TECHNICAL COMMENTARY

NeuRA
Discover. Conquer. Cure.
POST-TRAUMATIC STRESS DISORDER LIBRARY

Pregnancy and childbirth

Introduction

For a person to be diagnosed with PTSD, at least one stressor is required. Stressors as determined by the latest version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) include being exposed to threatened death, actual or threatened serious injury, or actual or threatened sexual violence. Examples are direct exposure, witnessing the trauma, or learning that a relative or close friend was exposed to trauma.

This summary table presents the evidence for PTSD following pregnancy and childbirth.

Method

We have included only systematic reviews (systematic literature search, detailed methodology with inclusion/exclusion criteria) published in full text, in English, from the year 2010 that report results separately for people with PTSD. Reviews were identified by searching the databases MEDLINE, EMBASE, and PsycINFO. When multiple copies of reviews were found, only the most recent version was included. We prioritised reviews with pooled data for inclusion.

Review reporting assessment was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist that describes a preferred way to present a meta-analysis[1]. Reviews with less than 50% of items checked have been excluded from the library. Note that early reviews may have been guided by less stringent reporting checklists than the PRISMA, and that some reviews may have been limited by journal guidelines.

Evidence was graded using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group approach where high quality evidence such as that gained from randomised controlled trials (RCTs) may be downgraded to moderate or low if review and study quality is limited, if there is inconsistency in results, indirect comparisons, imprecise or sparse data and high probability of reporting bias. It may also be downgraded if risks associated with the intervention or other matter under review are high. Conversely, low quality evidence such as that gained from observational studies may be upgraded if effect sizes are large or if there is a dose dependent response. We have also taken into account sample size and whether results are consistent, precise and direct with low associated risks (see end of table for an explanation of these terms)[2]. The resulting table represents an objective summary of the available evidence, although the conclusions are solely the opinion of staff of NeuRA (Neuroscience Research Australia).

Results

We found two systematic reviews that met our inclusion criteria[3, 4].

- Moderate quality evidence found the prevalence of PTSD in community samples of prenatal women is around 3.3%, and postpartum PTSD was around 4%. Rates were higher in high-risk samples of women who had difficult births or pregnancies or had babies with fetal anomalies (prenatal PTSD = 18.95%, postpartum PTSD = 18.5%).
- Moderate to high quality evidence found the pre-birth risk factors associated with PTSD (in descending order of effect) were depression in pregnancy, fear of childbirth, history of PTSD, poor health or complications, receiving counselling for pregnancy/birth, having previous psychological problems, less educational, less social support, history of sexual trauma, ethnicity, history of any trauma, higher parity, planned pregnancy, and younger age. At-birth risk factors associated with PTSD were negative subjective birth experiences, an operative birth, lack of support from staff, negative emotions, dissociation, objective birth experience, infant-related complications, lack of control or agency, pain, and shorter length of labour. Post-birth

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

To donate, phone 1800 888 019 or visit www.neura.edu.au

Pregnancy and childbirth

risk factors associated with PTSD were depression after childbirth, poor coping and stress, poor mental health, anxiety, and physical complications. No associations were found with marital status, socio-economic status, emotional health, time since birth, or presence of partner/companion at birth.

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au
To donate, phone 1800 888 019 or visit www.neura.edu.au

Ayers S, Bond R, Bertullies S, Wijma K

The aetiology of post-traumatic stress following childbirth: a meta-analysis and theoretical framework

Psychological Medicine 2016; 46: 1121-34

View review abstract online

Comparison	Risk factors associated with PTSD following childbirth.
Summary of evidence	Moderate to high quality evidence (large samples, mostly inconsistent, precise, direct) found the pre-birth risk factors associated with PTSD (in descending order of effect) were depression in pregnancy, fear of childbirth, history of PTSD, poor health or complications, receiving counselling for pregnancy/birth, having previous psychological problems, less education, less social support, history of sexual trauma, ethnicity, history of trauma (general), higher parity, planned pregnancy, and younger age. At-birth risk factors associated with PTSD (in descending order of effect) were negative subjective birth experiences, an operative birth, lack of support from staff, negative emotions, dissociation, objective birth experience, infant-related complications, lack of control or agency, pain, and shorter length of labour. Post-birth risk factors associated with PTSD (in descending order of effect) were depression after childbirth, poor coping and stress, poor mental health, anxiety, and physical complications. No associations were found with marital status, socio-economic status, emotional health, time since birth, or presence of partner/companion at birth.

