TECHNICAL COMMENTARY

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POST-TRAUMATIC STRESS DISORDER LIBRARY

Prevalence during and after epidemics and pandemics

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. This topic presents the evidence on prevalence rates in people exposed to epidemics and pandemics. Please also see the related risk factor topic.

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 to high quality evidence finds the overall prevalence of PTSD within 12 months of an infectious disease pandemic is around 22.6%. Rates were highest in frontline healthcare workers, during COVID-19 (rather than during severe acute respiratory syndrome, Middle East respiratory syndrome, Ebola, or H1N1), and in individuals exposed to quarantine (home or hotel).
- Moderate quality finds the rates of PTSD were higher in coronavirus patients with a history of physical illness, functional impairment, pain, and in those experiencing a lack of control.

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Cavicchioli M, Ferrucci R, Guidetti M, Canevini MP, Pravettoni G, Galli F

What Will Be the Impact of the COVID-19 Quarantine on Psychological Distress? Considerations Based on a Systematic Review of Pandemic Outbreaks

Healthcare 2021; 9(1): 101

View review abstract online

Comparison	**Prevalence of PTSD after quarantine due to COVID-19.**
Summary of evidence	**Moderate quality evidence (large sample size, appears inconsistent and imprecise, direct) finds the mean prevalence of PTSD following COVID-19 quarantine is about 21%.**
Prevalence after COVID-19 quarantine	
10 studies, N = 7,725, prevalence of PTSD = 21.65%, 95%CI 10.95% to 32.36% Overall distress (20.84%), depression (22.69%) and anxiety (16.16%) symptoms were also prevalent.	
Consistency in results‡	Appears inconsistent
Precision in results§	Appears imprecise
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 healthcare workers after severe acute respiratory syndrome (SARS) outbreaks.**
Summary of evidence	**Moderate to low quality evidence (unclear sample size, appears inconsistent and imprecise, direct) finds the mean prevalence of PTSD in healthcare workers following SARS outbreaks is around 14%.**

Prevalence in healthcare workers after SARS outbreaks	
15 studies, N not reported, mean prevalence = 13.9%, range = 2.9% to 20%	
Consistency in results	Appears inconsistent
Precision in results	Appears imprecise
Directness of results	Direct

Rogers JP, Chesney E, Oliver D, Pollak TA, McGuire P, Fusar-Poli P, Zandi MS, Lewis G, David AS

Psychiatric and neuropsychiatric presentations associated with severe coronavirus infections: a systematic review and meta-analysis with comparison to the COVID-19 pandemic

The Lancet Psychiatry 2020; 7: 611-27

View review abstract online

Comparison	**Prevalence of PTSD in people post-coronavirus illness (severe acute respiratory syndrome [SARS], Middle East respiratory syndrome [MERS], or coronavirus disease 2019 [COVID-19]). Follow-up time varied between 60 days and 12 years.**
Summary of evidence	**Moderate quality evidence (large sample size, appears inconsistent and imprecise, direct) finds the mean prevalence of PTSD following a coronavirus infection is around 32%. Rates of PTSD were higher in females than males, and high in healthcare workers, in people with a previous physical illness, in people with avascular necrosis, functional impairment, pain, and lack of control.**
Prevalence after coronavirus outbreaks	
4 studies, N = 402, point prevalence of PTSD = 32.2%, 95%CI 23.7% to 42.0% Rates of PTSD were higher in females than males, in healthcare workers, in people with a previous physical illness, in people with avascular necrosis, functional impairment, pain, and lack of control. Rate of depression was 14.9%, and anxiety disorders was 14.8%.	
Consistency in results	Appears inconsistent
Precision in results	Appears imprecise

Directness of results	Direct

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 symptoms 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 samples, inconsistent, mostly precise, direct) finds the overall mean prevalence of PTSD symptoms during coronavirus outbreaks is around 18%. Rates were higher in patients (29%) than in healthcare workers (18%) or in the general population (12%). Rates were generally higher in longitudinal cohort studies than in cross-sectional studies, and during MERS or SARS than COVID-19, however long-term measures of the effects of COVID-19 have not been completed. Rates were higher after the outbreaks, apart from in healthcare workers who showed higher rates of PTSD during outbreaks.**

Prevalence of PTSD symptoms during coronavirus outbreaks

Overall

35 studies, N = not reported, prevalence rate = 18%, 95%CI 15% to 20%, I^2 = 98%

Prevalence rates were more frequent in cohort studies (29%) than in cross-sectional (15%) and case-control (11%) studies. Prevalence rates of PTSD in MERS (36%, 2017-2020) outbreaks were higher than SARS (18%, 2004-2009) and COVID-19 (9%, 2020) outbreaks. Prevalence rates were higher after outbreaks (23%) than during outbreaks (14%).

