

BMJ Open Addressing the psychological impact of COVID-19 on healthcare workers: learning from a systematic review of early interventions for frontline responders

Jasmine Jean Hooper ¹, Lisa Saulsman,¹ Tammy Hall,² Flavie Waters^{1,2}

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¹School of Psychological Science, The University of Western Australia, Crawley, Western Australia, Australia

²Clinical Research Centre Gascoyne House, West Wing, Graylands Hospital, Mount Claremont, Western Australia, Australia

Correspondence to

Ms Jasmine Jean Hooper;
jasminehooper@gmail.com

ABSTRACT

Objectives Protecting healthcare workers from psychological harm is an urgent clinical issue within the current COVID-19 pandemic. Research on early psychological programmes that aim to prevent or reduce mental health symptoms and that have been tested in frontline responders may assist service providers with choosing a suitable intervention for rapid dissemination in healthcare settings.

Design and outcome measures First, Embase, Web of Science, PsycINFO and Google Scholar were searched through a systematic literature review of early psychological interventions administered to frontline responders in the last 15 years. Interventions were included if they were designed to prevent or reduce psychological impact and had outcome measures of psychological distress (eg, general psychopathology, post-traumatic stress disorder and stress) and/or positive mental health domains (eg, resilience, self-efficacy and life satisfaction). Second, the suitability of these programmes for the healthcare workforce was evaluated according to the criteria of effectiveness, content applicability and feasibility.

Results Of 320 articles retrieved, 12 relevant studies were included that described six early psychological interventions. Although the evidence base is limited, psychological first aid, eye movement desensitisation and reprocessing, and trauma risk management showed effectiveness across at least two studies each with frontline workers. Resilience and coping for the healthcare community; anticipate, plan, and deter; and resilience at work programmes found promising results in single studies. Concerning other suitability criteria, all programmes appear applicable to healthcare settings and have acceptable feasibility for rapid implementation.

Conclusions Despite the limited evidence, several interventions were identified as potentially suitable and useful for improving psychological functioning of healthcare workers across a variety of disaster situations. Service providers should continue to implement and evaluate early psychological interventions in frontline workers in order to refine best practices for managing the psychological impact of future disasters.

Strengths and limitations of this study

- This is a timely review given the current COVID-19 crisis and the limited availability of evidence-based information on early psychological interventions for healthcare workers and other frontline responders.
- Practical suitability of each programme was carefully considered, to address the need for rapid and widespread implementation of psychological support in the healthcare workforce.
- Despite multiple databases searched and a rigorous review process, it is possible that there are other suitable programmes not identified by this review paper.
- Given the chaotic nature of healthcare services when dealing with mass trauma or disasters, there may also be existing programmes that have not yet received formal evaluation.

INTRODUCTION

Healthcare decision-makers are continually seeking information on how to provide the best psychological assistance to workers. In particular, working in the frontline during local and global disasters involves repeated exposure to traumatic events, which can have a major impact on mental health such as increased rates of acute stress disorder, post-traumatic stress disorder (PTSD), anxiety and depression.^{1 2} Continued psychological distress may lead to further adverse outcomes of substance abuse and suicide risk³ as well as burnout, compassion fatigue and secondary traumatisation.^{4 5} In contrast, positive mental health domains such as resilience may serve to protect the mental health of frontline responders.⁶ In many cases, psychological harm may have a delayed onset, with symptoms only developing several months or years after the traumatic event.⁷ It is therefore important for healthcare services to

implement effective early intervention measures that seek to mitigate ongoing psychological distress and minimise the development of post-traumatic symptoms in the workforce.⁸ However, organisations require evidence-based information about available psychological programmes before they can make well-informed decisions on how to assist the mental health needs of their staff. By reviewing this information, the current study seeks to guide the response of healthcare service providers during current and future disasters.

The novel SARS-CoV-2 or COVID-19 pandemic⁹ has led to a sharp increase in demand for frontline health and social care workers such as nurses, doctors, paramedics, and forensic workers as well as other security personnel including police officers and the military.¹⁰ This increased demand occurred in the context of chronic shortages in frontline staff due to quarantine restrictions, sick leave, and the need for staff to continue caring for dependents and attend to other family responsibilities.¹¹ As a result, these frontline responders have elevated workloads and are expected to work long hours under highly stressful conditions. COVID-19 has brought further workplace stressors to healthcare workers due to fears of contracting the virus and infecting others, difficulties accessing personal protective equipment, stigma, discrimination from the public and heightened emotional burden.¹² These stressors have triggered elevated rates of psychological distress in healthcare workers such as depression, anxiety, and PTSD^{13 14} and may indeed have secondary effects such as burnout and compassion fatigue, creating concern over a subsequent mental health crisis.¹⁵

Healthcare services have responded swiftly to mental health concerns in the workforce. Initial assistance has included organisation-wide provision of non-psychological practical help through infection control procedures, access to protection equipment and response to other basic physical needs.¹⁶ There is also a wealth of ad-hoc stress management instructions available online to healthcare workers during COVID-19, which provide lists of basic educational information about psychological self-care and help-seeking. Staff are encouraged to contact personal crisis helplines and professional support services if mental health symptoms persist, with cognitive-behavioural therapy (CBT) interventions (eg, trauma-focused CBT) endorsed as an effective long-term treatment option for the reduction of ongoing psychological symptoms.^{11 17 18} However, such individualised interventions carry inherent limitations, as they require active help-seeking behaviour and stigma regarding mental health has been identified as a substantial barrier to seeking psychological support among healthcare workers.¹⁹

The provision of early psychological interventions to all trauma-exposed individuals may be equally as important as delayed intervention after symptom onset, in the context of preventing and minimising the short-term and long-term negative impacts of traumatic events on mental health.²⁰ Recent research has recommended

that frontline responders should receive early psychological intervention within the first few months of the traumatic event.^{21 22} However, there is currently no consistent implementation of early psychological interventions among trauma-exposed workforces. One major barrier to implementation is the lack of accessible information regarding early psychological interventions suitable for frontline workers. Furthermore, there is a paucity of research that has tested the effectiveness of these early interventions specifically within healthcare providers. Despite obvious differences in job demands across various frontline services and disaster situations, these workers all face frequent trauma exposure within the workplace.^{4 5} A potential solution to this issue is therefore to examine psychological programmes that have been administered and tested in *all* frontline responders during previous disasters and pandemics and review whether these programmes are relevant and practical for rapid implementation within healthcare services. The key objective of this paper was therefore to provide evidence-based and practical information to assist healthcare service providers in deciding how best to protect the mental health of their staff, drawing on research from frontline responders.

