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Running head: PTSD AFTER CHILDBIRTH

**Posttraumatic stress disorder after childbirth: Analysis of symptom presentation and sampling**

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### Abstract

**Background:** There is converging evidence that approximately 2% of women fulfill PTSD criteria following childbirth. This study examined the presentation and symptom structure of PTSD after birth and key risk factors in women from internet and community samples.

**Methods:** PTSD was measured in 1,423 women after birth recruited via the community ( $n=502$ ) or internet ( $n=921$ ). Demographic, obstetric, and trauma history variables were also measured.

**Results:** Full PTSD diagnostic criteria were endorsed by 2.5% of women from the community and 21% of women on the internet. Many more endorsed individual PTSD symptom criteria, suggesting this might be inflated by postnatal factors. Samples differed on demographic and obstetric characteristics. Factor analysis found two PTSD symptom clusters of re-experiencing and avoidance (RA) and numbing and arousal (NA).

PTSD cases were predicted by parity, delivery type, NA and RA symptoms, and the interaction between sexual trauma and PTSD symptoms. This correctly identified 64% of PTSD cases. **Limitations:** Questionnaire measurement of PTSD means prevalence rates may be over-estimated. Differences between samples suggest internet samples over represent symptomatic women. **Conclusions:** Results emphasise the importance of measuring full diagnostic criteria in postnatal samples, as reports of symptoms may be inflated. In addition a few risk factors are identified that could be used to screen for women at risk.

**Keywords:** Birth, Posttraumatic stress disorder, sexual trauma, anxiety

There is converging evidence that approximately 2% of women fulfill diagnostic criteria for PTSD following childbirth (Ayers, 2004; Olde et al., 2006). Research suggests PTSD after birth has a similar etiology to PTSD after other events. Risk factors include a history of psychological problems (Wijma et al., 1997), anxiety or depression in pregnancy (Van Son et al., 2005; Zaers et al., 2008), dissociation (Olde et al., 2005), negative emotions during labor, poor support and negative perceptions of care (Cigoli et al., 2006; Cohen et al., 2004; Czarnocka and Slade, 2000; Engelhard et al., 2006; Lemola et al., 2007; Maggioni et al., 2006; Soderquist et al., 2002; Soet et al., 2003; Van Son et al., 2005; Wijma et al., 1997). The effect of type of delivery is inconsistent suggesting there might not be a dose-response relationship between birth intervention and PTSD.

Although evidence suggests PTSD symptoms after birth and other events have similar etiology it would be premature to conclude they are comparable. Childbirth differs from other traumatic events in many ways. It is usually entered into voluntarily, is broadly predictable, experienced by the majority of women in the population, involves large physiological changes, is viewed positively by society, yet can involve breaches of bodily integrity that not all other traumatic events involve, and the baby can provide a positive outcome (Ayers et al., 2009). Similarly, the birth of a new baby requires substantial adjustment. Symptoms of arousal could be affected by normal physiological changes and fatigue after birth. Motherhood and routine postnatal healthcare make it hard for women to avoid reminders of birth, e.g. the baby and midwives, perhaps resulting in fewer symptoms of avoidance. There is some evidence to support this with studies finding 12-15% of postnatal women report re-experiencing, 2-7% avoidance, and 25-27% hyperarousal symptoms (Cigoli et al., 2006; Czarnocka and Slade, 2000; Lemola et al., 2007; Maggioni

et al., 2006; Soet et al., 2003). Therefore it might be more useful to focus on other PTSD criteria, such as disability and impairment, to determine need for treatment.

The current study therefore examines (i) the presentation and symptom structure of PTSD after birth; (ii) risk factors for PTSD after birth; (iii) risk factors for disability/impairment after birth in community and internet samples.

### **Method**

Participants were recruited to one of seven studies examining psychosocial factors and PTSD following birth: four cross-sectional internet studies (IS;  $n = 921$ ) and three longitudinal community studies (CS;  $n = 502$ ). For community studies PTSD measured in the first year after birth was used for analyses. Mean time since birth was similar in both samples (CS 10.18 months, SD 3.87; IS 12.79 months, SD 8.59) and not associated with PTSD symptoms ( $\rho = .03$ ,  $p = .29$ ) in the total sample. Data were missing for 126 participants. These were mostly from longitudinal community studies where women did not complete postnatal follow-ups ( $n = 123$ ), giving a response rate in community studies of 75%. In two of the community studies nonresponders were more likely to be single or separated. The sample for analysis was 1,297 women ( $n = 379$  community;  $n = 918$  internet sample).

