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A Scoping Review of Trauma, Mental Health and First Responders in Australia

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ABSTRACT

Exposure to traumatic and/or violent events is an inherent part of the first responder role, which increases the risk of developing acute and chronic mental health symptoms and conditions. Suicidality for Australian first responders have recently increased with prevalence considered much higher compared with the general population. To inform specific recommendations for Australian first responders, there is a need to establish what evidence is available regarding these issues within the Australian context. The aim of this scoping review was to explore the impacts of trauma on the mental health of Australian first responders, the strategies recommended to address these issues and any unique needs in rural contexts. A scoping review was undertaken following PRISMA guidelines for scoping reviews. Peer-reviewed articles on Australian first responder mental health from seven databases were screened for inclusion. This review highlights that despite available evidence on the types of traumas and adverse mental health outcomes experienced, less evidence exists pertaining to intervention effectiveness. There are major gaps in evidence within rural and remote contexts which hinders effective planning and delivery of support for rural and regional first responders. Clinicians such as mental health nurses, particularly in rural areas, need to be aware of these gaps which impact planning and delivery of support and are in prime position to ensure screening, interventions and strategies are used and evaluated to determine their suitability for rural first responders.

1 | Introduction

Exposure to traumatic and/or violent events is an inherent part of the first responder role, which can have a profound effect on the mental health of this cohort of workers (Jones, Jackson, and Usher 2024; Jones et al. 2022; Lee et al. 2022). First responders are defined as those who arrive on the scene of an emergency, accident or disaster with the goal of saving lives, protecting the community and/or protecting the environment and properties (Jones et al. 2022; Kshtriya et al. 2020). Many first responders are in paid employment, while others take time out of their lives

to perform this service in a voluntary capacity for no financial reward (Varker et al. 2018). In Australia, there are over 80 000 personnel employed and over 420 000 volunteers working in first responder roles as paramedics/ambulance personnel, firefighters, police officers and other emergency services workers such as State Emergency Services (SES) (Varker et al. 2018).

Suicidality for Australian first responders have recently increased (Varker et al. 2018) with prevalence considered much higher compared with the general population (Jones 2017; Szeto, Dobson, and Knaak 2019). Previous research has indicated that

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for first responders, attending to life and death situations is a daily reality (White 2019), and exposure to traumatic events is considered a significant part of their role (Luster 2022; Varker et al. 2018). Additionally, first responders are called to events that involve biohazardous agents or contagions, large-scale disasters and unsafe environments (Lee et al. 2022). Furthermore, attending complex, unpredictable and/or violent situations is common (Jones et al. 2022).

Trauma is defined by Griffin (2020) as, 'the presence of three factors: event, experience and effect' (279). Trauma can result from a single event or accumulation of several events (such as responding to death, disaster, experience sexual assault), the event causes a subjective response that is individual in nature and is difficult to psychologically process, and results in negative effects for the person experience the incident (such as distress, dissociation and anxiety) (Griffin 2020; Reeves 2015). Frequent exposure to such traumatic and stressful situations can result in accumulative impact putting first responders at risk of developing acute and chronic mental health symptoms and conditions (McKeon et al. 2019) such as increased anxiety and depression, post-traumatic stress disorders (PTSD), panic disorders, substance use and suicidal ideation (Harvey et al. 2016; Lee et al. 2022; Milligan-Saville et al. 2018; Szeto, Dobson, and Knaak 2019). Among first responders, prevalence rates of PTSD have been estimated at between 10% and 23.2% (Berger et al. 2012; Petrie, Milligan-Saville et al. 2018; Szeto, Dobson, and Knaak 2019), psychological distress at 27%, and both anxiety and depression at 15% (Petrie, Gayed, et al. 2018; Roberts et al. 2021; Szeto, Dobson, and Knaak 2019). The scale and severity of mental health issues within these essential workers is a significant concern given the public reliance on first responders to respond in times of great need.

The global disruptions and upheavals precipitated by the recent COVID-19 pandemic highlighted new and existing issues with how frontline professionals and first responders endure and persist in the face of adversity. Prioritising the study of the mental health issues and resilience among first responders is considered a matter of national urgency, as this is vital for improving their mental health and supporting this essential workforce (Ostrom et al. 2021; Prasad et al. 2020). In addition, healthcare professionals (including mental health nurses both in hospital and community settings) delivering mental health care to first responders need to consider health promotion and workforce well-being strategies, and delivery of services tailored to managing the negative impact of trauma on mental health for first responders.