Specifically, this review aimed to (1) identify and summarise recent early psychological intervention programmes that were administered to prevent or minimise psychological harm in frontline responders, through a systematic review; and (2) assess the potential suitability of implementing these interventions within the healthcare workforce using a healthcare service evaluation framework.

METHODOLOGY

Our methodology involved (1) a systematic review of early psychological intervention programmes tested in frontline responders; and (2) a healthcare service evaluation framework that reviewed the suitability of each programme for widespread implementation across healthcare workers based on the criteria of effectiveness, content applicability and feasibility of delivery.²³ Frontline responders are defined here as individuals trained to provide services in emergency or disaster settings, such as healthcare workers and security forces. Early psychological interventions are defined here as programmes designed to prevent or reduce mental health impact with delivery commencing within 3 months of exposure to a traumatic event, following recently revised guidelines from the International Society for Traumatic Stress Studies (ISTSS).²⁴ According to the recent ISTSS guidelines, interventions were further classified as universal with single or multiple prevention sessions, selective/indicated with single or multiple prevention sessions, or early treatment with single or multiple treatment sessions. Universal interventions target all trauma-exposed individuals regardless of risk, selective/indicated interventions target individuals at risk of developing symptoms or with

early signs of symptoms, and early treatment interventions target individuals after the development of a disorder.²⁴

Systematic review

For the systematic review, a single reviewer searched for early psychological intervention programmes that aim to prevent or reduce mental health issues and that have been tested in frontline responders. The single reviewer examined the identified records twice to minimise error and a second author reviewed the final articles. The search and reporting strategy followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines²⁵ and was conducted in July 2020 across Embase, Web of Science, PsycINFO, Google Scholar and cross-referencing of reference lists. Using the appropriate search term strategy for each database, the Ovid searches included the following keywords:

(Health care worker* OR healthcare worker* OR health care staff OR healthcare staff OR medical staff OR medical worker* OR frontline worker* OR frontline staff) AND (mental health OR psychological impact OR PTSD OR post-traumatic stress* OR anxiety OR depression) AND (prevent* OR intervention*) AND (covid-19 OR coronavirus OR outbreak* OR epidemic* OR pandemic* OR disaster).

The terms were used as free-text words. Articles were first screened for relevance to the topic by their title and abstract and if they appeared suitable then the full text was downloaded (see figure 1). Risk of bias was assessed at the review process and study levels, according to Risk Of Bias In Systematic reviews guidelines.²⁶ Studies were summarised based on their tested population, disaster context, study design, follow-up and outcome measures.

Eligibility criteria

- ▶ Early psychological interventions with delivery commencing within 3 months of the traumatic event, including universal, selective/indicated, or early treatment interventions according to the classification system previously outlined.
- ▶ Intervention tested in frontline responders.
- ▶ Empirical studies and doctoral theses with a clear theoretical framework that is based on psychological theory.
- ▶ Psychological outcome measurements of positive mental health outcomes such as resilience, coping, and life satisfaction and/or negative mental health outcomes such as PTSD, depression and anxiety.
- ▶ Longitudinal research design with a baseline and post-treatment follow-up(s).
- ▶ Published within the last 15 years.

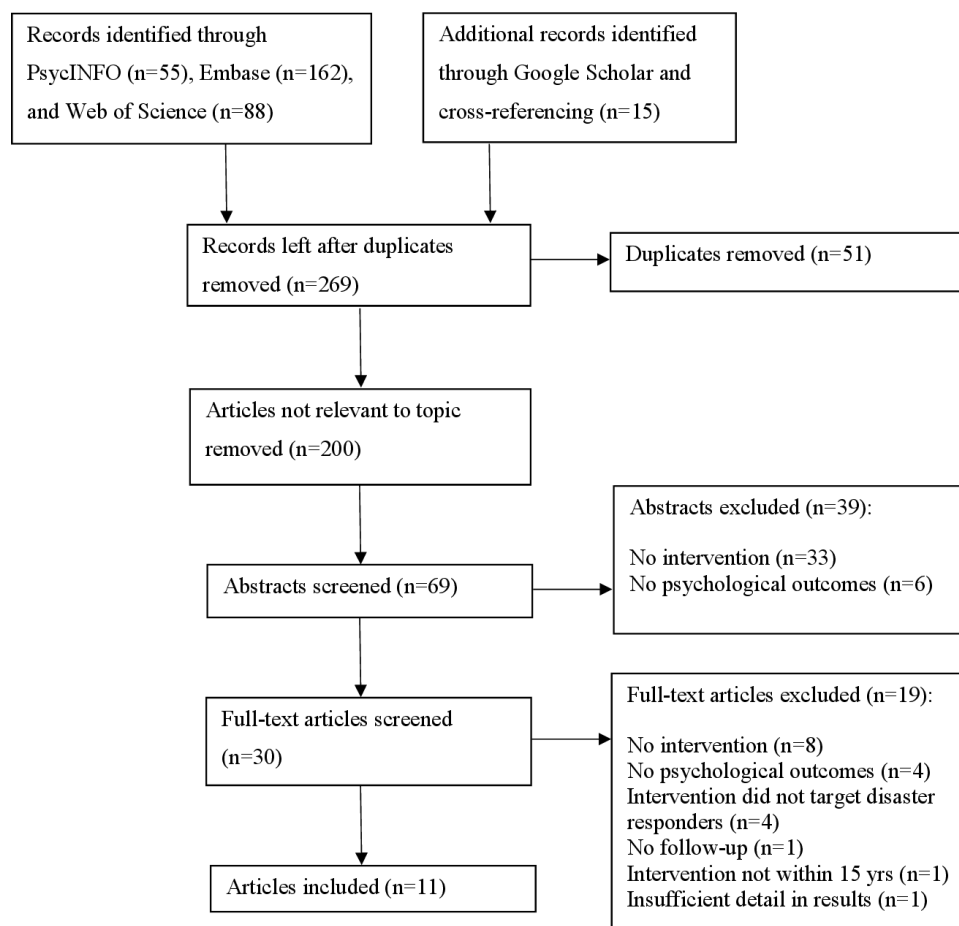


Figure 1 Study flow diagram.

