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Scoping review of programs and practices for the prevention and management of post-traumatic stress injuries and other mental health conditions in paramedic service organizations



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Executive Summary

Objective

The specific objective of this scoping review is to identify and synthesize peer-reviewed evidence on programs and practices for the prevention and management of post-traumatic stress injuries (PTSI), post traumatic stress disorder (PTSD) and other mental health issues that are relevant for paramedic organizations. The findings from this scoping review, in conjunction with the environmental scan and needs assessment will serve as critical inputs into the development of a Work Disability Management System Standards for Paramedic Organizations with a focus on PTSI.

Methods

We followed the scoping review methodology proposed by Arksey and O'Malley (Arksey & O'Malley, 2005) and refined by Levac and colleagues (Levac, Colquhoun, & O'Brien, 2010). According to this framework, there are six steps to undertaking a scoping review: (1) identify the research question(s); (2) identify relevant studies; (3) select studies; (4) chart the data; (5) collate, summarize and report the results; and (6) consult with relevant stakeholders.

In this review we sought to answer the following research question:

What programs and practices can aid in the prevention and management of PTSI and other mental health conditions in paramedic service organizations?

To answer this research question, we searched for the peer-reviewed literature of relevance to first responder organizations and in particular, paramedic service organizations.

The core search was comprised of literature search undertaken in four electronic journal databases. The four databases were Medline (OVID), EMBASE, PsycINFO and Business Source Premier (EBSCO). We considered literature cited in these databases that was published in English between January 2010 to January 2020. Search terms were selected using a modified PICO method (Population, Intervention, Comparison, Outcome) to ensure the relevant terms were included in the literature search. Eight articles were identified as “must-have” articles prior to the literature search and used to assess the robustness of the search.

Findings from included studies were organized and mapped under relevant corresponding categories, i.e., roles and responsibilities of managers and workers, primary prevention, early detection and intervention, and management of PTSI and other mental health conditions.

Summary of Findings/Results of the review

The initial search in Medline yielded 4,449 citations (titles and abstracts). WE sampled an additional 740 citations from the searches conducted in EMBASE, PsycINFO and EBSCO to determine if any incremental relevant studies would be found. One must-have article that was not identified in Medline was added to the included articles. A total of 40 citations were retained for inclusion in the synthesis, 22 of which were studies on first responders and 18 of military personnel and veterans. The 40 articles were grouped under the following categories:

- 1) Roles and Responsibilities
- 2) Access to Health Services
- 3) Primary Prevention
- 4) Early Detection and Intervention
- 5) Management of PTSI and Other Mental Health Conditions

Several key themes emerged from the scoping review regarding prevention, early intervention, and management roles in first responder organizations.

Manager mental health training and manager confidence was suggested to reduce rates of sickness absences. Improving organizational culture and reducing stigma can lower the barriers to help-seeking. Building resilience was suggested to be an important factor to the primary prevention of PTSI and mental health. A sense of coherence, and manageability in particular, appeared to serve as a potential resilience factor against developing clinically relevant mental or physical symptoms. Peer-support programs were found to be important in the early detection and intervention of mental health among first responders, including paramedics. Early and frequent contact with managers once a worker has begun an episode of sickness absence was found to be associated with reduced sickness absences and faster time to full return to work.

Discussion and Conclusions

The RESPECT manager mental health training program (which combined mental health knowledge and communication training) improved manager confidence in dealing with worker mental health needs. The RESPECT principles including early and frequent contact from managers once a worker has begun an episode of sickness absence, was found to be associated with reduced sickness absences and faster time to full return to work. The Trauma Risk Management (TRiM) Program may be an appropriate program for improving organizational culture and reducing stigma in order to lower the barriers to help-seeking. Building resilience was suggested to be key to the primary prevention of PTSI and mental health via several different programs, with sense of coherence, and manageability in particular, appearing to serve as a potential resilience factor against developing clinically relevant mental or physical symptoms. The REACT (Recognize, Evaluate, Advocate, Coordinate, and Track) and TRiM programs were notable peer-support programs showing evidence for early detection and intervention of stress injuries, adding to the evidence that peer-support programs may be

important for the early detection and intervention of mental health among first responders, in particular paramedics.

These evidence-based practices, triangulated with an environmental scan which synthesized existing guidelines, and preferred practices identified through key informant interviews, will inform the development of the new Canadian Work Disability Prevention Standards for Paramedics Organizations with a focus on PTSTI.

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Terminology and Acronyms

CHARLY: Chaos Driven Situations Management Retrieval System

EMS: Emergency medical services

HRV: Heart rate variability

MAPS: Mental Agility and Psychological Strength training

PICO: Population, Intervention, Comparison, Outcome

PTSD: Post-traumatic stress disorder

PTSI: Post-traumatic stress injuries

RAW: Internet-based Resilience@Work (RAW) Mindfulness Program

RCT: Randomized controlled trial

REACT: Recognize, Evaluate, Advocate, Coordinate, and Track

RESPECT: Four-hour face-to-face training program for managers that combines mental health knowledge and communication training

RTW: Return to work (return-to-work)

SOC: Sense of coherence

SRTS: Stress Resilience Training System

TRiM: Trauma Risk Management

Introduction

Rationale

Paramedic services organizations provide critical emergency medical services and are important front-line first responders in Canada. There are over 30,000 paramedics in Canada who provide emergency medical services (EMS) and secure public safety during times of crisis (Public Safety Canada, 2019). Given the nature of their work, paramedics are frequently exposed to traumatic situations and, as a result, are substantially more likely to experience post-traumatic stress than the average worker. In fact, the alarmingly high rates of post traumatic stress injury (PTSI) among paramedics may not be a surprise when workplace exposures are considered. Essential tasks include, but are not limited to, long shifts of patient care, patient transport, and patient handling in various environments and circumstances, often during a crisis. Consequently, effectively managing post traumatic stress and the mental health needs of paramedics requires that paramedic service organizations develop policies, programs, services and practices that have been designed with the specific consideration of best practices in the area of prevention and management of post-traumatic stress and other mental health conditions.

In general, it is important that paramedic service organizations, their managers and other key personnel are equipped with the skills and confidence to support paramedic staff in the area of post-traumatic stress and other mental health conditions. This can best be ensured by building PTSI and other mental health needs into the disability management system of paramedic service organizations. Management systems are generally based on a continual improvement process which, in the case of PTSI, is critical to ensure the most up-to-date evidence-informed policies, programs, services and practices are in place.

While guidelines are available for implementing and operating standalone programs for PTSI, there is little guidance available on how to integrate PTSI prevention and management into a paramedic service organization's management system. To this end, a new *Canadian Work Disability Management System Standards for Paramedic Service Organizations (CSA Z1011.1)* with a focus on the prevention and management of post-traumatic stress injuries (PTSI) and other mental conditions will be developed by the CSA Group in conjunction with the Canadian Institute for Safety, Wellness and Performance (CISWP) at Conestoga College and the Centre for Research on Work Disability Policy (CRWDP) at the Institute for Work & Health.

This scoping review is one part of three scientific methodologies that have been executed in order to inform the development of the new standard. The three methodologies are as follows:

- 1) An environment scan of recommended programs and practices for the prevention and management of PTSI amongst paramedics;
- 2) A scoping review of peer-reviewed literature on PTSI prevention and management programs and practices; and
- 3) A needs assessment undertaken via key informant interviews to identify current practices, challenges and needs of paramedic service organizations in addressing PTSI.

The specific objective of this scoping review is to identify and synthesize peer-reviewed evidence on programs and practices for the prevention and management of PTSI/PTSD and other mental health conditions that are relevant for paramedic service organizations. The findings from this scoping review, in conjunction with the environmental scan and needs assessment, will serve as critical inputs into the development of a Work Disability Management System Standards for Paramedic Service Organizations. In this scoping review, findings from included studies are organized and mapped under the following relevant corresponding categories—roles and responsibilities of managers and workers, primary prevention, early detection and intervention, and management of PTSI and other mental conditions, as the framework for the evidence synthesis. The framework is detailed in the methods section.

Key Constructs/Terms

There are several key constructs used throughout this document that warrant definition. A key one is *trauma*, which we define as the “direct or indirect exposure to stimuli that pose an actual or perceived threat to life or health and wellbeing, including emotional, physical and sexual violence. Traumatic experiences may include exposure to natural disasters, crimes, accidents, wars, conflicts” (Public Safety Canada, 2019). We use the term PTSI in this report as a “non-clinical term that encompasses a range of mental health injuries, including some operational stress injuries, clinically diagnosed PTSD, anxiety, and depression” (Public Safety Canada, 2019). In contrast, PTSD is a *clinically diagnosed mental disorder* characterized as an extreme reaction to trauma exposure. Symptoms of PTSD may include re-experiencing, avoidance, negative cognitions and mood, and hyperarousal.

Methods

We followed the scoping review methodology proposed by Arksey and O'Malley (Arksey & O'Malley, 2005) and refined by Levac and colleagues (Levac et al., 2010). According to this framework, there are six steps to undertaking a scoping review: (1) identify the research question(s); (2) identify relevant studies; (3) select studies; (4) chart the data; (5) collate, summarize and report the results; and (6) consult with relevant stakeholders.

Step 1: Identify the research question

In this review we sought to answer the following research question:

What programs and practices can aid in the prevention and management of PTSI and other mental health conditions in paramedic service organizations?

To answer this research question, we considered peer-reviewed literature on first responder organizations of relevance to paramedic service organizations. Specifically, we searched for peer-reviewed articles that considered workplace prevention and management programs and practices associated with PTSI and other mental conditions within first responder organizations. Articles pertaining to PTSI and other mental health conditions within the military and veteran organizations were also reviewed for relevancy.

Step 2: Conduct the literature search to identify relevant studies

The search plan was developed in conjunction with the research team and executed by a skilled and experienced librarian. We used EndNote® to store citations from all literature searches and to remove duplicate citations. The citations were downloaded to DistillerSR®, an online application designed specifically to support the various stages of structured literature review.

We used a number of strategies to identify potentially relevant peer-reviewed articles. The core search was comprised of literature searches undertaken in four electronic journal databases: Medline (OVID), EMBASE, PsycINFO and Business Source Premier (EBSCO). We considered articles cited in these databases that were published in English between January 2010 to January 2020. To supplement this core search, we conducted a focussed search of key websites to identify reports that might cite incremental peer-reviewed articles of relevance to this scoping review. We also inquired with our review team and other content experts about their knowledge of articles in-press or already published that were may be particularly relevant for our review. Reference lists of included articles were also scanned for citations not previously captured.