Ethical approval was obtained from university and health service committees. For internet studies questionnaires were put online and the URL posted on relevant websites e.g. [www.netmums.com](http://www.netmums.com), [www.birthtraumaassociation.org.uk](http://www.birthtraumaassociation.org.uk). Participants read information about the study and indicated consent before completing questionnaires. Internet samples were checked for multiple responding by looking for duplicates in baby's date of birth and other demographic characteristics. Duplicate cases were deleted ( $n = 1$ ).

Community studies were carried out in S.E. England. Women were recruited in the last trimester of pregnancy at hospital and community antenatal clinics. Informed consent was obtained and women completed questionnaires in pregnancy and 3 - 12 months after birth.

Samples differed on demographic and obstetric characteristics. Women recruited via the internet were more likely to be white (IS 97.5%; CS 79.6%;  $X^2(4) = 1148$ ,  $p < .001$ ), primiparous (IS 65.2%; CS 56.9%;  $X^2(1) = 7.60$ ,  $p < .05$ ), highly educated (IS 82.4%; CS 74.5%;  $X^2(1) = 9.96$ ,  $p < .05$ ), and less likely to be separated or single (IS 3.4%; CS 6.7%;  $X^2(4) = 10.63$ ,  $p < .05$ ). Women in the internet sample were more likely to have assisted (IS 18.7%; CS 14%) or caesarean deliveries (IS 30.2%; CS 25.3%;  $X^2(2) = 9.87$ ,  $p < .05$ ).

### *Measures*

*PTSD and trauma history* were measured using the Posttraumatic Stress Diagnostic Scale self-report version (PDS; Foa, Cashman, Jaycox, & Perry, 1997), which corresponds to DSM-IV criteria (American Psychiatric Association, 1994). Women were asked to complete it in relation to childbirth. The PDS measures stressor criterion (perceived threat to life or physical integrity; response of helplessness or terror), symptoms of re-experiencing, avoidance and numbing, arousal, symptom duration, disability, and impaired functioning. Impaired functioning was considered present if respondents stated their overall level of functioning was affected or if they indicated that  $\geq 2$  areas of life were affected. Previous trauma history was measured by checklist and calculated as present or absent. Sexual trauma was present if women reported any of: (i) sexual assault by a stranger, (ii) sexual assault by someone they knew, and (iii) sexual contact under the age of consent.

When used as a diagnostic measure the PDS has 82% agreement with structured clinical interviews. Reliability for subscales and the total scale ranged from .74 to .94. One community study used the PTSD Symptom Scale - Self Report Version (Foa et al., 1993). This has the same items to measure PTSD symptoms, but does not measure stressor criterion, symptom duration, impairment, or trauma history.

*Depression and Anxiety* were measured using different questionnaires in different studies. These were the Edinburgh Postnatal Depression Scale (Cox et al., 1987), a widely used screening measure of postnatal depression ( $\alpha$  .91,  $n = 335$ ). The Hospital Anxiety and Depression Scale (Zigmond and Snaith, 1983) which was developed for use in medical samples ( $\alpha$  .90 anxiety, .93 depression,  $n = 107$ ). The General Health Questionnaire (28-item version; Goldberg, 1978) subscales of anxiety and depression ( $\alpha$  .86 anxiety, .86 depression,  $n = 219$ ). The State-Trait Anxiety Inventory (Spielberger et al., 1983) where participants rate themselves for how they feel 'right now' (state subscale,  $\alpha$  .95) and for how they 'generally' feel (trait subscale,  $\alpha$  .93,  $n = 108$ ).

*Demographic & obstetric details* included age, marital status, education and ethnicity. Obstetric details included months since birth, parity (first or subsequent baby), and delivery type (normal vaginal delivery/assisted delivery/caesarean section).

## **Results**

Table 1 shows the proportion of women who fulfilled PTSD diagnostic criteria. Full PTSD diagnostic criteria were endorsed by 2.5% of women in community samples and 21% of women in internet samples. Arousal and re-experiencing symptoms were more frequent than avoidance and numbing symptoms. Reports of impaired functioning were high in both samples (CS 34%; IS 74%) but fewer women reported disability and



impairment (CS 14%; IS 30%). More women met criteria for re-experiencing, avoidance, and hyperarousal symptoms than stressor criterion or disability and impairment.