PTSD following pregnancy and childbirth

Pre-birth risk factors associated with PTSD (in descending order of effect);

Depression in pregnancy: 12 studies, N = 8,093, $r = 0.51$, 95%CI 0.50 to 0.53, Q$p < 0.05$

Fear of childbirth: 6 studies, N = 5,669, $r = 0.41$, 95%CI 0.39 to 0.43, Q$p < 0.05$

History of PTSD: 8 studies, N = 5,807, $r = 0.39$, 95%CI 0.37 to 0.41, Q$p < 0.05$

Poor health or complications: 9 studies, N = 4,152, $r = 0.38$, 95%CI 0.35 to 0.40, Q$p < 0.05$

Counselling for pregnancy/birth: 4 studies, N = 2,917, $r = 0.32$, 95%CI 0.29 to 0.35, Q$p < 0.05$

Previous psychological problems: 6 studies, N = 4,458, $r = 0.25$, 95%CI 0.23 to 0.28, Q$p < 0.05$

Less education: 6 studies, N = 3,713, $r = -0.19$, 95%CI -0.22 to -0.16, Q$p < 0.05$

Less social support: 16 studies, N = 6,125, $r = -0.19$, 95%CI -0.21 to -0.16, Q$p < 0.05$

History of sexual trauma: 8 studies, N = 6,531, $r = 0.17$, 95%CI 0.15 to 0.20, Q$p < 0.05$

Ethnicity: 7 studies, N = 4,348, $r = 0.16$, 95%CI 0.14 to 0.19, Q$p < 0.05$

History of trauma (general): 14 studies, N = 4,852, $r = 0.16$, 95%CI 0.14 to 0.19, Q$p < 0.05$

Higher parity: 12 studies, N = 7,654, $r = 0.08$, 95%CI 0.06 to 0.10, Q$p < 0.05$

Planned pregnancy: 5 studies, N = 2,107, $r = 0.07$, 95%CI 0.02 to 0.11, Q$p < 0.05$

Younger age: 12 studies, N = 6,196, $r = -0.03$, 95%CI -0.06 to -0.01, Q$p < 0.05$

At-birth risk factors associated with PTSD (in descending order of effect);

Negative subjective birth experiences: 6 studies, N = 4,622, $r = 0.59$, 95%CI 0.58 to 0.61, Q$p < 0.05$

Having an operative birth: 13 studies, N = 4,904, $r = 0.48$, 95%CI 0.46 to 0.50, Q$p < 0.05$

Lack of support from staff: 8 studies, N = 1,868, $r = -0.38$, 95%CI -0.41 to -0.34, Q$p < 0.05$

Negative emotions: 7 studies, N = 3,691, $r = 0.34$, 95%CI 0.31 to 0.36, Q$p < 0.05$

Dissociation: 7 studies, N = 2,964, $r = 0.32$, 95%CI 0.29 to 0.35, Q$p < 0.05$

Objective birth experience: 14 studies, N = 8,171, $r = 0.25$, 95%CI 0.23 to 0.27, Q$p < 0.05$

Infant-related complications: 17 studies, N = 3,354, $r = 0.23$, 95%CI 0.20 to 0.26, Q$p < 0.05$

Lack of control or agency: 5 studies, N = 1,502, $r = -0.23$, 95%CI -0.28 to -0.18, Q$p < 0.05$

Pain: 16 studies, N = 8,491, $r = 0.16$, 95%CI 0.13 to 0.18, Q$p < 0.05$

Place of birth: 3 studies, N = 774, $r = 0.10$, 95%CI 0.02 to 0.19, Q$p > 0.05$

Less length of labour: 6 studies, N = 3,189, $r = -0.05$, 95%CI -0.09 to -0.02, Q$p < 0.05$

Post-birth risk factors associated with PTSD (in descending order of effect);

Depression after childbirth: 11 studies, N = 3,162, $r = 0.60$, 95%CI 0.57 to 0.62, Q$p < 0.05$

Poor coping and stress: 10 studies, N = 2,688, $r = 0.30$, 95%CI 0.27 to 0.33, Q$p < 0.05$

Poor mental health: 7 studies, N = 2,017, $r = 0.27$, 95%CI 0.23 to 0.31, Q$p < 0.05$

Anxiety: 10 studies, N = 6,765, $r = 0.18$, 95%CI 0.15 to 0.20, Q$p < 0.05$

Physical complications: 5 studies, N = 3,794, $r = 0.06$, 95%CI 0.03 to 0.09, Q$p < 0.05$

No associations were found with marital status, socio-economic status, emotional health, time since birth, or presence of partner/companion at birth.

