sub-syndromal PTSD is associated with significant disability (Ballenger *et al.* 2000), functional impairment (Stein *et al.* 1997) and adjustment postpartum (Soet *et al.* 2003). The present study builds upon previous influential research by investigating the development of PTSD and subclinical symptoms in a large cohort of women recruited in their third trimester of pregnancy. In order to track the development of PTSD and related symptoms, women were followed up at three time points: 4–6 weeks; 12 weeks; 24 weeks postpartum.

Method

Sample and procedure

The protocols used in this study were approved by all relevant university and hospital ethics committees. A sample of women was recruited from two antenatal clinics in Brisbane, Australia, and from two adjoining regional antenatal clinics. Researchers approached consecutive attendees who were waiting for their scheduled antenatal appointments. Women were eligible to participate if they were at least 18 years of age, in their third trimester of pregnancy (from 28 weeks gestation), able to read and write in English and contactable by phone.

Of the 1067 women approached, 933 agreed to participate during the last trimester of pregnancy (87% response rate). A total of 93% (866/933) of these women completed at 4–6 weeks postpartum, 89% (826/933) completed at 12 weeks postpartum and 83% (776/933) completed at 24 weeks postpartum. The 134 non-responders (those who declined to take part in the research) did, nonetheless, answer a short questionnaire relating to their age, marital status, length of relationship, number of children, educational level and ethnic status. There were no significant differences ($p < 0.01$) between responders and non-responders on these variables except for ethnic status. Asian women were less likely to agree to the research compared with Caucasian/Northern European women [$\chi^2(10) = 41.68$, $p < 0.001$]. The attrition rate between first and last assessment was significant in that those who dropped out were more likely to belong to a lower socioeconomic status (SES) and display more pathology at intake.

The following demographics are given to gauge the representativeness of our sample, with Australian national data (AD) following each statistic. As can be seen, and would be expected with such a large group,

our sample is quite consistent with Australian data. The mean age of participants was 29 years (mean = 28.56, *s.d.* = 5.64; *AD* mean = 29.8; Laws & Hilder, 2008), most women were married (53.9%) or cohabitating (30.1%; *AD* = 82.1% combined; Social Policy Research Centre, 2006), some were single (13.5%) and a small percentage were separated (1.9%) or divorced (0.5%; *AD* = 14.6% combined; Social Policy Research Centre, 2006). The average relationship length was 6 years. Approximately 86% were Caucasian (*AD* = 89.1%; Social Policy Research Centre, 2006), with remaining participants reflecting a diverse ethnic background. Modal educational level was just less than high school completion (grades 10 or 11; 24.7%), followed by high school completion (22.8%), completion of a technical and further education certificate (20.4%), participation in tertiary studies (1–4 years; 18.4%), completion of a tertiary higher degree (7.6%) and less than grade 10 high school completion (6.2%). Most women had a gross annual household income between AUS\$36000 and \$50000 (23%; *AD* = median household income for 2005; Australian Bureau of Statistics, 2007) and AUS\$51000–80000 (23.2%). The majority of women nominated homemaker for their employment status (48.7%), followed by full (21.8%) and part-time (9.7%) employment, unemployment (9.6%), casual work (9.1%), disability pension (0.8%) and regular shift work (0.4%). More women than not indicated that they already had children [577 women (61.8%), *AD* = 58.4%; Laws & Hilder, 2008].

Assessment of PTSD and partial PTSD

The Posttraumatic Diagnostic Scale (PDS self-report; Foa *et al.* 1997) was selected to assess prior exposure to traumatic events, PTSD symptom severity and PTSD diagnoses. In pregnancy, participants were also asked to specify the event 'that bothers them the most' when the focus was on current PTSD (Stein *et al.* 1997).

For postpartum PTSD (related only to the birth), women who met criteria A1 and A2 could meet PTSD or partial PTSD criteria. To examine whether or not criteria A1 (a traumatic event) and A2 (fear response during trauma) was met during birth, we followed exact DSM-IV-TR criteria (American Psychiatric Association, 2000). Participants rated stressors on a 10-point scale ranging from 1 (not at all) to 10 (very much), with ≥ 2 representing a 'yes' answer. The assessment of criteria A1 and A2 are central to this article and are, therefore, discussed extensively.