In contrast, non-psychological (eg, medical, drug and physical) interventions, non-English studies, and purely descriptive, qualitative, or case study designs were excluded. Finally, studies were excluded if the proposed intervention programme is explicitly recommended against by clinical practice guidelines, such as psychological debriefing.^{27 28}

Healthcare service evaluation framework

After intervention programmes were identified through the systematic review, they were rated on their suitability for implementation within healthcare workplaces, based on criteria adapted from an evaluation framework for healthcare programmes.²³ Each programme was evaluated using three core components of: (1) effectiveness, in this case for reducing psychological distress outcomes or increasing positive psychological outcomes; (2) content applicability to healthcare settings, to determine whether the theoretical content and programme components are relevant for healthcare workers; and (3) feasibility of implementation, including ease of delivery, accessibility and cost.

Patient and public involvement

There was no patient or public involvement due to the nature of the review.

RESULTS

Study selection

The search strategy in the systematic literature review identified 320 potentially relevant articles, including 305 within the databases of PsycINFO, Embase and Web of Science, and an additional 15 articles through manually searching Google Scholar and cross-referencing of reference lists (figure 1). After duplicates were removed and titles and abstracts were screened for relevance, 30 full texts of articles were downloaded. Nineteen studies were excluded in the full-text screening stage. Finally, a total of 12 studies were identified (11 articles, see table 1). Risk of bias was assessed in the review process and the only risk identified was the absence of a second reviewer. Risk of bias was also assessed at the study level, which showed that the study by Farchi *et al*²⁹ did not meet eligibility criteria due to participants not being frontline responders and was therefore excluded.

Summary of study characteristics

Six psychological intervention programmes were identified across 12 studies (psychological first aid (PFA); eye movement desensitisation and reprocessing (EMDR); anticipate, plan, and deter (APD); resilience at work (RAW); resilience and coping for the healthcare community (RCHC) and trauma risk management (TRiM)). The included programmes were tested in frontline responder populations of medical and paramedic workers, firefighters, community healthcare workers, social service providers, military forces, police officers, forensic

workers and other non-professionals trained to respond to emergency or disaster situations (see table 1). Disaster contexts included Ebola,³⁰ human massacres,^{31 32} military deployment,³³ car crash fatalities,²⁹ maritime collisions³⁴ and other various local disasters.^{34–39} There were five randomised controlled trials (RCTs),^{34–36 38 40} four cross-sectional studies^{30 32 34 39} and three quasi-experimental designs.^{31 33 37} Follow-up periods ranged from 1 week to 18 months (where specified). PFA, RCHC, APD and RAW were classified as universal, EMDR was classified as selective/indicated in one study and early treatment in the other study, and TRiM was classified as a combination of universal and selective/indicative. PFA and RCHC interventions involved single-treatment sessions; EMDR had single and multiple sessions; and APD, RAW and TRiM had multiple sessions. EMDR and RAW were individual-level interventions, PFA and RCHC were group-format interventions, and APD and TRiM were delivered across the whole organisation.

The included studies used a variety of measures across the outcome domains of psychological distress (General Health Questionnaire and Depression, Anxiety and Stress Scales–Short Form for psychopathology; Perceived Stress Scale and Stress Arousal Checklist for stress; Impact of Event Scale–Revised, Short Post-Traumatic Stress Disorder Rating Interview, and PTSD Checklist–Civilian for PTSD; Cognitive Fusion Questionnaire for cognitive fusion; Acceptance and Action Questionnaire for experiential avoidance) and positive psychological change (Brief COPE, Ways of Coping, and Coping Self-Efficacy Scale for coping; Connor-Davidson Resilience Scale and Brief Resilience Scale for resilience; Life Orientation Test–Revised for optimism; Freiburg Mindfulness Inventory for mindfulness; Self-Compassion Scale–Short Form for self-compassion; 6-item questionnaire for life satisfaction; Professional Quality of Life for professional quality of life). Additional outcomes included perceived stigma and barriers (Military Stigma Scale and internal and external stigma questionnaire for stigma; Stigma and Barriers to Care Questionnaire for barriers to help-seeking), perceived PFA knowledge (PFA knowledge questionnaire), and occupational functioning (history of minor disciplinary offence rates and absenteeism rates).

Early psychological intervention programmes

The following section provides a brief description of each early psychological intervention programme included in this review, categorised as universal, selective/indicated, and/or early treatment.

Universal

PFA is a widely used psychological programme for disaster situations that provides access to emotional, social and physical support.⁴¹ It aims to reduce short-term and long-term psychological effects of disasters and traumatic events through promoting adaptive functioning and coping. It also offers practical care and immediate support via empathic listening and information on

Table 1 Evidence base for early psychological interventions with frontline responders

Authors	Intervention	Participants and context	Study design	Key findings and outcomes
Psychological first aid (PFA)				
Cheung; ³⁴ study 2	Single day of group pre-disaster PFA training, universal intervention	802 frontline responders: 458 in intervention group and 460 in waitlist control group. Various local and overseas disasters and mass gathering events, Hong Kong	RCT design, 3-month and 6-month follow-ups	The intervention group showed increased self-efficacy (pilot tested 13-item scale) at follow-ups, compared with controls. Paradoxically, the control group had increased general psychopathology (GHQ-28), adaptive coping (Brief-COPE) and life satisfaction (6-item scale) scores across time, whereas the intervention group remained unchanged for these measures. No other outcomes showed significant differences between groups (8-item PFA knowledge scale, DASS-21, IES-R, CD-RISC, MSPSS).
Cheung; ³⁴ study 3	Same as above	110 frontline responders: 51 had PFA training and 59 had no PFA training. Major maritime vessel collision, Hong Kong	Cross-sectional design, 2-month follow-up	Same outcome variables and measures were used as above. The PFA group reported greater levels of self-efficacy, PFA knowledge, coping, resilience, life satisfaction and social support compared with the control group. There were no other outcome differences.
Reed ³⁵	Same as above	21 emergency medical first responders received the intervention, unspecified controls. Local disasters, South Dakota, USA	RCT design, unspecified follow-up	Greater perceived PFA knowledge (knowledge of PFA questionnaire) predicted greater resilience (CD-RISC). Self-stigma (SSOSH) decreased from pre-PFA to post-PFA training.
Eye movement desensitisation and reprocessing (EMDR)				
Jarero and Uribe ³¹	Single individual session for 1.5–2 hours of EMDR-PRECI, early treatment intervention	32 forensic personnel with moderate or severe post-traumatic stress: 18 in immediate group (severe scores), 14 in waitlist group (moderate scores). Human massacre disaster in Durango, Mexico	Quasi-experimental design, post-treatment and 3-month and 5-month follow-ups	Significant improvement found in both PTSD measures (IES-R, SPRINT) at post-treatment and a further significant reduction at follow-ups, for both the immediate and waitlist/delayed treatment groups.
Jarero <i>et al</i> ; ³⁶	Two 1.5-hour individual sessions of EMDR-PROPARA, selective/indicated intervention	39 first responders in active duty: 19 received intervention, 20 received supportive counselling. Various local disasters, Sonara, Mexico	RCT design, post-treatment and 1-month and 3-month follow-ups	Significant improvement in PTSD symptoms (SPRINT) at post-treatment and both follow-ups, compared with the control group.
Anticipate, plan, and deter (APD) responder risk and resilience model				

