TECHNICAL COMMENTARY

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Prevalence in healthcare workers

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-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 five systematic reviews that met our inclusion criteria[3-7].

- Moderate quality evidence finds the mean prevalence of PTSD in doctors is 14.8%, with rates highest in doctors treating trauma patients and lowest in doctors practicing medicine in rural areas.
- Moderate to high quality evidence finds the mean prevalence of PTSD in healthcare workers during a coronavirus outbreak is around 18%. Rates were higher during the Middle East respiratory syndrome (MERS) outbreak than during the severe acute respiratory syndrome (SARS) or Coronavirus disease 2019 (COVID-19) outbreaks. Rates were higher when PTSD was measured during an outbreak rather than after an outbreak and were higher in cross-sectional than in cohort studies.
- Moderate to low quality evidence finds the mean prevalence of PTSD in medical responders to a disaster is 20.5%.

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

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- Moderate quality evidence finds the mean prevalence of PTSD in ambulance personnel is 11%. This estimate has reduced over time from 20% in 1985 to 0.05% in 2017.
- Moderate to low quality evidence finds the prevalence of PTSD in healthcare workers after exposure to workplace violence is between 5% and 32%.

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

Lanctot N, Guay S

The aftermath of workplace violence among healthcare workers: A systematic literature review of the consequences

Aggression and Violent Behavior 2014; 19: 492-501

View review abstract online

Comparison	**Prevalence of PTSD in healthcare workers exposed to workplace violence.**
Summary of evidence	**Moderate to low quality evidence (unclear sample size, direct) finds the prevalence of PTSD in healthcare workers after exposure to workplace violence is between 5% and 32%.**
Prevalence in healthcare workers exposed to workplace violence	
4 studies (N not reported) found between 5% and 32% of healthcare workers met diagnostic criteria for PTSD.	
Consistency in results	Unable to assess; no measure of consistency is reported.
Precision in results	Unable to assess; no measure of precision is reported.
Directness of results	Direct

Naushad VA, Bierens JJ, Nishan KP, Firjeeth CP, Mohammad OH, Maliyakkal AM, ChaliHadan S, Schreiber MD

A Systematic Review of the Impact of Disaster on the Mental Health of Medical Responders

Prehospital and Disaster Medicine 2019; 34: 632-43

View review abstract online

Comparison	**Prevalence of PTSD in medical responders (doctors, nurses, paramedics, allied health staff, admin staff, non-medical responders) to a disaster (natural, air crash).**
Summary of evidence	**Moderate to low quality evidence (unclear sample size, direct) finds the mean prevalence of PTSD in medical responders is 20.5%.**

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

Prevalence in healthcare workers

Prevalence in medical responders	
14 studies, N not reported, mean prevalence = 20.5%	
Consistency in results	Unable to assess; no measure of consistency is reported.
Precision in results	Unable to assess; no measure of precision is reported.
Directness of results	Direct

Petrie K, Milligan-Saville J, Gayed A, Deady M, Phelps A, Dell L

Prevalence of PTSD and common mental disorders amongst ambulance personnel: a systematic review and meta-analysis

Social Psychiatry and Psychiatric Epidemiology 2018; 53: 897-909

View review abstract online

Comparison	**Prevalence of PTSD in ambulance personnel.**
Summary of evidence	**Moderate quality evidence (unclear sample size, inconsistent, precise, direct) finds the overall mean prevalence of PTSD in ambulance personnel is 11%. This estimate has reduced over time from 20% in 1985 to 0.05% in 2017.**
Prevalence in ambulance personnel	
14 studies, N not reported, mean prevalence = 11%, 95%CI 7% to 14%, I^2 = 94% Older studies reported higher prevalence rates (1985-1999 = 20%, 2000-2005 = 13%, 2006-2017 = 0.05%), which explained 31% of the between-study variance in PTSD prevalence estimates. Authors suggest that as ambulance services have had an increase in the awareness of mental health issues over time, leading to the introduction of more rigorous pre-employment screening processes, mental health training and education, more frequent staff wellbeing checks, and better post-incident support processes, rates of PTSD have reduced over time. There were no moderating effects of sample size, study region, response rates, or measures used.	
Consistency in results	Inconsistent, partly explained by year that the study was conducted.
Precision in results	Appears precise
Directness of results	Direct

