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RUNNING HEAD: Hyperarousal symptoms after birth

# Hyperarousal symptoms after traumatic and nontraumatic births

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## Abstract

**Background**: Symptoms of postnatal PTSD may be influenced by normal postnatal phenomena such as fatigue so measurement is critical.

**Objective**: This study examined: (1) whether hyperarousal symptoms differ between women who have traumatic or non-traumatic births; (2) whether the construct of hyperarousal is coherent in postnatal women; and (3) whether hyperarousal symptoms accurately identify women who have traumatic births.

**Methods**: A survey of PTSD symptoms in 1,078 women recruited via the community or internet who completed a questionnaire measuring childbirth-related PTSD symptoms 1 to 36 months after birth. DSM-IV criterion A were used to classify women as having a traumatic (n = 458) or nontraumatic birth (n = 591).

**Results**: A one-factor dimension of hyperarousal was identified that included all five hyperarousal items. Diagnostic criteria of two or more hyperarousal symptoms was reported by 75.3% of women with traumatic birth and 50.5% of women with non-traumatic births. The difference in mean hyperarousal symptoms between groups was substantial at 0.76 of a standard deviation (Hedge's *g*, CI = 0.64, 0.89). A larger difference was found for women with PTSD (*g*=1.64, CI 1.46, 1.81). However, ROC analyses showed hyperarousal symptoms have poor specificity. Alternative ways of calculating symptoms did not improve this. Re-experiencing symptoms were most accurate at identifying women with traumatic births.

**Conclusions**: Results suggest hyperarousal symptoms are associated with traumatic birth and are a coherent construct in postnatal women. However, they have poor specificity and should only be used as part of diagnostic criteria, not as a sole indicator.

## Introduction

There is evidence that some women develop post-traumatic stress disorder (PTSD) following traumatic birth experiences (McKenzie-McHarg, Ayers, Ford, Horsch, Jomeen, Sawyer, Slade, Stramrood & Thomson, 2015). A recent meta-analysis found that 3.17% of women develop PTSD following childbirth and this increases to 15.7% of women at high-risk (Grekin & O'Hara, 2014). High risk includes women with a psychiatric history, history of trauma, and adverse perinatal factors such as fear of childbirth, preterm birth and preeclampsia (Feeley et al., 2011; Ryding, Persson, Onell, & Dvist, 2003; Shaw, Bernard, Storfer-Isser, Rhine, & Horwitz, 2013). The diagnostic criteria for PTSD were recently updated in DSM-5 (American Psychiatric Association, 2013) with substantial changes, which reflect ongoing debate over how PTSD is defined as a disorder (Brewin, Lanius, Novac, Schnyder, & Galea, 2009; Rosen, Lilienfeld, Frueh, McHugh, & Spitzer, 2010). This tension is especially relevant to the field of PTSD following childbirth because having a baby is a time of great life change and adjustment where normal symptoms of stress or anxiety may risk being over-pathologised.

When assessing childbirth as a potential stressor, we therefore need to remain mindful that it differs from other traumatic events in many ways. Childbirth 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 breeches of bodily integrity that not all other traumatic events involve (Ayers, Joseph, McKenzie-McHarg, Slade, & Wijma, 2008). Childbirth is also not traumatic for most women, but in many cases can be a positive and fulfilling event. Approximately 15% to 20% of women rate childbirth as traumatic according to the previous DSM-IV diagnostic criteria (Ayers, Harris, Sawyer, Parfitt, & Ford, 2009; Boorman, Devilly, Gamble, Creedy, & Fenwick, 2014). These criteria specify that a person should witness or experience death, or

threat of death or serious injury (Criterion A1); and respond with intense fear, helplessness or horror (Criterion A2) (American Psychiatric Association, 2000). After a birth experienced as traumatic, many women recover and do not experience the full range of PTSD symptoms or meet diagnostic criteria. Those who do develop the disorder need to have all three types of symptoms that are listed in DSM-IV (see Table 1). In DSM-5 (APA, 2013) a fourth cluster of symptoms was added of negative alterations in cognitions and mood, such as amnesia for aspects of the event, negative cognitions about self, others or the world, distorted blame of self or others, and the inability to experience positive emotions. For a diagnosis of PTSD, people should report one or more re-experiencing symptoms, two or more hyperarousal symptoms, and the number of avoidance symptoms was reduced from three or more in DSM-IV to one or more in DSM-5. Symptoms should be experienced for longer than one month and cause significant distress, disability and impaired functioning.