The aim of this scoping review was to explore the evidence (original peer-reviewed research) pertaining to the impacts of trauma on the mental health of Australian first responders by identifying factors and/or key concepts of relevance within the current literature, with a particular interest in examining the available evidence in a rural context. Specifically, it aims to:

1. explore the lived psychological experience of being exposed to potentially traumatic events while undertaking their work duties by Australian first responders,

2. explore the impact of trauma on mental health for first responders in Australia,

3. evaluate strategies that have been implemented to support the mental health of first responders, and

4. evaluate the evidence pertaining to the first three aims within a rural context.

For the purpose of this review, first responders are defined as current or retired or salaried, or volunteer, police, paramedics/ambulance personnel, firefighters and SES.

2 | Method

2.1 | Design

This scoping review was conducted between June to December 2023. The scoping review protocol was guided by the JBI scoping review template (JBI n.d.), the framework outlined by Arksey and O'Malley (6 step process) (2005) and reported using the PRISMA scoping review extension (PRISMA-ScR) (Tricco et al. 2018). A scoping review allows for a rigorous method to identify, analyse, synthesise and map the literature to answer broad research questions (as used in this review), and is of particular importance when little is known about a particular subject area (Bradbury-Jones et al. 2022).

2.2 | Search Strategy

A comprehensive search strategy was developed in consultation with a health librarian, based upon an initial search for key terms within relevant literature, and the ability to meet the aims of the review and identify topic specific databases for the search. The search was pilot tested on one database (CINAHL) to ensure the efficacy of the search strategy. The scoping review question was developed using the Population (or participants), Concept, Context (PCC) framework (Population: First responders, Concept: Mental Health, Context: Australia) (Pollock et al. 2023). The search terms (see Table 1) were identified for the PCC and used to undertake a title OR abstract search in PubMed (or Medline), ProQuest Medicine and Health, CINAHL (EBSCO platform), Scopus, Informit, Psych Info (ProQuest platform) and Google Scholar. The full search terms/strings for each database can be found in Table S1.

2.3 | Search and Screening Process

The original search was limited to publications focusing on first responders in rural, remote and regional locations with a publication year of 2003–2023. However, this limited the results to minimal during the trial search, so it was decided to remove these criteria and instead include available research within both rural and urban Australian contexts where possible. Two researchers (RJ and JR) conducted the search across all sources listed using the search strategy outlined above, with articles limited to English language. The reference, title, abstract and keywords were exported into Covidence, where two reviewers screened them for inclusion in the review using the inclusion/exclusion criteria. A title and abstract screen were undertaken (RJ, CS) followed by a full-text screening (RJ, LC). If

TABLE 1 | PCC search terms.

Population—First responders	Concept—Mental health	Context— Australia
("emergency service*" OR "emergency personnel" OR "emergency worker*" OR "emergency responder*" OR "emergency medical responder*" OR "emergency medical technician*" OR EMT OR "emergency medical service*" OR EMS OR "disaster worker*" OR "disaster responder*" OR "rescue worker*" OR "emergency responder*" OR "first responder*" OR firefighter* OR "fire brigade*" OR "fire service" OR firemen OR firewomen OR ambulance OR "paramedic*" OR police OR "law enforcement" OR "marine rescue" OR "rescue service" OR "ambulance officer*")	("mental health" OR wellbeing OR well-being OR "wellbeing" OR "psycho-social health" OR "psycho social heath" OR "psychological stress" OR "work-related stress" OR "occupational stress" OR "Traumatic events")	"Australia"

the reviewers identified any conflicting ideas on which piece of evidence should be included/excluded, a third reviewer was consulted, and final decision reached through consensus.

Inclusion criteria were as follows: available in English, include Australian first responders as primary participants, present primary/original research findings published in peer-reviewed journals and present findings from real-world/lived experience following exposure to a potentially traumatic situation/event while undertaking their work duties (e.g., responding to violence, life or death situations, serious injury to first responder, natural disastersand mass incidents) and/ or Australian first responder mental health issues and/or actions to help improve mental health outcomes for Australian first responders. Exclusion criteria included discursive articles, commentaries, editorials, opinion pieces, other reviews (e.g., scoping, systematic) and papers that focused only on military personnel (while they may have similar roles when responding to disasters, a large part of their role focuses on border defence and security which may involve trauma sustained during war time and as such their experience of trauma and impacts on mental health are likely to be different) (Australian Government n.d.). In addition, the protocol exclusion criteria were refined during the title/abstract screening process to ensure only relevant literature was included in the review; papers that focus on occupational stress (e.g., bullying and manager/staff relationships) rather than impact of trauma and papers that focus on the student cohort or partners of first responders.