General population samples

12 studies, N = 13,006, prevalence rate = 12%, 95%CI 8% to 16%, I^2 = 98%

Prevalence rates were higher in SARS (18%) than in COVID-19 (8%), in studies using the Impact of Event scale (18%), and after outbreaks (18%) than during outbreaks (11%).

Patients

10 studies, N = 794, prevalence rate = 29%, 95%CI 18% to 39%, I^2 = 96%

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Prevalence rates were more frequent in cohort studies (36%) than in cross-sectional studies (13%). Prevalence rates were higher in MERS (40%) than SARS (28%) patients, and in studies using the Impact of Event scale (40%). Prevalence rates were higher after outbreaks (37%) than during outbreaks (2%).

Healthcare workers

15 studies, N = 5,628, prevalence rate = 18%, 95%CI 13% to 24%, I^2 = 97%

Prevalence rates were higher in cross-sectional (18%) than in cohort studies (11%). Prevalence rates were higher during MERS (33%) than during SARS (14%) or COVID-19 (11%). Prevalence rates were higher during outbreaks (23%) than after outbreaks (13%).

Consistency in results	Inconsistent
Precision in results	Appears mostly precise
Directness of results	Direct

Yuan K, Gong YM, Liu L, Sun YK, Tian SS, Wang YJ, Zhong Y, Zhang AY, Su SZ, Liu XX, Zhang YX, Lin X, Shi L, Yan W, Fazel S, Vitiello MV, Bryant RA, Zhou XY, Ran MS, Bao YP, Shi J, Lu L

Prevalence of posttraumatic stress disorder after infectious disease pandemics in the twenty-first century, including COVID-19: a meta-analysis and systematic review

Molecular Psychiatry 2021; 26: 4982-98

View review abstract online

Comparison	**Prevalence of PTSD following infectious disease pandemics.** **Most studies evaluated the prevalence of PTSD within 12 months of the outbreak. Most studies assessed the effects of COVID-19, followed by SARS, Ebola, MERS, and H1N1.**
Summary of evidence	**Moderate to high quality evidence (large sample, inconsistent, precise, direct) finds the overall prevalence of PTSD within 12 months of a pandemic is around 22.6%. Rates were highest in frontline healthcare workers, during COVID-19, and in individuals exposed to quarantine (home or hotel).**

Prevalence of PTSD

77 studies, N = 203,831, overall prevalence = 22.6%, 95%CI 19.9% to 25.4%, I^2 = 99%

Healthcare workers had a pooled prevalence rate of 26.9%, patients had a pooled prevalence rate of 23.8%, and the general public had a pooled prevalence rate of 19.3%.

The pooled prevalence rate in frontline healthcare workers was 30.8%, and in non-frontline healthcare workers it was 8.2%. Individuals with quarantine exposure had a pooled prevalence rate of 15.2%, while those with no quarantine exposure had a pooled prevalence rate of 4.7%. Studies of COVID-19 reported a pooled prevalence rate of 24.6%, those assessing SARS reported a pooled prevalence rate of 19.9%, and those assessing Ebola, MERS, and H1N1 reported a pooled prevalence rate of 13.7%. While the overall prevalence rates were similar within vs. after six months of an outbreak (22.5% vs. 21.1%), the rate in patients was higher after vs. before six months (28.8% vs. 18.6%), and the rate in healthcare workers was higher within vs. after six months (28.6% vs. 10%). The rates were similar for males (26.2%) and females (27.2%), in studies using self-report (22.6%) or clinical diagnosis of PTSD (21.5%), and in studies from high-income (24.6%) or low-middle-income (21.2%) regions.	
Consistency in results	Inconsistent
Precision in results	Appears precise
Directness of results	Direct

Explanation of acronyms

CI = confidence interval, COVID-19 = Coronavirus disease 2019, I^2 = the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance), MERS = Middle East respiratory syndrome, N = number of participants, SARS = severe acute respiratory syndrome

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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[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.

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