Given that 15 to 20% of women experience childbirth as traumatic but only 3% develop full PTSD, it is worth considering the nuances of symptom experience and remission within postnatal women, and reflecting on how these may differ from PTSD symptoms in individuals following other traumatic events. One particular issue is the symptom cluster of hyperarousal. The birth of a new baby requires substantial adjustment, with physiological changes and fatigue almost universal after birth. The postpartum period may be associated with increased vigilance and parental preoccupation with the newborn (Leckman et al., 2004) which creates an environment for meeting the needs of the infant and keeping it safe. Leckman et al. (1994) propose this process might be mediated by oxytoxin, the “bonding” hormone, which has also been associated with anxious, obsessional and hypervigilant behaviour, more normally typical of obsessive compulsive disorder. This hypervigilance may manifest in heightened anxiety immediately after the birth (Paul, Downs, Schaefer, Beiler, & Weisman, 2013) and up to eight weeks later (Wenzel, Haugen, Jackson, & Brendle, 2005).

Therefore, hyperarousal symptoms may naturally be elevated in mothers in the postpartum period, whether the birth was traumatic or not, and it is important to disentangle normal symptoms of hyperarousal from pathological symptoms. If hyperarousal symptoms are naturally elevated after birth, there are two main implications for postnatal PTSD diagnosis: one is that it may be hard to distinguish between women with PTSD or not, following birth, on the basis of hyperarousal symptoms. Secondly, hyperarousal symptoms may be inflated in women with postnatal PTSD compared to those who have PTSD following other events.

There is some evidence to support increased hyperarousal symptoms in women after birth. Some studies have reported higher levels of hyperarousal symptoms and lower levels of avoidance symptoms in women with postnatal PTSD (Cigoli, Gilli, & Saita, 2006; Czarnocka & Slade, 2000; Lemola, Stadlmayr, & Grob, 2007; Maggioni, Margola, & Filippi, 2006; Soet, Brack, & Dilorio, 2003). A previous report on the data used in the current study, examining the presentation of PTSD symptoms, also found the prevalence of hyperarousal symptoms was higher (58%) than avoidance (27%) and re-experiencing symptoms (38%) in postpartum women[1] (Ayers et al., 2009). It is not clear whether all hyperarousal symptoms are equally elevated in the postpartum period or whether, for example, being overly alert may be elevated but irritability may not be.

If levels of postnatal PTSD symptoms differ from standard diagnostic criteria it has a number of implications for research and practice. In perinatal research, we need to consider how to best measure PTSD in order to be accurate and not over- or under-estimate the prevalence of PTSD. Similarly, in clinical practice we need to consider how best to screen for postnatal PTSD and identify women who need treatment. There are a number of ways this can be done. One is to adapt diagnostic criteria for postnatal PTSD. This may mean women need to report more hyperarousal symptoms than usually required, or report hyperarousal

symptoms that are not commonly observed in women after birth. However, any recommendations for adaptations to diagnostic criteria for PTSD in postnatal women must be based on evidence. Research is therefore clearly needed to inform how we assess and measure perinatal PTSD accurately. The current study therefore aimed to examine: 1) whether hyperarousal symptoms differ between women who have traumatic or non-traumatic births; 2) whether the construct of hyperarousal is coherent in postnatal women; and 3) whether hyperarousal symptoms are useful for identifying women who have traumatic births or PTSD.

## Method

### Design

This paper reports information from a cross-sectional survey of PTSD symptoms in women after birth using a validated measure of PTSD symptoms, administered as postal questionnaires or online.

### Participants

Participants were recruited to a series of studies examining childbirth-related PTSD (see Ayers et al., 2009 for methods)[2] where 918 women were recruited via the internet and 160 from antenatal clinics in hospitals or the community.

### Sampling and Recruitment

Ethical approval was obtained from university and National Health Service research ethics committees. Women in the community sample were recruited in the last trimester of pregnancy from hospital and community antenatal clinics. Informed consent was obtained and women completed questionnaires approximately 3 months after birth. Internet recruitment was also used to access greater numbers of women who might have experienced

traumatic births. Questionnaires were put online and the URL posted on relevant websites e.g. www.netmums.com, www.birthtraumaassociation.org.uk. Women were eligible for online studies if they had given birth in the previous three years. 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 demographic characteristics.

