Training and post-disaster interventions for the psychological impacts on disaster-exposed employees: a systematic review

Samantha K. Brooks, Rebecca Dunn, Richard Amlôt, Neil Greenberg & G. James Rubin


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Abstract

Background: When organisations are exposed to traumatic situations, such as disasters, often staff are not prepared for the potential psychological impact which can negatively affect their wellbeing.

Aims: To conduct a systematic review of the literature on psychological interventions aimed at improving staff wellbeing during or after disasters.

Method: Four electronic literature databases were searched. Reference lists of relevant articles were hand-searched.

Results: Fifteen articles were included. Five studies suggested that pre-disaster skills training and disaster education can improve employee confidence. Ten studies on post-disaster interventions revealed mixed findings on the effectiveness of psychological debriefing and limited evidence for cognitive behavioural therapy, psychoeducation and meditation.

Conclusions: Pre-disaster training and education can improve employees’ confidence in their ability to cope with disasters. The routine use of post-disaster psychological debriefings is not supported; further research is needed to determine if debriefing interventions could be useful in some circumstances. Further research is needed to provide more evidence on the potential positive effects of cognitive behavioural therapy, psychoeducation and meditation. More experimental studies on psychological disaster interventions are needed.

Keywords: Disasters, interventions, wellbeing, work

Introduction

Disasters and traumatic events are occurring more often across the world (Guha-Sapir et al., 2013), with earthquakes, hurricanes, floods, explosions and terrorist attacks affecting increasingly large numbers of people. Many people who are exposed to trauma are exposed as part of an occupational group: for example a commercial organisation targeted by terrorists or healthcare workers who assist with the emergency response.

There has been much research on the prevalence of psychological disorders – such as post-traumatic stress disorder (PTSD), depression, anxiety, and alcohol misuse – in employees following disaster exposure. For example a review by Strohmeier & Scholte (2015) revealed high levels of trauma-related psychological problems in humanitarian workers, and research has demonstrated a risk of mental health problems in frequently trauma-exposed employees, such as fire-fighters (Chang et al., 2005) and police (West et al., 2008). A number of recent reviews exploring organisational responses to disasters (Brooks et al., 2015, 2016, 2017) have identified factors affecting the development of psychological disorders in occupational groups, suggesting that the extent of traumatic exposure, lack of social support, lack of preparedness and greater impact of the disaster on one’s personal and professional life may all be associated with poor psychological outcomes. These factors appear to be important in determining wellbeing regardless of occupation – the same factors were identified in a study of rescue workers, who are involved in disaster recovery as part of their role (Brooks et al., 2015), and in other occupational groups who would not expect to be exposed to trauma (Brooks et al., 2017).

While the prevalence of psychological problems post-disaster and factors affecting psychological wellbeing after a traumatic incident have been explored, there is less evidence regarding how to support trauma-exposed staff, and what kind of interventions might be successful in reducing the distress experienced during and after disasters.

Groups who are routinely exposed to traumatic situations as part of their everyday work – such as rescue workers, the military and emergency services personnel – are likely to have some employee support systems in place and to be prepared to support their staff or colleagues after being exposed to trauma. For example a recent article (Dunn et al., 2015) suggested that preparatory mental health briefings at the start...
of their role, monitoring of employees’ wellbeing and informal support, such as trauma risk management (TRiM; Greenberg et al., 2008) or psychological first aid (PFA; Pekevski, 2012) could enable staff to better support their colleagues. However, as Dunn et al. noted, there has been little evidence on how to best support trauma-exposed employees, and it is unclear how many organisations apply evidence to their practice. Often some form of psychological debriefing, or “Critical Incident Stress Debriefing” (Mitchell, 1983), occurs. This differs from the structured debriefing often offered in workplaces which typically take the form of ‘after action reviews’ and review performance rather than wellbeing, in that psychological debriefing is designed specifically to prevent the development of post-traumatic stress and similar symptoms, is conducted by mental health professionals, and offers a structured approach for employees to discuss their emotions (Mitchell, 1983). There has been mixed evidence on the effectiveness of this kind of intervention, with research suggesting that debriefing is unhelpful and can even have negative consequences (Wessely et al., 2000). This has led the National Institute for Health and Care Excellence (NICE) to suggest that individual debriefing sessions focusing on the trauma experience should not be part of routine practice (NICE, 2005).

The aim of this article was to review the evidence on effective interventions to support employees during or after traumatic incident such as a disaster. We explored: (1) Can pre-disaster training equip employees with better coping skills if a disaster were to occur? (2) What kinds of post-disaster interventions have been evaluated? (3) To what extent do pre-disaster and post-disaster interventions protect the wellbeing of employees and promote resilience?

Method

Search strategy

This study forms part of a wider review on the psychological impact of disasters on employees (Brooks et al., 2015, 2016, 2017): our previous publications emerging from this review focus on the factors affecting the psychological wellbeing of disaster-exposed employees, and the data on interventions has until now not been reviewed. One large, broad search was used to locate articles for each strand of the study. This combined three smaller searches. Search 1 included psychological terms, such as “wellbeing” and “PTSD”. Search 2 included terms relating to extreme events, and was informed by the emergency events database (Centre for Research on the Epidemiology of Disasters, 2009). Search 3 included terms relating to occupational groups, such as ‘employees’ and ‘organisation’. The full search strategy can be seen in Appendix I.

One author (SKB) ran the searches on MEDLINE®, Embase, PsycINFO® and Web of Science. Resulting citations were downloaded to EndNote® software version X7 (EndNote, Philadelphia, PA), where duplicate items were immediately removed. SKB then evaluated titles for relevance and removed any clearly not relevant to the review. Next, two authors (SKB, RD) used the inclusion criteria to screen abstracts of the remaining citations and then finally to screen full texts. Reference lists of all remaining articles were then hand-searched for any additional, relevant studies: if our included articles contained any citations which appeared to be relevant and had not been found through our search, we looked up these papers and assessed their relevance by abstract and then by full-text.

Inclusion criteria

Articles were eligible for inclusion if they:

- Were written in English.
- Were published in peer-reviewed journals.
- Included employed participants (any occupational group; any group of people that work together within a hierarchical system to achieve some sense of group aim).
- Involved a “disaster” or potential disaster – we took an inclusive approach to the definition of “disaster” and largely relied on authors’ own assessment of whether to categorise the incident in this way or not.
- Involved any form of psychological intervention designed to help employees in any occupational group cope either during or after a disaster.
- Was published post-1984 (30 years before the start of our study in 2014 – reducing the risk of including research conducted before post-traumatic stress disorder was introduced as a diagnostic category in the DSM-III-R (American Psychiatric Association, 1980)).