Continued

Table 1 Continued

Authors	Intervention	Participants and context	Study design	Key findings and outcomes
Schreiber <i>et al</i> ³⁰	Ongoing APD for whole organisation, universal intervention	45 US Ebola medical providers trained in APD, across two groups that were deployed to West Africa at different times	Cross-sectional design, over a 2-month period	PsySTART-R psychological risk factor trends identified and targeted with the 'deter' phase. The first deployed group showed greater cumulative risk factors than the second group after qualitative feedback implemented (10% vs 1%, respectively). Good usability reported.
Resilience at work (RAW) mindfulness programme				
Joyce <i>et al</i> ⁴⁰	Six 2-hour individual sessions of RAW (across 3.5–6 weeks), universal intervention	143 active full-time firefighters across 24 Primary Rescue and Hazmat stations, 60 in treatment condition and 83 in the control condition, in NSW, Australia	Cluster RCT design, post-intervention and 6-month follow-up	Psychological resilience (CD-RISC) and active coping (Brief-COPE) improved at follow-up for the intervention group compared with controls. However, bounce-back resilience (BRS), mindfulness (FMI), self-compassion (SCS-SF), cognitive fusion (CFQ) and experiential avoidance (AAQ-II) showed no difference between groups. Optimism (LOT-R), using emotional support (Brief-COPE) and using instrumental support (Brief-COPE) improved at post-intervention for intervention group compared with controls, but not at follow-up.
Resilience and coping for the healthcare community (RCHC)				
Powell and Yuma-Guerrero ³⁷	Single 3-hour group session of RCHC, universal intervention	69 healthcare or social service workers across 6 health, social service and disaster response organisations	Quasi-experimental, post-intervention and 3-week follow-up	Perceived knowledge on four domains (7 questions) increased and acute stress levels (SACL) decreased from pre-intervention to post-intervention. Perceived knowledge and social support (Social Provisions Scale) increased at follow-up. No other outcomes showed significant differences (PSS, ProQOL, Ways of Coping, CSE).
Trauma risk management (TRiM)				
Frappell-Cooke <i>et al</i> ³³	Stepped-care TRiM for whole organisation, both universal and selective/indicated intervention	Compared two groups: 86 British army personnel in initial stages of using TRiM and 94 British Royal Marines personnel with extensive use of TRiM, deployed in Afghanistan	Quasi-experimental, outcomes measured halfway during deployment and in the week after returning home	Better general mental health (GHQ-12) and decreased PTSD symptoms (PCL-C) at post-deployment than pre-deployment and during deployment for both groups, but especially for group with extensive use of TRiM.
Greenberg <i>et al</i> ³⁸	Same as above	638 British military personnel: 6 Royal Navy warships for intervention condition and 597 personnel in 6 ships for control condition. Exposure to various natural disasters and injuries, UK	Cluster RCT design, follow-up of 12–18 months	No significant difference found between groups for general psychopathology (GHQ-12), PTSD symptoms (PCL-C) or self-stigma (internal and external questions). However, history of minor disciplinary offence rates was significantly lower in the intervention group, suggesting better occupational functioning.

Continued

Table 1 Continued

Authors	Intervention	Participants and context	Study design	Key findings and outcomes
Watson and Andrews ³⁹	Same as above	693 police officers across 3 forces using TRiM, 166 police officers across 2 forces not using TRiM. Various local disasters, UK	Cross-sectional design, unspecified follow-up	The TRiM forces reported lower levels of PTSD symptoms (PCL-C), fewer barriers to help-seeking (Stigma and Barriers to Care Questionnaire) and reduced public stigma (MSS), than the non-TRiM forces.
Hunt <i>et al</i> ⁶²	Same as above	640 police officers: 44 given briefing, 44 given briefing and 1:1, 166 given 1:1 and 386 given no intervention. Exposure to mass shooting event in Cumbria, UK	Cross-sectional design, 2-month follow-up	The TRiM intervention programme showed reduced occupation impact (absenteeism rates) when sociodemographic factors were adjusted, especially for junior officers. TRiM scores improved across time in the intervention group, although were significantly higher in the intervention group than control group at baseline and follow-up.

AAQ-II, Acceptance and Action Questionnaire; Brief-COPE, Brief-Coping Orientation to Problems Experienced; BRS, Bounce-Back to Resilience Scale; CD-RISC, Connor-Davidson Resilience Scale; CFQ, Cognitive Fusion Questionnaire; CSE, Coping Self-Efficacy Scale; DASS-21, Depression, Anxiety and Stress Scales-Short Form; EMDR-PRECI, EMDR Protocol for Recent Critical Incidents; EMDR-PROPARA, EMDR Protocol for Paraprofessional Use; FMI, Freiburg Mindfulness Inventory; GHQ-12/28, General Health Questionnaire-12/28; IES-R, Impact of Event Scale-Revised; LOT-R, Life Orientation Test-Revised; MSPSS, Multidimensional Scale of Perceived Social Support; MSS, Military Stigma Scale; NSW, New South Wales; PCL-C, PTSD Checklist-Civilian; ProQoL, Professional Quality of Life; PSS, Perceived Stress Scale; PsySTART-R, Psychological Simple Triage and Rapid Treatment-Responder; PTSD, post-traumatic stress disorder; RCT, randomised controlled trial; SACL, Stress Arousal Checklist; SCS-SF, Self-Compassion Scale-Short Form; SPRINT, Short Post-Traumatic Stress Disorder Rating Interview; SSOSH, Self-Stigma Of Seeking Help.



psychosocial services. It is based on the concept of resilience and involves five empirically supported disaster and mass trauma intervention principles, which include promoting a sense of (a) safety, (b) calming, (c) self-efficacy and community-efficacy, (d) connectedness and (e) hope.⁴¹ It has eight core helping actions and goals that are described in [table 2](#).⁴² PFA can be offered via group or individual format, in a single session.