**Data Collection Instruments**

Criterion A and PTSD symptoms were measured using the Posttraumatic Stress Diagnostic Scale self-report version (PDS; Foa, Cashman, Jaycox, & Perry, 1997), which corresponds to DSM-IV criteria (APA, 2000). When used as a diagnostic measure the PDS has 82% agreement with structured clinical interviews. Internal reliability (Cronbach's alpha) for subscales and the total scale ranged from .74 to .94. Women were asked to complete the measure in relation to childbirth. Women were classified as having a traumatic birth if they reported (i) thinking their or someone else's life was in danger and/or they or someone else were physically injured; and (ii) that they felt helpless and/or terrified (N=458). If women reported only one, or none, of these criteria they were classified as having a non-traumatic birth (N=591).

Symptoms of PTSD were measured for re-experiencing (5 items), avoidance and numbing (7 items), and hyperarousal (5 items) on a frequency scale from 0 (not at all) to 3 (five or more times a week). Duration of symptoms and perceived disability and impairment are also included and used to calculate diagnostic PTSD. Impaired functioning was considered to be present if women stated their overall functioning was affected, or if they indicated that two or more areas of their life were affected. When used as a diagnostic

measure the PDS has 82% agreement with structured clinical interviews. Internal reliability for subscales and the total scale (Cronbach's alpha) in this sample ranged from .87 to .94.

## Results

### Sample

A total of 1078 women completed the questionnaire in the internet and community samples. Mean time since birth was different in the community (3.32 months, SD 0.62) and internet samples (12.80 months, SD 8.60). Time since birth had a small association with PTSD symptoms ($\rho = .17$, $p < .01$). Samples differed on a number of characteristics. Women recruited via the internet were more likely to be younger ($t(1050) = -6.16$, $p<.001$), white ($\chi^2(4) = 33.33$, $p<.001$), educated to degree level or higher ($\chi^2(5) = 105.39$, $p<.001$), have assisted instrumental births ($\chi^2(2) = 10.16$, $p=.006$) and report PTSD symptoms ($t(450.07) = 13.69$, $p<.001$).

### Aim 1: Hyperarousal symptoms in women with traumatic and non-traumatic births

The distributions of responses to hyperarousal items for women with traumatic and non-traumatic births are shown in Figure 1. This shows hyperarousal symptoms have different distributions in women with traumatic births and non-traumatic births. Symptoms that were least endorsed by women with non-traumatic births were '*being overly alert*' and '*being jumpy or easily startled*' with only 20 to 22% of women with non-traumatic births reporting these (see Table 2). Spearman correlations between symptoms and traumatic birth were moderate and similar for all items (range $\rho = .27$ to $.32$). Confidence intervals for the correlations are shown in Figure 1 for each item.

The number of women who reported hyperarousal symptoms after traumatic and non-traumatic births is shown in Table 1. Significantly more women who had traumatic births

reported symptoms on every hyperarousal item compared to women who had non-traumatic births. However, it can be seen that between 20% and 51% of women who had non-traumatic births also reported hyperarousal symptoms. This was particularly high for '*having trouble concentrating*' which was reported by 51.4% of women with non-traumatic births, and '*feeling irritable or having fits of anger*' which was reported by 45.1% of women with non-traumatic births. Using DSM criteria to classify presence of hyperarousal would therefore include 50.5% of women with non-traumatic births who reported two or more symptoms. If the frequency criteria are raised from at once a week to 2-4 times a week this reduces the number of women with non-traumatic births identified to 35.4%.

- Insert Table 2 and Figure 1 here -

**Aim 2: Construct of hyperarousal symptoms in postnatal women**

Correlations between hyperarousal symptoms were high ($\rho$ = .46 to .74). It is possible that one or more unmeasured latent factors underlies these observed variables and may offer a more parsimonious understanding of the hyperarousal construct. There are several latent variable models appropriate for situations where it is assumed that ordinal observed variables, like the hyperarousal items, are caused by a small number of continuous latent factors (for reviews see Bartholomew, Knott, & Moustaki, 2011; Embretson & Reise, 2000). For this analysis, a graded response model was used which allows for the possibility that items may have different discrimination abilities and transition points from each other (Samejima, 1969) [3]. We compared models with 1, 2 and 3 latent factors using the Akaike and Bayesian information criteria (AIC and BIC) to compare the fit of models. Low values mean better fit and BIC prefers simple models more than AIC. The difference between values for different models is what is important rather than the absolute magnitude. The AIC values for the three models were: 10270.90, 10150.98, and 10155.41; the BIC values were 10370.56, 10270.57,