2.4 | Data Synthesis and Appraisal

Two reviewers (RJ and LC) extracted data from the literature using a data extraction tool (adapted from a JBI template [JBI n.d.]) to gather specific information on the citation, geographical location, methodology/design, study methods/data collection, population/sample and key themes/findings relevant to the review objectives (see Table 2). A narrative synthesis approach was undertaken to identify and describe commonalities among the key themes relevant to the review objectives. The literature was critically appraised using the Mixed Methods Appraisal Tool (MMAT) (Hong et al. 2018; Tables S1 and S2) which consisted of five questions requiring a yes or no response and notes added where no response was provided. Two

reviewers (RJ and AA) critically appraised and determined the risk of bias of the literature, with conflicts resolved by consensus (see Table S2).

3 | Results

The search returned 1078 hits across the databases and 675 000 hits on Google Scholar with a total of 1155 references uploaded to endnote and subsequently Covidence. Duplicates ($n = 604$) were removed in Covidence, 439 were excluded during title/abstract screening and a further 89 excluded at full-text screening. An additional two articles were identified through hand searching of references in identified papers. Figure 1 (PRISMA-ScR) displays the full search/screening results.

A total of 23 papers were included in the scoping review. The methodology identified included quantitative ($n = 19$), mixed methods ($n = 3$) and qualitative ($n = 1$) (See Table 2).

There was variation in study design. A survey/questionnaire tool was used for data collection in 22 of the studies, and semi-structured interviews were used to collect data in the one qualitative study (total of 23 papers included). Of the 23 studies, the participants were recruited from NSW ($n = 6$), VIC/ACT ($n = 2$), WA ($n = 1$), QLD ($n = 1$) and Australia wide ($n = 13$) (one mostly included NSW/VIC participants—97%). The studies focused on participants in fire and rescue ($n = 12$), paramedics/ambulance personnel ($n = 10$), police ($n = 11$) and other emergency service personnel (i.e., SES) ($n = 5$) (see Table 3).

Overall quality (assessed using the MMAT tool) of the included studies indicated five were good quality (with a response of yes to all five questions), seven moderate quality (had a response of no to one question only) and 11 low quality (had two or more no response to questions). Of the 23 studies included in the review, three papers reported findings from the one study (i.e., single data collection) (Kyron et al. 2021; Kyron, Rikkers, Bartlett et al. 2022; Kyron, Rikkers, LaMontagne et al. 2022), and two papers reported findings from another single study (Evans and Coman 1993; Evans et al. 1993).

The original aim was to explore the rural context related to the experience of trauma while undertaking their work duties and its impact on rural first responders' mental health. However,

TABLE 2 | Characteristics of studies and key findings.