The search terms were selected using a modified PICO method (Population, Intervention, Comparison, Outcome) to ensure all relevant terms were included in the literature search. Eight articles were identified as “must-have” articles prior to the literature search—Arnetz et al., (2013), Greenberg et al., (2010), Hunt et al., (2013), Joyce et al., (2019), Milligan-Saville et al.,

2017), Mishara & Martin (2012), Skeffington et al., 2016), and Watson & Andrews (2018) (see Appendix for citation and abstracts of these articles). Search terms were further refined to ensure these “must-have” articles were captured in the literature search. Seven of the “must-have” articles were captured in the Medline search, and the eighth article was captured in the PsycINFO search. Search terms were adapted to best utilize the search functionality and controlled vocabularies unique to each database. Table 1 provides details of the final list of search terms used in the in the four databases.

Table 1. List of search terms (PICO method)

| Population | Intervention | Outcome |
|--|--|---|
| (Worker? or labo?rer?).tw,kf. | Management system*.tw,kf. | polic*.tw,kf. |
| employee?.tw,kf. | Roles and responsabilit*.tw,kf. | practice*.tw,kf. |
| employer?.tw,kf. | Best practice? .tw,kf. | procedure*.tw,kf. |
| Employment/ | Internal responsibility system*.tw,kf. | Implementation *.tw,kf. |
| employment.tw,kf. | Labour role*.tw,kf. | Inclusive workplace*.tw,kf. |
| job?.tw,kf. | plan,do, check, act | Culture |
| occupation*.tw,kf. | Continuous improvement*.tw,kf. | Joint management system*.tw,kf. |
| work/ | Disability management*.tw,kf. | productivity*.tw,kf. |
| workplace/ | workplace | absenteeism*.tw,kf. |
| exp Health Occupations/ | “prevention program\$” | cost*.tw,kf. |
| | “primary prevention” | |
| | Primary prevention/ | |
| | “Trauma Risk Management” | |
| | “mental health training” | |
| | “resilience training” | |
| | “Mindfulness program\$” | |
| | Risk Management/ | |
| exp Health Personnel/ | | turnover*.tw,kf. |
| exp Hospitals/ | | Mental health (e.g., stress, anxiety, depression) |
| health care sector/ or (healthcare or "health care").tw,kf. | | Post-traumatic Stress/ PTSD/ PTSI |
| health | | Presenteeism* |
| professional.tw,kf. | | Turnover |
| (medical and (staff or personnel or professional* or worker* or provider*)).tw,kf. | | |
| Police/ (policem#n or policewom#n or police officer*).tw,kf. | | Engagement |
| | | Job satisfaction |
| emergency medical services/ or emergency | | Retention |

medical dispatch/ or
emergency service,
hospital/

emergency medical
services.tw,kf.
first responder*.tw,kf.

firefighters/ or
(firefighter* or
firem#n).tw,kf.

ambulance*.tw,kf.

paramedic*.tw,kf.
Frontline-worker*.tw,kf.
Frontline worker?
*.tw,kf.
Civilian police*.tw,kf.
Manager*.tw,kf.
Disability
manager*.tw,kf.
Emergency care*.tw,kf.
Military Personnel/

Return-to-work

Stay at work

Resilience

Stress, Psychological/
Program Evaluation/

Step 3: Article selection

Two members of the research team conducted a review of the citations yielded from the search to assess title and abstract relevancy and full-text relevancy based on five inclusion criteria questions. First, titles and abstracts were reviewed for inclusion on the basis of their relevance for the scope and purpose of this review. If a citation was deemed relevant, the full article was retrieved. Second, all retrieved full-text articles were reviewed for relevancy, and if relevant, were included in the final evidence synthesis. The five inclusion criteria questions (and by default, the exclusion criteria) are detailed in Table 2.

Table 2. Article inclusion and exclusion criteria.

| # | Question | Response |
|----|--|---|
| 1. | <p>Does the article appear to be about workers' health, function and/or disability? Some terms that may suggest this:</p> <ul style="list-style-type: none"> a. Work disability b. Post-traumatic stress (PTSI, PTSD) c. Mental health d. Stress/Anxiety e. Injury/illness | <p><i>If "Yes," move to Question #2.</i> <i>If "No," exclude article.</i> <i>If "Unclear," include article.</i></p> |

- f. Impairment
- g. Work absences
- h. Health absences
- i. Absenteeism/Presenteeism

Note: We are particularly interested in PTSTI/PTSD and mental health, but other health needs and disabling conditions may also be relevant.

- 2. Does the article appear to address the management of health and disability in the workplace? Some terms that may suggest this:**

*If “Yes,” move to Question #3.
If “No,” exclude article.
If “Unclear,” include article.*

- a. Accommodation
- b. Return-to-work
- c. Stay-at-work
- d. Joint management
- e. Disability management
- f. Work productivity
- g. Engagement at work

Note: We are focusing on organizational-level management issues of worker health needs, so programs/initiatives outside the organizational context, such as that provided by a service provider (e.g., workers’ compensation authority) are not relevant.

- 3. Does the article appear to be one of the following?**

*If “Yes,” move to Question #4.
If “No,” exclude article.
If “Unclear,” include article.*

- a. A field study (evidence-informed)
- b. An analysis/evaluation of an intervention
- c. A case study with analysis of its merits
- d. A review of evidence
- e. A summary of best practice guidance

Note: We are interested in evidence that can inform organizational management policies, programs and practice, so opinion pieces, issues articles, and descriptions of policies, programs and practices that are not evidence informed are not relevant.

- 4. Is the study in a developed country?**

*If “Yes,” move article to Question #5.
If “No,” exclude article.
If “Unclear,” include article.*

Note: Exclude studies conducted in Asia, Africa, South and Central America

5. Is the study population first responders?

If “Yes,” include article.

If “No,” does the article appear relevant to first responders. If “Yes,” move to include.

If “Unclear,” include article.

Step 4: Charting the data

Data from relevant articles were extracted to answer the review question using a standardized data charting form. Standardized forms and guides were prepared and tested in DistillerSR® to ensure the forms were being used consistently. Where available, detailed information to be charted included: study type (quantitative, qualitative, observational or literature review), population (first responders group or military personnel and veterans), specific policy or program under investigation, health condition(s) or relevant outcomes the study focused on, and funding sources for the study.

Step 5: Collating, summarizing, and reporting the results

Our evidence synthesis includes a descriptive quantitative summary and a qualitative thematic analysis of the relevant literature. The final set of included articles were clustered into groups and categories for evidence synthesis. Specifically, findings from included articles were organized and mapped under the relevant corresponding categories, i.e., roles and responsibilities of managers and workers, primary prevention, early detection and intervention, and management of PTSI and other mental health conditions, as the framework for the evidence synthesis.

Step 6: Consult with relevant stakeholders.

Consultation with stakeholders will take place during the development of the new standard. Specifically, a Technical Committee comprised of relevant stakeholders, including paramedics, will meet on a period basis over a one-year time period to develop the details of the standard, with consideration of the finding from this scoping review as well as the environmental scan and needs assessment. Prior to the inaugural Technical Committee meeting, a seed document for the standard will be prepared the key research team members from CISWP at Conestoga College and the CRWDP at the Institute for Work & Health.

Results

Overview of Findings

Below we present an overview of findings from the literature search, and then provide a detailed synthesis of the evidence drawn from the included articles.

The initial search in Medline yielded 4,449 citations (titles and abstracts) after the removal of 15 duplicates. An additional search of 740 citations were reviewed from the title and abstract search of EMBASE, PsycINFO and EBSCO. All titles and abstracts were reviewed for inclusion on the basis of their relevance to the scope and purpose of the review. One reviewer screened the 4,449 citations that were identified from the search in Medline. The same reviewer screened 140 of the citations from EMBASE, PsycINFO and EBSCO, and a second reviewer screened 600 citations (200 citations from each database). In total, 5,189 citations were reviewed by two reviewers across the four electronic journal databases using the software DistillerSR®. Details of the number of titles and abstracts identified in each of the databases can be found in the Appendix.

After the 5,189 citations were reviewed for title and abstract relevancy using the inclusion questions, 348 potentially relevant unique citations were identified. Full text PDFs of these citations were then retrieved and reviewed for relevancy for the final evidence synthesis. At the full article review, a further 309 articles were deemed not relevant, and one must-have article which was not in the 5,189 citations reviewed was added, giving rise to 40 articles that formed the basis of the evidence synthesis.

Figure 1. Flow chart of article selection for full-text review.



The 40 remaining articles included 22 peer-reviewed studies on first responders and 18 peer-reviewed studies on military personnel and veterans, focusing on programs and practices for the prevention and management of PTSI and other mental health conditions in the workplace.

The majority of the 40 articles were of studies undertaken in the United States (US), Australia and the United Kingdom (UK) (14, ten and seven studies respectively), with an additional four

studies coming from the European countries, two from Israel, one from Canada, and two literature reviews that included studies from several countries (the other three literature reviews included only studies from the US). Study populations included police (nine studies), firefighters and rescue services (seven studies), and ambulance services (two studies). In addition, 18 studies on military personnel and veterans, one study on a general population relevant to emergency services personnel, and three studies that included multiple groups of first respondents and/or military personnel, were included. A variety of health conditions and relevant key variables were examined in the studies, including sickness absence, suicide rate, PTSD symptoms, stress and emotional and physical responses to it, well-being and psychological health, resilience and other outcomes. Workplace programs under investigation included HeadCoach, RESPECT Manager Training, and MAPS (Mental Agility and Psychological Strength training) in Australia; peer support training programs REACT (Recognize, Evaluate, Advocate, Coordinate, and Track) in the US and TRiM (Trauma Risk Management) in UK; Chaos Driven Situations Management Retrieval System (CHARLY) in Germany; multiple resilience training programs in US, Australia and other countries; a primary prevention program to improve responses to stress among police officers in Sweden, and suicide prevention programs in Canada, the US and other countries.

Most prevalent study types were quantitative and observational studies; two studies were literature reviews, and only one study used a qualitative design. The following table provides a frequency of the types of studies included in this review. A complete profile of the 40 studies can be found in the appendix.

Table 3. Summary of articles by type identified in the search

| Study Type | Number of Articles |
|---|---------------------------|
| Qualitative | 1 |
| Observational Study (Case Study Design) | 1 |
| Observational Study (Cross-Sectional Design) | 7 |
| Literature Review | 5 |
| Quantitative Study (Experimental/Randomized Design) | 14 |
| Quantitative Study (Experimental/Non-randomized Design) | 3 |
| Observational Study (Before/After Design) | 9 |
| TOTAL | 40 |

Detailed Synthesis of Findings/Evidence

The 40 articles consulted for this review were grouped under the following categories:

- 6) Roles and Responsibilities
- 7) Access to Health Services
- 8) Primary Prevention

- 9) Early Detection and Intervention
- 10) Management of PTSD and Other Mental Health Conditions

These articles were then organized by themes (e.g., Senior Management Roles, Management Training, etc.). This organization of the studies provided the framework for our evidence synthesis.

Roles and Responsibilities

The roles and responsibilities of management and paramedic workers were explored in several studies. Although few studies were found pertaining to senior management roles, five studies addressed the importance of management training on mental health issues within first responder organizations.