The exact questions asked to assess criterion A1 were: (1) 'Did you feel that your life or your baby's life was threatened during or after the birth?' (2) 'Did you think that you or your baby might die?' (3) 'Did you experience an actual injury or threat of serious injury

around the time of the birth?' (4) 'Did your baby experience an actual injury or threat of serious injury around the time of birth?' (5) 'Did you feel worried about your own safety during the labour and childbirth?' (6) 'Did you feel worried about your baby's safety during the labour and childbirth?' (7) 'Were you frightened that your baby was not normal?' Items 1–4 permitted an assessment of 'actual or threatened death or serious injury' (APA, 2000, p. 467). Items 5–7 permitted an assessment of 'a threat to the physical integrity of self or others' (APA, 2000, p. 467). No woman who received a diagnosis of PTSD only endorsed item 7 and the diagnosis of PTSD in only four women relied on one or more of items 5, 6 or 7. If a participant's baby died during the birth, then criterion A1 was met ($n = 3$, 0.3%). Further, women who did not experience the commencement of labour were instructed to answer the questions that had a reference to labour and childbirth in relation to the birth event itself.

Criterion A2 was assessed through the following item: 'During or immediately after childbirth, did you feel intense fear, helplessness, terror or horror?' As with A1, the item was rated on a 10-point scale (1 = not at all to 10 = very much), with ≥ 2 representing an affirmative answer. The PDS also assesses impairment in important areas of functioning. Criterion F for PTSD was fulfilled if participants answered 'yes' on at least one item, thereby indicating impairment in important areas of functioning.

Partial PTSD was diagnosed if the DSM-IV-TR criteria for PTSD were met except that an individual 'lacked one or two of the necessary three criterion C (avoidance) symptoms and/or they lacked one of the necessary two criterion D (hyperarousal) symptoms' (Stein *et al.* 1997, p. 1116). Based on this definition, three partial PTSD groups were formed: group 1 met all PTSD criteria except for one or two of the necessary three criterion C symptoms; group 2 met all PTSD criteria except for one of the necessary two criterion D symptoms; group 3 met all PTSD criteria except for one or two of the necessary three criterion C symptoms and one of the necessary two criterion D symptoms. Partial PTSD-like symptom groups met the same criteria as partial PTSD except the criteria for a traumatic birth event were not met (i.e. a non-criterion A event).

The concurrent validity of the PDS was examined against the Clinician Administered PTSD Scale (CAPS), a scale commonly seen as the gold standard for a diagnosis of PTSD (Griffin *et al.* 2004). A random selection of women ($n = 95$) who completed the study at 24 weeks postpartum also agreed to complete the CAPS. Overall, the PDS and CAPS correlated highly at $r = 0.81$ and cross-tabulations indicated good

agreement between the CAPS and the PDS on all criteria (A = 77.89%; B = 88.42%; C = 87.36%; D = 78.95%; E = 100%; F = 63.16%).

Assessment of anxiety

Clinically significant levels of anxiety in pregnancy and postpartum were assessed with the State-Trait Anxiety Inventory (STAI) forms Y-1 and Y-2 (Spielberger *et al.* 1983). The STAI has been utilized in research examining PTSD following childbirth (Creedy *et al.* 2000; Soet *et al.* 2003), in other PTSD studies (Freedman *et al.* 2002; Greening *et al.* 2002) and in studies with pregnant (Sjostrom *et al.* 2002) and postpartum (Matthey *et al.* 2003) women. Overall, the STAI has been extensively researched and has acceptable reliability and validity (Spielberger *et al.* 1983; Ayers, 2001). Women who received total subscale scores >40 were considered as having clinically significant symptoms of anxiety (Spielberger *et al.* 1983).