Citation	Location	Study design	Methods	Population	Aims/objectives	Key themes/findings
Bryant and Harvey (1996)	NSW	Quantitative	Survey	Volunteer Firefighters—751	Compare PTS levels in firefighters involved in different stressors and with different trauma experience	87% reported IES was related to firefighting activities (13% reported personal life) 56% safety threatened, 21% reported one, 17% reported two, 9% reported three, and 9% reported more than three threatening experiences Firefighters attributed these threats to general fire incidents (45%), being trapped by unpredictable fires (35%), accidents with fire trucks (8%), smoke inhalation (7%), other peoples' incompetence (3%) or threat of explosion at motor vehicle accidents (3%) 60% believed stress was predominantly caused by helplessness over conditions, exhaustion or inadequate equipment or training 89% reported fearing death or personal injury more than any other factors 73% reported no distress, 14% reported mild distress, and 13% reported severe distress. 17% reported significant PTS related to firefighting duties; 9% reported extreme PTS Not associated with PTSD: Type of stressor Associated with PTSD: Severity of trauma, threat of trauma, experiencing multiple traumas, helplessness (inability to manage trauma suffered by victims) Negative adjustment post a disaster associated with inexperience. Concern from participants reporting stress may be viewed as inadequacy as a firefighter
Deady et al. (2017)	NSW	Quantitative	Survey	Fire and rescue—106	To describe the use and preferences of emergency services workers regarding potential uptake of smartphone-based MH interventions	Two thirds (64%) of respondents claimed they were 'likely'/'very likely' to try a tailored emergency service worker physical health app, while 54% claimed they were 'likely'/'very likely' to try a similar MH app Overall, 42% of respondents preferred face-to-face MH support, 17% preferred app format and the remainder had no preference Behavioural therapy (75%) was the most popular preference for different psychological therapeutic techniques, followed by relaxation/mindfulness (53%), and cognitive techniques (43%). Positive psychology (32%) and interpersonal therapeutic (27%) techniques were less popular Emergency workers were interested in utilising smartphone applications focused on MH but expressed clear preferences regarding language (well-being and mental fitness as opposed to MH) used in promotion, features required and therapeutic techniques preferred The majority (74%) of respondents claimed they would use an app for mental well-being daily if they were feeling low, with 60% claiming they would use an app for at least 5 min/day When asked which terms were most appropriate for use in a MH app for emergency service workers, 'well-being' (54%) and 'mental fitness' (54%) were rated as the most preferred terms for referring to MH 76% wanted audio/visual text content

(Continues)

TABLE 2 | (Continued)

Citation	Location	Aims/objectives	Study design	Methods	Population	Key themes/findings
Evans and Coman (1993)	VIC/ACT	Examine the stressors reported by groups of officers from two Australian police forces and correlated these with subjects' perceptions of their working environment and measure anxiety, locus of control and mood states	Quantitative	Survey	Police officer—271	The most stressful job content included violent death of partner in the line of duty, participation in act of police corruption, shooting someone in the line of duty, attending call to nonaccidental death of child, confronting person with a gun and duty-related injury. Events occur infrequently. Most frequent stress related to giving evidence in court, shift work, taking command, facing situations with possibility of physical injury, facing unpredictable situations The most stressful job context events were failing police training, failing promotional exam, unsatisfactory personnel evaluation and being passed over for promotion The most frequent job context events were job overload, duty under a poor supervisor, negative community attitudes, long hours, change in shifts and change in supervisors
Evans et al. (1993)	VIC/ACT	Examine the range of stress-coping strategies used by officers to help them deal with their occupational stress and its effects	Quantitative	Survey	Police officer—271	Most officers utilise problem-focused, direct action coping strategies, with more limited use of social supports, self-blame and wishful thinking. While their coping behaviours may help them moderate problem-focused stress concerns, the data suggest that many officers may not deal effectively with their emotion-focused concerns
Hansen, Iannos, and Van Hooff (2023)	AUS	Evaluate the effectiveness of the OPK9/ADA programs (accredited Australian Assistance Dog programs) in reducing PTSD and mental health symptoms over a 1-year period	Quantitative	Pilot Survey	ADF vets—37 police officer—4 ES other—3	Results showed that all mental health outcomes exhibited statistically significant reductions in scores at the 3-month follow-up, which then persisted at the 6-month and 12-month follow-up timepoints. Based on the change in score from the treatment-baseline to 3-month follow-up, the effect size (Cohen's d for paired samples) was strongest for stress ($d = 0.993$), followed by PTSD ($d = 0.892$), anxiety ($d = 0.837$), insomnia ($d = 0.694$), depression ($d = 0.630$) and anger ($d = 0.620$)
Harnett, Kelly, and Gullo (2021)	AUS	Test a model investigating the relationship between symptoms of PTSD and well-being	Quantitative	Survey	Former or current Australian Police officers—506	More male police officers had been diagnosed with a PTSD disorder at some point (43%) than female police officers (29%). PTSD was a statistically significant predictor of psychological distress (higher levels of PTSD leading to higher levels of psychological distress) and positivity (higher levels of PTSD leading to lower levels of positivity). PTSD was a statistically significant predictor of social support (higher levels of PTSD leading to lower levels of social support). Social support was a statistically significant predictor of both positivity and well-being (higher levels of social support leading to higher levels of both well-being and positivity), indicating social support had a direct effect on well-being and an indirect effect by increasing positivity

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TABLE 2 | (Continued)