Senior Management Roles

There were articles in the literature search pertaining to senior management roles within first responder organizations. However, one article on military personnel and veterans briefly touched upon the role of senior management within the context of the successful implementation of a peer support trauma risk management (TRiM) program.

A qualitative study by Greenberg et al., in 2011 on the acceptability of the TRiM program within the UK Armed Forces suggested the need for senior management support for the successful implementation of a post-incident peer support program such as TRiM. The results of the study suggested that TRiM was viewed positively and was supported by the majority of those personnel who were aware of this program. At the same time, negative objections to TRiM implementation were revealed related to the selection of personnel as TRiM practitioners and the other related to organizational support for the use of TRiM. The study concluded that successful implementation of TRiM program requires careful selection of TRiM practitioners, and that the program should be well supported by junior, mid-level and senior managers (Greenberg, Langston, Iversen, & Wessely, 2011).

Management Training

Several studies addressed mental health training for managers within first responder organizations. Two of the studies focused on management training within a large fire and rescue service. One study evaluated the role of an employee performance management system and how it can foster the well-being of police officers. The other study investigated managers' confidence and behaviour and its impact on sickness absences within ambulance service organizations in Australia.

A study by Milligan-Saville, in 2017, indicated that a 4-hour mental health training programme for managers could significantly reduce work-related sickness absence. A cluster randomized

controlled trial was conducted to examine the effect of a 4-hour face-to-face RESPECT manager mental health training within a large Australian fire and rescue service, with a six-month follow-up.¹ The RESPECT principles when contacting a worker who might be suffering from mental health problems are: Regular contact is essential; the Earlier the better; Supportive and empathetic communication; Practical help, not psychotherapy; Encourage help-seeking; Consider return to work options; Tell them the door is always open and arrange next contact. The study found that the mental health training significantly reduced rates of work-related sick leave among employees and reduced the odds of employees taking standard sick leave. It was shown that after the training, increased managers' confidence and a greater likelihood of communicating with workers about the risk of sickness absence might have been key mediators. There was also an association of a faster time to full return to work with early and frequent contact from managers once an worker had begun an episode of sickness absence. Limitations to this study include different statistical approaches producing differing results. However, these findings suggest still that brief mental health training for managers of fire and rescue services can potentially favour both the workplace and the worker (Milligan-Saville et al., 2017).

Authors of the above noted study also conducted another study of the managers in the same Australian fire and rescue service (Bryan et al., 2018). This study investigated managers' response to mental health issues among their staff. The study found that there is a significant association between confidence and non-stigmatizing attitudes towards mental illness and manager behaviour. Managers included in the study were defined as mid-level, on-shift, uniformed managers who had primary responsibility for sickness absence management. In terms of managers' behaviour in contacting a worker suspected or confirmed to be suffering a mental illness, managers' confidence was the strongest predictor. Manager behaviour and the likelihood of a manager contacting a worker suspected of having a mental illness or on sickness absence for mental health reasons was not associated with mental health literacy. The study suggested that an increase in confidence can be achieved by managers learning the practical skills required for having difficult conversations and having the space and time to cultivate these techniques. Therefore, the study concluded that techniques aimed at improving confidence and reducing stigma in manager through mental health training, with a shift in focus away from mental health literacy, may improve the effectiveness of manager mental health training (Bryan et al., 2018).

A Belgium study by Van Thielen et al., in 2018, evaluated the role of the employee performance management system and how it can foster the well-being of police officers. The study demonstrated that police officers' well-being is increased when line managers implement employee performance management as an overall integrative system. Specifically, employee performance management was found beneficial to worker job satisfaction and helped decrease strain when it was implemented as a system that included both planning and evaluation stages. That study also found that performance management satisfaction is positively related to worker

¹ The RESPECT Training Program combined mental health knowledge and communication training. It consisted of three main topics: 1) key features and effects of common mental health issues in the workplace, 2) roles and responsibilities of senior officers in terms of worker mental health, and 3) development of effective skills for discussing mental health matter with staff.

well-being. The results of this study suggest that with the right approach, a system can be balanced and will not negatively impact workers' well-being while increasing performance (Van Thielen, Bauwens, Audenaert, Van Waeyenberg, & Decramer, 2018).

Improving managers' confidence was a key theme found in studies of ambulance service organizations in Australia. Gayed et al., in 2019, conducted a cluster randomized controlled trial comparing managers who received an online mental health training program for workplace managers called Head Coach to a waitlist control. The Head Coach program was designed to improve managerial confidence and behaviours in order to create mentally healthy workplaces and reduce sickness absence and occupational incapacity. The results indicated that appropriate preventive and responsive managerial strategies play an important role in the well-being of the staff they supervise (Gayed et al., 2019).

Another study by Gayed et al., also published in 2019, used two previously conducted studies (Milligan-Saville et al., 2017 and Gayed, Bryan, et al., 2019) to compare face-to-face training (a four-hour session called RESPECT) and online training (Head Coach) to improve managers' confidence in supporting the mental health of workers in a large Australian fire and rescue service. Both training programs used an identical scale to measure managers' confidence in supporting the mental health needs of their staff and initiating conversations about matters of mental health. The authors found that both types of training can significantly improve managers' confidence in supporting the mental health needs of their staff, however online training tended to have lower retention rates and therefore the relative effect was reduced with this method of training delivery (Gayed, Tan, et al., 2019).

In summary, there is some evidence that management training, and in particular training targeted at improving managers' confidence, is an important factor in the well-being of first responders.

Paramedic/Worker Training

There was limited evidence on the role of paramedic and worker training. However, numerous studies, including a study by Behnke et al., 2019, have emphasized the importance of primary prevention programs among rescue workers such as building resilience in order to manage stressful situations. Paramedic or worker training could include primary prevention programs in their training, such as strengthening a sense of coherence, a possible important psychological resilience factor. Behnke et al. found that strengthening a sense of coherence, in particular, a high manageability conviction, was observed as resilience factors for high-risk groups, such as rescue workers, frequently exposed to traumatic events (Behnke, Conrad, Kolassa, & Rojas, 2019).

Resources

Evidence-based studies on resources for managers or paramedics was limited. Resilience training and peer-support programs have been suggested to be a strong resource for support for first

responders and therefore paramedics, and are described later in this scoping review.

Confidentiality

The evidence-based studies found in this literature search did not directly address how to deal with confidentiality, however the RESPECT Manager Training Program, evaluated by Milligan-Saville (Milligan-Saville et al., 2017), may offer helpful principles when contacting a worker who may be suffering from mental health problems and dealing with confidentiality.

Access to Health Services

There was a dearth of evidence-based studies on the access to health services within paramedic and first responder organizations.

Medical Professionals

There was limited evidence on the role of medical professionals, however in a systematic review by Witt et al., 2017, on the effectiveness of suicide prevention programs for emergency and protective services workers found that there were a number of gatekeeper programs that provided information on how to actively link persons experiencing a mental health crisis, including those who are suicidal, with professional support services. One of these programs adopted a face-to-face gatekeeper training in the Ukraine, to improve the identification of those at risk of suicide and to ensure these persons can be linked in with professional mental health services. Two years following implementation, the authors of the study concluded the program was associated with a significant reduction in suicide rates {(Witt, Milner, Allisey, Davenport, & LaMontagne, 2017)}.

Employee Assistance Program (EAP) / Employee Family Assistance Program (EFAP)

The evidence on the effectiveness of Employee Assistance Programs or Employee Family Assistance Programs within paramedic or first responder organizations was minimal. However, Milligan-Saville et al., 2017 conducted a cluster randomized controlled trial on RESPECT, a four-hour face-to-face manager mental health training, within a fire and rescue service. Managers in the control group were continued to be offered the standard employee assistance program manager support as needed, where employee assistance program specialist advisors were available for managers to contact them anytime via phone to provide assistance across a broad range of management issues, including the sickness absence of workers. However, the results indicated that the RESPECT training intervention led to a significant reduction of sickness absence in the two statistical models analyzed, compared to the control group exposed to EAP manager support (Milligan-Saville et al., 2017).

Primary Prevention

Primary prevention can include a wide range of activities focused on reducing the risk of exposures and the prevention of diseases or injuries before they occur. The primary prevention of PTSTI among first responders was investigated in several studies, with a particular emphasis on building resilience.

Culture and Stigma

Primary prevention strategies include addressing the barriers to seeking help, such as stigma and self-stigma, and improving organizational culture, including behaviours and values that may prevent workers from seeking help. Only one study addressed these issues.

A cross-sectional study by Watson et al, in 2018, investigated the effect of TRiM Program on stigma and barriers to help-seeking amongst police. TRiM was described in the study as a peer-support program that aims to support workers following trauma, by reducing stigma and encourage help-seeking. The authors found that the TRiM group demonstrated less stigmatized views towards experiencing mental health difficulties (public stigma) and perceived fewer barriers to help-seeking than did the non-TRiM group. As well, they had lower PTSD symptoms. The study suggested that the lower PTSD scores in the TRiM group may indicate that TRiM indirectly reduced distress by encouraging early recognition and treatment. Conversely, in the non-TRiM group distress levels may increase because of the impact of cumulative trauma without recognition, referral or appropriate treatment. Since no significant difference between the two groups was found in terms of self-stigma, it was suggested that TRiM may be particularly helpful with decreasing the concerns that police personnel have of how others respond to their mental health problems, rather than altering on individual's own perceptions of mental health. According to the authors, efforts at cultural change need to focus on decreasing the public-stigma and perceived risks of seeking help for psychological difficulties, and TRiM may be an appropriate intervention to achieve this (Watson & Andrews, 2018).

Building Resilience

Resilience building was a key theme that emerged among the studies focusing on primary prevention of PTSTI and other mental health conditions. In an article on enhancing resilience in active duty military personnel, the concept of “resilience” was defined as the ability to withstand stressors or overcome traumatic life events. Resilience enables an individual to face adversity and continue to maintain a relatively healthy life (Crabtree-Nelson & DeYoung, 2017). Numerous studies addressed the importance of building resilience as a form of primary prevention. Pertaining to rescue workers, one study in Germany examined sense of coherence (SOC)² as a potential resilience factor against developing clinically relevant mental or physical health symptoms. Another three studies addressed the impact of resilience training among

² “Sense of coherence” (SOC) is the extent to which a person has an enduring feeling of confidence that their environment is predictable and that their life situation will unfold reasonably well. It is somewhat of a mix of optimism and control.

firefighters. Several additional studies examined resilience training programs for police, and for military personnel and veterans.

A SOC, and its manageability facet, has been proposed as a potential resilience factor against developing clinically relevant mental or physical symptoms among rescue workers in emergency medical services. A SOC is a mindset that may help those in high-risk groups, such as rescue workers, to avoid developing trauma-related mental and physical health impairments, including post-traumatic symptoms, by perceiving occupational exposures as manageable, meaningful, and coherent. As described by Behnke et al., it includes three principal beliefs:

comprehensibility “the perception of the world as logically structured, understandable, and thus predictable;”

manageability “the conviction of having sufficient resources to successfully face the demands of the world;” and

meaningfulness “the conviction that these demands are valuable challenges that exist for a good reason and are worth dealing with.”.

