

## Suicide and self-harm

### Introduction

There has been much research dedicated to determining potential risk factors for suicide, which may have clinically important applications for prevention. Many of the important risk factors for suicide in the general population can apply to people with PTSD, including suffering from depression or having a history of previous suicide attempts. However, factors specific to PTSD may also contribute to an increased risk of suicide or self-harm.

### 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 a diagnosis of PTSD. Reviews were identified by searching the databases MEDLINE, EMBASE, and PsycINFO. Hand searching reference lists of identified reviews was also conducted. Reviews with pooled data are prioritised 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<sup>1</sup>. Reviews with less than 50% of items checked have been excluded from the library. The PRISMA flow diagram is a suggested way of providing information about studies included and excluded with reasons for exclusion. Where no flow diagram has been presented by individual reviews, but identified studies have been described in the text, reviews have been checked for this item. 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, low or very 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, there is a dose dependent response or if results are reasonably consistent, precise and direct with low associated risks (see end of table for an explanation of these terms)<sup>2</sup>. 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 six systematic reviews that met our inclusion criteria<sup>3-8</sup>.

- Moderate quality evidence finds a large effect that people with PTSD were more likely to report suicidal behaviours (particularly ideation and suicide attempts) than people without PTSD. People with PTSD and comorbid depression are particularly at risk of suicidal behaviours.
- Moderate to low quality evidence finds a medium-sized effect that people with PTSD and sleep disturbances were more likely to report suicidal behaviours than people with PTSD without sleep disturbances.
- Moderate to low quality evidence finds a medium-sized effect that people with PTSD were more likely to report non-suicidal self-harm than people without PTSD or an anxiety or depressive disorder.



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- Moderate quality evidence finds a medium-sized effect of increased suicidal behaviour in prisoners with PTSD compared to prisoners without PTSD. Rates were highest in males and adult prisoners.



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*Bentley KH, Cassiello-Robbins CF, Vittorio L, Sauer-Zavala S, Barlow DH*

**The association between nonsuicidal self-injury and the emotional disorders: A meta-analytic review**

Clinical Psychology Review 2015; 37: 72-88

[View review abstract online](#)

<b>Comparison</b>	Rates of non-suicidal self-harm in people with PTSD vs. people without PTSD or an anxiety or depressive disorder.
<b>Summary of evidence</b>	Moderate to low quality evidence (unclear sample size, inconsistent, imprecise, direct) finds a medium-sized effect that people with PTSD were more likely to report non-suicidal self-harm than people without PTSD.
<b>Non-suicidal self-harm</b>	
<i>A medium-sized effect showed people with PTSD were more likely to report non-suicidal self-harm; 17 studies, N not reported, OR = 2.06, 95%CI 1.39 to 3.05, p &lt; 0.001, I<sup>2</sup> = 71%</i>	
<b>Consistency in results<sup>‡</sup></b>	Inconsistent
<b>Precision in results<sup>§</sup></b>	Imprecise
<b>Directness of results<sup>  </sup></b>	Direct

*Facer-Irwin E, Blackwood NJ, Bird A, Dickson H, McGlade D, Alves-Costa F, MacManus D*

**PTSD in prison settings: A systematic review and meta-analysis of comorbid mental disorders and problematic behaviours**

PLoS ONE 2019; 14

[View review abstract online](#)

<b>Comparison</b>	Rates of depressive disorders in prisoners with PTSD vs. prisoners without PTSD.
<b>Summary of evidence</b>	Moderate quality evidence (unclear sample size, consistent, imprecise, direct) finds a medium-sized effect of increased suicidal behaviour in prisoners with PTSD compared to



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	<b>prisoners without PTSD. Rates were highest in males and adult prisoners.</b>
<b>Suicidal behaviour</b>	
<p><i>A significant, medium-sized effect of increased suicidal behaviour in prisoners with PTSD;</i>                  7 studies, N not reported, OR = 3.03, 95%CI 2.45 to 3.76, <math>p &lt; 0.05</math>, <math>I^2 = 0\%</math>                  Rates of suicidal behaviour were higher in male prisoners with PTSD than female prisoners with PTSD (OR = 3.34 vs. OR = 2.90), and in adult prisoners with PTSD than incarcerated youth with PTSD (OR = 3.07 vs. OR = 2.91).</p>	
<b>Consistency in results</b>	Consistent
<b>Precision in results</b>	Imprecise
<b>Directness of results</b>	Direct

*Kanwar A, Malik S, Prokop LJ, Sim LA, Feldstein D, Wang Z, Murad MH*

**The association between anxiety disorders and suicidal behaviors: a systematic review and meta-analysis**

Depression and Anxiety 2013; 30: 917-29

[View review abstract online](#)

<b>Comparison</b>	<b>Rates of suicidal thoughts and behaviours in people with PTSD vs. people without PTSD or an anxiety disorder.</b>
<b>Summary of evidence</b>	<b>Moderate to low quality evidence (unclear sample size, inconsistent, imprecise, direct) finds a medium-sized effect that people with PTSD were more likely to report suicidal behaviours than people without PTSD or an anxiety disorder.</b>
<b>Suicidal behaviours</b>	
<p><i>A medium-sized effect showed people with PTSD were more likely to report suicidal behaviours;</i>                  16 studies, N not reported, OR = 2.71, 95%CI 1.84 to 3.98, <math>p &lt; 0.0001</math>, <math>I^2 = 93\%</math>                  The effect size was similar in the subgroup analysis of rates of ideation, attempts, and completion.</p>	
<b>Consistency in results</b>	Inconsistent
<b>Precision in results</b>	Imprecise