Citation	Location	Aims/objectives	Study design	Methods	Population	Key themes/findings
Harvey et al. (2016)	NSW	To assess the prevalence of a variety of mental health and alcohol use disorders (PTSD, depression and heavy drinking) in current and retired firefighters	Quantitative	Survey	Firefighters (Full-time)—270 Retired Firefighters—256 (Metro & regional)	Among current firefighters, rates of PTSD and depression were 8% and 5%, respectively, while 4% reported consumption of more than 42 alcoholic drinks per week. Retired firefighters reported significantly greater levels of symptomatology, with the prevalence estimates of post-traumatic stress disorder at 18% ($p = 0.001$), depression at 18% ($p < 0.001$) and heavy drinking at 7%. There was a significant positive linear relationship between the number of fatal incidents attended and rates of post-traumatic stress disorder, depression and heavy drinking
Joyce et al. (2019)	NSW	To examine whether baseline measures of resilience among a group of first responders predicted future mental health symptomology following trauma exposure	Quantitative	Survey	Firefighters –143	75 (52%) were lost to follow-up. 10 participants (18%) were found to have low resilience as measured by the CDRISC_10 (mean.29.7, SD: 5.2), 13 (23%) had low average resilience, 24 (43%) had average resilience, and 9 (16%) had high resilience The associations between baseline resilience and future post-traumatic stress disorder (PTSD) and depression symptoms were statistically significant. Those reporting higher resilience levels had lower symptomology at 6-month follow-up. Eighty percent of first responders who screened positive for low resilience went on to develop more PTSD symptoms
Kerswell et al. (2020)	QLD	To identify the levels of clinical psychological distress and trauma in serving police officers and civilian staff within the QPS following a large-scale PTE (potentially traumatic events) and to examine the association of certain demographics with these two mental health outcomes (distress and PTSD)	Quantitative	Survey	Police officers—178 Civilian staff—38	A strong positive relationship was observed between symptoms of psychological distress and symptoms of post-traumatic stress Police officers reported a mean of 14.14 (SD = 5.27) on the K10 and 22.10 (SD = 7.19) on the PCL-C, with civilians reporting a mean of 16.53 (SD = 6.45) on the K10 and 24.37 (SD = 7.15) on the PCL-C The results showed that approximately 24% of the participants had elevated levels of general distress, while 13% had clinical levels of PTSD symptoms Age was associated with the severity of PTSD symptoms but not general distress. Civilian staff reported significantly higher symptoms of general distress and PTSD than police officers. Females reported significantly higher symptoms of psychological distress than males; however, no differences were observed for symptoms of post-traumatic stress. Finally, the K10 had strong convergent validity with clinical levels of PTSD as measured by the PCL-C indicating that the K10 may be a useful general screening measure of both general distress and PTSD symptoms when brevity is needed in a large-scale PTE mental health screening measure

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Citation	Location	Aims/objectives	Study design	Methods	Population	Key themes/findings
Kyron, Rikkers, LaMontagne et al. (2022)	AUS	To determine the nature and prevalence of stressful events, both work and nonwork, and to assess whether stressful events experienced at work have a stronger association with PTSD and psychological distress then those stressful events experienced away from work in the sector	Quantitative	Survey	14868 Police officer—8088 Ambulance officer—3473 Fire/rescue—2975 SES-332	Roughly 83% of all employees indicated experiencing some form of stressful event that deeply affected them There was a stepwise increase in length of service and the proportion of employees reporting stressful events at work in the sector Traumatic events experienced while working in the police and emergency services sector were the most frequently reported stressor (51%). Stressful events experienced at work in the sector were associated with significantly higher levels of suspected post-traumatic stress symptoms and high psychological distress compared with stressors experienced away from the sector Stressors experienced at work are a risk factor for developing post-traumatic stress symptoms and distress in the sector Longer lengths of service associated with higher likelihood of exposure to stressful events that affected employees at work Therefore, stressful events experienced while working in the emergency services sector had notably stronger associations with poor mental health outcomes when compared with events away from work in the sector
Kyron, Rikkers, Bartlett et al. (2022)	AUS	To establish a baseline measure of mental health and well-being pf personnel in ambulance, fire and rescue, police and SES organisations in Australia; to examine individual and workplace factors associated with well-being, and levels of support provided and needed	Quantitative	Survey	14868 Police officer—8088, Ambulance officer—3473 Fire/rescue—2975 SES-332	Police and emergency services employees had higher rates of mental health issues and lower levels of mental well-being compared with the general population. Ambulance employees had the lowest level of well-being at 26.75 with police at 32.35 which was nearly twice as high as population expectations Almost a third of employees had high or very high levels of psychological distress (29.8%, 95% CI 28.8–30.7), which is significantly higher than for the general Australian population (11.7%), and 9.3% had very high psychological distress (95% CI 8.6–9.9) compared with 3.7% in the general Australian population One in 20 employees had considered suicide in the 12 months prior to the survey which was over 2 times higher than the general population A strong association was found with length of employment with early career employees having high/very high levels of psychological distress, low well-being and possibly PTSD. Employees later in their careers had the highest rates of mental health outcomes While higher rates of mental health issues in emergency services personnel are consistent with previous research, of particular concern are the low rates of help-seeking. Among employees with low well-being, high or very high psychological distress or probable PTSD, no more than one in five reported receiving adequate levels of help