Assessment of depression

The Edinburgh Postnatal Depression Scale (EPDS; Cox *et al.* 1987) was used to assess clinically significant levels of depression in pregnancy and postpartum. The measure has acceptable psychometric properties (Cox *et al.* 1987; Eberhard-Gran *et al.* 2001) and has been widely used with pregnant and postpartum women and new mothers (Righetti-Veltema *et al.* 2002). Consistent with the EPDS recommendations and past research, scores of ≥ 12 were used to indicate possible depression and scores of ≥ 14 were used to indicate probable depression during pregnancy (Murray & Cox, 1990). Possible depression postpartum was indicated through scores of ≥ 9 and probable depression through scores of ≥ 12 (Matthey, 2004).

Results

Pre-birth trauma prevalence

Approximately 91% of women self-reported experiencing a potentially traumatic event at some point in their life and 43.3% met DSM-IV criteria for a traumatic event. A considerable number of women reported two ($n=187$, 22.2%) or more ($n=448$, 53.1%) potentially traumatic events throughout their life.

Prevalence of traumatic births

A large proportion of this sample reported a 'traumatic' birth event, at 4–6 weeks post-partum, using the DSM-IV-TR criteria ($n=394$, 45.5%). The rate of traumatic birth events in women who had not

experienced a prior traumatic life event (that met criterion A) was 43.5%. Thus, prior traumatic events did not contaminate the rate of traumatic birth events [$\chi^2(1)=0.07$, not significant]. Of those who endorsed criterion A1 ($n=727$; 83.95%), only 54.2% ($n=394$) endorsed A2 as well. Of those who endorsed A2 ($n=429$; 49.54%) only 35 (8.16%) had not endorsed A1.

In addition to criteria A1 and A2, women were asked whether they experienced any of a series of birth events that were seen as being potentially traumatic. This was to enable us to see which actual events were most related to meeting criteria for PTSD. These events included experiencing an episiotomy, vaginal tear, use of forceps or vacuum instruments to assist vaginal birth, general anaesthetic, emergency Caesarean, baby being placed in a neonatal intensive care unit, baby being born premature, baby experiencing an injury during labour or birth, woman experiencing an injury during labour or birth, woman experiencing a medical complication, baby being born with a medical illness or disability, baby experiencing medical complications and other obstetric complications during birth. Of the 866 women assessed at 1 month postpartum, 80.1% endorsed one or other of these events. By 12 weeks postpartum, this grew to 80.6% and 80.7% by 24 weeks postpartum. Of those women who went on to meet full PTSD criteria at 4–6 weeks postpartum, all had experienced at least one of these birthing events, during which they believed either their life/well-being or the life/well-being of their baby was in danger. But by 12 weeks postpartum, 9.6% reported not experiencing at least one of these events, with only 4.4% by 24 weeks postpartum not experiencing one of these birthing events. In other words, unexpected and potentially harrowing birthing events are common, yet do not necessarily account for women developing PTSD. Yet, those women who did develop PTSD invariably experienced such events.

PTSD and partial PTSD postpartum

Data regarding estimates of PTSD, partial PTSD and PTSD-like symptoms (both of criterion A not met) are presented in Table 1. Note that the rate of PTSD increases from 3.6% to 6.3% from 4–6 weeks postpartum to 12 weeks postpartum, before declining slightly to 5.8% at 24 weeks postpartum. Following childbirth, 8.9% of women met criteria for PTSD at least once over the three postpartum assessments. PTSD-like symptoms (i.e. symptoms that mirror PTSD symptoms but result from a non-criterion A event) were not examined during the last trimester of pregnancy because participants were instructed to rate symptom severity only if they had experienced a potentially traumatic event.

Table 1. Prevalence of PTSD, partial PTSD and PTSD-like symptoms pre-birth (any trauma) and postpartum due to birthing event