The cross-sectional study by Behnke and colleagues investigated whether a SOC served as a protective/resilience factor against post-traumatic, depressive, and somatic symptoms in a sample of German rescue workers (Behnke et al., 2019). In the study, rescue workers participated in a 60-minute online survey to measure a variety of potential risk and resilience factors associated with the development of mental health problems. The authors found that for high-risk groups frequently exposed to traumatic events, a high SOC was a resilience factor, particularly a high level of manageability conviction. In particular, rescue workers with higher manageability scores reported less severe post-traumatic symptoms. Rescue workers who had a high conviction had sufficient resources to successfully manage stressful situations. In contrast workers who believed that there are no solutions or strategies for dealing with stressors, were at greater risk of negative self-reflective emotions such as despair, hopelessness, shame and guilt. The study concluded that strengthening workers’ manageability conviction may help them better cope with their professional demands (Behnke et al., 2019).

Skeffington et al., evaluated an evidence-based and theory driven program for the primary prevention of PTSD in firefighters in Australia by conducting a clustered randomized control trial (RCT) with a 12-month follow-up. This program was comprised of a four-hour (four group sessions) resilience training intervention (Mental Agility and Psychological Strength (MAPS) training) as part of a recruit training school curriculum. No evidence was found that the intervention was effective in the primary prevention of mental health issues (Skeffington, Rees, Mazzucchelli, & Kane, 2016).

Two studies by Joyce et al. measured the effect and feasibility of the internet-based Resilience@Work (RAW) Mindfulness Program in a group of 29 full-time firefighters. The RAW program is a self-paced interactive e-learning program consisting of 6 internet-based training sessions. Each session takes about 20-25 minutes to complete. The first of the two

studies, a pilot study, examined the initial feasibility of the RAW Mindfulness Program in a workplace setting, and determined whether it would lead to measurable changes in resilience and other key outcomes. The study observed trends towards increased resilience and psychological flexibility, and lower levels of experiential avoidance. The RAW program was found to be feasible in a workplace setting, and the authors concluded that the necessary skills and techniques could be taught via an internet-based format. This aspect of the program was important, particularly for those considered high-risk workers such as first responders, and those with logistical challenges for training such as shift work, frequent travel on the road, and limited access to face-to-face training (Joyce, Shand, Bryant, Lal, & Harvey, 2018). The second study by Joyce et al. further examined the effectiveness of the RAW program. The authors found that this training can create improvements in adaptive resilience among firefighters. According to the authors, a low baseline resilience may be a risk factor for increased mental health symptomology in emergency workers, however, resilience is a potentially modifiable risk factor, and programs such as RAW may help increase an organization's ability to proactively protect worker psychological well-being (Joyce et al., 2019).

Ramey et al., investigated the impact of a resilience training intervention in a population of American police officers (the police district locations were not identified in the study) on autonomic responses to stress, cardiovascular risk, psychological and physiological outcomes. The training consisted of one educational class taught by a member of the research team, and one telementor session conducted by mental health professionals such as licensed psychologists. These sessions adopted an interactive format using discussion to share real-life experiences. Topics included altering breathing when encountering stressful situations and improving decision-making by focusing on positive rather than negative emotions like anger or frustration normally associated with stress. Outcomes measured included self-reported stress measures and blood pressure at several timepoints three months apart. Results indicated that younger participants benefitted more from the training, suggesting the importance of intervening early in a police officer's career path in order to build resilience (Ramey et al., 2016).

Ramey et al. also pilot tested a resilience training program in police recruits at the Milwaukee Police Academy. The 36 recruits in the study first attended a 2-hour educational class and were provided with instructional books and a pocket flip chart with the class content. The treatment group received iPads with an application installed to measure altered breathing and heart rate feedback. The treatment group also received a mentoring component 10 day after the initial class, including four telementor sessions that were approximately one hour in length and held 2-3 weeks apart. Heart rate variability (HRV) coherence was measured to validate the relationship between cognition and HRV. Improvements in HRV served as a measure of the ability to modify resilience. The article noted that "HRV is an important indicator of psychological resilience and behavioural flexibility as well as the ability to effectively adapt to changing social and environmental demands". HRV can be self-regulated, and improvements in HRV can contribute to the development of resilience. The authors found the intervention to be effective in significantly improving HRV coherence in a short time period. As well, an Emotional Buoyancy subscale was positively associated with the quantity of practice to build self-regulation capacity.

These results suggested that the skills taught in this intervention were valuable for equipping recruits with the ability to self-regulate, leading to improved performance and health (Ramey, Perkhounkova, Hein, Bohr, & Anderson, 2017).

A case study by Weltman et al. in 2014 tested the impact of a scientifically based self-regulation and resilience building program called the Stress Resilience Training System (SRTS), delivered via an iPad, and personal mentoring among law enforcement officers in the San Diego Police Department. The SRTS program was designed to be a low-cost, self-contained, mobile, comprehensive stress resilience program aiming to reduce the adverse effects of stress and enhance health and performance. The SRTS training course combined a) information about the physiology of stress and resilience, b) engaging training in a series of evidence-based energy self-regulation techniques, and c) the use of heart rate variability (HRV) coherence biofeedback to control a series of progressively more challenging games that were designed to increase the use and sustainment of resilience-building skills. The results of this case study revealed that all four main scales, Emotional Vitality, Organizational Stress, Emotional Stress, and Physical Stress, showed improvement (Weltman, Lamon, Freedy, & Chartrand, 2014).

Another study on resilience training in police officers by McCraty et al, in 2012, found that the application of the Coherence Advantage resilience and performance enhancement training on police officers in Santa Clara County, California, can reduce damaging psychological and physiological responses to both acute and chronic stress in police. The Coherence Advantage Stress Resilience and Performance Enhancement Program aimed to build and sustain the resilience of police officers, as well as diminish operational stress and reduce the development of serious and long-lasting stress injuries, by providing practical, easy-to-learn and employ, self-empowering, self-regulation skills that are adaptable to many situations, as well as being cost-effective. The study observed that a key benefit of the Coherence Advantage Training was an increased awareness and self-management of stress reactions (McCraty & Atkinson, 2012).

Arnetz et al, 2013, assessed a prevention program for work-related stress among 75 urban police officers in the final term of the Swedish Police Academy. The program was designed to improve psychobiological responses to stress among urban police officers. Training took place during normal academy hours and began with a psychoeducational session. The training continued with 10 weekly 90-minute sessions in classroom format, including relaxation training, the use of guided imagery to facilitate imaginal exposure to potentially stressful on-the-job incidents, and the mental practice of police tactical skills. Coping strategies for different scenarios were covered as was Jacobsen's (1938) progressive muscle relaxation technique. Participants were assigned to practice the relaxation technique daily. Participants also met once a week in small groups with their police group leader to address any difficulties and enhance skills. Results demonstrated that problem-based coping and general health was improved in the intervention group, and sleep difficulty was experienced significantly less. Since sleep disturbances are strongly associated with stress and general psychopathology, obtaining adequate rest likely boosts physical and psychological resilience (Arnetz, Arble, Backman, Lynch, & Lublin, 2013).

Adler et al. 2014 conducted a study on the impact of resilience training on US soldiers' wellbeing during combat training. In this study, platoons were randomly assigned to either the interactive style, relatively brief two-hour Resilience Training during the first week of Basic Combat Training or the active control intervention (Military History). Resilience Training was designed to teach individuals evidence-informed skills promoting mental health to enhance adaptation and to prevent the development of symptoms and adjustment problems. The study found that while anxiety decreased in both conditions, the rate of decrease was faster in the Resilience Training condition. At the same time, Resilience Training group had a slower rate of increase in group cohesion over time than the Military History group. In addition, Resilience Training was associated with greater confidence in helping others. The study concluded that brief resilience training may have use in supporting mental health and peer support, but may not benefit unit climate (Adler, Williams, McGurk, Moss, & Bliese, 2015).

Another study by Pyne et al., in 2019, examined the impact of a self-paced resilience training delivered by use of an iPod device on post-deployment PTSD symptoms. The resilience training included self-paced heart rate variability feedback (HRVB) and cognitive bias modification for interpretation (CBM-I) training sessions on laptop computers followed by a brief individual practice session using the downloaded app on an iPod Touch device. App practice was suggested at least three times per week and before or after stressful events. This randomized controlled trial found no overall significant intervention effect, however, there were significant intervention effects for subgroups of soldiers. The study concluded that pre-deployment resilience training resulted in lower post-deployment PTSD symptom scores in subgroups of older soldiers compared with controls. Study limitations included self-report app use, and a general low level of PTSD symptom severity throughout the study (Pyne et al., 2019).

A randomized controlled trial by Wesemann et al. in 2016, evaluated a technology-based adaptive learning and prevention program for stress response, called Chaos Driven Situations Management Retrieval System (CHARLY), to help prevent deployment-related mental disorders. This longitudinal randomized controlled trial compared the levels of psychological and traumatic stress between two groups of military medical personnel before and after overseas deployment. The CHARLY program was designed to provide social skills and mental pre-deployment training, such as awareness and acceptance of mental injuries, psychoeducation, protective mindset, coping strategies such as relaxation, and distancing techniques, and constructive communication in a peer group, as a form of primary prevention from developing post-traumatic and general psychological stress, via an interactive training platform. Stress games simulating different operational scenarios were also featured. The CHARLY training lasted 1.5 days. The study found a smaller increase in the CHARLY group for PTSD-specific symptoms, and the results suggested that this computer program was superior to personal prevention led by a psychologist of the same duration. The authors suggested that this highly standardized, computer-based primary prevention of mental disorders in military medical personnel may also be applicable to other response forces, such as police and fire departments (Wesemann et al., 2016), and therefore by proxy, paramedics. Griffith et al, 2013, examined the relationship between the US Army Master Resilience Training (the latter end of the

Comprehensive Soldier Fitness program) and stress buffering among Army National Guard soldiers. Four modules including six core resilience competencies such as connection, optimism, mental agility, self-awareness, self-regulation and character strength were taught over a period of one week via a brief presentation and a series of experiential activities such as group discussions, role plays and application exercises. Self-reported changes in resilience competencies were collected using a web-based questionnaire. There was some evidence, however not always at traditional levels of statistical significance, that resilience training is associated with cognitive change and in turn, stress buffering (a reduced reporting of stressful events) (Griffith & West, 2013).

The above noted studies all point to the importance of building resilience among first responders, including paramedics, as an important strategy for the prevention of PTSI.