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TABLE 2 | (Continued)

Citation	Location	Aims/objectives	Study design	Methods	Population	Key themes/findings
Kyron et al. (2021)	AUS	It examines which factors differentiate those who think about suicide from those who have acted on their suicidal thoughts, presenting prevalence of suicidal thoughts and behaviours in first responders	Quantitative	Survey	14868 Police officer—8088, Ambulance officer—3473 Fire/rescue—2975 SES-332	Roughly 5.3% ($n=802$) of employees indicated experiencing suicidal thoughts in the prior 12 months, while 2.0% ($n=320$) reported plans and 0.3% ($n=50$) attempted. Lifetime rates were notably higher, with 12.3% ($n=2016$) thinking about suicide, 5.7% ($n=943$) planning and 1.9% ($n=309$) attempting. Emergency services personnel reported significantly higher rates of suicide thoughts, $\chi^2(1, 23709)=95.63$, $p<0.001$, and plans, $\chi^2(1, 23709)=69.69$, $p<0.001$, in the prior 12 months, but not attempts, $\chi^2(1, 23709)=2.76$, $p=0.097$. Police employees had the lowest rates of thoughts and behaviours, while fire and rescue and ambulance personnel reported significantly higher lifetime rates and in the prior 12 months. Male, single/divorced, nonheterosexual or longer-serving employees reported higher rates of suicidal thoughts and behaviours across each sector. Perceptions of stigma regarding mental health conditions from others in the workplace, negative impact of work on one's private life and low meaning of work were associated with suicidal thoughts, while bullying significantly differentiated who planned and attempted suicide from those who reported suicidal thoughts only. Higher resilience and social support were associated with lower suicidal thoughts, while intermittent explosive anger and illegal drug use were associated with higher rates of suicidal thoughts. Post-traumatic stress disorder symptoms significantly differentiated who planned suicide, while misuse of prescription drugs and psychological distress differentiated who attempted suicide from those who only reported suicidal thoughts
McKeon et al. (2021)	AUS	To assess the feasibility, acceptability and preliminary effectiveness of using a private Facebook group to deliver a physical activity intervention for first responders and their selected support partners	Mixed Methods	Survey	Police officer—2 Firefighter—6 Paramedic—4 and 12 nominated support partners	Half of the first responders were former or current firefighters, 33% (4/12) were police officers, and 17% (2/12) were paramedics. Most of the total sample (17/24, 71%) used Facebook for >3h per week before the intervention The results provide preliminary support for the use of social media and a multiple time series design to deliver. Social media is a feasible and acceptable platform for delivering a mental health–informed physical activity intervention
McKeon et al. (2023)	AUS	To evaluate the efficacy of mental health informed 10-week physical activity and diet programme delivered via Facebook for sedentary emergency services workers and chosen support person	Quantitative	Survey	Firefighter—20 Paramedic—16 Police officer—7 Other ESW—4	The results of this study showed that an online physical activity intervention is a feasible strategy that can help to reduce levels of psychological distress among emergency service workers and their support partners. Levels of psychological distress did not change significantly during the baseline period yet reduced significantly during the first 6 weeks of the intervention, compared with baseline