and 10289.94 respectively. The one- and two-factor solutions were examined in more detail. If the loadings for the two-factor solution were rotated and allowed to correlate, the factors differentiated symptoms of hyper-vigilance or anxiety (i.e. overly alert and easily startled) from fatigue (i.e. poor sleep, poor concentration, and irritability). However, these factors were highly correlated with each other ($r$ = .82). If an orthogonal rotation was used all five items loaded on both factors so factor interpretation becomes conceptually difficult. All items load highly on the single factor from the one-factor solution. Therefore, the one-factor graded response model was used.

**Aim 3: Are hyperarousal symptoms useful for identifying women with traumatic birth or PTSD?**

The distribution of the single factor of hyperarousal symptoms for women who had traumatic or non-traumatic births is shown in Figure 2. The distribution for women who have diagnostic PTSD or no PTSD is shown in Figure 3. In these diagrams the factor has been standardized so that the mean is 0 and standard deviation is 1 for the whole sample. It can be seen that the hyperarousal factor has a different distribution in these groups. The effect size (Hedge's $g$, calculated using Del Re, 2013) is the difference in means divided by the pooled standard deviations from within each group. The difference between women who had a traumatic or non-traumatic birth was $g$ = 0.76 of a standard deviation (95% CI = 0.64, 0.89) and the difference between women who had diagnostic PTSD or no PTSD was $g$ = 1.64 standard deviations (95% CI = 1.46, 1.81).

- insert Figures 2 and 3 here –

Receiver operating characteristic (ROC) curve analysis was used to examine the sensitivity and specificity of the hyperarousal factor at identifying women with a traumatic birth. For a measure to be useful the area under the curve should be good (.80 - .90) or

excellent (.90 – 1.0). Hyperarousal symptoms were in the poor to fair range at identifying women with traumatic birth (area under the curve = .71; 95% CI .68 to .74). A cut-off value of 2.5 or more provided 100% sensitivity but only 46% specificity. A cut-off of 3 or more provided 95% sensitivity and 58% specificity. Changing the criteria for hyperarousal symptoms to restrict it to women who reported more frequent symptoms (i.e. 2 to 4 times a week) or symptoms that are more rarely reported (i.e. *overly alert* and *easily startled*) did not improve the ROC statistics. This confirms that, although all women with traumatic birth report hyperarousal symptoms, these are not specific to traumatic birth and also observed in women with non-traumatic births. Alternative methods of calculating hyperarousal symptoms do not appear to improve this.

Comparison of ROC curves for hyperarousal symptoms with symptoms of re-experiencing and avoidance is shown in Figure 4. This shows that symptoms of re-experiencing perform best at identifying women with traumatic birth and would be classified as good (area under the curve = .84, 95% CI = .82 to .87). Symptoms of avoidance are also reasonable and would be classified as fair to good (area under the curve = .79, 95% CI = .76 to .82). Symptoms of re-experiencing and avoidance therefore appear to be better identifiers of women who have traumatic births than symptoms of hyperarousal.

- insert Figure 4 here -

## Discussion

This study is the first to examine whether the construct of hyperarousal symptoms is useful when investigating responses to traumatic birth. Results suggest postnatal hyperarousal symptoms are a coherent, unidimensional factor and are associated with traumatic birth. However, hyperarousal symptoms were also reported by approximately half of women who

had non-traumatic births so have poor specificity. Symptoms of re-experiencing were more accurate at identifying women with traumatic births. These results are discussed in turn.

This study provides evidence to support a one- and two-dimensional construct of hyperarousal symptoms. The two dimensions were interesting in that they formed a hypervigilance factor (*overly alert* and *easily startled*) and a fatigue-related factor (*trouble sleeping*, *irritable* and *trouble concentrating*). The hypervigilance items were also those that were least likely to be endorsed by women who had non-traumatic births. However, the relationship between the hypervigilance and fatigue-related factors was so high it made them difficult to interpret. We therefore used a single dimension of hyperarousal symptoms.