Early Detection and Intervention

Several studies focused on the early detection and intervention (i.e., secondary prevention) of PTSI and other mental health conditions among first responders. There was strong evidence for peer-support programs as a form of secondary prevention. One study evaluated a program called REACT which was piloted among four fire departments in Orlando, Florida. The TRiM program was evaluated in a police organization as well as among military personnel. TRiM is a peer-delivered psychological support system aiming to help those who develop psychological disorders as a result of exposure to traumatic events, have assistance to seek help (Greenberg et al., 2010).

Debriefings After Critical Events

There was limited evidence found in our literature search on the effectiveness of debriefings after critical events among first responders.

Peer Support

Marks et al., 2017 evaluated a newly designed paraprofessional peer support training program REACT (Recognize, Evaluate, Advocate, Coordinate, and Track) developed to address the need for promoting psychological health and intervening with the stress injury epidemic among first responders. The REACT training was delivered at the local fire department training centre as a 6-hour session with four modules using classroom and small-group breakout session format. Participants who received REACT training demonstrated increased knowledge concerning their ability to identify stress injuries, initiate and maintain conversations, motivate peers to follow through with help-seeking behavior, and provide acute stress management. The study also found that this increase in knowledge was maintained over a 3-month follow-up period. The study concluded that this peer-support model is a promising approach for equipping first responders with the tools to support their peers in an effort to address the psychological impact of potentially traumatic events (Marks et al., 2017).

Following a traumatic event in Cumbria Constabulary in 2010, Cumbrian Constabulary arranged an organizational peer support response for personnel involved in the traumatic event. Using incident databases, Hunt et al., 2013, conducted an evaluation of the TRiM intervention and its relationship to sickness absence, as a proxy outcome measure for mental ill-health. The TRiM intervention is a supportive interview incorporating psychological risk assessment. The study found a reduction in sickness absence, especially among junior ranks, with engagement in the TRiM process. The study concluded that the TRiM programme may be useful for early detection of psychological risk so that officers can be offered early supportive interventions (Hunt, Jones, Hastings, & Greenberg, 2013).

A cross-sectional study by Watson et al, in 2018, investigated the importance of peer-support for PTSD symptoms prevention, by examining the effect of a TRiM Program on stigma and barriers to help-seeking in the police. The peer-support element of TRiM was hoped to encourage the open recognition of trauma-related distress, and decrease the public and structural stigma associated with mental health distress, in turn reducing self-stigma and encouraging help-seeking behaviour. The TRiM group in the study reported lower levels of PTSD symptoms, less stigmatized views toward experiencing mental health difficulties, and perceived fewer barriers to help seeking than did the non-TRiM group (Watson & Andrews, 2018).

Greenberg et al, in 2010, conducted a cluster randomized controlled trial to determine the efficacy of TRiM compared to standard care in a British military population. TRiM practitioners are volunteer nonmedical personnel provided with a basic understanding of trauma psychology and training in psychological risk assessment. Capitalizing on social cohesion available within military units is the aim of TRiM. In relation to traumatic stress, the TRiM practitioners are trained to advise commanders about best practice guidelines and carry out structured risk assessments to identify those individuals exposed to events who may benefit from additional support. Military personnel are encouraged to speak to TRiM practitioners about stressful events, and the practitioners are available within units whether there is a critical incident or not (Greenberg et al., 2010). Basic psychoeducational briefings and appropriate feedback and support are provided after traumatic events, with traumatic risk assessment interviews completed after 72 hours and one month to assess the coping of individuals in line with National Institute of Clinical Excellence (NICE) guidelines on PTSD management {Frappell-Cooke, 2010 #48}. After a follow-up of 12-18 months, no significant change in psychological health or stigma was found in either group, however organizational and occupational functioning was modestly better in the TRiM group. One limitation to these results would be that due study vessels were only exposed to a modest number of non-serious traumatic incidents during the study period, resulting in infrequent use of TRiM during the study period. Importantly however, this study did not find evidence that the TRiM program was harmful, in contrast to studies on debriefing (Greenberg et al., 2010).

Another study by Frappell-Cooke et al, in 2010, evaluated the effects of TRiM within two groups of the UK Royal Marines personnel: one group in the initial stages of using TRiM (TRiM-naive

group), and another group which had already incorporated TRiM into their organizational culture (TRiM-experienced group). The study found that the TRiM-experienced group reported lower levels of psychological distress than the TRiM-naive group both pre- and post-deployment. The study also found reduced levels of anxiety in both groups within the first week post-deployment, compared with pre-deployment. Personnel from both groups who reported significant levels of distress were less likely to perceive effective social support from their colleagues. The study concluded that enhancing social support, through the use of TRiM or otherwise, is likely to be beneficial for personnel who work in high-threat environments. (Frappell-Cooke, Gulina, Green, Hacker Hughes, & Greenberg, 2010).

Finally, a study by Jones et al, in 2017, compared help seeking for mental health problems among combat-exposed U.K. military personnel between TRiM recipients and an unexposed group. The study found that TRiM recipients were significantly more likely to seek help from formal mental health services than the non-TRiM group. As well, TRiM recipients were significantly more likely to report possible PTSD at baseline (however not at follow-up) compared to the non-TRiM group. Limitations of this study include the observational nature of the data, making it difficult to confidently attribute mental health and help-seeking effects to the TRiM intervention alone (Jones, Burdett, Green, & Greenberg, 2017).

In summary, social and peer support is likely to benefit first responders and military personnel in terms of their levels of psychological distress and psychological health. In police officers, the program in turn appears to reduce sickness absences. TRiM also appears to improve PTSD symptoms as well as reducing the stigma towards help-seeking behaviours among both first responders and military personnel. The REACT program also appears to be a promising approach towards mitigating stress levels.

Stress Management

As described earlier in this scoping review, building resilience is an important factor in the primary prevention of mental health and PTISI among paramedics and first responders, however, the role of resiliency training for stress management in these occupations is also important. The peer-support programs such as TRiM {(Hunt et al., 2013), (Watson & Andrews, 2018), (Greenberg et al., 2010), (Frappell-Cooke et al., 2010), (Jones et al., 2017), (Jones et al., 2017)} and REACT (Marks et al., 2017) described above also serve as a form of acute stress management.

Management of PTISI and other Mental Health Conditions

There was a dearth of evidence focusing on the workplace management of PTISI and other mental health conditions among first responders. However, some articles touched upon these topics.

Work Accommodation

Specific evidence on work accommodations for paramedics and first responders was limited in our literature search.

Stay at work

Two articles touched upon helping first responders stay at work and reducing sickness absences. Hunt et al, 2013, found that engagement in the TRiM process was associated with a reduction in sickness absence especially in more junior ranks of police officers (Hunt et al., 2013). Milligan-Saville et al, 2017, found that the RESPECT mental health training significantly reduced rates of work-related sick leave among workers in a fire and rescue department and reduced the odds of workers taking standard sick leave. It was shown that after the training, the increased managers' confidence and a greater likelihood of communicating with workers about the risk of sickness absence might have contributed as mediators (Milligan-Saville et al., 2017).

Medical/Stress Leave

Evidence-based studies on the management of medical and stress leave within paramedic and first responder organizations was limited in this literature search for this scoping review. However, work-related sickness absences were significantly reduced among workers in a fire and rescue department with the RESPECT manager mental health training (Milligan-Saville et al., 2017).

Return to Work

Regarding return to work within a large fire and rescue service, Milligan-Saville et al, 2017, evaluated the RESPECT Manager Training Program. The RESPECT principles when contacting a worker who might be suffering from mental health problems are: Regular contact is essential; the Earlier the better; Supportive and empathetic communication; Practical help, not psychotherapy; Encourage help-seeking; Consider return to work options; Tell them the door is always open and arrange next contact. The study found an association of a faster time to full return to work with early and frequent contact from managers once a worker has begun an episode of sickness absence. These findings suggest that a brief mental health training for managers of fire and rescue services can potentially favour both the workplace and the worker (Milligan-Saville et al., 2017).

Suicide Prevention

Suicide prevention for emergency and protective services, as well as police officers, was also addressed in two studies.

As described in the section on Medical Professionals of this scoping review, a systematic review by Witt et al, 2017, on the effectiveness of suicide prevention programs for emergency and protective services workers, noted that active employment is a protective factor against suicide however the majority of working age people who die by suicide are employed at the time of death. Working conditions may contribute to suicide risk in the employed adult population. They found that there were a number of gatekeeper programs that provided information on how to actively link persons experiencing a mental health crisis, including those who are suicidal, with professional mental health services. One of these programs adopted a face-to-face training style in the Ukraine, to identify those at risk of suicide and ensure these individuals are linked to professional mental health services, and two years following implementation, the authors of the study concluded the program was associated with a significant reduction in suicide rates. However, they also suggested that perhaps greater focus on the relatively neglected area of workplace primary prevention could further improve suicide prevention effectiveness. Workplace suicide prevention programs for emergency services personnel warrant further evaluation, however these programs should integrate activities at the primary prevention level (Witt et al., 2017).

Mishara et al, in 2012, hypothesized that a sustained prevention program that provided education on suicide prevention and support for all members of a police department may significantly decrease suicides by police officers. The program, called Together for Life, ultimately aimed to prevent suicides among members of the Montreal Police Force. However, the program's short-term goals were to help officers to deal with suicide, develop mutual support and solidarity among members of the Force in suicide prevention, and provide help for related problems and develop competencies in using existing resources. The program involved four components: 1) Training for all units, 2) Police resources, 3) Training of supervisors and union representatives, 4) Publicity campaign "Together for Life" (Mishara & Martin, 2012). The study found a 79% decrease of the suicide rate in the 12 years since the program began, and suggested that this decrease could be related to the program, since suicide rates for comparable population did not decrease and there were no major changes in functioning, training or recruitment to explain the differences.

From these articles, it is suggested that workplace prevention programs of suicide are important to implement within emergency service and first responder organizations, if possible, with a greater focus at the primary prevention level.

Discussion and Conclusions

Summary

This scoping review included a literature search and evidence synthesis of relevant peer-reviewed articles in four databases, including a full review of the yield in Medline, and a review of a sample of 740 studies in EMBASE, PsycINFO, and EBSCO.

Several key themes emerged from the scoping review regarding prevention, early intervention, and management roles in first responder organizations, and were supplemented by evidence-based findings within military and veteran organizations. There were a number of studies focusing on manager confidence within ambulance service organizations to build mentally healthy workplaces. Manager mental health training and manager confidence was suggested to reduce rates of sickness absences. Improving organizational culture and reducing stigma can lower the barriers to help-seeking. Building resilience was suggested to be an important factor to the primary prevention of PTSI and other mental health conditions. The role of peer-support programs in early detection and intervention of PTSI and mental health symptomology also emerged as an important theme. Early and frequent contact from managers once a worker has begun an episode of sickness absence was found to be associated with reduced sickness absences and faster time to full return to work. A number of the programs and practices evaluated in the studies have been suggested to be applicable to other first responder organizations such as paramedic services organizations. There are caveats to utilizing some of these studies to inform guidelines and best practices due to sometimes weak evidence and limitations of the internal and external validity of the studies. These evidence-based findings are invaluable for informing best practice guidance for the prevention and management of PTSI and other mental health conditions in paramedic service organizations. The findings also suggest that there is a need for more evidence-based research on the management of PTSI within paramedic organizations.