	Pre-birth	4–6 weeks postpartum	3 months postpartum	6 months postpartum
PTSD				
Full PTSD	75 (8.0%)	31 (3.6%)	52 (6.3%)	45 (5.8%)
Partial PTSD group 1	21 (2.3%)	12 (1.4%)	17 (2.1%)	14 (1.8%)
Partial PTSD group 2	10 (1.1%)	1 (0.1%)	2 (0.2%)	1 (0.1%)
Partial PTSD group 3	9 (1.0%)	4 (0.5%)	6 (0.7%)	2 (0.3%)
PTSD-like symptoms				
Full PTSD-like symptoms	N.A.	4 (0.5%)	23 (2.8%)	23 (3.0%)
Partial PTSD-like symptoms group 1	N.A.	6 (0.7%)	13 (1.6%)	5 (0.6%)
Partial PTSD-like symptoms group 2	N.A.	0 (0.0%)	0 (0.0%)	0 (0.0%)
Partial PTSD-like symptoms group 3	N.A.	0 (0.0%)	3 (0.4%)	0 (0.0%)
No classification	818 (87.7%)	808 (93.3%)	710 (86.0%)	686 (88.4%)
Total	933 (100%)	866 (100%)	826 (100%)	776 (100%)

Partial post-traumatic stress disorder (PTSD) group 1 met all PTSD criteria except for one or two of the necessary three criterion C symptoms; group 2 met all PTSD criteria except for one of the necessary two criterion D symptoms; group 3 met all PTSD criteria except for one or two of the necessary three criterion C symptoms and one of the necessary two criterion D symptoms. Partial PTSD-like symptom groups met the same criteria as partial PTSD except the criteria for a traumatic birth event were not met (i.e. a non-criterion A event).

Adjusted PTSD, partial PTSD and PTSD-like symptoms postpartum

Estimates of PTSD, partial PTSD and PTSD-like symptoms, after removing the data for women with PTSD and partial PTSD prior to childbirth, are presented in Table 2. The rates of PTSD at every time-point postpartum, after removing these data, are below the uncontrolled figure as presented in Table 1. As can be seen, the rates of PTSD postpartum are lower (4.7%) than those initially reported in Table 1. Furthermore, postpartum rates of full PTSD-like symptoms are reduced. Yet, the rates of partial PTSD and partial PTSD-like symptoms are comparable with the rates reported in Table 1.

Clinically significant depression and anxiety during pregnancy

Approximately 122 women (13.1%) had scores on the EPDS that were consistent with a probable diagnosis of depression (EPDS score ≥ 14) and another 9.1% ($n = 85$) had scores consistent with possible depression (EPDS score = 12 or 13). In addition, 26.8% of women ($n = 250$) had clinically significant symptoms of state anxiety and 29.7% of women ($n = 277$) had clinically significant symptoms of trait anxiety.

Adjusted PTSD, partial PTSD, and PTSD-like symptoms postpartum

Table 3 presents adjusted estimates of PTSD, partial PTSD and PTSD-like symptoms after removing the

data for women with prior PTSD and partial PTSD and clinically significant symptoms of depression or anxiety during pregnancy (as assessed during the last trimester of pregnancy). With a PTSD rate of 3.1% for women with no history of prior trauma symptomatology or depression or anxiety during pregnancy, it is clear that childbirth events can be traumatic and precipitate the onset of PTSD postpartum.

Traumatic birth events and psychopathology postpartum

Approximate rates of clinically significant symptoms of postpartum depression and anxiety following a traumatic birth event, with and without concurrent PTSD and partial PTSD, are shown in Table 4. It is evident that, after experiencing a traumatic birth, more women with possible depression had no PTSD classification, in comparison with women with possible depression and experiencing PTSD or partial PTSD. By contrast, there was a comparable number of women with full PTSD and probable depression and women with no PTSD classification but with probable depression (at 12 weeks and 24 weeks postpartum). Also, while women with a PTSD classification experienced significant anxiety, more women with clinically significant anxiety did not have a PTSD classification.

We also assessed for 'other' traumatic events (criteria A1 and A2) between birth and 24 weeks postpartum at the last assessment time-point. The way the time-frame was collected meant that we could assess the incidence of PTSD from childbirth at 12 weeks

Table 2. Adjusted prevalence of PTSD, partial PTSD and PTSD-like symptoms postpartum after controlling for prior PTSD, partial PTSD and PTSD-like symptoms