- insert Table 1 about here -

Previous traumatic events were reported by over half of women (CS 56.7%; IS 59.9%; range 0-8). Rates of sexual trauma were also high (CS 22.7%; IS 33.3%;  $X^2(1) = 5.95, p < .05$ ). Events reported most frequently were sexual contact under the age of consent with someone five or more years older (CS 12%; IS 23.8%;  $X^2(1) = 9.33, p < .005$ ), sexual assault by someone they knew (CS 11.3%; IS 18.3%, ns), serious accident, fire, or explosion (CS 10.4%; IS 15.5%, ns), and other events (CS 23.3%; IS 15.5%;  $X^2(1) = 5.01, p < .05$ ). Other events predominantly comprised death, suicide, or serious injury of a parent, sibling, child, or good friend.

#### *Structure of PTSD symptoms after birth*

Unweighted least squares exploratory factor analysis was used to examine the structure of PTSD symptoms after birth. Examination of eigenvalues and scree plots showed two factors accounted for a large amount of variance (CS 46.7%; IS 62%). These were numbing and arousal (NA) which accounted for most variance (CS 33%; IS 52%) and re-experiencing and avoidance (RA) which accounted for less variance (CS 13.7%; IS 9.9%). Appendix A shows items that loaded onto each component. Three items did not load on factors in the community sample but this was largely resolved when extraction was limited to two factors (see Appendix A).

NA symptoms (range 0-27, mean 6.6, SD 6.9,  $\alpha .91$ ) and RA symptoms (range 0-24, mean 4.67, SD 6.1,  $\alpha .92$ ) were inter-correlated ( $\rho$  0.60). Depression and anxiety were moderately correlated with RA symptoms ( $\rho$  range .31 to .44) and strongly

correlated with NA symptoms (*rho* range .41 to .74). Figure 1 shows the relationship between these symptoms and type of delivery. Intervention was associated with increased symptoms although outliers show that some women with normal deliveries also reported severe symptoms.

- insert Figure 1 about here -

### *Predicting PTSD*

Stepwise regression with backward method was used to determine which factors best predicted PTSD symptoms. Risk factors associated with PTSD were entered into the model as follows: Step 1: age, marital status and ethnic group; Step 2: history of trauma or sexual trauma; Step 3: parity and type of delivery. Table 2 shows the final model, which accounted for 12% of the variance in PTSD symptoms ( $F(5,902) = 25.46, p < .001$ ).

Logistic regressions with backward method were used to examine risk factors that predicted PTSD cases or disability and impairment. Risk factors were entered as before with the addition of Step 4: NA and RA symptoms; and Step 5: interactions between trauma history x PTSD, and sexual trauma x PTSD. The final model for PTSD cases accounted for 62% of the variance and correctly identified 64.5% of women with PTSD, 95% of women without PTSD, with an overall correct classification of 89.5% ( $X^2(5) = 364.5, p < .001$ ). The final model for disability and impairment accounted for 58% of the variance, correctly identified 70% of women with disability or impairment; 93% of women with no disability or impairment; with an overall correct classification of 87% ( $X^2(4) = 388.3, p < .001$ ).

As NA symptoms were associated with symptoms of depression and anxiety, this regression was repeated with the Edinburgh Postnatal Depression Scale (EPDS) included

on step 3 to see if the PTSD symptom subscales predicted disability and impairment above and beyond the EPDS, which is widely used to screen women for postnatal depression. Results showed the EPDS did not contribute significantly to disability and impairment ( $\beta=.02$ ,  $p=.68$ ) and NA remained the strongest predictor ( $\beta=.32$ ,  $p<.001$ ,  $n = 204$ ).

- insert Table 2 about here -

### **Discussion**

This study found that PTSD symptoms following childbirth form two symptom clusters of numbing and arousal (NA) and re-experiencing and avoidance (RA), which is consistent with some studies of symptoms after other events (Asmundson, et al., 2003). NA symptoms were strongly associated with anxiety and depression suggesting it may be a measure of general distress rather than a specific traumatic stress response. A high proportion of women endorsed individual PTSD symptoms after birth, suggesting some symptoms may be inflated by normal postnatal factors. Sixty-four percent of PTSD cases were correctly identified on the basis of parity (having a first baby), delivery type (assisted or caesarean delivery), NA and RA symptoms, and the interaction between sexual trauma and symptoms.