Management Roles

The role of management was discussed in several studies. Successful implementation of early intervention programs such as TRiM should be well-supported by junior, mid-level, and senior management. Improving managers' confidence was a theme that emerged in studies on manager confidence within ambulance service organizations in Australia, particularly with the four-hour RESPECT manager mental health training in comparison to the online Head Coach training program, as the online training tended to have lower retention rates and therefore a reduced relative effect with this form of training delivery. There was also evidence that pointed towards the association between the RESPECT manager mental health training, increased manager confidence, and faster time to full return to work, in particular with early and frequent contact from managers once a worker has begun an episode of sickness absence.

Access to Health Services

This scoping review revealed that there is a lack of evidence-based studies on the access to health services within paramedic and first responder organizations. However, a systematic review on the effectiveness of suicide prevention programs for emergency and protective services workers suggested that having gatekeeper training to identify those at risk of suicide to ensure these persons can be linked with professional mental health services was associated with a significant reduction in suicide rates two years after implementation.

EAP was not evaluated directly within first responder organizations, however, one randomized controlled trial evaluating the RESPECT manager mental health training intervention, offered the control group the standard employee assistance program manager support, and found that the RESPECT manager training led to a significant reduction in sickness absence compared to the control group, suggesting that face-to-face manager training may be the better method to support managers dealing with management issues such as the sickness absence of workers.

Prevention

Improving organizational culture and reducing stigma in order to lower the barriers to help-seeking was addressed by one study investigating the effect of the TRiM Program on stigma and barriers to help-seeking amongst police. The study suggested that TRiM may be an appropriate intervention for decreasing public-stigma and perceived risks of seeking help for psychological difficulties.

Mounting evidence from numerous studies suggested that building resilience was key to the primary prevention of PTSTI and other mental health conditions. Strengthening a sense of coherence, particularly manageability conviction, among rescue workers in emergency medical services appeared to be a specific potential resilience factor against developing clinically relevant mental or physical symptoms. Several resilience training programs were evaluated to help organizations modify protective factors such as resilience against mental health symptomology. The RAW program was one program found to potentially help an organization proactively protect their workers' psychological wellbeing. Self-regulation and resilience building programs such as the SRTS delivered via iPad, was also found to improve four main measures associated with mental health including emotional stress and emotional vitality. Self-regulation, self-management of stress coping strategies such as relaxation and distancing techniques were a recurring theme in the studies on building resilience, and in some cases, lower levels of PTSD symptom scores. Among military medical personnel, a technology-based adaptive learning and prevention program for stress response called CHARLY, was found to have a smaller increase in PTSD-specific symptoms for the CHARLY group compared to personal prevention led by a psychologist of the same duration, although not always at traditional statistical levels. Not all resilience training programs covered in this review were found to be effective in the prevention of mental health issues among first responders (e.g., MAPS training), however the evidence of

most of these studies point to the importance of building resilience as a strategy for the primary prevention of PTSTI.

Early Detection and Intervention

The evidence for peer-support programs as a form of early detection and intervention is increasing. Several studies evaluated the TRiM program, particularly among military personnel, where volunteer nonmedical personnel were provided with basic trauma psychology and training in psychological risk assessment. In some of these studies, lower levels of PTSTI symptoms were observed, suggesting that this program may be useful for early detection of psychological risk and offering early supportive interventions. The REACT program, a 6-hour session using classroom and small-group breakout sessions, was also found to be effective in terms of increased knowledge related to participants' ability to identify stress injuries, initiate and maintain conversations, motivate peers to follow through with help-seeking behaviour, and provide acute stress management, and was maintained over a 3-month follow-up period. These studies indicate the promising approach of social and peer support in reducing levels of distress, improving PTSTI symptoms, as well as reducing stigma and improving help-seeking behaviours, among first responder and military populations.

Disability Management

Several studies found that the management of PTSTI and other mental health conditions can be improved through management training. Specifically, reducing sickness absences and a full return to work rates can be improved by increased managers' confidence and promoting more communication with worker. The RESPECT Manager Training Program for managers within first responder organizations was associated with reduced rates of sickness absences and faster time to full return to work, specifically when there was early and frequent contact from managers once the sickness absence occurred if managers followed the RESPECT principles. The principles are: Regular contact is essential; the Earlier the better; Supportive and empathetic communication; Practical help, not psychotherapy; Encourage help-seeking; Consider return to work options; Tell them the door is always open and arrange next contact.

Some studies also addressed the effectiveness of suicide prevention programs, and emphasized the importance of workplace prevention of suicide. One systematic review suggested there should be a greater focus on integrating activities at the prevention level. The review also found that implementing gatekeeper programs among emergency and protective services workers that helped train individuals identify those at risk of suicide and ensure these persons are linked to professional mental health services was associated with a significant reduction in suicide rates. Another study aimed to prevent suicides among police officers via a program called Together for Life, by developing mutual support and solidarity among members of the police force, providing help and developing competencies in using existing resources. In this study, a decrease in suicide rates was observed over 12 years, suggesting the decrease could be explained by the program.

Therefore, suicide prevention programs are important to implement within paramedic service organizations.

Conclusions

In this scoping review we synthesized evidence-based findings on the prevention and management of PTSI and other mental health conditions within first responder organizations and military personnel, with a special focus on paramedic service organizations. The evidence identified in the scoping review, triangulated with evidence from an environmental scan which synthesized existing guidelines, and preferred practices identified through key informant interviews, will inform the development of the new Canadian Work Disability Prevention Standards for Paramedic Organizations with a focus on PTSI and other mental health conditions.

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Appendix I: Must have articles abstracts

1. Arnetz, B. B., Arble, E., Backman, L., Lynch, & A., Lublin, A. (2013). Assessment of a prevention program for work-related stress among urban police officers. *Int Arch Occup Environ Health*, 86:79–88. doi 10.1007/s00420-012-0748-6.

Abstract

Objective To determine the efficacy of a primary prevention program designed to improve psychobiological responses to stress among urban police officers.

Methods A random sample of 37 police cadets received complementary training in psychological and technical techniques to reduce anxiety and enhance performance when facing a series of police critical incidents. Training was done by Special Forces officers, trained by the authors in imaging. A random sample of 38 cadets, receiving training as usual, was followed in parallel. Assessment of somatic and psychological health, and stress biomarkers, was done at baseline, immediately following training, and after 18 months as regular police officers. Comparison was done using two-way repeated analysis of variance (ANOVA) and logistic regression.

Results The intervention group improved their general health and problem-based coping as compared to the control group. They also demonstrated lower levels of stomach problems, sleep difficulties, and exhaustion. Training was associated with an OR of 4.1 (95% CI, 1.3–13.7; $p < 0.05$) for improved GHQ scores during the study as compared to no changes or worsening score.

2. Greenberg, N., Langston, V., Everitt, B., Iversen, A., Fear, N. T., Jones, N., & Wessely, S. (2010). A cluster randomized controlled trial to determine the efficacy of Trauma Risk Management (TRiM) in a military population. *J Trauma Stress*, 23(4), 430-436. doi:10.1002/jts.20538

Abstract

Trauma Risk Management is a peer-support program that aims to promote help-seeking in the aftermath of traumatic events. Prior to its implementation, the British military conducted a randomized controlled trial of Trauma Risk Management against standard care in 12 warships; 6 were randomized to use Trauma Risk Management after collecting baseline measurements. Follow up after 12–18 months found no significant change in psychological health or stigma scores in either group; however, the studied vessels only encountered low numbers of critical incidents. Additionally, measurements of organizational functioning were modestly better in the Trauma Risk Management ships. The authors conclude that within organizations using Trauma Risk Management may be beneficial and may, in time, lead to a valuable cultural shift.

3. **Hunt, E., Jones, N., Hastings, V., & Greenberg, N. (2013). TRiM: an organizational response to traumatic events in Cumbria Constabulary. *Occup Med (Lond)*, 63(8), 549-555. doi:10.1093/occmed/kqt113**

Abstract

Background A major incident involving multiple fatalities occurred in Cumbria, England on 2 June 2010. The Cumbrian Constabulary deployed an organizational peer support response for personnel involved known as trauma risk management (TRiM).

Aims To examine data routinely gathered during the TRiM process to evaluate the relationship of the intervention to sickness absence.

Methods Using incident databases, details were gathered regarding exposure to the murders and type of TRiM intervention, including an assessment of the psychological risk to the individual of developing a trauma-related mental health problem.

Sociodemographic information was collated by the occupational health department. Cumulative sickness absence data in the 2 months following the murders were used as a proxy for mental health status.

Results A total of 717 police officers and civilian support staff were identified. High levels of traumatic exposure were associated with subsequent receipt of a TRiM intervention. The majority of psychological risk indices reduced between the initial and subsequent evaluation. Greater traumatic exposure was associated with longer sickness absence lengths. Engagement in the TRiM process was associated with a reduction in sickness absence especially in more junior ranks.

Conclusions In this study, we found that TRiM deployed within a police force responding to a major event offered a way of structuring a response for those involved. Our data suggest that TRiM may offer a way of assessing psychological risk so that officers can be offered early supportive interventions. Our data suggest that TRiM may help to ameliorate some of the negative effects of high trauma exposure.

4. **Joyce, S., Shand, F., Lal, T. J., Mott, B., Bryant, R. A., & Harvey, S. B. (2019). Resilience@Work Mindfulness Program: Results From a Cluster Randomized Controlled Trial With First Responders. *J Med Internet Res*, 21(2), e12894. doi:10.2196/12894**

Abstract

Background A growing body of research suggests that resilience training can play a pivotal role in creating mentally healthy workplaces, particularly with regard to protecting the long-term well-being of workers. Emerging research describes positive outcomes from various types of resilience training programs (RTPs) among different occupational groups. One specific group of workers that may benefit from this form of proactive resilience training is first responders. Given the nature of their work, first responders are frequently exposed to stressful circumstances and potentially traumatic events, which may impact their overall resilience and well-being over time.

Objective: This study aimed to examine whether a mindfulness-based RTP (the Resilience@Work [RAW] Mindfulness Program) delivered via the internet can effectively enhance resilience among a group of high-risk workers.

Methods We conducted a cluster randomized controlled trial (RCT) comprising 24 Primary Fire and Rescue and Hazmat stations within New South Wales. Overall, 12 stations were assigned to the 6-session RAW Mindfulness Program and 12 stations were assigned to the control condition. A total of 143 active full-time firefighters enrolled in the study. Questionnaires were administered at baseline, immediately post training, and at 6-month follow-up. Measurements examined change in both adaptive and bounce-back resilience as well as several secondary outcomes examining resilience resources and acceptance and mindfulness skills.