Postpartum	4–6 weeks	3 months	6 months
PTSD			
Full PTSD	18 (2.4%)	34 (4.7%)	32 (4.7%)
Full PTSD without control	31 (3.6%)	52 (6.3%)	45 (5.8%)
Partial PTSD group 1	11 (1.4%)	15 (2.1%)	11 (1.6%)
Partial PTSD group 1 without control	12 (1.4%)	17 (2.1%)	14 (1.8%)
Partial PTSD group 2	1 (0.1%)	2 (0.3%)	0 (0.0%)
Partial PTSD group 2 without control	1 (0.1%)	2 (0.2%)	1 (0.1%)
Partial (group 3)	2 (0.2%)	4 (0.5%)	2 (0.3%)
Partial (group 3) without control	4 (0.5%)	6 (0.7%)	2 (0.3%)
PTSD-like symptoms			
Full PTSD-like symptoms	3 (0.4%)	17 (2.3%)	16 (2.3%)
Full PTSD-like symptoms without control	4 (0.5%)	23 (2.8%)	23 (3.0%)
Partial PTSD-like symptoms group 1	5 (0.7%)	11 (1.5%)	5 (0.7%)
Partial PTSD-like group 1 without control	6 (0.7%)	13 (1.6%)	5 (0.6%)
Partial PTSD-like symptoms group 2	0 (0.0%)	0 (0.0%)	0 (0.0%)
Partial PTSD-like group 2 without control	0 (0.0%)	0 (0.0%)	0 (0.0%)
Partial PTSD-like symptoms group 3	0 (0.0%)	2 (0.3%)	0 (0.0%)
Partial PTSD-like group 3 without control	0 (0.0%)	3 (0.4%)	0 (0.0%)
No classification	722 (94.8%)	643 (88.3%)	620 (90.4%)
No classification without control	808 (93.3%)	710 (86.0%)	686 (88.4%)
Total no. (%)	762 (100%)	728 (100%)	686 (100%)
Total no. (%)	866 (100%)	826 (100%)	776 (100%)

Partial post-traumatic stress disorder (PTSD) group 1 met all PTSD criteria except for one or two of the necessary three criterion C symptoms; group 2 met all PTSD criteria except for one of the necessary two criterion D symptoms; group 3 met all PTSD criteria except for one or two of the necessary three criterion C symptoms and one of the necessary two criterion D symptoms. Partial PTSD-like symptom groups met the same criteria as partial PTSD except the criteria for a traumatic birth event were not met (i.e. a non-criterion A event).

postpartum and women who endorsed having experienced another traumatic event between birth and 12 weeks. This cross tabulation was statistically significant, although with a small effect [$\chi^2(1)$, $n=826$] = 8.48, $p < 0.01$, $\phi = 0.1$].

Non-traumatic birth events and psychopathology postpartum

Table 5 presents the rates of clinically significant symptoms of postpartum depression and anxiety following a non-traumatic birth event. Rates of concurrent PTSD-like symptoms are also presented. As indicated in the table, most women with possible depression did not have a PTSD-like symptom classification. Yet, more women with probable depression, in comparison with women with possible depression, had a full PTSD-like symptom classification, although this could reflect general distress postpartum. Likewise, a number of women who had clinically significant symptoms of state and trait anxiety also had a

PTSD-like symptom classification. Again, this may be reflective of general distress following childbirth.

Discussion and recommendations

The current study provides data on PTSD in pregnancy and childbirth that can be considered representative of actual occurrence. Approximately 91% of women self-reported experiencing a potentially traumatic event at some point in their life, which is similar to that reported in other trauma research (e.g. Stein *et al.* 2000; Freedman *et al.* 2002). Also, 43.3% of the sample met criteria for a traumatic event, which is also consistent with past epidemiological research (e.g. Kessler *et al.* 1995; Creamer *et al.* 2001). A considerable number of women had experienced two ($n=187$, 22.2%) or more ($n=448$, 53.1%) potentially traumatic events throughout their life; again, similar rates to those reported in epidemiological research studies (e.g. Creamer *et al.* 2001). The rate of PTSD

Table 3. Adjusted prevalence of PTSD, partial PTSD and PTSD-like symptoms postpartum after controlling for prior PTSD phenomenology and clinically significant depression and anxiety during pregnancy