Results are mixed with regard to whether hyperarousal symptoms are useful for identifying postnatal PTSD. On the one hand, the results confirm that hyperarousal symptoms are associated with traumatic birth, and women who have traumatic births report substantially more hyperarousal symptoms. On the other hand, hyperarousal symptoms are also reported by women with non-traumatic births so have poor specificity. DSM diagnostic criteria state that two or more hyperarousal symptoms are needed for a diagnosis of PTSD. The measure used in this study specified that symptoms had to be experienced at least once a week. As half of women with non-traumatic births met these criteria they are clearly not optimal for identifying traumatic birth or postnatal PTSD. Changing criteria to more frequent symptoms (i.e. twice a week or more), or to only include symptoms that were less endorsed by women with non-traumatic births, did not improve predictive ability. Hyperarousal symptoms are therefore unlikely to be a good indicator of traumatic birth.

**Strengths and limitations**

Strengths of this study include the large sample and measurement of all diagnostic criteria. Different sampling methods via the community and internet mean a broad range of women

were included, resulting in good variance in the primary variables of interest – traumatic birth and PTSD. The samples from the community and internet differed demographically but each method of recruitment has advantages. Data from the community samples are more representative of the general population of postnatal women. However, numbers of PTSD cases are low in prospective studies, thereby restricting analyses. Conversely while internet samples, recruited postnatally, provide higher absolute numbers of rare outcomes, they may be influenced by self-selection biases. The bulk of our sample were therefore recruited postnatally and our combined sample is not likely to be representative of the childbearing population as a whole.

Limitations include that the study did not have certain comparison groups. It would be interesting to compare women in our sample with women who have not recently given birth, or women with PTSD following non-childbirth related events. This would enable us to answer questions about whether hyperarousal sypmptoms following childbirth are higher than in the general population (i.e. women who have not given birth recently); or higher than those observed after other potentially traumatic events. Another limitation is that the outcome measure used in analyses was traumatic birth rather than PTSD. This was preferable because measures of hyperarousal and PTSD are not independent. Traumatic birth therefore provides an independent indicator of postnatal PTSD. However, future research is needed to look at the diagnostic utility of hyperarousal symptoms in women with postnatal PTSD compared to PTSD following other events.

A third limitation was that time since birth when questionnaires were completed ranged from 1 to 36 months which could have introduced recall bias if women re-appraise or reframe their experiences differently as time goes on (Waldenström, 2003). However, other postnatal surveys have found no effect of time since birth on survey responses (e.g. Ford, Ayers and Wright, 2009).

**Implications for research and clinical practice**

This study suggests postnatal hyperarousal symptoms are a coherent construct but not discriminative of traumatic birth or PTSD. Alternative ways of calculating hyperarousal did not improve this. Rather, it suggested that re-experiencing symptoms are most indicative of a traumatic birth. The implications of this for research and clinical practice are varied. As hyperarousal symptoms were higher in women with traumatic births it suggests symptoms are valid to use as part of diagnostic criteria for postnatal PTSD but should not be used as a sole measure. It might be useful to focus more on re-experiencing symptoms or weight these more heavily in diagnostic criteria for postnatal PTSD.

The results of this study also suggest we should examine more closely other symptoms of PTSD. Hyperarousal may not be the only symptom affected by the circumstances of the postnatal period. Several studies have found that avoidance symptoms are lower compared to other symptoms in postnatal women (Cigoli et al., 2006; Czarnocka & Slade, 2000; Lemola et al., 2007; Maggioni et al., 2006; Soet et al., 2003). Motherhood and routine postnatal healthcare make it hard for women to avoid reminders of birth such as health clinics and the baby, which might lead to fewer symptoms of avoidance. Similarly, symptoms may be affected by other postnatal phenomena, such as fatigue, returning to work, or experiencing additional stressful life events. These possibilities warrant further consideration.

**Summary and conclusions**

This is the first study to examine the utility of hyperarousal symptoms in the concept and diagnosis of postnatal PTSD. Results suggest hyperarousal symptoms are associated with traumatic birth and are a coherent construct in postnatal women. However, they have poor specificity to traumatic birth and should only be used as part of diagnostic criteria, not as a

sole indicator. Alternative methods of calculating hyperarousal symptoms by raising the frequency criteria or focusing on symptoms that are more specific to traumatic birth did not improve diagnostic ability. In future it may be more useful to focus on symptoms of re-experiencing which have greater diagnostic ability. However, this study is limited by lack of a comparison group and uses traumatic birth as an indicator of PTSD. Further research is needed to replicate and further explore how normal postnatal factors, such as fatigue and maternal preoccupation with the newborn interact with the manifestation of PTSD as a result of a difficult birth.