Data extraction and synthesis

We designed spreadsheets with the following headings: first author; publication year; country of study; disaster; primary aim; design; occupation of participants; participant demographics; details of intervention; outcomes measured; instruments used; key results; conclusions; and limitations. These data were extracted by two authors (SKB, RD) from all studies which remained after the full-text screening.

During the data extraction, it became clear that due to the varying types of interventions, instruments used and outcomes measured, meta-analysis would not be possible. Instead, we extracted all relevant outcomes, grouped articles into pre-disaster and post-disaster interventions, and grouped articles with similar outcomes together where possible.

Quality appraisal

This study used a quality appraisal tool developed for a previous review (Brooks et al., 2015) which had been informed by existing quality appraisal tools (Drummond & Jefferson, 1996; EPHP, 2009; National Institute for Health, 2014). This tool assessed quality in three areas – study design, data collection and methodology and analysis and interpretation of results. The appraisal tool can be seen in Appendix II.

Results

The initial search yielded 18 005 studies. One hundred and seventy of these were relevant to the overall set of reviews on the psychological impact of disasters on occupational groups, and 15 were relevant for inclusion in this review. Details of screening can be seen in Figure 1.

Seven studies were longitudinal, seven were cross-sectional and one was a randomised controlled trial.
The disasters explored in the literature included earthquakes ($n = 3$), the 11 September terrorist attacks in New York ($n = 3$), potential pandemics ($n = 2$), hurricanes ($n = 2$) and terrorism in general, a simulated submarine disaster, a rail crash, a bank robbery and a bombing (each $n = 1$). A summary of the characteristics of articles included in this review is presented in Table 1, and more detailed description of each study’s intervention is presented in Table 2.

Overall quality was mixed (see Figure 2). Studies typically scored highly for design. Scores for data collection and methodology were more mixed, with several articles not using standardised measures and having participation rates of less than 50%. Analysis and interpretation of results tended to be the weakest areas; many did not use statistical tests or consider confounding variables.

One-third of the relevant articles involved employees who had not yet experienced a disaster and evaluated pre-disaster training interventions designed to improve confidence and ability to cope should an incident occur, while the remaining two-third looked at interventions to improve wellbeing after a disaster had occurred.

**Pre-disaster**

*Summary of studies*

Five studies involved pre-disaster interventions aimed at improving preparedness and ability to cope with disasters. Of these, two involved Canadian hospital workers preparing for a potential influenza epidemic (Aiello et al., 2011; Maunder et al., 2010), one involved Norwegian Navy sailors participating in a simulated submarine disaster (Eid et al., 2004), one involved occupational health workers preparing for terrorist attacks in the USA (Gershon et al., 2004) and one involved
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<tr>
<th>Study</th>
<th>Country</th>
<th>Disaster</th>
<th>Design</th>
<th>Participants (n)</th>
<th>Role of participants</th>
<th>Intervention</th>
<th>Outcomes assessed</th>
<th>Results</th>
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<tr>
<td>Aiello et al.</td>
<td>Canada</td>
<td>Potential influenza pandemic</td>
<td>Pre and post-training surveys</td>
<td>1250</td>
<td>Hospital staff</td>
<td>Training session on what to expect and how to cope.</td>
<td>Confidence in ability to deal with pandemic pre-training and belief that one will be able to cope during a pandemic post-training; assessed via study-specific survey.</td>
<td>Only 34.9% felt confident in being able to deal with the pandemic pre-training; 76.1% felt better able to cope as a result of the session. 87.5% found the session “useful”; 91.3% found it “helpful and informative” and 69.7% felt they were prepared for a pandemic following the session.</td>
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<tr>
<td>Boscarino et al.</td>
<td>USA</td>
<td>11 September 2001 terrorist attacks</td>
<td>Longitudinal– baseline data collected 13–15 months post-disaster and follow-up data collected 24 months post-disaster</td>
<td>1681</td>
<td>Various</td>
<td>Various</td>
<td>Alcohol abuse assessed by study-specific questions and GAGE criteria; subclinical/partial PTSD assessed by modified version of PTSD section of NIMH-DIS and WHO diagnostic interview; depression assessed by SCID’s depression scale; psychiatric syndromes (anxiety, somatisation and global severity) assessed by Brief Symptom Inventory-18. Treatment groups were asked to what extent sessions helped them deal with post-disaster emotional problems</td>
<td>21.2% reported the intervention helped a lot; 22.8% said it helped some; 33.7% said it helped a little and 22.4% found it not at all helpful. Between 1 and 3 sessions appeared to be effective in protecting workers from binge drinking (OR = 0.26, p &lt; 0.05) and alcohol dependence (OR = 0.09, p &lt; 0.05). 2–3 sessions were protective for PTSD (OR = 0.36, p &lt; 0.05); depression (OR = 0.23, p &lt; 0.05); somatisation (OR = 0.36, p &lt; 0.05), anxiety</td>
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<td>Study</td>
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<tr>
<td>Boscario et al. (2006)</td>
<td>USA</td>
<td>11 September 2001 terrorist attacks</td>
<td>Longitudinal– baseline data collected 13–15 months post-disaster and follow-up data collected 24 months post-disaster.</td>
<td>1121</td>
<td>Various</td>
<td>Brief employer-provided worksite crisis interventions.</td>
<td>using a study-specific scale.</td>
<td>(OR = 0.17, ( p &lt; 0.01 )) and global severity (OR = 0.30, ( p &lt; 0.05 ))</td>
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<td>An ANOVA examining pre/post changes in CAPS scores found a significant main effect of time (( F )</td>
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<tr>
<td>Difede et al. (2007)</td>
<td>USA</td>
<td>11 September 2001 terrorist attacks</td>
<td>Randomised controlled trial</td>
<td>21 (7 in CBT intervention group, 14 in treatment as usual (TAU) group).</td>
<td>Disaster workers</td>
<td>Intervention group: 12 weekly sessions of cognitive behavioural therapy. TAU group: Mental</td>
<td>PTSD, depression, alcohol problems and various clinical disorders; measures included</td>
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<td>Study</td>
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|       |         |          |        | health treatment | commons available after a traumatic event; participants were given results of their PTSD evaluation and referred back to occupational health for assistance with obtaining treatment through community providers (though none took this up). | clinician-administered PTSD Scale, structured clinical interview for DSM-IV Axis I disorders, life stressor checklist-revised, PTSD checklist, Beck depression inventory, SCL-90-R, Michigan alcohol screening test, social adjustment scale and life events scale. | (1, 19) = 9.690, \( p < 0.01 \); a significant main effect of Group \( F (1, 19) = 6.317, \( p < 0.05 \); and a significant time X Group interaction \( F (1, 19) = 6.547, \( p < 0.05 \). Significant decrease in CAPS scores for CBT group compared to TAU group \( F = 4.1, \( p < 0.01 \). None in treatment condition increased in CAPS score but 21% in TAU group did increase. An ANOVA examining pre/post changes in BDl scores found a trend for a time X Group interaction \( F (1, 16) = 3.457, \( p < 0.081 \) with no significant main effects. An ANOVA examining pre/post changes in SCL-90 GSI scores found a trend for a time X Group interaction, \( F (1, 18) = 3.074, \( p < 0.097 \), and a significant main effect of Group, \( F (1, 18) = 7.062, \( p < 0.016 \), but no
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<tr>
<td>Eid et al. (2004)</td>
<td>Norway</td>
<td>Simulated submarine disaster</td>
<td>Experimental study; surveys conducted pre-training and at the end of the 6-d training.</td>
<td>18</td>
<td>Sailors</td>
<td>Disaster simulation exercise</td>
<td>Personality hardness assessed by short form of the dispositional resiliency scale; coping style assessed by Coping Style Questionnaire; PTSD assessed by Impact Of Event Scale and PTSS-10; quality of life assessed by GHQ-12.</td>
<td>On a scale of 1–5, median score of 5 for whether similar exercises should be held on a regular basis; median of 4/5 for the exercise reinforcing their confidence in their jobs. Measures on IES, PTSS-10 or GHQ-12 never exceed “low symptom, same as usual” during the exercise. QOL measured by GHQ significantly increased over time ( F (6, 14) = 4.0, p &lt; 0.01 ). Stress symptoms measured by IES significantly decreased over time ( F (6, 14) = 2.76, p &lt; 0.05 ). Personality hardness was negatively associated with IES total ( r = -0.52, p &lt; 0.05 ), IES intrusion ( r = -0.47, p &lt; 0.05 ) and IES avoidance ( r = -0.47, p &lt; 0.05 ) while avoidance coping (continued)</td>
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<td>Study</td>
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<td>Gershon et al. (2004)</td>
<td>USA</td>
<td>Terrorism in general</td>
<td>Cross-sectional</td>
<td>84</td>
<td>Occupational health workers</td>
<td>Terrorism educational workplace programme</td>
<td>Confidence in clinical skills; recognition of terrorism exposure</td>
<td>Increased confidence in protecting self-while caring for victims of terrorism (59.7%)</td>
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<td>how stressful they found the disaster, assessed by study-specific scale; psychological morbidity assessed by Impact of Events scale and GHQ-12.</td>
<td>No correlation between number of debriefing sessions and perceived helpfulness. No significant findings in relation to debriefing helpfulness for the IES or GHQ-12. Debriefing was reported to be “very” or “extremely” helpful by 34% of participants, “somewhat” helpful by 46% and “not at all” helpful by 20%. Those who were debriefed reported significantly higher overall GHQ-12 scores. Overall,</td>
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### Study | Country | Disaster | Design | Participants (n) | Role of participants | Intervention | Outcomes assessed | Results
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Maunder et al. (2010) | Canada | Potential influenza pandemic | A “dose-finding” study compared pre-post changes in three different durations of training. | 158 | Hospital workers | Computer-assisted “Pandemic Stress Vaccine” training course. Participants randomly assigned to short course (7 sessions, Confidence in training and support; perceived efficacy to adapt to pandemic conditions; interpersonal problems; coping via | Significant improvements from the start to the end of the course in pandemic self-efficacy, confidence in training and support and |
### Table 1. Continued