APD responder risk and resilience model aims to assess and manage psychological risk and resilience in healthcare workers and their families across pre-incident, response and recovery stages of public health emergencies.³⁰ Specifically, the APD model consists of a three-step action plan, with the 'anticipate' phase involving prevent stress inoculation training to prepare healthcare personnel for the psychosocial impact of mass trauma events. In the 'plan' phase, staff develop a personal resilience plan, where they can identify and document their expected stress responses and challenges as well as support systems and coping strategies. The final 'deter' phase involves teaching staff how and when to activate their personal resilience plan during stress exposure and encouraging them to use the Psychological Simple Triage and Rapid Treatment-Responder (PsySTART-R) self-triage system. PsySTART-R is a web-based mobile-friendly application and self-assessment tool that tracks daily exposure to traumatic stress, assesses psychological risk factors and gives confidential feedback. The APD model targets the whole organisation over time.

RAW mindfulness programme, renamed recently to Mindarma, is an online intervention designed to increase resilience in high-risk workers, such as first responders.⁴⁰ The RAW is an evidence-based programme that combines principles from mindfulness, CBT, acceptance and commitment therapy, and self-compassion approaches. Specific strategies covered across the programme target mindfulness, resilience, unhelpful thoughts, avoidance, personal values, self-care and compassion. The content is delivered individually via internet format. The original programme runs for 6 sessions of 20–25 min each and the revised current version is 10 sessions of 15 min each. There is a minimum 3-day break in between sessions to enable skills practice. Sessions include interactive exercises, audio-recordings and animations. Four half-hour group webinars delivered by a senior psychologist are available in conjunction to the programme, to encourage engagement and motivation of users. Moreover, the RAW (or Mindarma) programme is an individual intervention with an optional group component.

RCHC is a recent post-disaster intervention designed to reduce psychological distress and increase resilience in healthcare and social service providers.⁴³ In particular, it aims to build healthy coping strategies for dealing with past, current, and future disasters and foster resilience through promoting support between colleagues. It combines psychoeducation and mindfulness practices in an interactive group format that uses solution-focused techniques and action learning theory. There are five

core modules: common reactions to stress, how the brain reacts to severe stress and trauma, healthcare provider responses to stress and traumatic events, coping with stress and trauma with individual strategies, and coping with stress and trauma with collective strategies. RCHC is delivered as a single session.

Selective/indicated or early treatment

EMDR is a psychotherapy treatment designed to alleviate PTSD and other trauma-related symptoms.⁴⁴ EMDR was developed based on the theoretical framework of adaptive information processing, which assumes that trauma symptoms arise from adverse life events being inadequately processed within the brain and stored as traumatic memories that continue to resurface.⁴⁵ In this intervention, a trained EMDR practitioner guides the person to relive their original trauma memory in brief doses while making rapid eye movements, instead of the memory being locked in the nervous system in the form of thoughts, emotions and sensory information about the episode.⁴⁶ EMDR has subprotocols for early intervention in the immediate days and weeks following disaster events, such as the Protocol for Recent Critical Incidents,⁴⁷ Group Traumatic Episode Protocol⁴⁸ and Recent Traumatic Episode Protocol.⁴⁹ It can be delivered in single or multiple sessions, either individually or as a group.

Universal and selective/indicated

TRiM is a well-established peer-support intervention for first responders that aims to mitigate psychological risk from potentially traumatic events by identifying high-risk individuals and matching them to the appropriate care.⁵⁰ Participation is voluntary and careful consideration is made regarding who it is offered to. Trained management personnel first hold a planning meeting with everyone involved in the potentially traumatic event, to better understand the incident and agree on a tailored response. In the next stage, TRiM practitioners run basic psychoeducational briefings to cover the specific incident as well as how to manage responses. Lastly, high-risk individuals are asked to take part in a semistructured risk assessment interview and are linked with appropriate psychological support. Essentially, TRiM provides a framework for organisations to monitor and effectively manage the psychological impact of potentially traumatic events in their employees, through a whole organisation stepped-care intervention.

Healthcare service evaluation framework

The following section evaluates each programme within the healthcare workforce, based on the criteria of effectiveness, content applicability and feasibility with this population. A snapshot summary of the objective, content, endorsements, effectiveness, feasibility and overall suitability for healthcare settings is summarised in [table 2](#).

Table 2 Snapshot summary of the six early psychological intervention programmes

Intervention	Objectives	Endorsements and effectiveness	Content	Feasibility	Suitability for HCWs
Universal interventions					
PFA	Promotes adaptive functioning and coping in all disaster victims by providing access to information and support	Endorsed by the WHO and APS for general crisis support; suggested by 2 empirical studies as suitable for frontline workers, another empirical study had mixed findings	Based on 5 trauma intervention principles and 8 core actions or goals (contact/engagement; safety/comfort, stabilisation, assess needs, practical assistance, social support, coping strategies, link with appropriate services)	Deliverable by non-professionals; single session; individual or group; free guides online and in-person or online training course at a cost (see Box 1)	Effectiveness: 3 studies Content applicability: ✓ Feasibility: ✓
RCHC	Seeks to mitigate post-disaster distress and build resilience in HCW and social service providers	Recently implemented in response to several natural disasters in the USA; one empirical study; funded by AmeriCares	Based on the risk and resilience framework; combines psycho-education, group work and mindfulness into 5 core modules	Requires trained RCHC facilitator; single session; group; free facilitator guide online (see Box 1)	Effectiveness: 1 study Content applicability: ✓ Feasibility: ✓
APD	Assess and manage psychological risk and resilience in HCW at pre/during/post stages of disaster	Evaluated in one recent study and currently undergoing evaluation in West China Hospital and Minnesota, USA during COVID-19	Involves stress inoculation training, building a personal resilience plan, and activating plan while using the PsySTART-R self-triage system	Requires whole organisation to implement and monitor over time; free instructor guide online (see box 1)	Effectiveness: 1 study Content applicability: ✓ Feasibility: ✓
RAW	Aims to target resilience in high-risk workers such as first responders	Used by several frontline teams across eastern states of Australia (ambulance, corrective services, health); one empirical study	Based on mindfulness and self-compassion training; involves 6 (now 10) brief individual sessions via an interactive e-learning programme	Multiple session; individual; purchase from Mindarma website (see box 1), scaled pricing based on number of users	Effectiveness: 1 study Content applicability: ✓ Feasibility: ✓
Selective/indicated or early treatment					
EMDR	Targets trauma-related symptoms in all trauma victims by guided reliving of trauma memory	Endorsed as a trauma intervention by the WHO, APS and APA, among others; two empirical studies found reduced PTSD in frontline workers	Based on adaptive information processing model and reprocessing of trauma memory in brain; has 8-phase treatment structure	Requires trained EMDR practitioner; single or double session; individual or group; free subprotocols online, overall manual at a cost (see box 1)	Effectiveness: 2 studies Content applicability: ✓ Feasibility: ✓
Universal and selective/indicated					
TRIM	Peer-support intervention for first responders that identifies high-risk individuals and matches them to appropriate care	Developed for the British police force and military, now recommended as peer-support initiative across UK; mixed empirical evidence	Based on trauma-informed care principles and involves stepped management phases	Whole organisation; volunteers trained as TRiM practitioners (2-day course). Free handbooks for trauma victims (see box 1), no practitioner manual online	Effectiveness: 4 studies Content applicability: ✓ Feasibility: ✓