**Footnotes**

1. Percentages based on women recruited from the community. For more information see Ayers et al (2009).
2. One community study included in the previous analyses reported by Ayers et al. (2009) is not included here because it did not include a measure of criterion A.
3. Comparison of this graded model with three other models (a rating scale model, generalised rating scale, and generalised partial credit model) showed it was a significantly better fit of the data (AIC 10270.9, BIC 10370.56, $\chi^2 \geq 36.7$, all $p < .001$).

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**Table 1: Symptoms of PTSD (DSM-IV: APA, 1994)**

| Symptom Cluster | Symptoms |
|---|---|
| Re-experiencing<br>(one or more) | 1) recurrent and intrusive distressing recollections of the event.<br>2) recurrent distressing dreams of the event.<br>3) acting or feeling as if the traumatic event were recurring.<br>4) intense psychological distress at exposure to cues that are reminders of the event.<br>5) physiological reactivity on exposure to cues that are reminders of the event. |
| Avoidance and numbing<br>(three or more) | 1) efforts to avoid thoughts, feelings, or conversations associated with the trauma.<br>2) efforts to avoid activities, places, or people that arouse recollections of the trauma.<br>3) inability to recall an important aspect of the trauma.<br>4) markedly diminished interest or participation in significant activities.<br>5) feeling of detachment or estrangement from others.<br>6) restricted range of affect (e.g., unable to have loving feelings).<br>7) sense of a foreshortened future (e.g., does not expect to have a normal life span). |
| Hyperarousal<br>(two or more) | 1) difficulty falling or staying asleep.<br>2) irritability or outbursts of anger.<br>3) difficulty concentrating.<br>4) hypervigilance.<br>5) exaggerated startle response. |

**Table 2. Proportion of women with traumatic and non-traumatic births who reported hyperarousal symptoms**

| | Hyperarousal items | Loading on the 1-factor solution [a] | Traumatic birth % (N) N=458 | Non-traumatic birth N (%) N=591 |
|---|---|---|---|---|
| 1 | Having trouble falling or staying asleep | 0.75 | 59.1% (270) | 34.6% (204) |
| 2 | Feeling irritable or having fits of anger | 0.81 | 72.9% (333) | 45.1% (265) |
| 3 | Having trouble concentrating (for example drifting in and out of conversations, losing track of a story on television, forgetting what you read) | 0.82 | 73.1% (334) | 51.4% (303) |
| 4 | Being overly alert (for example, checking to see who is around you, being uncomfortable with your back to a door, etc) | 0.92 | 49.0% (224) | 20.1% (118) |
| 5 | Being jumpy or easily startled (for example, when someone walks up behind you) | 0.92 | 50.9% (231) | 22.8% (134) |
| | Presence of 2 or more symptoms at least *once* a week | | 75.3% (345) | 50.5% (299) |
| | Presence of 2 or more symptoms at least *twice* a week | | 64.4% (295) | 35.4% (209) |

All differences significant at p<.001: Items 1 to 5 $\chi^2$ (4) 80.97 - 109.20; presence of symptoms $\chi^2$ (5) 131.98 - 141.07.
[a] in the 2-factor solution items 4 and 5 loaded on the first factor, and items 1, 2 and 3 loaded on the second factor