Consistency in results	Mostly inconsistent
Precision in results	Precise
Directness of results	Direct

Yildiz PD, Ayers S, Phillips L

The prevalence of posttraumatic stress disorder in pregnancy and after

<table>
<tr><td colspan="2">birth: A systematic review and meta-analysis

Journal of Affective Disorders 2017; 208: 634-45
View review abstract online</td></tr>
<tr><td>Comparison</td><td>Prevalence of PTSD in pregnancy and after birth.</td></tr>
<tr><td>Summary of evidence</td><td>Moderate quality evidence (large samples, appears inconsistent and imprecise, direct) found the prevalence of PTSD in community samples of prenatal women is around 3.3%, and postpartum PTSD was around 4%. Rates were higher in high-risk samples of women who had difficult births or pregnancies or had babies with fetal anomalies (prenatal PTSD = 18.95%, postpartum PTSD = 18.5%).</td></tr>
<tr><td colspan="2">Prevalence of PTSD in pregnancy and after birth</td></tr>
<tr><td colspan="2">Community samples
Women sourced from maternity hospitals, antenatal clinics, or childbirth educational classes
Prenatal PTSD: 29 studies, N = 14,104, prevalence = 3.3%, 95%CI 2.4% to 4.5%
Postpartum PTSD: 21 studies, N = 8,511, prevalence = 4.0%, 95%CI 2.8% to 5.7%
High-risk samples
Woman who experienced a difficult or traumatic birth, had emergency caesarean sections, or who had severe pregnancy complications, severe fear of birth, a history of sexual/physical violence or childhood abuse, babies that were born very low birth weight, preterm, or diagnosed with a fetal anomaly
Prenatal PTSD: 6 studies, N = 1,160, prevalence = 18.9%, 95%CI 10.6% to 31.4%
Postpartum PTSD: 7 studies, N = 542, prevalence = 18.5%, 95%CI 10.6% to 30.4%
Using clinical interviews was associated with lower prevalence rates in pregnancy and higher prevalence rates postpartum.</td></tr>
<tr><td>Consistency in results</td><td>Appears inconsistent</td></tr>
<tr><td>Precision in results</td><td>Appears imprecise</td></tr>
<tr><td>Directness of results</td><td>Direct</td></tr>
</table>

Explanation of acronyms

CI = confidence interval, I^2 = the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance), N = number of participants, p = probability of gaining a statistically significant result, Q = test for heterogeneity, r = correlation coefficient

Explanation of technical terms

* Bias has the potential to affect reviews of both RCT and observational studies. Forms of bias include; reporting bias – selective reporting of results; publication bias - trials that are not formally published tend to show less effect than published trials, further if there are statistically significant differences between groups in a trial, these trial results tend to get published before those of trials without significant differences; language bias – only including English language reports; funding bias - source of funding for the primary research with selective reporting of results within primary studies; outcome variable selection bias; database bias - including reports from some databases and not others; citation bias - preferential citation of authors. Trials can also be subject to bias when evaluators are not blind to treatment condition and selection bias of participants if trial samples are small[5].

† Different effect measures are reported by different reviews.

Prevalence refers to how many existing cases there are at a particular point in time. Incidence refers to how many new cases there are per population in a specified time period. Incidence is usually reported as the number of new cases per 100,000 people per year. Alternatively some studies present the number of new cases that have accumulated over several years against a person-years denominator. This denominator is the sum of individual units of time that the persons in the population are at risk of becoming a case. It takes into account the size of the underlying population sample and its age structure over the duration of observation.

Reliability and validity refers to how accurate the instrument is. Sensitivity is the proportion of actual positives that are correctly identified (100% sensitivity = correct identification of all actual positives) and specificity is the proportion of negatives that are correctly identified (100% specificity = not identifying anyone as positive if they are truly not).

Weighted mean difference scores refer to mean differences between treatment and comparison groups after treatment (or occasionally pre to post treatment) and in a randomised trial there is an assumption that both groups are comparable on this measure prior to treatment. Standardised mean differences are divided by the pooled standard deviation (or the standard deviation of one group when groups are homogenous) that allows results from different scales to be combined and compared. Each study's mean difference is then given a weighting depending on the size of the sample and the variability in the data. Less than 0.4 represents a small effect, around 0.5 a medium effect, and over 0.8 represents a large effect[5].