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<th>Study</th>
<th>Country</th>
<th>Disaster</th>
<th>Design</th>
<th>Participants (n)</th>
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<td>median 111 min); medium course (12 sessions, 158 min); or long course (17 sessions, 223 min). problem-solving, seeking support or escape-avoidance. Nine-item SARS scale adapted for influenza; Of 24-item Pandemic Self-Efficacy Scale derived for this study; IIP-32: ways of coping inventory.</td>
<td>interpersonal problems. Dimensions of interpersonal problems which improved included problems with being socially inhibited, non-assertive, overly accommodating, self-sacrificing and intrusive/needly. Coping with stress using problem-solving, seeking support from others or escape-avoidance did not change over the course overall: however, for those not reporting problem-solving and seeking support, there were pre-post improvements. Among those under-utilising problem-solving at T1 there was a significant pre-post increase (95% CI of difference 0.2–0.4, (p &lt; 0.001)). Among those under-utilising seeking support, there was again an increase (95% CI of difference 0.1–0.3, (p = 0.003)). Among those who reported any use</td>
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<td>Study</td>
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<td>Disaster</td>
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<td>Miller-Burke et al. (1999)</td>
<td>USA</td>
<td>Bank robberies</td>
<td>Cross-sectional</td>
<td>141</td>
<td>Bank employees</td>
<td>Critical incident stress debriefing.</td>
<td>Work productivity, stress, physical health, work relationships, personal relationships, desire to keep working, days off work; psychological health symptoms – survey designed for the study.</td>
<td>Of 47% attended a formally presented CISD session; almost 8 of 10 believed it to be helpful (these ratings were not associated with aspects of the robbery context). 77% also rated interventions with co-workers as successful; 64% interventions with supervisors; 54% with family/friends and 48% with overall work environment. Of 20% considered overall work environment to have made their recovery worse. Of 11% reported that questions from customers, police and media...</td>
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Table 1. Continued