**Figure 1. The distribution of hyperarousal symptoms for women with traumatic and non-traumatic births**

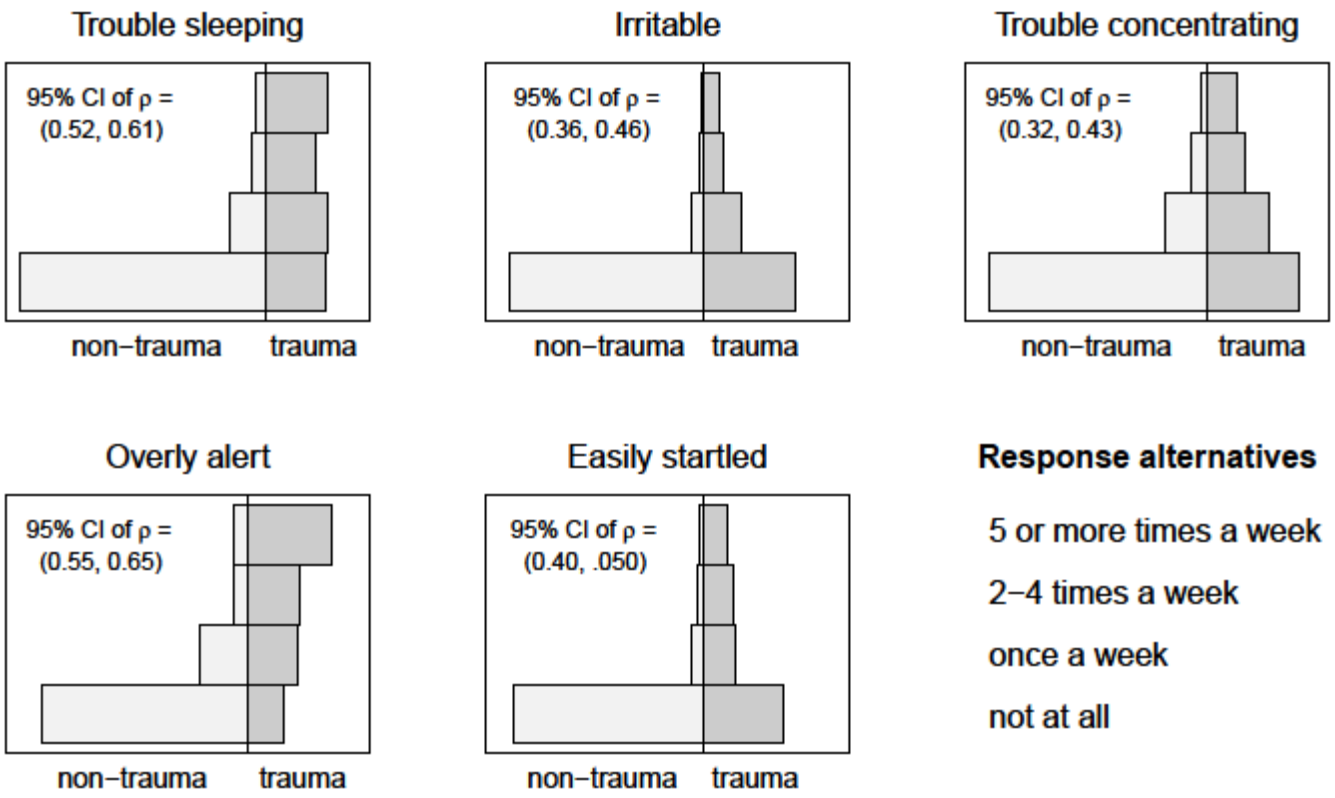

**Figure 2. The distribution of the standardised factor of hyperarousal symptoms for women with traumatic or nontraumatic births.**