APA, American Psychiatric Association; APD, anticipate, plan, and deter; APS, Australian Psychological Society; EMDR, eye movement desensitisation and reprocessing; HCWs, healthcare workers; PFA, psychological first aid; PsySTART-R, Psychological Simple Triage and Rapid Treatment-Responder; PTSD, post-traumatic stress disorder; RAW, resilience at work; RCHC, resilience and coping for the healthcare community; TRIM, trauma risk management.

Psychological first aid

Effectiveness

Despite being one of the most widely known and used programmes in the general community⁵¹ as well as endorsed by the WHO⁵² and Australian Psychological Society,⁵³ PFA has limited empirical evidence.⁵⁴ To our knowledge, there has been no empirical study in which frontline workers were the direct recipients of PFA after a trauma event. However, three studies reported on the mental health benefits to frontline workers after receiving a single day of training in PFA delivery (see [table 2](#)). Psychological benefits were reported in medical staff³⁵ and other professional and non-professional first responders.³⁴ These benefits included improvements in positive psychological outcomes of resilience, self-efficacy, perceived knowledge and social support. Reduced perceived self-stigma was also found. There was no evidence for change in general psychopathology, coping or life satisfaction in the intervention group, although controls showed increased general psychopathology over time. The authors suggest that PFA brings psychological benefits for the person delivering it, in addition to their recipients, as it teaches coping strategies and facilitates connection with support systems and services, which can be used to protect the self as well as support others.

Content applicability

PFA is a generic disaster relief approach that can be implemented either during or immediately after the disaster and can apply to anyone impacted by the event. Its broad-spectrum response strategy makes it easily generalisable to multiple population groups and settings with a variety of psychological needs. It allows for local adaptations, thus is suitable for healthcare workers.

Feasibility

PFA training typically runs for a single day. Specialised mental health practitioners are not required to deliver PFA, although it assumes that trainees have basic knowledge in helping distressed individuals. Short training courses in delivering PFA are available and costs are variable, but can be minimised through group training, train the trainee schemes and online training (see [box 1](#)).

Eye movement desensitisation and reprocessing

Effectiveness

Despite continuous scepticism from the scientific community,⁵⁵ EMDR is steadily becoming a popular and well-established intervention for treating trauma-related symptoms.⁵⁶ It is universally endorsed by the WHO,⁵⁷ among others.^{27 58 59} Reduced PTSD symptoms have been found across forensic personnel and first responders receiving EMDR.^{31 36} Given that frontline workers across healthcare, forensic and first responder populations are frequently exposed to traumatic events and are prone to experience secondary traumatisation,⁴ EMDR may also be applicable for treating trauma-related symptoms in healthcare providers.

Box 1 Links to more information on each included programme

Psychological first aid (PFA)

- ▶ There are several free PFA guides available online. The WHO⁵² provides a guide in 30 languages, accessible via the link: https://www.who.int/mental_health/publications/guide_field_workers/en/.
- ▶ The Australian Red Cross provides another PFA guide endorsed by the Australian Psychological Society,⁵³ accessible via the link: <https://www.redcross.org.au/getmedia/dc21542f-16e4-44ba-8e3a-4f6b907bba6f/Psychological-First-Aid-An-Australian-Guide-04-20.pdf.aspx>.

Eye movement desensitisation and reprocessing (EMDR)

- ▶ A comprehensive practice manual by Marilyn Luber⁷¹ can be purchased online that contains models, scripted protocols and summary sheets for early EMDR intervention.
- ▶ An overview and protocol manual is available for free for EMDR Recent Traumatic Episode Protocol⁴⁹: <https://emdrresearchfoundation.org/toolkit/rtep-manual.pdf>; for EMDR-Protocol for Recent Critical Incidents⁷²: <https://emdrresearchfoundation.org/toolkit/pre-ci.pdf>; and for EMDR Group Traumatic Episode Protocol⁷³: <https://emdrresearchfoundation.org/toolkit/gtep.pdf>.

The anticipate, plan, and deter (APD) responder risk and resilience model

- ▶ An instructor guide for the APD model with relevant worksheets⁷⁴ is freely available online: http://file.lacounty.gov/SDSInter/dhs/221064_AnticipatePlanandDeterInstructorManual-FINAL.pdf.

Resilience at work (RAW) mindfulness programme

- ▶ The RAW (now called Mindarma) programme can be purchased via the website below,⁷⁵ which contains information including pricing, media, workshops and contact details: <https://www.mindarma.com/home/>.
- ▶ More information can also be found on the Black Dog Institute website⁷⁶: <https://www.blackdoginstitute.org.au/education-services/workplaces/workplace-programs/mindarma/>.

Resilience and coping for the healthcare community (RCHC)

- ▶ While the full RCHC manual is not available online, the author can be contacted at: paula.yuma@colostate.edu and more information on each module⁴³ can be found at: <https://digitalcommons.library.tmc.edu/jfs/vol19/iss1/8/>.

Trauma risk management (TRiM)

- ▶ Several TRiM handbooks designed for trauma victims are available online. For more information on TRiM training, see⁷⁷: http://www.marchonstress.com/page/p/trim_faqs.
- ▶ TRiM handbook by the British Royal Navy⁷⁸: <http://c69011.r11.cf3.rackcdn.com/d951c5627eb44b3789e84292d1e2c1fa-0x0.pdf>.
- ▶ TRiM handbook by the UK Hampshire Fire and Rescue Service and Hampshire Constabulary⁷⁹: <https://documents.hants.gov.uk/cor-phantsweb/Traumahandbook.pdf>.