Results Mixed-model repeated measures analysis found that the overall test of group-by-time interaction was significant ($P=.008$), with the intervention group increasing in adaptive resilience over time. However, no significant differences were found between the intervention group and the control group in terms of change in bounce-back resilience ($P=.09$). At 6-month follow-up, the group receiving the RAW intervention had an average increase in their resilience score of 1.3, equating to a moderate-to-large effect size compared with the control group of 0.73 (95% CI 0.38-1.06). Per-protocol analysis found that compared with the control group, the greatest improvements in adaptive resilience were observed among those who completed most of the RAW program, that is, 5 to 6 sessions ($P=.002$).

Conclusions The results of this RCT suggest that mindfulness-based resilience training delivered in an internet format can create improvements in adaptive resilience and related resources among high-risk workers, such as first responders. Despite a number of limitations, the results of this study suggest that the RAW Mindfulness Program is an effective, scalable, and practical means of delivering online resilience training in high-risk workplace settings. To the best of our knowledge, this is the first time a mindfulness-based RTP delivered entirely via the internet has been tested in the workplace.

5. Milligan-Saville, J. S., Tan, L., Gayed, A., Barnes, C., Madan, I., Dobson, M., . . . Harvey, S. B. (2017). Workplace mental health training for managers and its effect on sick leave in employees: a cluster randomised controlled trial. *The Lancet Psychiatry*, 4(11), 850-858. doi:10.1016/s2215-0366(17)30372-3

Abstract

Background Mental illness is one of the most rapidly increasing causes of long-term sickness absence, despite improved rates of detection and development of more effective interventions. However, mental health training for managers might help improve occupational outcomes for people with mental health problems. We aimed to investigate the effect of mental health training on managers' knowledge, attitudes, confidence, and behaviour towards employees with mental health problems, and its effect on employee sickness absence.

Methods We did a cluster randomized controlled trial of manager mental health training within a large Australian fire and rescue service, with a 6-month follow-up. Managers (clusters) at the level of duty commander or equivalent were randomly assigned (1:1) using an online random sequence generator to either a 4-h face-to-face RESPECT mental

health training programme or a deferred training control group. Researchers, managers, and employees were not masked to the outcome of randomisation. Firefighters and station officers supervised by each manager were included in the study via their anonymised sickness absence records. The primary outcome measure was change in sickness absence among those supervised by each of the managers. We analysed rates of work-related sick leave and standard sick leave separately, with rate being defined as sickness absence hours divided by the sum of hours of sickness absence and hours of attendance. This trial was registered with the Australian New Zealand Clinical Trials Registry.

Findings 128 managers were recruited between Feb 18, 2014, and May 17, 2014. 46 (71%) of 65 managers allocated to the intervention group received the intervention, and 42 (67%) of 63 managers allocated to the control group were entered in the deferred training group. Managers and their employees were followed up and reassessed at 6 months after randomisation. 25 managers (1233 employees) in the intervention group and 19 managers (733 employees) in the control group provided data for the primary analysis. During the 6-month follow-up, the mean rate of work-related sick leave decreased by 0.28 percentage points (pp) from a pre-training mean of 1.56% (SE 0.23) in the intervention group and increased by 0.28 pp from 0.95% (0.20) in the control group ($p=0.049$), corresponding to a reduction of 6.45 h per employee per 6 months. The mean percentage of standard sick leave increased by 0.48 pp from 4.97% (0.22) in the intervention group and by 0.31 pp from 5.27% (0.21) in the control group ($p=0.169$).

Interpretation A 4-h manager mental health training programme could lead to a significant reduction in work-related sickness absence, with an associated return on investment of £9.98 for each pound spent on such training. Further research is needed to confirm these findings and test their applicability in other work settings.

6. **Mishara, B. L., & Martin, N. (2012). Effects of a comprehensive police suicide prevention program. *Crisis*, 33(3), 162-168. doi:10.1027/0227-5910/a000125**

Abstract

Background Police suicides are an important problem, and many police forces have high rates. Montreal police suicide rates were slightly higher than other Quebec police rates in the 11 years before the program began (30.5/100,000 per year vs. 26.0/100,000).

Aims: To evaluate Together for Life, a suicide prevention program for the Montreal police. **Methods:** All 4,178 members of the Montreal police participated. The program involved training for all officers, supervisors, and union representatives as well as establishing a volunteer helpline and a publicity campaign. Outcome measures included suicide rates, pre-post assessments of learning, focus groups, interviews, and follow-up of supervisors.

Results In the 12 years since the program began the suicide rate decreased by 79% (6.4/100,000), while other Quebec police rates had a nonsignificant (11%) increase (29.0/100,000). Also, knowledge increased, supervisors engaged in effective interventions, and the activities were highly appreciated.

Limitations Possibly some unidentified factors unrelated to the program could have influenced the observed changes.

Conclusions The decrease in suicides appears to be related to this program since suicide rates for comparable populations did not decrease and there were no major changes in functioning, training, or recruitment to explain the differences. Comprehensive suicide prevention programs tailored to the work environment may significantly impact suicide rates.

7. Skeffington, P. M., Rees, C. S., Mazzucchelli, T. G., & Kane, R. T. (2016). The Primary Prevention of PTSD in Firefighters: Preliminary Results of an RCT with 12-Month Follow-Up. *PLoS One*, *11*(7), e0155873. doi:10.1371/journal.pone.0155873

Abstract

Aim To develop and evaluate an evidence-based and theory driven program for the primary prevention of Post-traumatic Stress Disorder (PTSD).

Design A pre-intervention / post-intervention / follow up control group design with clustered random allocation of participants to groups was used. The “control” group received “Training as Usual” (TAU).

Method Participants were 45 career recruits within the recruit school at the Department of Fire and Emergency Services (DFES) in Western Australia. The intervention group received a fourhour resilience training intervention (Mental Agility and Psychological Strength training) as part of their recruit training school curriculum. Data was collected at baseline and at 6- and 12-months post intervention.

Results We found no evidence that the intervention was effective in the primary prevention of mental health issues, nor did we find any significant impact of MAPS training on social support or coping strategies. A significant difference across conditions in trauma knowledge is indicative of some impact of the MAPS program.

Conclusion While the key hypotheses were not supported, this study is the first randomized control trial investigating the primary prevention of PTSD. Practical barriers around the implementation of this program, including constraints within the recruit school, may inform the design and implementation of similar programs in the future.

8. Watson, L., & Andrews, L. (2018). The effect of a Trauma Risk Management (TRiM) program on stigma and barriers to help-seeking in the police. *International Journal of Stress Management*, *25*(4), 348-356. doi:10.1037/str0000071

Abstract

Police personnel exposed to potentially traumatic events as part of their operational duty may develop psychological problems. A number of UK Police Forces have made use of Trauma Risk Management (TRiM) in response. TRiM is a peer-support process that aims to support employees following trauma, reduce stigma, and encourage help-seeking. Research within military populations has provided preliminary support for the beneficial effects, and importantly no detrimental effects of using TRiM. However, to date there are only a small number of studies that have conducted research into the use of TRiM with

police populations. A cross-sectional online questionnaire study compared personnel from 3 forces using TRiM (TRiM group, n 693) with personnel from 2 forces without TRiM (non-TRiM group, n 166). The questionnaire included measures of posttraumatic stress disorder (PTSD) symptomatology, barriers to help-seeking, self-stigma, and public-stigma. The TRiM group reported lower levels of PTSD symptoms, demonstrated less stigmatized views toward experiencing mental health difficulties, and perceived fewer barriers to help-seeking than did the non-TRiM group. Implications and future directions are discussed.

Appendix II: Count of citations identified in each database

| Database | Search Yield |
|---------------------------------|---------------------|
| Medline (Ovid) | 4,464 |
| Embase (Ovid) | 4,942 |
| PsycINFO (Ovid) | 1,797 |
| Business Source Premier (EBSCO) | 1,212 |
| Sub-total | 12,415 |
| Duplicates removed | 2,549 |
| Total | 9,866 |

Appendix III: Profile of the 40 included articles

| # | Reference | Country | Study type | Population | Group(s) and theme(s) | Program/policy under investigation | Health condition(s) examined | Funding of the study |
|---|-----------------------------------|-----------|---|---|--|--|--|---|
| 1 | Adler et al., 2014 | US | Quantitative/Experimental/Randomized design | Military | Primary prevention/Building Resilience | Resilience Training | Anxiety, group cohesion, confidence in helping others | Not identified |
| 2 | Arnetz et al., 2013 [must-have] | Sweden | Quantitative/Experimental/Randomized design | First responders/Police | Primary prevention/Building Resilience | Primary prevention program designed to improve psychobiological responses to stress among urban police officers | Somatic symptoms (gastric pain and symptoms and heart complaints), coping (active planning and stepwise concentration), mental well-being, sleep quality, exhaustion, blood hormone sampling | Swedish Work Environment Fund (currently, Swedish Council for Working Life and Social Research) |
| 3 | Behnke et al., 2019 | Germany | Observational/Cross-Sectional | First responders/Rescue workers | Primary prevention/Building Resilience | Exploring importance of higher sense of coherence for mental and physical health | PTSD, depression, and somatic symptoms (sleep disturbances and physical impairment such as stomach aches and back pain) | German Red Cross (Deutsches Rotes Kreuz) rescue service Heidenheim-Ulm gGmbH |
| 4 | Bryan et al., 2018 | Australia | Observational/Cross-Sectional | First responders/Fire and rescue services | Roles and responsibilities/Management training | N/A. Study goal was to test whether knowledge, attitudes and confidence are associated with managers' behavioural responses to mental health issues among their staff. | Managers' behavioural responses to mental health issues among their staff | beyondblue with donations from the Movember Foundation |
| 5 | Crabtree-Nelson and DeYoung, 2017 | US | Literature review | Military | Primary prevention/Building Resilience | Multiple resilience training programs | PTSD symptoms | Not identified |
| 6 | Frappell-Cooke et al., 2010 | UK | Quantitative/Experimental/Non-randomized design | Military | Early detection and intervention/Peer support | Trauma Risk Management (TRiM) | Psychological distress, PTSD symptoms, deployment stress and perceived support | Ministry of Defense |