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<th>Study</th>
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<th>Outcomes assessed</th>
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<tr>
<td>North et al. (2002)</td>
<td>USA</td>
<td>Oklahoma City bombing</td>
<td>Cross-sectional</td>
<td>181</td>
<td>Fire-fighters who served as rescue and recovery workers.</td>
<td>Workplace debriefings</td>
<td>Psychiatric diagnoses; diagnostic interview schedule</td>
<td>Of 92% had participated in workplace debriefings. Two-third was satisfied with this and one-third dissatisfied; however, 89% said they would recommend the intervention. PTSD was not related to satisfaction or recommendation of the debriefings. However, participants with other (non-PTSD) disorders were less likely to report satisfaction (50 vs. 71%, ( x^2 = 6.93, p &lt; 0.01 )) or recommend them (82 vs. 92%, ( x^2 = 4.24, p &lt; 0.05 )).</td>
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<td>Reid et al. (2005)</td>
<td>USA</td>
<td>Hurricanes</td>
<td>Cross-sectional</td>
<td>53</td>
<td>Florida Department of Health employees</td>
<td>Training on knowledge, skills and preparedness.</td>
<td>Impact of training on knowledge, skills and awareness; perceptions of preparedness and knowledge/skill application relative to training; involvement in the 2004 hurricanes. Open-ended questions on recommendations, overall impact of training, suggestions for improving</td>
<td>Large majority reported the training increased their knowledge of the core program concepts. Most indicated the training enhanced their ability or prepared them to implement the 13 specific skills addressed in the training. Of 90% indicated the training was</td>
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<td>Study</td>
<td>Country</td>
<td>Disaster</td>
<td>Design</td>
<td>Participants ($n$)</td>
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<td>Seyle et al. (2013)</td>
<td>Indonesia</td>
<td>Earthquake</td>
<td>4-year longitudinal study</td>
<td>43</td>
<td>Elementary school teachers</td>
<td>Psychoeducation</td>
<td>Post-traumatic distress symptoms; depression; perceptions of teaching efficacy; perceptions of classroom behaviour. PCL; CES-D; Teacher Efficacy Scale; modified version of child behaviour checklist.</td>
<td>useful for their jobs and 98% felt better prepared to respond to a major trauma as a result of the training. Of 89% had incorporated the training and its related concepts/skills in their personal life; 83% in their professional life. Compared to parents from the community: they did not differ in terms of degree of earthquake exposure or depression, but teachers reported lower PTSD scores. Pre-intervention, CES-D scores were a significant predictor of reported negative student behaviour ($\beta = 0.354, p = 0.037$). PCL was not a significant predictor of teachers' perceptions of negative classroom behaviour. Pre-intervention, PCL scores predicted increased general teaching efficacy ($\beta = 0.343, p = 0.025$). Post-intervention, CES-D and PCL scores were not...</td>
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<td>Study</td>
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| Tehrani et al. (2001)        | UK      | Paddington train          | One week after crash;        | 12               | Sainsbury’s employees (the supermarket was near to the crash site and they were some of the first on the scene, providing ladders to help passengers climb up from the track and giving immediate first aid). | Debriefing   | PTSD depression, Extended Impact of Events Scale; Goldberg Anxiety and Depression Scale. Records of sickness absence. | Paired-sample t tests showed a significant drop in PCL scores \( t (42) = 1.95, p = 0.029 \) and CES-D scores \( t (42) = 2.307, p = 0.013 \) from before to after the intervention. One week after the event, there was a high level of post-trauma. Four months following the debriefing, there was a significant reduction in the symptoms measured by the IES-E and Goldberg instruments. Before scores, after scores, mean difference between scores, T-score, significance, respectively: Anxiety: 5.9, 3.1, 2.8, 3.75, 0.003 Depression: 4.8, 2.2, 2.6, 4.08, 0.001 Avoidance: 18.3, 9.7, 8.6, 7.7, 0.001 Arousal: 15.8, 6.3, 9.5, 4.3, 0.001 Re-experience: 24.2, 9.3, 15.1, 7.5, 0.001 The performance indicators showed that all the \( \text{continued} \)
Study Country Disaster Design Participants (n) Role of participants Intervention Outcomes assessed Results

Waelde et al. (2008) USA Hurricane Katrina 8-week programme beginning 10 weeks post-disaster; mid-treatment and post-treatment questionnaires completed at 3 and 8 weeks post-workshop. Twenty at baseline; 15 at follow-up. Mental health workers Four-hour meditation workshop followed by 8-week home study programme. PTSD symptoms; depression; anxiety; follow-up questionnaire asked them to rate improvement in wellbeing, stress coping, frustration tolerance, activity level, depression, anger, physical pain, sleep problems and fatigue as a

employees demonstrated an improvement in performance between November 1999 and April 2000 with the greatest improvement being in their cheerfulness, ability to concentrate and performance on the job. The managers assessed the performance of most of the employees as excellent or very good in April 2000.

There was a reduction in the level of sickness absence between the first quarter of 1999 and 2000. In the whole group, 14 fewer days absence was recorded in 2000 than had been recorded in 1999.

Scores for total PTSD, re-experiencing, hyperarousal and state anxiety significantly decreased over time. Slopes for avoidance and depression were in the expected directions but not statistically different from zero. All treatment
Table 1. Continued

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Disaster</th>
<th>Design</th>
<th>Participants (n)</th>
<th>Role of participants</th>
<th>Intervention</th>
<th>Outcomes assessed</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wu et al. (2012)</td>
<td>China</td>
<td>2008 Sichuan earthquake</td>
<td>One month; follow-up completed by 7 months post-disaster.</td>
<td>1267</td>
<td>Military rescuers</td>
<td>512 PIM, 1-month post-disaster</td>
<td>Anxiety, depression and PTSD. Hospital Anxiety and Depression Scale (HADS); Structured</td>
<td>Baseline analysis suggested no significant differences between the study groups. Severity of PTSD, anxiety</td>
</tr>
</tbody>
</table>

The slopes of total PTSD and anxiety were correlated with the total number of minutes of meditation practice across the 8 weeks ($r = -0.40$, $p < 0.05$ and $r = -0.38$, $p < 0.05$, respectively) indicating that more meditation practice was associated with greater improvements. Of 93% reported feeling somewhat or much better as a result of the intervention. More than 60% reported improvements in stress coping, frustration tolerance, activity level and depression. Of 47% reported improved ability to deal with anger. Effect sizes were in the medium range, except depression, which was in the small range.
<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Disaster</th>
<th>Design</th>
<th>Participants ($n$)</th>
<th>Role of participants</th>
<th>Intervention</th>
<th>Outcomes assessed</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Interview for PTSD (SI-PTSD).</td>
<td>and depression decreased over time in all three groups, with significant differences between the groups in symptoms of PTSD ($p&lt;0.01$). Compared with the debriefing and control group, significantly lower scores of PTSD and positive efficacy in improving symptoms of re-experiencing, avoidance and hyperarousal were found in the ‘‘512 PIM’’ group.</td>
<td></td>
</tr>
</tbody>
</table>
Florida Department of Health employees preparing for hurricanes (Reid et al., 2005).

Three studies involved interactive training workshops providing education and allowing for discussion of key issues (Aiello et al., 2011; Gershon et al., 2004; Reid et al., 2005); one study involved interactive computer-based training (Maunder et al., 2010) and one entailed a disaster simulation exercise (Eid et al., 2004). Training courses lasted between one hour (Aiello et al., 2011) and six days eighteen hours (Eid et al., 2004). All five interventions were designed to educate employees about what they may experience during a disaster and how best to cope with this. The education that was provided covered various aspects of disasters including disaster planning (Eid et al., 2004; Gershon et al., 2004; Maunder et al., 2010; Reid et al., 2005); common concerns of employees during a disaster (Aiello et al., 2011); the potential psychological impact of disasters (Aiello et al., 2011; Gershon et al., 2004; Maunder et al., 2010); coping strategies (Aiello et al., 2011; Maunder et al., 2010) and resources for further support (Aiello et al., 2011; Maunder et al., 2010). Further details of what each intervention entailed can be seen in Table 2.