There were clear differences between internet and community samples which has implications for research and clinical practice. Internet samples over represented symptomatic women so have limited generalisability but may be a useful medium for screening and targeting intervention. Measurement of PTSD by self-report questionnaire was not ideal as it is prone to error and false-positives. Important variables such as dissociation and support were not included (Brewin et al., 2000; Ozer et al., 2003). Nonetheless, the current study clarifies the importance of parity, delivery type, and

previous sexual trauma in the development of PTSD following childbirth. These factors could easily be screened for to identify women at risk. These results also emphasise the importance of measuring full diagnostic criteria in postnatal samples and perhaps focusing on disability and impairment as an indication of need for treatment.

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**Table 1. Proportion of women fulfilling PTSD criteria after birth**

	Community sample <sup>a</sup>	Internet sample	X <sup>2</sup> (df 1)
DSM-IV PTSD criteria	% (n)	% (n)	
(A) Stressor criteria	19.7% (31)	47.9% (427)	42.93**
A1 Threat to life	35.5% (55)	57.6% (514)	26.09**
A2 Response of fear	35.0% (56)	63.9% (576)	47.21**
(B) Re-experiencing symptoms	37.7% (143)	67.3% (616)	96.77**
(C) Avoidance & numbing symptoms	27.4% (104)	47.7% (437)	45.27**
(D) Arousal symptoms	58.0% (220)	64.7% (593)	5.14*
(E) Duration	56.0% (70)	75.4% (568)	20.38**
(F) Disability <i>or</i> impairment	37.2% (48)	55.8% (445)	15.36**
F1 significant disability <sup>b</sup>	16.5% (21)	31.3% (256)	11.31**
F2 impairment in functioning <sup>c</sup>	34.5% (48)	73.6% (594)	83.01**
Disability <i>and</i> impairment	14.3% (20)	29.8% (250)	72.38**
PTSD cases	2.5% (4)	21.0% (179)	30.9**

Chi Square test, \* $p < .05$ , \*\* $p < .001$

<sup>a</sup> One of the community studies only measured criteria B, C, and D so  $n$  ranges from 127 to 379.

<sup>b</sup> defined as 'significantly disabling' or worse (score of 2 or more on the PDS).

<sup>c</sup> defined as reporting impaired functioning generally or reporting impairment to two or more specific areas of life.



**Table 2: Regression models of risk factors for PTSD, disability and impairment after birth**

	<b>Variables in the final model</b>	<b>Beta</b>	<b>Exp b</b>
<b>PTSD symptoms</b>	Age	-.11 <sup>***</sup>	
	Marital status	.06	
	Ethnic group	.05	
	History of sexual trauma	.17 <sup>***</sup>	
	Delivery type	.28 <sup>***</sup>	
<b>PTSD cases</b>	Parity	.80 <sup>*</sup>	2.23
	Delivery type	.50 <sup>***</sup>	1.65
	Numbing and arousal symptoms	.16 <sup>***</sup>	1.17
	Re-experiencing and avoidance symptoms	.14 <sup>***</sup>	1.15
	History of sexual trauma x PTSD symptoms	.03 <sup>*</sup>	1.03
<b>Disability and impairment</b>	History of sexual trauma	.30	1.35
	Delivery type	.17	1.18
	Numbing and arousal symptoms	.21 <sup>***</sup>	1.23
	Re-experiencing and avoidance symptoms	.11 <sup>***</sup>	1.11

\* p&lt;.01, \*\* p&lt;.005, \*\*\* p&lt;.001

### Appendix A. Item loadings for factor analysis of PTSD symptoms

PDS item no.		Internet sample		Community sample	
		1	2	1	2
		<i>Numbing &amp; Arousal</i>			
9	Less interest in activities	.68		.65	
10	Feeling distant and cut off	.76		.79	
11	Feeling numb	.69		.68	
12	Feeling that future plans are not possible	.73		.56	
13	Trouble falling or staying asleep	.63		.57	
14	Irritable or fits of anger	.71		.63	
15	Trouble concentrating	.77		.51	
16	Being overly alert	.81		.50 <sup>a</sup>	
17	Being jumpy and easily startled	.79		.52 <sup>a</sup>	
<i>Re-experiencing &amp; Avoidance</i>					
1	Upsetting thoughts and images	.92		.69	
2	Bad dreams or nightmares	.61		.70	
3	Reliving the event	.67		.46	
4	Emotionally upset at reminders	.85		.70	
5	Physical reactions when reminded	.77		.69	
6	Trying not to think about the event	.81		.67	
7	Trying to avoid activities that remind you	.80		.56	
8	Not remembering part of the event	.42		.17 <sup>b</sup>	

<sup>a</sup>These items only loaded on this factor in the community sample when extraction was restricted to two factors.

<sup>b</sup>This item did not load on any factor in the community sample.