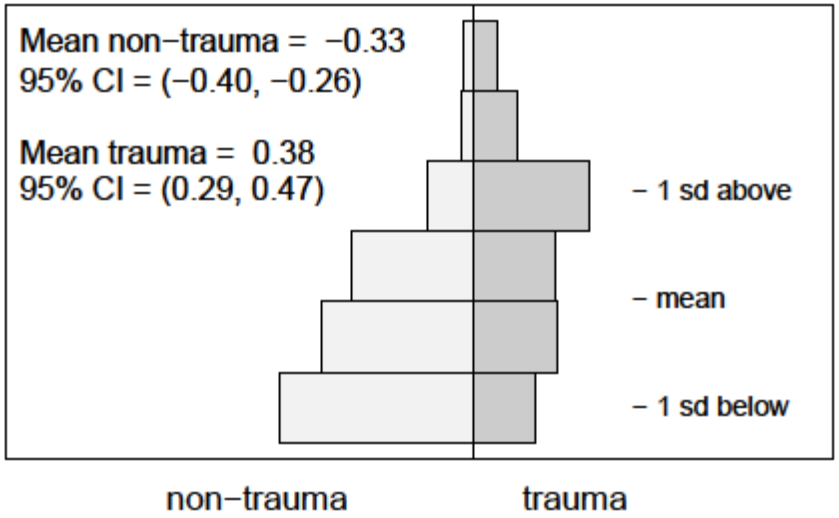

**Figure 3. The distribution of the standardised factor of hyperarousal symptoms for women with PTSD and no PTSD**

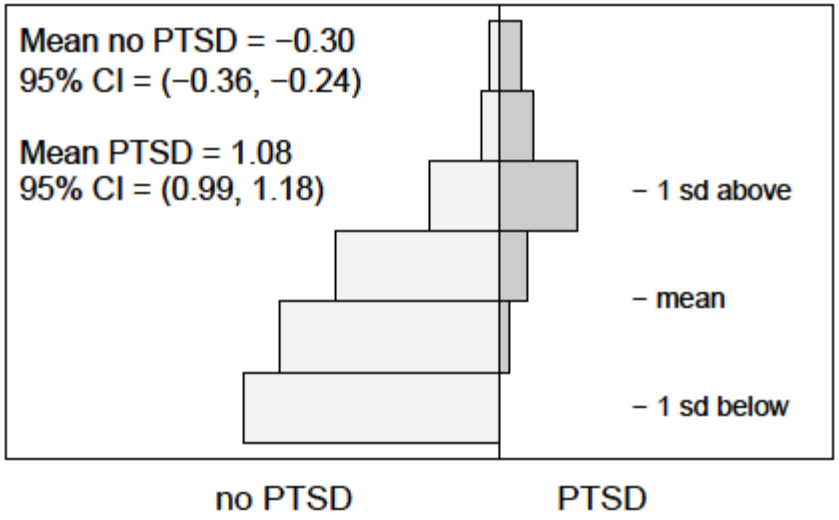
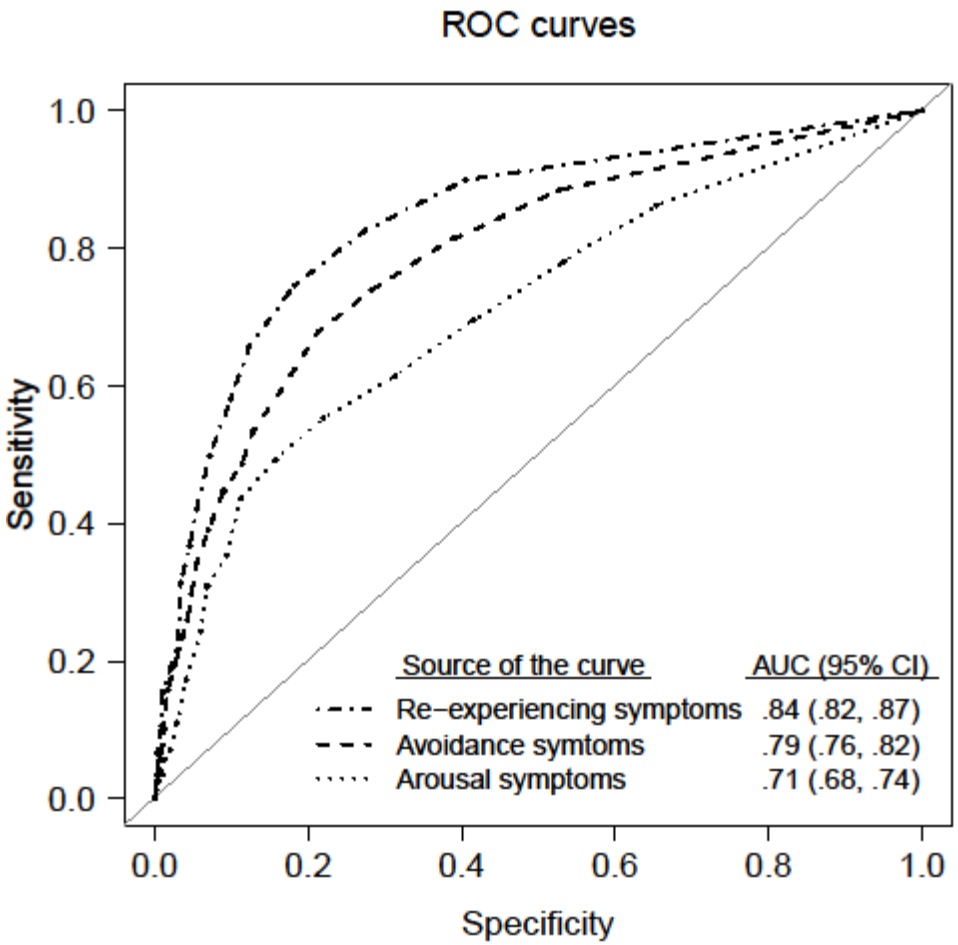
**Figure 4. ROC curves for the diagnostic ability of hyperarousal, re-experiencing and avoidance symptoms to predict traumatic birth**