Outcomes

All five studies considered the effect of the intervention on participants’ confidence. Aiello et al. (2011) found that pre-intervention, only 34.9% of hospital workers felt confident in being able to deal with a potential influenza pandemic. Following the session, 69.7% agreed with the statement “The session prepared me for a pandemic”, while 76.1% felt more confident in their ability to cope as a result of the session, agreeing with the statement “Following today’s session, I believe that I will be better able to cope in the event of a pandemic”. Reid et al. (2005) found that 98% of Department of Health workers felt more confident and better prepared to respond to a major trauma as a result of the skills training; most of those who were involved in hurricane response in 2004, having received training in 2003, indicated that the training had given them confidence and they had used the acquired skills in their response efforts. Gershon et al. (2004) found increased confidence in recognising symptoms of terrorism exposure, treating victims of chemical exposure and protecting oneself whilst caring for victims. Maunder et al. (2010) found that participants showed significant improvements from the start to the end of the training course in ‘pandemic self-efficacy’ (i.e. confidence in one’s ability to carry out their job effectively during a pandemic) and significantly improved confidence in training and support received. Eid et al. (2004) found that their submarine disaster simulation exercise reinforced confidence in Navy sailors: on a scale of 1–5 (with 5 being high) there was a median score of 4/5 when participants were asked to rate whether the exercise had reinforced their confidence in the submarine service.

Maunder et al. (2010) found that participants showed significant improvements from the start to the end of the course in some interpersonal problems, including social inhibition and non-assertive, overly accommodating, self-sacrificing and intrusive/needy behaviours. The same study found that the intervention led to better coping strategies: those participants who did not report coping with stress by using problem-solving or seeking support pre-course tended to be more likely to use these positive coping strategies post-course, and less likely to use negative coping strategies, such as escape-avoidance.

Participants’ perceived usefulness of intervention

Aiello et al. (2011) reported that 87.5% of hospital workers found the training session “useful” while 91.3% found it “helpful and informative”. Reid et al. (2005) found that 90% of Department of Health employees found the hurricane training useful, and as a result 89% had incorporated the training and its related concepts or skills into their personal lives while 83% had incorporated these into their professional lives. Eid et al. (2004) reported a median score of 5 (out of 5) for whether similar exercises should be held on a regular basis, showing that sailors did indeed feel the exercises were useful and should be held regularly.

No studies reported any detrimental effects of pre-disaster training on confidence and the one study (Maunder et al., 2010) which considered the impact of the training on interpersonal problems found only positive effects. No studies measured whether there was any detrimental effect of pre-disaster training on other mental health outcomes.

Post-disaster

Summary of studies

Ten studies explored the effects of interventions designed to improve psychological wellbeing after disasters. Two studies from the USA involved a worksite crisis intervention for employees of various organisations following the 11 September terrorist attacks in New York (Boscarino et al., 2005, 2006). Kenardy et al. (1996) examined the effects of group stress debriefing on emergency services personnel and disaster workers following an earthquake in Australia; North et al. (2002) looked at the effects of debriefing on fire-fighters after a bombing in the USA; Tehrani et al. (2001) examined the effects of debriefing on supermarket workers in the UK after a train crash; and Miller-Burke et al. (1999) examined the effects of Critical Incident Stress Debriefing (CISD) for bank employees following bank robberies in the USA. It is important to note that though these articles all refer to ‘debriefing’, the procedures involved and focus of the intervention may have differed between studies (see Table 2 for specific details). Other interventions included cognitive behavioural therapy for disaster workers who met full or subthreshold PTSD criteria after the 11 September attacks in the USA (Difede et al., 2007); psycho-education for elementary school teachers in Indonesia who experienced an earthquake (Seyle et al., 2013); meditation for mental health workers following a hurricane in the USA (Waelde et al., 2008); and a psychological intervention called the ‘512 PIM’ (512 Psychological Intervention Model) including discussions, training on cohesion and stress management, delivered to military rescuers following an earthquake in China (Wu et al., 2012).

Outcomes

Boscarino et al. (2005) reported that between 1 and 3 worksite crisis sessions appeared to protect workers from binge
Table 2. Overview of interventions.