Postpartum	4–6 weeks	3 months	6 months
PTSD			
Full PTSD	6 (1.2%)	15 (3.1%)	14 (3.1%)
Partial PTSD group 1	5 (1.0%)	8 (1.7%)	6 (1.3%)
Partial PTSD group 2	1 (0.2%)	1 (0.2%)	0 (0.0%)
Partial PTSD group 3	2 (0.4%)	2 (0.4%)	0 (0.0%)
PTSD-like symptoms			
Full PTSD-like symptoms	3 (0.6%)	8 (1.7%)	8 (1.8%)
Partial PTSD-like symptoms group 1	4 (0.8%)	10 (2.1%)	2 (0.4%)
Partial PTSD-like symptoms group 2	0 (0.0%)	0 (0.0%)	0 (0.0%)
Partial PTSD-like symptoms group 3	0 (0.0%)	1 (0.2%)	0 (0.0%)
No classification	479 (95.8%)	432 (90.6%)	423 (93.4%)
Total no. (%)	500 (100%)	477 (100%)	453 (100%)

Partial post-traumatic stress disorder (PTSD) group 1 met all PTSD criteria except for one or two of the necessary three criterion C symptoms; group 2 met all PTSD criteria except for one of the necessary two criterion D symptoms; group 3 met all PTSD criteria except for one or two of the necessary three criterion C symptoms and one of the necessary two criterion D symptoms. Partial PTSD-like symptom groups met the same criteria as partial PTSD except the criteria for a traumatic birth event were not met (i.e. a non-criterion A event).

before childbirth was found to be 8.0% of women, similar to that found by Kessler *et al.* (1995), who reported a lifetime prevalence of PTSD equal to 7.8%. We are, therefore, satisfied that our intake sample was reasonably representative of pregnant women in the community.

The current study also revealed that nearly half of women experienced a traumatic birth event. However, in comparison with the number of traumatic birth events, a much smaller percentage of women developed PTSD postpartum. That 45.5% of women reported, between 4 and 6 weeks after the birth, as having met PTSD criteria A1 (experienced threat to self or baby) and A2 (experienced fear, helplessness or horror) during the birth is worthy of comment. In epidemiological surveys, 50% of women and 65% of men have experienced a traumatic event excluding birth (A1; Creamer *et al.* 2001) and, of those who endorse A1, 81% of females and 69% of males also endorse A2 (Creamer *et al.* 2005). Our study demonstrated lower A1 and A2 concordance rates, with only 54.2% of those women endorsing A1 also endorsing A2. This lower concordance rate may be due to the expectation or interpretation of birth being a dangerous time for mother and baby regardless of subjective fear, helplessness or horror. However, with only 8.16% of women who had endorsed A2 not endorsing A1, it appears that subjective fear without viewing the birth as dangerous is unusual.

In the Creamer *et al.* (2005) study, of those who endorsed A2, 97% went on to endorse persistent traumatic memories of the event. In deriving the DSM-IV-TR criteria (APA, 2000), the intention may have been to have both objective (A1) and subjective (A2) appraisals of event status (traumatic *versus* non-traumatic). However, criterion A1, as it currently stands, still requires a subjective interpretation of the event.

In the current study, we asked whether the woman interpreted the birth in a similar fashion as if we were asking a returned servicewoman or any other person about a critical event. We had no doubts that the woman had given birth. That this could instigate pause for concern from researchers in the field suggests an a priori worry with criterion creep (or bracket creep; McNally, 2003) regarding whether birth could possibly be seen as traumatic at an objective (i.e. subjective third party) level. We caution against such an approach, with the preponderance of research conducted into the predictive value of A1 events finding paradoxical outcomes with 'non-traumatic' or 'stressful life' events being associated with higher trauma symptomatology than classical 'traumatic' events (Long *et al.* 2008; van Hooff *et al.* 2009). That just under half of our sample endorsed criteria A1 and A2 suggests that women who have given birth a month earlier either view the birth as dangerous and causing fear and/or have a lowered threshold for what

Table 4. Rates of clinically significant symptoms of depression and anxiety postpartum following a traumatic birth event with and without PTSD and partial PTSD