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<b>Directness of results</b>	Direct
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<p>Malik S, Kanwar A, Sim LA, Prokop LJ, Wang Z, Benkhadra K, Murad MH</p> <p><b>The association between sleep disturbances and suicidal behaviors in patients with psychiatric diagnoses: a systematic review and meta-analysis</b></p> <p>Systematic Reviews 2014; 3: 18</p> <p><a href="#">View review abstract online</a></p>	
<b>Comparison</b>	Relationship between sleep disturbances and suicidal behaviour in people with PTSD.
<b>Summary of evidence</b>	Moderate to low quality evidence (small sample, imprecise, direct) finds a medium-sized effect that people with PTSD and sleep disturbances were more likely to report suicidal behaviours than those without sleep disturbances.
<b>Suicidal behaviour</b>	
<p><i>A medium-sized effect showed people with PTSD and sleep disturbances were more likely to report suicidal behaviour than those without sleep disturbances;</i></p> <p>1 study, N = 153, OR = 2.56, 95%CI 1.91 to 3.43, <math>p &lt; 0.001</math></p>	
<b>Consistency in results</b>	Not applicable; 1 study
<b>Precision in results</b>	Imprecise
<b>Directness of results</b>	Direct

<p>Panagioti M, Gooding PA, Tarrier N</p> <p><b>A meta-analysis of the association between posttraumatic stress disorder and suicidality: the role of comorbid depression</b></p> <p>Comprehensive Psychiatry 2012; 53: 915-30</p> <p><a href="#">View review abstract online</a></p>	
<b>Comparison</b>	Association between PTSD and suicidality.



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<b>Summary of evidence</b>	<b>Moderate quality evidence (unclear sample size, inconsistent, precise, direct) finds a large effect that people with PTSD were more likely to report suicidal behaviours (particularly ideation and suicide attempts) than people without PTSD. People with comorbid depression are particularly at risk of suicidal behaviours.</b>
<b>Suicidal behaviours</b>	
<p><i>A large effect showed people with PTSD were more likely to report suicidal behaviours;</i> 55 studies, N not reported, <math>g = 0.78</math>, 95%CI 0.64 to 0.93, <math>p &lt; 0.0001</math>, <math>Qp &lt; 0.0001</math></p> <p>While subgroup analysis showed similar contributions of PTSD and depression on suicidality, meta-regression showed increased depression symptoms in people with PTSD was associated with more suicidal behaviour.</p> <p>Subgroup analysis found associations between PTSD and suicidal ideation and attempts but not completions. There were associations in war veterans and in those exposed to mixed traumas, abuse, or natural disasters. There were associations in those with a current or lifetime diagnosis of PTSD, and in those assessed with different PTSD measures.</p> <p>There were no moderating effects of sex or age.</p>	
<b>Consistency in results</b>	Inconsistent
<b>Precision in results</b>	Precise
<b>Directness of results</b>	Direct

*Panagioti M, Gooding PA, Triantafyllou K, Tarrier N*

**Suicidality and posttraumatic stress disorder (PTSD) in adolescents: a systematic review and meta-analysis**

**Social Psychiatry and Psychiatric Epidemiology 2015; 50: 525-37**

[View review abstract online](#)

<b>Comparison</b>	<b>Association between PTSD and suicidality in adolescents (11-21 years).</b>
<b>Summary of evidence</b>	<b>Moderate quality evidence (unclear sample size, inconsistent, precise, direct) finds a large effect that adolescents with PTSD were more likely to report suicidal behaviours.</b>



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<b>Suicidal behaviours</b>	
<p><i>A large effect showed adolescents with PTSD were more likely to report suicidal behaviours;</i>                      28 studies, N not reported, <math>d = 0.70</math>, 95%CI 0.55 to 0.85, <math>p &lt; 0.0001</math>, <math>Qp &lt; 0.0001</math>                      There were no moderating effects of severity of suicidality, target groups, and methodological quality of the studies.</p>	
<b>Consistency in results</b>	Inconsistent
<b>Precision in results</b>	Precise
<b>Directness of results</b>	Direct

**Explanation of acronyms**

CI = confidence interval,  $d$ ,  $g$  = Cohen’s  $d$  and Hedges’  $g$ , standardised mean differences,  $I^2$  = the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance), N = number of participants, OR = odds ratio, vs. = versus



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### 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<sup>9</sup>.

† 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). A receiver operating characteristic (ROC) curve represents sensitivity/specificity pairs corresponding to different cut-off values. A guide for interpreting the area under the curve (AUC) statistic is; 0.90 to 1.00 = excellent, 0.80 to 0.90 = good, 0.70 to 0.80 = fair, 0.60 to 0.70 = poor, and 0.50 to 0.60 = fail.

Weighted mean difference scores refer to mean differences between treatment and comparison groups after treatment (or occasionally pre to post treatment) and in a randomized trial there is an assumption that both groups are comparable on this measure prior to treatment. Standardized 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. 0.2 represents a small effect, 0.5 a moderate effect, and 0.8 and over represents a large effect<sup>9</sup>.

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



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effect if  $RR > 5$  or  $< 0.2$ <sup>10</sup>. InOR stands for logarithmic OR where a InOR 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 between variables. They can provide an indirect indication of prediction, but do not confirm causality due to possible and often unforeseen 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. Unstandardized ( $b$ ) 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. Standardized 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<sup>9</sup>;

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

§ 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<sup>11</sup>.

|| 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.



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### References

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