<table>
<thead>
<tr>
<th>Study</th>
<th>Details of intervention</th>
<th>Quality appraisal score (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aiello et al. (2011)</td>
<td>One-hour training session on predicted stressors associated with influenza; common concerns; normal responses to extraordinary stress; organisational approaches to building resilience and reducing stress; coping and resources for further support. Sessions focused on principles such as ‘hoping for the best but preparing for the worst’ and making implicit coping strategies explicit. Interaction, in terms of discussion, identification of problems and suggested solutions, was encouraged.</td>
<td>66.7</td>
</tr>
<tr>
<td>Boscarino et al. (2005)</td>
<td>Brief employer-provided workforce crisis interventions. These could be any brief sessions related to coping with the 9/11 disaster received shortly after the event, arranged by the employer and led by mental health professionals or counsellors. These included critical incident stress management, psychological debriefing or any other short-term interventions designed to provide emergency mental health support following trauma. Interventions were different for different workplaces, but 60–70% reported that the intervention involved coping/relaxation techniques and strategies for positive thinking.</td>
<td>93.8</td>
</tr>
<tr>
<td>Boscarino et al. (2006)</td>
<td>See above</td>
<td>93.8</td>
</tr>
<tr>
<td>Difede et al. (2007)</td>
<td>Twelve weekly sessions of cognitive behavioural therapy modified for disaster workers. Including psychoeducation; treatment rationale and contracting; breathing exercises; cognitive reprocessing; relapse prevention and homework involving imaginal exposure using audio-taped imaginal exposure from treatment sessions, graduated in vivo exposure and cognitive reprocessing.</td>
<td>75</td>
</tr>
<tr>
<td>Eid et al. (2004)</td>
<td>Simulated submarine disaster exercise lasting 6 d 18 h. Participants were seated in a section of the submarine in seawater of 35 m depth with lighting, ventilation and heating shut off. Activities and schedules were organised as closely as possible to have a SUBSUNK procedures – an operation carried out to search for a submarine that is known to have sunk.</td>
<td>80</td>
</tr>
<tr>
<td>Gershon et al. (2004)</td>
<td>Half-day terrorism educational workplace programme, including: role of emergency management in a disaster; information on reporting guidelines, diagnosis, treatment, infection control and bioterrorism effects; methods to diagnose and treat chemical and radiological agents; an overview of disaster mental health and treatment options; key elements in workplace disaster planning.</td>
<td>73.3</td>
</tr>
<tr>
<td>Kenardy et al. (1996)</td>
<td>Group stress debriefing</td>
<td>87.5</td>
</tr>
<tr>
<td>Maunder et al. (2010)</td>
<td>‘‘Pandemic Stress Vaccine’’, a computer-assisted course comprised of audio and video mini-lectures, onscreen notes, printed fact sheets, quizzes and games and audio modules for relaxation skills. Topics addressed included what to expect during a pandemic; what is resilience; normal stress responses; psychological first aid; working outside of one’s comfort zone; moral and ethical dilemmas, coping approaches; active listening; expressing oneself constructively; balancing work and family; talking to children about disasters/emergencies; personal and home preparation; managing drugs and alcohol; danger signals; and resources for getting help. Participants were randomly assigned to either the short course (7 sessions, median 111 min total); medium course (12 sessions, 158 min); or long course (17 sessions, 223 min).</td>
<td>87.5</td>
</tr>
<tr>
<td>Miller-Burke et al. (1999)</td>
<td>Critical Incident Stress Debriefing emphasising containment of feelings and expression of feelings in a safe and supportive environment, aimed at moving participants from ‘‘shock’’ to ‘‘acceptance’’. This was delivered by an external employee-assistance service.</td>
<td>66.7</td>
</tr>
<tr>
<td>North et al. (2002)</td>
<td>Workplace debriefings/defusings. Debriefings were carried out in groups of 15–20 workers, while ‘‘mental health defusing’’ was carried out individually, after each shift in which participants worked at the bomb site.</td>
<td>80</td>
</tr>
<tr>
<td>Reid et al. (2005)</td>
<td>Bioterrorism Trauma Intervention Specialist Training (BTIST): Providing skills in assessment, triage, trauma stabilisation, individual and group defusing, debriefing, stress management, compassion fatigue, grief intervention, cultural competence, critical incident stress management and team development. The 5-d training course included interactive teaching methods, such as case studies, role-playing and scenarios. Modules were also available on CDs and DVDs.</td>
<td>60</td>
</tr>
<tr>
<td>Seyle et al. (2013)</td>
<td>Psychoeducational material about impact of disasters on thoughts, emotions and behaviours in adults; relaxation and coping exercises such as deep breathing; psychoeducational information about impact of disasters on children and basic information about supporting children’s emotional stability; education on child misbehaviour and supporting children’s attention in class.</td>
<td>75</td>
</tr>
<tr>
<td>Tehrani et al. (2001)</td>
<td>Group debriefing one-week post-disaster, beginning with a short presentation on post-trauma stress giving the opportunity to ask questions and learn about the common reactions/symptoms experienced after a traumatic event. The debriefing then allowed employees to share their experiences of what they went through, focusing on their behaviours and things that were seen, heard, smelled, touched and tasted. This allowed them to examine what had happened during the day of the crash, to fill gaps in the story, check understanding and share knowledge.</td>
<td>50</td>
</tr>
<tr>
<td>Waelde et al. (2008)</td>
<td>Four-hour meditation workshop, including instruction and guided practice in meditation; breathing; guided breathing-focused imagery; mantra repetition and letting go of</td>
<td>81.3</td>
</tr>
</tbody>
</table>
drinking or alcohol dependence, while 2–3 sessions were protective for PTSD, depression, somatisation, anxiety and global severity. A follow-up study using propensity scores to match intervention cases to non-intervention controls (Boscarino et al., 2006) found that outcomes tended to be better for intervention cases: they were less likely to show symptoms of depression and alcohol dependence in the past year and less likely to show symptoms of PTSD, depression and anxiety over the past month. Similarly, Tehranian et al. (2001) found a high level of trauma symptoms immediately post-disaster, but four months after the debriefing intervention participants reported reduced anxiety, depression, and PTSD symptoms – however, there was no control group to determine whether this recovery was due to the intervention. Tehranian et al. (2001) also found that post-intervention, all employees demonstrated an improvement in “cheerfulness” and ability to concentrate. However, one study did not find any improvement in psychological outcomes following debriefing: in Kenardy et al.’s (1996) study of group stress debriefing, the participants who were debriefed reported significantly higher scores on the GHQ-12 than those who were not debriefed, and showed less improvement in PTSD. Even when level of exposure was taken into account, there was no evidence of debriefing improving psychological wellbeing.

North et al. (2002) measured PTSD symptoms but not as an effect of the intervention; instead, they explored whether PTSD symptoms were associated with satisfaction with, or recommendation of, the intervention. They found no such association, though participants with other, non-PTSD disorders were less likely to report satisfaction or recommend the intervention.

In Wu et al.’s (2012) study of the “512 Psychological Intervention Model”, anxiety, depression and PTSD symptoms decreased over time for all three groups (the “512 PIM” group, the debriefed group and the control group), with significant differences between groups with regard to PTSD symptoms. The “512 PIM” group had significantly lower scores of PTSD and positive efficacy in improving symptoms of re-experiencing, avoidance and hyperarousal.

The study which explored the effects of CBT (Difede et al., 2007) found a significant decrease in PTSD scores for the CBT group compared to the treatment-as-usual group, 21% of which actually increased in PTSD scores. However, there were no significant differences between groups in terms of alcohol misuse.

One study looked at the effects of a psycho-educational intervention (Seyle et al., 2013). This article reported a significant decrease in depression and PTSD symptoms post-intervention.

The study exploring meditation as an intervention (Waelde et al., 2008) found that scores for total PTSD, re-experiencing, hyperarousal and state anxiety significantly decreased over time. Total PTSD and anxiety scores were correlated with the total number of minutes of meditation practiced across the 8 weeks, suggesting more meditation was associated with greater improvements. The majority of the participants (93%) in this study reported feeling somewhat or much better as a result of the intervention. More than 60% reported improvements in stress coping, frustration tolerance, activity level and depression, while 47% reported improved ability to deal with anger.

Participants’ perceived usefulness of intervention

In Boscarino et al.’s (2005) study, 21.2% reported that the worksite crisis intervention helped a lot; 22.8% said it helped some; 33.7% said it helped a little and 22.4% found it not at all helpful. North et al. (2002) found that two-third of participants were “satisfied” with the workplace.
defusings/debriefings they had taken part in; although one-third were dissatisfied, 89% still said they would recommend the intervention. Miller-Burke et al. (1999) found that almost 80% of participants who attended a formally presented CISD session found it to be helpful. Interventions with co-workers were also perceived as successful by 77%; interventions with supervisors were found to be helpful by 64%; and 54% found interventions with family or friends to be helpful. In Kenardy et al.’s (1996) study – which showed no positive effect of debriefing – there was no correlation between the number of defusings sessions and the perceived helpfulness of the intervention; debriefing was reported to be “very” or “extremely” helpful by 34% of participants, “somewhat” helpful by 46% and “not at all” helpful by 20%.