Content applicability

The Protocol for Paraprofessional Use in acute trauma situations (PROPAPA) was developed as an early EMDR intervention for first responders.³⁶ Like other early intervention models, it follows the same eight-phase structure as the standard treatment protocol,^{60 61} yet differs in the specific processing techniques used and how the

traumatic episode is conceptualised.^{29 32} PROPARA would need no further adaption for use with healthcare workers who experience trauma or disaster events. Other early EMDR protocols may also potentially be adapted to support the needs of the healthcare workforce.

Feasibility

Early EMDR intervention typically lasts for a couple of hours, whereas the standard intervention spans across several days. An EMDR practitioner with specialist training must deliver EMDR therapy to ensure correct delivery, making it a costly treatment. There are several early EMDR intervention protocols available online (see [box 1](#)).

APD responder risk and resilience model

Effectiveness

There is limited evaluation of the APD model in the literature. In one recent study, however, the full APD model was implemented in medical providers during the Ebola crisis, who showed reduced psychological risk factors across time.³⁰ The APD model is part of a two-stage psychological rehabilitation plan currently underway in West China Hospital, which seeks to prevent further psychological impact of COVID-19 on healthcare workers. It is also part of a larger psychological intervention study for healthcare organisations to provide to their staff during the COVID-19 pandemic, currently undergoing evaluation in Minnesota.⁶² While research on the APD model is in its infancy, it has shown promising effectiveness in healthcare workers.

Content applicability

The APD model was explicitly intended as a psychological intervention for healthcare workers, with theoretical frameworks of risk and resilience tailored to suit this population. Therefore, its content is already applicable to healthcare settings.

Feasibility

The APD risk and resilience model requires the organisation to implement the system throughout all stages of disaster response and regularly monitor risk. Therefore, it is relatively resource-intensive compared with other programmes, as it requires continuous management over time (see [box 1](#) for a full instructor guide).

RAW mindfulness programme

Effectiveness

The RAW programme shows promising preliminary results, with a recent empirical study finding improved positive mental health outcomes of resilience and active coping in a group of full-time firefighters at post-treatment.⁴⁰ This study also provided evidence for increased optimism and use of support, but no evidence for change in resilience, mindfulness, self-compassion, cognitive fusion or experiential avoidance. The programme, now called Mindarma and adapted to run for 10 sessions, has been adopted by several frontline organisations in the eastern

states of Australia including ambulance, corrective and health services. The programme is also fully endorsed by the Black Dog Institute—a not-for-profit organisation and world leader in mental health services and research.

Content applicability

The RAW programme was designed to protect the well-being of high-risk workers through resilience training. The programme can be tailored to the unique needs of the workforce, through customisation of content such as scripts, animations and programming. Therefore, it appears suitable for healthcare professionals in high-risk workplaces.

Feasibility

The online RAW (or Mindarma) programme can be implemented quickly and easily at a low cost by contacting the owners of the programme via their website (see [box 1](#)). Pricing is scaled depending on the number of users in the organisation and organisation managers can receive in-person training workshops to ensure they are well informed.

Resilience and coping for the healthcare community

Effectiveness

The RCHC intervention has demonstrated some effectiveness at reducing psychological impact in healthcare workers, producing positive psychological outcomes of increased perceived knowledge and social support and decreased acute stress levels in a single study.³⁷ RCHC was recently implemented in several other areas also affected by natural disasters in the USA, such as typhoon-affected Saipan in 2015 and flood-affected Shreveport in 2017, and is currently undergoing evaluation as a recovery response strategy for Hurricane Harvey in Texas and Hurricane Maria in Puerto Rico, funded by AmeriCares.⁴³

Content applicability

The RCHC uses a risk and resilience framework that has been carefully adapted for use with healthcare and social service providers by acknowledging the high-risk exposure of this workforce and the incorporation of appropriate strategies to build resilience.⁴³ RCHC contains suitable content for healthcare workers, as it was explicitly designed for this population.

Feasibility

The RCHC can be delivered to staff in 3 hours and a trained RCHC facilitator is required to deliver the intervention. There is no full manual available online (see [box 1](#)).

Trauma risk management

Effectiveness

The TRiM programme has mixed findings, with two studies showing reduced psychological impact in police and Army officers and one study showing no change in military officers.^{33 38 39 63} However, there is evidence to suggest it can reduce stigma and barriers to help-seeking

as well as improve occupational functioning in these populations.^{32 38 39}

Content applicability

Initially developed in the British military and used within police officers, TRiM is now used by many different organisations across the UK. It offers an evidence-based framework for early indication of who may go on to develop mental health symptoms after a traumatic event and how this should be managed to ensure the best conditions for psychological recovery. This framework is generic enough that it is also suitable for use in healthcare settings. The overlap in traumatic workplace experiences between healthcare and other frontline workers suggests that the TRiM programme would show similar results in healthcare settings.

Feasibility

The TRiM programme is intended to be delivered by volunteer personnel within the organisation, ideally from a managerial position. TRiM practitioner courses typically run over 2 or more days. Several TRiM handbooks designed for trauma victims are available online (see [box 1](#)).

DISCUSSION

The key objective of this paper was to equip healthcare service providers with practical information on how to protect the mental health of healthcare professionals during local and global disasters. Since the evidence base for early psychological interventions within healthcare workers is limited and personnel on the frontline also face exposure to traumatic events, all frontline responders were considered in this review. Evidence was searched for early psychological interventions designed to prevent or reduce psychological harm and that were tested in frontline workers during recent disease outbreaks and disasters. Each included programme was described and evaluated based on its suitability for rapid implementation among the healthcare workforce using the criteria of effectiveness, content applicability and feasibility. This evaluation framework seeks to provide a current workplace mental health response guide for healthcare service providers.

Generally, the evidence base was limited across all intervention programmes. Six early psychological programmes were identified across 12 studies, with four programmes classified as universal, one classified as selective/indicated in one study and early treatment in another study, and one classified as both universal and selective/indicated, due to its stepped-care approach.²⁴ Out of the sparse number of studies, PFA, EMDR and TRiM were tested in frontline responders across at least two studies each, in addition to being applicable and feasible for rapid implementation within the healthcare workforce (see [table 2](#)). In particular, these interventions demonstrated improved psychological outcomes at follow-ups across two or more

Box 2 Recommendations for single-session prevention interventions

- ▶ Intervention with emerging evidence—psychological first aid.
- ▶ Intervention with insufficient evidence—resilience and coping for the healthcare community.