Postpartum	4–6 weeks	3 months	6 months
Possible depression			
With full PTSD	8 (16.0%)	6 (12.5%)	10 (26.3%)
With partial PTSD group 1	2 (4.0%)	6 (12.5%)	1 (2.6%)
With partial PTSD group 2	0 (0.0%)	1 (2.1%)	0 (0.0%)
With partial PTSD group 3	0 (0.0%)	1 (2.1%)	1 (2.6%)
No PTSD classification	40 (80.0%)	34 (70.8%)	26 (68.4%)
Total no. (%)	50 (100%)	48 (100%)	38 (100%)
Probable depression			
With full PTSD	19 (27.9%)	37 (47.4%)	30 (39.0%)
With partial PTSD group 1	3 (4.4%)	4 (5.1%)	3 (3.9%)
With partial PTSD group 2	1 (1.5%)	0 (0.0%)	0 (0.0%)
With partial PTSD group 3	0 (0.0%)	0 (0.0%)	0 (0.0%)
No PTSD classification	45 (66.2%)	37 (47.4%)	44 (57.1%)
Total no. (%)	68 (100%)	78 (100%)	77 (100%)
Clinically significant state anxiety			
With full PTSD	18 (21.2%)	34 (34.3%)	27 (30.0%)
With partial PTSD group 1	3 (3.5%)	7 (7.1%)	4 (4.4%)
With partial PTSD group 2	1 (1.2%)	0 (0.0%)	1 (1.1%)
With partial PTSD group 3	0 (0.0%)	1 (1.0%)	1 (1.1%)
No PTSD classification	63 (74.1%)	57 (57.6%)	57 (63.3%)
Total no. (%)	85 (100%)	99 (100%)	90 (100%)
Clinically significant trait anxiety			
With full PTSD	25 (18.9%)	45 (32.8%)	36 (28.8%)
With partial PTSD group 1	7 (5.3%)	11 (8.0%)	7 (5.6%)
With partial PTSD group 2	1 (0.8%)	1 (0.7%)	1 (0.8%)
With partial PTSD group 3	1 (0.8%)	2 (1.5%)	1 (0.8%)
No PTSD classification	98 (74.2%)	78 (56.9%)	80 (64.0%)
Total no. (%)	132 (100%)	137 (100%)	125 (100%)

Partial post-traumatic stress disorder (PTSD) group 1 met all PTSD criteria except for one or two of the necessary three criterion C symptoms; group 2 met all PTSD criteria except for one of the necessary two criterion D symptoms; group 3 met all PTSD criteria except for one or two of the necessary three criterion C symptoms and one of the necessary two criterion D symptoms.

constitutes danger and fear. The need for a distinction between these two interpretations has not been proven. Whether A1 and A2 related to childbirth have external, long-term validity (i.e. related to functional impairment and help-seeking behaviours due to memories of the birth), as well as short-term, internal validity (predicting PTSD criteria B, C and D) remains to be seen.

Women who developed PTSD as a result of childbirth invariably had experienced an unexpected and potentially harrowing obstetric event. This finding differs from previous findings (Ballard *et al.* 1995), where most women with a profile of PTSD had experienced a normal vaginal delivery. We believe that a more exhaustive history, taking assessment of the

birthing experience, may be partially responsible for this difference in results.

Consistent with other research findings (Ballard *et al.* 1995), this study also found that diagnoses of PTSD postpartum increased initially over time and then appeared to stabilize. However, unlike past research, we found that total PTSD symptom severity decreased initially postpartum and then appeared relatively stable. Similarly, the findings indicated that women can experience clinically significant levels of depression and anxiety postpartum and these rates are comparable with rates obtained in other research studies (Brown & Lumley, 1998).