Discussion

This review aimed to explore the literature on interventions designed to improve the wellbeing of employees exposed to disasters. We aimed to assess the success of such interventions by looking at their effect on psychological constructs, such as confidence and ability to cope, and on symptoms of psychological disorders, such as PTSD and anxiety. We also aimed to explore how helpful or useful the participants found the interventions.

We found only a limited amount of relevant literature. Five studies considered the impact of pre-disaster training courses, focusing mainly on whether they improved confidence and whether participants found them useful. Overall, we found that pre-disaster training was found to be helpful in increasing confidence in all five studies. Three of the five studies asked participants to rate the usefulness of the intervention, with all three reporting positive results. There was very little exploration of the impact of training on psychological outcomes, though one study reported that it led to improvements in “inter-personal” problems and more effective coping mechanisms (i.e. problem-solving or seeking support, rather than avoidance).

It appears that evidence-based approaches, providing education and focusing on mediators of distress, may be relevant and useful in terms of improving employees’ confidence in their own abilities to act appropriately during a disaster and their ability to cope. Realistic simulated crisis training, such as the rehearsal training explored by Eid et al. (2004) appears to also be valuable in improving confidence. While these are positive findings, confidence on its own is not an especially useful outcome for pre-disaster training as it is likely to be a temporary outcome, especially if measured directly after training. It would perhaps be more useful for studies to focus on how participants rate the usefulness of the training, and whether they plan to or succeed in implementing their learning into their work – as in the Reid et al. (2005) study which reported that over 80% of participants had incorporated training concepts into their professional lives. This is more likely to be a long-lasting outcome than increased confidence.

Importantly, no negative effects associated with pre-disaster skills training were reported in any of the five pre-disaster training studies. No studies reported a detrimental effect on confidence and the study which considered interpersonal problems found only positive effects of training. Participants typically rated training as useful and something they would recommend. This is a positive finding especially since it could be possible for any disaster training to increase feelings of worry or anxiety in employees, as it requires them to consider worst-case scenarios and perhaps causes them to think about stressful situations they may not have considered before. However, it is possible that the lack of findings regarding detrimental effects is due to the nature of the post-training questions asked; future studies should include a measure of worry or anxiety to further explore whether training could have a detrimental effect.

Ten studies explored post-disaster interventions, focusing mainly on their impact on psychological symptoms. Three studies suggested that workplace interventions such as defusings can have long-term positive effects, with ideally more than one session being most helpful (Boscarino et al., 2005). However, one study found that debriefing was not helpful and could in fact lead to poorer outcomes. Other interventions such as the “512 Psychological Intervention Model” (Wu et al., 2012), CBT, psychoeducation and meditation were all found to be useful in improving psychological symptoms. It is also important to note that the studies exploring these interventions were among the highest-scoring studies in the quality appraisal, in particular the 512 Psychological Intervention Model study which described the appropriate statistical tests fully and considered confounding variables and was the only study to receive 100% on our quality assessment. However, these interventions were only explored in one study each, therefore, we cannot be sure that the results are generalisable to other employee populations.

Four studies explored how useful participants rated the interventions, and the results were not especially positive overall. The most positive result came from Miller-Burke et al.’s (1999) study of bank employees who participated in CISD – 80% reported finding it useful. Three studies on workplace debriefings suggested that participants did not find them particularly helpful. The other studies did not include any measure of helpfulness of the intervention, and, therefore, we do not know whether the 512 Psychological Intervention Model, CBT, psychoeducation or meditation were rated as helpful by the employees who participated in them.

Overall, we found little evidence of what kind of post-disaster interventions are most useful. The fact that we found such a small number of relevant studies, many of which looked at different interventions, means we cannot identify which intervention is most successful. It does appear that debriefing led to an improvement in psychological symptoms but, as one study found that debriefing did not improve wellbeing at all and in fact led to poorer outcomes, it is likely that the effectiveness of debriefing is dependent on factors, such as how and when it is carried out, what it involves, and how many sessions are provided. It is also important to note that there was little consistency within the articles regarding what constituted debriefing, and so it would be inappropriate to generalise from this review. The lack of longitudinal studies also means that there was no evidence on the potential long-term effects of psychological debriefing.

Literature reviews focusing on the mental health impact of disasters on communities in general have shown similar
findings. For example a review of the mental health response to community disasters (North & Pfefferbaum, 2013) identified PFA, debriefing and “crisis counselling” as the three most commonly applied early psychosocial interventions. Their discussion of PFA was fairly positive, suggesting it should be embedded into emergency response systems, although they point out that it has not been empirically tested. They concluded that debriefing was ineffective for PTSD prevention or treatment and that it could actually be harmful in the long term, suggesting that instead, individuals at risk for psychopathology should be identified and referred for psychiatric services. Finally, they found that “crisis counseling” was poorly defined in the literature and that overall it appeared to be insufficient in meeting the needs of individuals who require formal psychiatric treatment. Another review on disaster impact at the community level (Goldmann & Galea, 2014) supported the ideas that debriefing is not recommended and that PFA is the preferred post-disaster intervention, although empirical studies evaluating its effectiveness are still needed. They also found empirical support for CBT, in particular exposure therapy where the individual is asked to recollect the traumatic experience, though they point out that there are few randomised controlled trials for CBT in disaster survivors and few studies looking at the long-term effects. This review also proposes that pre-disaster, it is helpful to develop and test response methods within communities that are adaptable to different disaster situations, and to build on knowledge gained from previous disasters. They suggest that addressing modifiable stressors and helping victims return to pre-disaster routines may be effective in reducing post-disaster distress; they also cite an association between media exposure of the disaster and PTSD, suggesting that communities should look into ways of communicating information in such a way as to reduce fear and promote calm.

Limitations

Two-third of the included articles (n = 10) were from North America. It may have been useful to consider widening the search and translating foreign language articles to provide further evidence about the effectiveness of interventions. The decision to restrict the search to articles published in peer-reviewed journals may have limited the results; future research may consider searching grey literature for relevant studies. The quality appraisal tool we used was the same one we used to assess articles in our previous reviews (Brooks et al., 2015, 2016, 2017); it was a deliberate choice to use the same tool throughout our reviews to ensure consistency. However, this particular tool does not specifically assess the quality of intervention studies, and it may have been useful to include questions specifically relating to the potential for bias which are relevant only for intervention studies.