Emerging evidence=two or more studies; insufficient evidence=only one study. Recommendations based on recent International Society for Traumatic Stress Studies guidelines.²⁴

studies, with several increased positive psychological outcomes found with PFA,^{34 35} several reduced negative psychological outcomes found with TRiM^{32 33 39} and reduced PTSD levels found with EMDR.^{31 36} However, TRiM requires further research, due to inconsistent findings of effectiveness across various studies with frontline responders.⁶³ It is also important to note that the evidence base for PFA involves frontline workers receiving training in PFA delivery rather than as direct recipients of the intervention.

The APD, RAW (or Mindarma) and RCHC programmes are relatively new psychological interventions that have shown promising outcomes with frontline workers and appear to be potentially suitable interventions for rapid implementation among healthcare workers.^{30 37 40} APD and RCHC were specifically intended for healthcare workers and RAW for high-risk workers, thus these programmes have been tailored to suit this population and may be more appropriate than more generic approaches such as PFA and EMDR. Nevertheless, evidence for APD, RCHC and RAW programmes is limited to a single study each and only the RAW study included a control condition, thus further evaluation of these programmes is required in order to strengthen their evidence base. [Boxes 2–4](#) provide a summary of recommendations for evidence according to the ISTSS guidelines for prevention (ie, universal and selective/indicated) interventions and early treatment programmes with single or multiple sessions.²⁴ These tables indicate emerging evidence for PFA and TRiM and insufficient evidence for EMDR, APD, RCHC and RAW, further suggesting the need for additional research on each intervention.

Several promising early psychological interventions did not meet eligibility requirements for this review, yet deserve mention. First, immediate cognitive–functional

Box 3 Recommendations for multiple session prevention interventions

- ▶ Intervention with emerging evidence—trauma risk management.
- ▶ Intervention with insufficient evidence—eye movement desensitisation and reprocessing; anticipate, plan, and deter; resilience at work.

Emerging evidence=two or more studies; insufficient evidence=only one study. Recommendations based on recent International Society for Traumatic Stress Studies guidelines.²⁴

Box 4 Recommendations for early treatment

- Intervention with insufficient evidence—eye movement desensitisation and reprocessing.

Insufficient evidence=only one study. Recommendations based on recent International Society for Traumatic Stress Studies guidelines.²⁴

PFA (ICF-PFA) was recently proposed as an improved, structured and more immediate disaster relief approach to PFA that targets symptoms of the acute stress reaction by drawing on psychological theories of stress and resilience.²⁹ ICF-PFA is recognised as the national PFA model by the Israeli Ministry of Health and has been adopted by several frontline sectors, with the Israeli Defence Forces currently investigating its impact on frontline soldiers. However, this intervention was excluded as it has only been empirically tested in trauma-exposed adolescent students and requires formal evaluation in frontline staff. In addition, a computer-assisted resilience training programme given to Canadian healthcare workers during the SARS outbreak found positive psychological impact at post-treatment, but was excluded from this review due to lack of a follow-up measurement.⁶⁴ A recent digital learning package targeting psychological well-being showed good user satisfaction of healthcare workers across the UK during COVID-19 but was also excluded as it used qualitative analysis only.⁶⁵ A study testing a stress management and resilience training programme in medical physicians was also excluded due to absence of disaster situations.⁶⁶ Finally, study protocol is available for an 8-week online CBT programme designed for healthcare workers that is currently undergoing evaluation in the context of COVID-19 in France.⁶⁷ Future research should explore these potential alternative interventions, in addition to those included in this review.

Empirical research on the effectiveness of early psychological interventions for preventing or reducing post-traumatic and other mental health symptoms in healthcare and other frontline workers is limited, with few RCTs available and most interventions targeting community disaster victims. One alternative is to compare the findings of this paper with literature on early psychological interventions tested in other trauma-exposed populations. Recent systematic reviews suggest that early EMDR and trauma-focused CBT are among the most effective individualised programmes for targeting trauma-related symptoms,^{68 69} yet more evidence is still needed on these interventions.⁷⁰ PFA is also recommended as an early intervention for trauma victims,⁵¹ despite its lack of evidence in comparison with the other interventions.⁵⁴ This wider literature is consistent with the finding that PFA and EMDR are the most evidence-based early psychological interventions for frontline workers to date. To the best of our knowledge, there is currently no research on trauma-focused CBT for frontline responder populations. Nevertheless, it is recommended that anyone with severe or persistent trauma-related symptoms should seek out

more intensive and longer term individualised support, such as trauma-focused CBT.^{11 17 18}

It is possible that several other suitable early psychological interventions exist for frontline workers, in addition to those mentioned above, that have not yet received formal evaluation. This is understandable given the chaotic nature of healthcare services when dealing with mass traumas and disasters. A potential limitation of this paper is that, due to the rapid need for a review in this area, only three databases were searched and a single reviewer assessed the articles. Even though the databases were chosen for their comprehensive coverage of medical and psychological research, it is possible that relevant studies were missed. Additionally, the ongoing character of the COVID-19 pandemic may induce longer periods of elevated traumatic stress in frontline workers compared with the acute trauma from local disasters and accidents, differentiating this context from previous disaster situations. Despite limitations, available past research with all frontline workers can still guide healthcare services in implementing early intervention programmes that might proactively address the mental health fallout of the current COVID-19 crisis, as well as future pandemics and other mass health and trauma crises. This review has outlined several early interventions tested in frontline workers during disease outbreaks and other disasters, which also appear suitable for widespread implementation in the healthcare workforce.

While the process and prioritisation of research can be challenging in the context of mass trauma events, this is an essential area of development. Healthcare systems play a crucial role in evaluating the interventions they implement, in order to build the much needed evidence base for preventing and reducing psychological impact in healthcare workers and elucidating best practices for services in managing future disasters. Healthcare services are typically vigilant to addressing the physical safety of staff in the workplace and the psychological safety of staff must also be given equal priority. Indeed, healthcare services have a duty of care to equip their staff with support and psychological skills to assist with the mental health challenges they will inevitably face as part of their courageous frontline work they do for the benefit of the broader community, particularly during times of mass crises. This review of the evidence for early psychological interventions within frontline staff and the consideration of suitability for healthcare settings is intended to be a helpful resource to guide healthcare and other frontline services seeking to select an intervention to suit the needs of their organisation and its employees.

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ORCID iD

Jasmine Jean Hooper <http://orcid.org/0000-0003-2134-1085>

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