Odds ratio (OR) or relative risk (RR) refers to the probability of a reduction (< 1) or an increase (> 1) in a particular outcome in a treatment group, or a group exposed to a risk factor, relative to the comparison group. For example, a RR of 0.75 translates to a reduction in risk of an outcome of 25% relative to those not receiving the treatment or not exposed to the risk factor. Conversely, a RR of 1.25 translates to an increased risk of 25% relative to those not receiving treatment or not having been exposed to a risk factor. A RR or OR of 1.00 means there is no difference between groups. A medium effect is considered if RR > 2 or < 0.5 and a large effect if RR > 5 or < 0.2[6]. lnOR stands for logarithmic OR where a lnOR of 0 shows no difference between groups. Hazard ratios measure the effect of an explanatory variable on the hazard or risk of an event.

Correlation coefficients (eg, r) indicate the strength of association or relationship

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

To donate, phone 1800 888 019 or visit www.neura.edu.au

between variables. They can provide an indirect indication of prediction, but do not confirm causality due to possible and often unforseen confounding variables. An r of 0.10 represents a weak association, 0.25 a medium association and 0.40 and over represents a strong association. Unstandardised (*b*) regression coefficients indicate the average change in the dependent variable associated with a 1 unit change in the independent variable, statistically controlling for the other independent variables. Standardised regression coefficients represent the change being in units of standard deviations to allow comparison across different scales.

‡ Inconsistency refers to differing estimates of effect across studies (i.e. heterogeneity or variability in results) that is not explained by subgroup analyses and therefore reduces confidence in the effect estimate. I^2 is the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance) - 0% to 40%: heterogeneity might not be important, 30% to 60%: may represent moderate heterogeneity, 50% to 90%: may represent considerable heterogeneity and over this is considerable heterogeneity. I^2 can be calculated from Q (chi-square) for the test of heterogeneity with the following formula[5];

$$I^2 = \left(\frac{Q - df}{Q}\right) \times 100\%$$

§ Imprecision refers to wide confidence intervals indicating a lack of confidence in the effect estimate. Based on GRADE recommendations, a result for continuous data (standardised mean differences, not weighted mean differences) is considered imprecise if the upper or lower confidence limit crosses an effect size of 0.5 in either direction, and for binary and correlation data, an effect size of 0.25. GRADE also recommends downgrading the evidence when sample size is smaller than 300 (for binary data) and 400 (for continuous data), although for some topics, these criteria should be relaxed[7].

‖ Indirectness of comparison occurs when a comparison of intervention A versus B is not available but A was compared with C and B was compared with C that allows indirect comparisons of the magnitude of effect of A versus B. Indirectness of population, comparator and/or outcome can also occur when the available evidence regarding a particular population, intervention, comparator, or outcome is not available and is therefore inferred from available evidence. These inferred treatment effect sizes are of lower quality than those gained from head-to-head comparisons of A and B.

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

To donate, phone 1800 888 019 or visit www.neura.edu.au

NeuRA Discover. Conquer. Cure.

POST-TRAUMATIC STRESS DISORDER LIBRARY

References

1. Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMAGroup (2009): Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *British Medical Journal* 151: 264-9.
2. GRADEWorkingGroup (2004): Grading quality of evidence and strength of recommendations. *British Medical Journal* 328: 1490.
3. Yildiz PD, Ayers S, Phillips L (2017): The prevalence of posttraumatic stress disorder in pregnancy and after birth: A systematic review and meta-analysis. *Journal of Affective Disorders* 208: 634-45.
4. Ayers S, Bond R, Bertullies S, Wijma K (2016): The aetiology of post-traumatic stress following childbirth: a meta-analysis and theoretical framework. *Psychological Medicine* 46: 1121-34.
5. CochraneCollaboration (2008): Cochrane Handbook for Systematic Reviews of Interventions. Accessed 24/06/2011.
6. Rosenthal JA (1996): Qualitative Descriptors of Strength of Association and Effect Size. *Journal of Social Service Research* 21: 37-59.
7. GRADEpro (2008): [Computer program]. Jan Brozek, Andrew Oxman, Holger Schünemann. *Version 32 for Windows*

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au
To donate, phone 1800 888 019 or visit www.neura.edu.au