Prevalence in healthcare workers

Salehi M, Amanat M, Mohammadi M, Salmanian M, Rezaei N, Saghazadeh A, Garakani A

The prevalence of post-traumatic stress disorder related symptoms in Coronavirus outbreaks: A systematic-review and meta-analysis

Journal of Affective Disorders 2021; 282: 527-38

View review abstract online

Comparison	**Prevalence of PTSD in healthcare workers during coronavirus outbreaks (severe acute respiratory syndrome [SARS], Middle East respiratory syndrome [MERS], and Coronavirus disease 2019 [COVID-19]).**
Summary of evidence	**Moderate to high quality evidence (large sample size, inconsistent, precise, direct) finds the mean prevalence of PTSD in healthcare workers during a coronavirus outbreak is around 18%. Rates were higher during MERS than SARS or COVID-19, higher during the outbreak than after, and slightly higher in cross-sectional than cohort studies.**
Prevalence in heathcare workers	
15 studies (14 Asian studies, 1 Canadian), N = 5,628 Prevalence rate of PTSD symptoms = 18%, 95%CI 13% to 24%, I^2 = 97% Prevalence rates were non-significantly higher during MERS (33%, 2017-2020) than during SARS (14%, 2004-2009) or COVID-19 (11%, 2020). Prevalence was also non-significantly higher when PTSD was measured during the outbreak (23%) rather than after the outbreak (13%). Prevalence rates were non-significantly higher in cross-sectional (18%) than in cohort studies (11%). Rates were similar according to study quality (below average = 19%, above average = 17%), and measures (Impact of Event Scale = 16-22%, other = 28%).	
Consistency in results	Inconsistent
Precision in results	Appears precise
Directness of results	Direct

Sendler DJ, Rutkowska A, Makara-Studzinska M

How the exposure to trauma has hindered physicians' capacity to heal: Prevalence of PTSD among healthcare workers

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

Prevalence in healthcare workers

European Journal of Psychiatry 2016; 30: 321-34 View review abstract online	
Comparison	**Prevalence of PTSD in doctors.**
Summary of evidence	**Moderate quality evidence (large sample, inconsistent, imprecise, direct) finds the mean prevalence of PTSD in doctors is 14.8%, with rates highest in doctors treating trauma patients and lowest in doctors practicing medicine in rural areas.**
Prevalence in doctors	
9 studies, N = 1,616, mean prevalence = 14.8%, range 4.4% to 28% Rates varied according to setting; treating trauma patients (21.5%), working in conflict zones (16.5%), during residency training (12.3%), and practicing medicine in the rural areas (4.4%).	
Consistency in results	Inconsistent
Precision in results	Appears imprecise
Directness of results	Direct

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

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

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[8].

† 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[8].

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[9]. 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

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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[8];

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

§ 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[10].

‖ 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

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. Naushad VA, Bierens JJ, Nishan KP, Firjeeth CP, Mohammad OH, Maliyakkal AM*, et al.* (2019): A Systematic Review of the Impact of Disaster on the Mental Health of Medical Responders. *Prehospital and Disaster Medicine* 34: 632-43.
4. Petrie K, Milligan-Saville J, Gayed A, Deady M, Phelps A, Dell L*, et al.* (2018): Prevalence of PTSD and common mental disorders amongst ambulance personnel: a systematic review and meta-analysis. *Social Psychiatry and Psychiatric Epidemiology* 53: 897-909.
5. Salehi M, Amanat M, Mohammadi M, Salmanian M, Rezaei N, Saghazadeh A*, et al.* (2021): The prevalence of post-traumatic stress disorder related symptoms in Coronavirus outbreaks: A systematic-review and meta-analysis. *Journal of Affective Disorders* 282: 527-38.
6. Sendler DJ, Rutkowska A, Makara-Studzinska M (2016): How the exposure to trauma has hindered physicians' capacity to heal: Prevalence of PTSD among healthcare workers. *European Journal of Psychiatry* 30: 321-34.
7. Lanctot N, Guay S (2014): The aftermath of workplace violence among healthcare workers: A systematic literature review of the consequences. *Aggression and Violent Behavior* 19: 492-501.
8. CochraneCollaboration (2008): Cochrane Handbook for Systematic Reviews of Interventions. Accessed 24/06/2011.
9. Rosenthal JA (1996): Qualitative Descriptors of Strength of Association and Effect Size. *Journal of Social Service Research* 21: 37-59.
10. 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