

Prevalence in firefighters

Introduction

Prevalence represents the overall proportion of individuals in a population who have the disorder of interest. It is different from incidence, which represents only the new cases that have developed over a particular time period. Point prevalence is the proportion of individuals in a population who have the disorder at a given point in time (e.g., at one-month post-trauma), while period prevalence is the proportion of individuals in a population who have the disorder over specific time periods (e.g., one to two months post-trauma). Lifetime prevalence is the proportion of individuals in a population who have ever had the disorder and lifetime morbid risk also includes those who had the disorder but were deceased at the time of the survey.

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-analysis¹. 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 finds the mean current prevalence of PTSD in firefighters is around 7.3%.
- More firefighters reported moderate than severe PTSD and were more likely to report PTSD symptoms after multiple and/or recent traumatic events.



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Berger W, Coutinho ES, Figueira I, Marques-Portella C, Luz MP, Neylan TC, Marmar CR, Mendlowicz MV

Rescuers at risk: a systematic review and meta-regression analysis of the worldwide current prevalence and correlates of PTSD in rescue workers

Social Psychiatry and Psychiatric Epidemiology 2012; 47: 1001-11

[View review abstract online](#)

| | |
|---|--|
| Comparison | Prevalence of PTSD in firefighters. |
| Summary of evidence | Moderate quality evidence (large sample, imprecise, direct) finds the current prevalence of PTSD in firefighters is around 7.3%. |
| Prevalence in firefighters | |
| 16 studies, N = 5,680, current prevalence = 7.3%, 95%CI 3.6% to 11% | |
| Consistency in results | No measure of consistency is reported for this subgroup. |
| Precision in results | Appears imprecise |
| Directness of results | Direct |

Jones S

Describing the mental health profile of first responders: A systematic review

Journal of the American Psychiatric Nurses Association 2017; 23: 200-14

[View review abstract online](#)

| | |
|----------------------------|---|
| Comparison | Prevalence of PTSD in firefighters. |
| Summary of evidence | Moderate quality evidence (large sample, inconsistent, direct) finds the prevalence of PTSD in firefighters varies widely, between 3.5% and 68%. Generally, more firefighters reported moderate than severe PTSD and were more likely to report PTSD symptoms after multiple and recent traumatic events. |
| Prevalence in firefighters | |



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9 studies, N = 3,334

1 Australian study (N = 651) of volunteer firefighters found a 17% prevalence rate of 'significant' PTSD and a 9% prevalence rate of 'extreme' PTSD. Factors associated with having PTSD were a sense of helplessness during the incident, and multiple and recent critical incidents.

Another Australian study (N = 142) of volunteer and professional firefighters found a 9.3% prevalence rate of 'significant' PTSD in professional firefighters and a 4.5% prevalence rate of 'significant' PTSD in volunteer firefighters. For 'extreme' PTSD, there was a 13.3% prevalence rate in professional firefighters and a 4.5% prevalence rate in volunteer firefighters.

Another Australian study (N = 164) of firefighters found a prevalence rate of 68% for 'moderate' PTSD and a prevalence rate of 7.4% for 'severe' PTSD. PTSD symptoms were related to insecurity, lack of personal control, and alienation from others.

1 US study (N = 828) of urban firefighters found a 22% prevalence rate of PTSD in US firefighters and a 17% prevalence rate in Canadian firefighters. Increased rates of PTSD were associated with increased frequency of exposure to traumatic events.

Another US study (N = 131) of firefighters found an 8% prevalence rate of PTSD, which was related to having previous psychological issues, a horror response to trauma, and a younger age at career commencement.

Another US study (N = 142) of firefighters found a 4.2% prevalence rate of current PTSD and a 3.5% prevalence rate of lifetime PTSD.

1 Taiwanese study (N = 410) of firefighters found a 10.5% prevalence rate of PTSD. Having PTSD was related to lower quality of life, and more psychological stress and physical health problems.

1 Polish study (N = 464) of firefighters found a 3.9% prevalence rate of PTSD. Increased PTSD symptoms were related to a lower sense of coherence (one's perception of manageability, meaning, and comprehensibility).

1 German study (N = 402) of firefighters found an 18.2% prevalence rate of current PTSD, which was related to longer job experience and increased number of distressing events per month.

| | |
|-------------------------------|-------------------------------------|
| Consistency in results | Inconsistent |
| Precision in results | No measure of precision is reported |
| Directness of results | Direct |

Explanation of acronyms

Ci = confidence intervals, N = number of participants



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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 small⁵.

† 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 effect⁵.

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. 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



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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. 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 formula⁵;

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

§ 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 relaxed⁷.

|| 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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