There were also a number of key limitations of the studies included in this review. The pre-disaster intervention studies tended to limit their analysis to exploring confidence and perceived self-efficacy, and did not measure other psychological outcomes. Most of the pre-disaster studies were cross-sectional rather than prospective or randomised controlled trials. Often, confidence pre-training was measured retrospectively, so while participants may have felt their confidence improved, it is difficult to ascertain whether this is true and by how much it improved. The articles reviewed here also failed to explore the impact this reported increase in confidence may have on coping and other psychological outcomes. Follow-up periods tended to be short, with participants completing measures immediately following their training sessions, and so long-term effects on confidence and competency are not known. Furthermore, while participants clearly reported feeling more confident after training, there is no evidence to suggest whether this would translate to better coping during an actual disaster. A useful way of assessing this might involve having simulated crisis events (i.e. emergency preparedness exercises or drills), where employees have to act and respond exactly as they would in a disaster situation. This would give a better idea of whether the training has actually been successful in terms of improving skills, though it would still not be clear – without experiencing a real disaster – whether the training really does improve employees’ ability to cope psychologically.

Though several of the post-disaster intervention studies showed positive effects of interventions, such as workplace debriefings, some studies (e.g. Boscarino et al., 2005, 2006) looked at many different workplaces, all of whom had received their own workplace interventions. These presumably differed in terms of how they were offered, the timing of the intervention, who led the sessions, the length of the sessions and what exactly was involved. As there was no attempt to differentiate the results of different workplaces, it is difficult to ascertain which aspects of debriefing are important in terms of improving outcomes. Many of the post-disaster studies failed to ask participants to rate the usefulness of, or their satisfaction with, the interventions. Many had no control groups or “treatment-as-usual” groups to compare results with, and many had no follow-up or pre-disaster comparisons. Therefore, even when results were positive and indicated that employees coped well after disasters, it is impossible to know whether this is due to the interventions: perhaps the employees involved were particularly resilient, or perhaps symptoms would have improved over time even without an intervention.

In addition, many studies had small sample sizes and high dropout rates, making it difficult to generalise from the results. Often no standardised measures were used, and the questionnaires given to participants were brief. Several studies presented few statistical details and did not measure psychological outcomes. Very few studies considered other factors which may affect the effectiveness of interventions, such as prior psychiatric history or previous exposure to trauma.

Implications

The paucity of good quality work in this area is striking. More and better quality, studies are required before any firm recommendations can be made on how best to prepare employees for a possible disaster or to intervene following a disaster. Future studies should include comparison groups. Reliance on non-randomised study techniques, especially ones without a suitable control group and accounting for
known confounders, can lead to misguided practice. A review on psychological debriefing (Greenberg, 2001) highlights this, with six of eight randomised trials of debriefing showing it to be at best unhelpful and at worst harmful, while the uncontrolled trials showed mixed results, sometimes finding debriefing to be unhelpful but sometimes finding it to be beneficial.

The small number of studies examining pre-disaster training courses appeared to show that these courses were successful in increasing confidence and feelings of self-efficacy; however, it is unclear whether this would translate to better coping if faced with a real disaster, or whether increased confidence would be protective of mental health post-incident. It is also unclear what impact training may have on psychological wellbeing, as no studies measured this, focusing instead on confidence and satisfaction with the training course. Taking account of the limitations of the included studies is particularly important given that whilst some of the studies we found reported that psychological debriefing was helpful, there is good evidence from randomised controlled studies of debriefing techniques in other populations that not only is it ineffective in improving mental health status in the longer term but also has the potential to cause harm (NICE, 2005; Rose et al., 2009). However, some suggest that the evidence that debriefing is unhelpful or even harmful is unreliable and that, if protocols are followed correctly, debriefing can have positive effects on wellbeing (Hawker & Hawker, 2015). This is an area which merits further research within disaster-exposed organisations.

From the results of this review, it appears possible that CBT, psychoeducation and meditation may be useful in improving the psychological wellbeing of employees after a disaster. However, these findings come from a very limited number of studies, without randomised controlled trials, and, therefore, any suggestion that these could be helpful is extremely tentative. Future research is needed to support these findings.

Based on the findings of this review as well as the findings of reviews on interviews for disaster-exposed communities, our suggestions for organisations would be as follows:

- Pre-disaster training appears to be helpful for employees; prepare them for both the practical issues involved and the potential psychological distress they may experience. Develop and test response methods adaptable to different emergency situations; simulated crisis training may be useful in helping them to understand how to respond should a disaster occur. Use any previous experience of emergency situations to inform these response methods and crisis training. Educate employees on the symptoms of distress they should look out for post-disaster and where they should go to seek help should they need to. Workshops focusing on appropriate coping skills may be useful – for example encouraging problem-solving rather than avoidance, and encouraging them to seek support from others. PFA training for employees may help them feel able to listen to and support their colleagues. These steps are likely to enhance their confidence both in their abilities to act appropriately during a disaster and their ability to cope with it psychologically.
- Communicate calmly and effectively about the emergency situation with employees in a way as to not produce fear.
- Do not “debrief” following a disaster as this has the potential to be harmful. Instead, encourage a supportive atmosphere within the workplace where employees feel able to discuss their feelings with their colleagues. Managers who are educated in the possible risks of disaster exposure and the symptoms to look out for may be able to identify employees who are particularly vulnerable and may need more support than the organisation can provide and these employees should be signposted on to the appropriate psychiatric services.

**Declaration of interest**

NG runs a psychological health consultancy which provides disaster support training and support.

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**ORCID**

Samantha K. Brooks [http://orcid.org/0000-0003-3884-3583](http://orcid.org/0000-0003-3884-3583)

Richard Amlôt [https://orcid.org/0000-0003-3481-6588](https://orcid.org/0000-0003-3481-6588)

Neil Greenberg [http://orcid.org/0000-0003-4550-2971](http://orcid.org/0000-0003-4550-2971)

G. James Rubin [http://orcid.org/0000-0002-4440-0570](http://orcid.org/0000-0002-4440-0570)

**References**


Section 2: Data collection and methodology

1. Were standardised measures used, or where measures are designed for the study, attempts to ensure reliability and validity were made?
2. Were the data collected in a way that addressed the research issue?
3. Was the participation rate stated and at least 50%?
4. Was the number of participants described at each stage of the study?
5. If the study followed participants up, were reasons for loss to follow-up explained?

Section 3: Analysis and interpretation of results

1. Were details of statistical tests sufficiently rigorous and described?
2. Were details of confidence intervals given?
3. Were potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?
4. Was the answer to the study question provided?
5. Are the findings related back to previous research?
6. Do conclusions follow from the data reported?
7. Are conclusions accompanied by the appropriate caveats?