We also found that women who obtained a diagnosis of PTSD at 12 weeks postpartum were more

Table 5. Rates of clinically significant symptoms of depression and anxiety postpartum following a non-traumatic birth event with and without PTSD-like symptoms

Postpartum	4–6 weeks	3 months	6 months
Possible depression			
With full PTSD-like symptoms	1 (2.6%)	3 (6.8%)	4 (7.5%)
With partial PTSD-like symptoms (group 1)	1 (2.6%)	1 (2.3%)	3 (5.7%)
No PTSD-like classification	37 (94.9%)	40 (90.9%)	46 (86.8%)
Total no. (%)	39 (100%)	44 (100%)	53 (100%)
Probable depression			
With full PTSD-like symptoms	3 (8.8%)	13 (24.5%)	15 (34.9%)
With partial PTSD-like symptoms group 1	1 (2.9%)	2 (3.8%)	0 (0.0%)
No PTSD-like symptoms classification	30 (88.2%)	38 (71.7%)	28 (65.1%)
Total no. (%)	34 (100%)	53 (100%)	43 (100%)
Clinically significant state anxiety			
With full PTSD-like symptoms	1 (2.1%)	11 (18.0%)	11 (17.7%)
With partial PTSD-like symptoms group 1	0 (0.0%)	1 (1.6%)	2 (3.2%)
No PTSD-like symptoms classification	46 (97.9%)	49 (80.3%)	49 (79.0%)
Total no. (%)	47 (100%)	61 (100%)	62 (100%)
Clinically significant trait anxiety			
With full PTSD-like symptoms	2 (2.7%)	16 (16.2%)	20 (20.8%)
With partial PTSD-like symptoms group 1	1 (1.4%)	3 (3.0%)	1 (1.0%)
With partial PTSD-like symptoms group 3	0 (0.0%)	1 (1.0%)	0 (0.0%)
No PTSD-like symptoms classification	71 (95.9%)	79 (79.8%)	75 (78.1%)
Total no. (%)	74 (100%)	99 (100%)	96 (100%)

Partial post-traumatic stress disorder (PTSD)-like symptoms group 1 met all PTSD criteria except for criteria A and one or two of the necessary three criterion C symptoms; partial PTSD-like symptoms group 2 met all PTSD criteria except for criteria A and one of the necessary two criterion D symptoms; partial PTSD-like symptoms group 3 met all PTSD criteria except for criteria A and one or two of the necessary three criterion C symptoms and one of the necessary two criterion D symptoms.

likely to experience and/or endorse other events experienced between birth and 12 weeks postpartum as 'traumatic'. However, it should be stressed that to obtain a diagnosis of PTSD from birth, the woman answered the criteria related solely in relation to the birth and we do not know whether the women who endorsed experiencing another traumatic event would have met the diagnostic criteria of PTSD from that event.

The method utilized during the present study improves on prior research that examined PTSD postpartum by having a large sample, a validated measure of PTSD, assessing impairment and accounting for pre-existent PTSD, depression and anxiety. This approach permits stronger conclusions to be drawn regarding the prevalence of PTSD following childbirth. However, we suggest that while the rates in the present study were compared with those identified through the CAPS, structured clinical interviews for all Axis I disorders (e.g. SCID) may lead to improved specificity in future research.

While this study utilized self-report measures, structured diagnostic interviews were also used, with good agreement between the CAPS and the PDS. Due to the chronicity of untreated PTSD (Sommer & Ehler, 2004), it would also be advantageous to follow up our current sample for longer than 12 months and assess outcome over at least a 5-year time-span, offering treatment to those with a continued disorder. Considering the attrition rate was over-represented by people from a lower SES and who initially displayed more pathology, these results would, if anything, represent an underestimate of total pathology and impairment.

The findings that a large number of women perceive childbirth to be traumatic, and that approximately 5.8% of women (3.1% when removing any women with a history of PTSD, anxiety or depression during pregnancy) will still have diagnosable PTSD at 6 months postpartum, speaks to the need for additional research into traumatic childbirth events and PTSD postpartum. In 2003, 251 200 births were

registered in Australia (Australian Bureau of Statistics, 2004), 695 500 were registered in the UK (National Statistics Online, 2007) and in the USA 4.12 million births were registered in 2004 (Centres for Disease Control and Prevention, 2006). Thus, traumatic birth events and PTSD could potentially impact on a significant number of women worldwide. Overall, these data suggest the need for healthcare professionals and researchers to assess the nature of childbirth events and anxiety conditions, including PTSD, postpartum. Such research could inform prevention and treatment efforts.

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Declaration of Interest

None.

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