| # | Reference | Country | Study type | Population | Group(s) and theme(s) | Program/policy under investigation | Health condition(s) examined | Funding of the study |
|----|------------------------------------|-----------|---|---|--|---|---|---|
| 7 | Gayed, Bryan et al., 2019 | Australia | Quantitative/Experimental/Randomized design | First responders/Ambulance services | Roles and responsibilities/Management training | HeadCoach | Managers' confidence in supporting employee mental health issues | beyondblue with donations from the Movember Foundation |
| 8 | Gayed, Tan et al., 2019 | Australia | Observational/Before-after design | First responders/Fire and rescue services, and ambulance services | Roles and responsibilities/Management training | RESPECT Manager Training, and HeadCoach | Managers' confidence in supporting employee mental health issues | NSW Health and Employers Mutual Ltd., beyondblue with donations from the Movember Foundation, icare Foundation. |
| 9 | Gayed., Bryan et al., 2018 | Australia | Quantitative/Experimental/Randomized design | First responders/Ambulance services | Roles and responsibilities/Management training | HeadCoach | Managers' confidence in supporting employee mental health issues | beyondblue with donations from the Movember Foundation |
| 10 | Greenberg et al., 2010 [must-have] | UK | Quantitative/Experimental/Randomized design | Military | Early detection and intervention/Peer support | Trauma Risk Management (TRiM) | Psychological health, stigma | Ministry of Defense |
| 11 | Greenberg et al., 2011 | UK | Qualitative | Military | Roles and responsibilities/Senior management roles | Trauma Risk Management (TRiM) | Acceptability of the program for staff, and views on the program as complementing or replacing pre-existing personnel support systems | Ministry of Defense |
| 12 | Griffith and West., 2013 | US | Observational study/Cross-sectional design | Military | Primary prevention/Building Resilience | US Army Master Resilience Training | Resilience competencies (self-awareness and strength of character); stress buffering effects of resilience | Not identified |
| 13 | Hunt et al., 2013 [must-have] | UK | Observational/Before-after design | First responders/Police | Early detection and intervention/peer support | Trauma Risk Management (TRiM) | Sickness absence | Not identified |
| 14 | Jones et al., 2017 | UK | Observational/Before-after design | Military | Early detection and intervention/Peer support | Trauma Risk Management (TRiM) | Help seeking from mental health services | Ministry of Defense |

| # | Reference | Country | Study type | Population | Group(s) and theme(s) | Program/policy under investigation | Health condition(s) examined | Funding of the study |
|----|--------------------------------|-----------|---|---|---|--|---|--|
| 15 | Joyce et al., 2018 | Australia | Observational/Before-after design | First responders/Firefighters | Primary prevention/Building Resilience | Resilience@Work Mindfulness Program | Adaptive and bounce-back resilience; secondary outcomes included acceptance and mindfulness skills and resilience resources (optimism, coping and a sense of purpose) | Australian Government Research Training Program Scholarship, the University New South Wales Brain Sciences PhD Grant in aid, NSW Health and the icare foundation |
| 16 | Joyce et al., 2019 [must-have] | Australia | Quantitative/Experimental/Randomized design | First responders/Firefighters | Primary prevention/Building Resilience | Resilience@Work Mindfulness Program | Adaptive and bounce-back resilience; secondary outcomes included acceptance and mindfulness skills and resilience resources (optimism, coping and a sense of purpose) | Australian Government Research Training Program Scholarship, the University New South Wales Brain Sciences PhD Grant in aid, NSW Health and the icare foundation |
| 17 | Marks et al., 2017 | US | Observational/Before-after design | First responders/Fire departments and emergency communication centres | Early detection and intervention/Peer support | Peer support training program REACT (Recognize, Evaluate, Advocate, Coordinate, and Track) | Knowledge and training-related self-efficacy (primary); general self-efficacy, resilience, and improved attitudes and expectations (secondary) | Not identified |
| 18 | McCarty and Atkinson., 2012 | US | Quantitative/Experimental/Randomized design | First responders/Police | Primary prevention/Building Resilience | Coherence Advantage Stress Resilience and Performance Enhancement Program | Vitality, emotional well-being, stress coping and interpersonal skills, work performance, workplace effectiveness and climate, family relationships, and physiological recalibration following acute stressors. | Not identified |

| # | Reference | Country | Study type | Population | Group(s) and theme(s) | Program/policy under investigation | Health condition(s) examined | Funding of the study |
|----|---|-----------|---|---|--|--|--|---|
| 19 | Milligan-Saville et al., 2017 [must-have] | Australia | Quantitative/Experimental/Randomized design | First responders/Fire and rescue services | Roles and responsibilities/Management training | RESPECT Manager Training | Sickness absence | NSW Health and Employers Mutual Ltd |
| 20 | Mishara and Martin, 2012 [must-have] | Canada | Observational/Before-after design | First responders/Police | Management of PTSD and other mental health conditions/Suicide prevention | Together for Life, suicide prevention program | Suicide rate | Not identified |
| 21 | Pyne et al., 2019 | US | Quantitative/Experimental/Randomized design | Military | Primary prevention/Building Resilience | Resilience interventions - pre-deployment heart rate variability biofeedback and cognitive bias modification for interpretation training | PTSD symptom severity | Research grants from the Department of Defense, VA South Central Mental Illness Research, Education, and Clinical Center (MIRECC); and National Institute of Health |
| 22 | Ramey et al., 2016 | US | Quantitative/Experimental/Non-Randomized design | First responders/Police | Primary prevention/Building Resilience | Resilience training intervention | Emotional and physical responses to stress | Data were collected in two separate pilot studies funded by different agencies: Pilot A, funded by the National Institute of Occupational Safety and Health and Pilot B, funded by the US Department of Justice |
| 23 | Ramey, et al. 2017 | US | Quantitative/Experimental/Randomized design | First responders/Police | Primary prevention/Building Resilience | Resilience training | Stress, resilience, and coherence | Office of Community Oriented Policing Services, U.S. Department of Justice |

| # | Reference | Country | Study type | Population | Group(s) and theme(s) | Program/policy under investigation | Health condition(s) examined | Funding of the study |
|----|--------------------------------------|--------------------------------|---|--|---|---|---|--|
| 24 | Skeffington et al., 2016 [must-have] | Australia | Quantitative/Experimental/Randomized design | First responders/Firefighters | Primary prevention/Building Resilience | Mental Agility and Psychological Strength (MAPS) training | PTSD, other mental health symptoms, perceived social support, coping strategies | The authors received no specific funding for this work. |
| 25 | Van Thielen et al., 2018 | Belgium | Observational/Cross-Sectional | First responders/Police | Roles and responsibilities/Management training | Employee performance management system | Job satisfaction, strain, employee performance management system satisfaction | This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. |
| 26 | Watson and Andrews, 2018 [must-have] | UK | Observational/Cross-Sectional | First responders/Police | Primary prevention/Culture and stigma | Trauma Risk Management (TRiM) | PTSD symptomatology, barriers to help-seeking, self-stigma, and public-stigma. | Not identified |
| 27 | Weltman et al., 2014 | US | Observational/Case study | First responders/Police | Primary prevention/Building Resilience | Stress Resilience Training System (SRTS), self-regulation and resilience building program | Emotional vitality, organizational stress, emotional stress, physical stress | Defense Advanced Research Projects Agency (DARPA) through Small Business Innovation Research (SBIR) |
| 28 | Witt et al., 2017 | Multiple, most studies from US | Literature review | Military and First responders/Police and Fire fighters | Management of PTSTI and other mental health conditions/Suicide prevention | Multiple suicide prevention programs | Suicide rate | No specific sources of funding were received for this project. |
| 29 | Cacioppo | US | Quantitative/Experimental/Randomized design | Military | Primary prevention/Building Resilience | Resilience training | Social cognition (e.g. empathy, perspective taking, and military hardiness), loneliness | Department of the Army Award |
| 30 | De Visser et al., 2016 | US | Observational/Before-after design | Military | Primary prevention/Building Resilience | Stress Resilience Training System (SRTS) | Self-reported stress, self-reported depression, post-deployment PTSD symptoms, Heart Rate Variability Coherence | Defense Advanced Research Projects Agency (DARPA) through Small Business Innovation Research (SBIR) |

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|----|--------------------------------|-----------|---|--|---|--|--|---|
| 31 | Gayed, LaMontagne et al., 2018 | Australia | Observational/Before-after design | First responders/Fire and rescue service | Roles and responsibilities/Management training | HeadCoach | Managers' confidence in supporting employee mental health issues; managers' knowledge regarding their role in managing mental health issues; managers' self-reported actions to use strategies to prevent and decrease stress among their team members | beyondblue with donations from the Movember Foundation; additional funding by the icare foundation and the Mental Health Branch of NSW Health |
| 32 | Hourani et al., 2011 | US and UK | Literature review | Military | Early detection and intervention | Primary prevention efforts to stem the advent of PTSD and other combat and operational stress injuries | Multiple, including overall health status, depression, PTSD, risk behaviors, etc. | Department of Defense |
| 33 | Luxton et al., 2012 | US | Observational study/Cross-sectional design | Military | Management of PTSI and other mental health conditions/Suicide prevention | The Caring Letters Project (CLP) | Psychiatric rehospitalization, adverse events | Not identified |
| 34 | Ramchand et al., 2015 | US | Observational study/Cross-sectional design | Military | Management of PTSI and other mental health conditions /Suicide prevention | Noncommissioned officers' perspectives on identifying, caring for, and referring soldiers and marines at risk of suicide | Officers' views on the need for suicide prevention training | Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury |
| 35 | Shelef et al., 2015 | Israel | Quantitative/Experimental/Non-randomized design | Military | Management of PTSI and other mental health conditions /Suicide prevention | Emotional regulation of mental pain as a contributor to suicidal ideation in soldiers | Suicide ideation, mental pain, emotional regulation of mental pain | Not identified |
| 36 | Shelef et al., 2016 | Israel | Observational/Before-after design | Military | Management of PTSI and other mental health conditions /Suicide prevention | Israeli Defense Forces (IDF) Suicide Prevention Program | Suicide rate | Not identified |

| # | Reference | Country | Study type | Population | Group(s) and theme(s) | Program/policy under investigation | Health condition(s) examined | Funding of the study |
|----|----------------------------|-----------|---|---|--|---|--|--|
| 37 | Thompson and Dobbins, 2018 | US | Literature review | Military | Primary prevention/Building Resilience | Resilience training | Multiple key variables in the reviewed studies, including PTSD symptoms, mental health disorders, alcohol use, mental health skills, adaptation to stress, resilience measures, etc. | The author(s) received no financial support for the research, authorship, and/or publication of this article |
| 38 | Varker and Devilly, 2012 | Australia | Quantitative/Experimental/Randomized design | General population (results are relevant to emergency services personnel) | Primary prevention/Building Resilience | Inoculation/resilience training with emergency services personnel | Psychological distress, memory performance | Not identified |
| 39 | Wesemann et al., 2016 | Germany | Quantitative/Experimental/Randomized design | Military | Early detection and intervention | Chaos Driven Situations Management Retrieval System (CHARLY) | Mental state, PTSD symptoms, knowledge of and attitude toward PTSD, and deployment-specific stressors | Elektroniksystem- und Logistik-GmbH (ESG) produced the CHARLY program and thereby provided equipment |
| 40 | Whybrow et al., 2015 | UK | Literature review | Military | Primary prevention/Building Resilience | Trauma Risk Management (TRiM) | Multiple, including well-being, mental, and occupational outcomes | Not identified |