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Citation	Location	Aims/objectives	Study design	Methods	Population	Key themes/findings
Milligan-Saville et al. (2018)	NSW	To examine the impact of the frequency and accumulation of trauma on the development of PTSD and psychological distress	Quantitative	Survey	Volunteer rural Firefighters (RFS)—459	The estimated prevalence of probable PTSD and psychological distress in the sample were 5.4% and 9.8%, respectively, with 11.8% suffering from probable mental disorder NSW RFS volunteers and/or staff members who had attended or been involved with more than 10 personally distressing incidents per year had significantly greater odds of suffering from probable PTSD (OR = 6.39, 95% CI = 1.73, 23.6, $p = 0.005$) compared with not being involved in any incidents The most common incidents experienced by NSW RFS volunteers and/or staff members involved deceased adults ($n = 254$, 59.8%) and seriously injured or burnt adults ($n = 249$, 58.9%), whereas the least common incident was being assaulted by other people ($n = 50$, 11.8%) NSW RFS volunteers and/or staff members with probable mental disorder were significantly more likely to have been involved with a higher number of distressing incidents per year than those without a mental disorder. There were no significant differences between the probable mental disorder and no-mental disorder groups with regard to gender, age, NSW RFS roles, years of service or the number of distressing incidents across all years of service
Petrie et al. (2022)	AUS	Investigate the severity and prevalence of mental health problems and assessed the workplace, social and financial disruptions and challenges experienced by Aus HCW during COVID-19	Mixed Methods	Survey	Healthcare workers on front line—7845 Paramedics—95	The COVID-19 pandemic resulted in considerable occupational disruption for paramedics and was associated with significant negative impacts on mental health Findings emphasise the need for more adaptive working conditions, mental health support for paramedics and enhanced crisis preparedness across the health system for future crises
Pyper and Paterson (2016)	AUS	To investigate issues of fatigue and mental health in rural and regional ambulance personnel	Mixed Methods	Survey	Paramedic/ Ambulance officer—121 Volunteer—12	Fatigue: Over half of the participants (55.9%) reported experiencing fatigue at work (35% severe; 20.9% mild). Ninety-three percent of respondents reported sleeping 5 h or less while on call, and a further 43% reported sleeping less than 8 h while not on call Stress: stressful aspect of their work, participants identified several themes. These included treating personally known patients, working with children, critically ill patients, the death of patients, community expectations, 'office politics' (including paperwork, colleagues and management), fatigue, working as a single officer and longer response times due to travel distances Emotional trauma: Eighty to 90 % of cases in rural and regional areas involved treating personally known patients, which was reported by 79% of the sample as particularly stressful. This is largely due to a 'higher expectation to perform well' and because 'many (patients) are known friends or family'. However, it was also reported that 'treating personally known patients who are not in a serious condition is easier and quite rewarding'

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TABLE 2 | (Continued)

Citation	Location	Aims/objectives	Study design	Methods	Population	Key themes/findings
Rosenbaum et al. (2022)	NSW	To examine the association of participation in the RECONNECT program and prospective symptoms of PTSD and comorbid symptoms in NSW Police Officers	Quantitative	Survey	60 NSW Police officers	The majority of the sample had a clinician confirmed diagnosis of traumatic stress ($n = 48$, 80%), with just under half endorsing a diagnosis of depression ($n = 28$, 47%) 40% of the sample reporting both traumatic stress and depression ($n = 24$) A clinically significant reduction in PTSD (Cohen's $d = 0.96$), depression ($d = 0.71$), anxiety ($d = 0.55$) and stress ($d = 0.69$) symptoms were found from baseline to Week 12. Drop-out and lost to follow-up was high. Higher baseline PTSD severity was associated with an increased likelihood to complete postintervention assessment
Shakespeare-Finch and Daley (2017)	AUS	To assess workplace belongingness as a predictor of well-being using both measures of psychological distress and of resilience, while controlling for the effects of previously investigated predictors such as trauma severity and access to an EAP	Quantitative	Survey	Australian Ambulance officers—740	The majority of participants indicated that the most traumatic event they had experienced had occurred at work (81.8%), and for more than half of participants, this event had been perceived as either highly severe (28.4%) or extremely severe (28.1%) Strategies to enhance a sense of workplace belongingness in emergency service organisations could promote the well-being of emergency workers despite routine exposure to potentially traumatic events
Skeffington, Rees, and Mazzucchelli (2017)	WA	Gather information on PTE exposure in WA fire and emergency department workers, and the associated impact on mental health and well-being. The relationship between PTE exposure and PTSD in particular the significance of social support and coping style	Quantitative	Survey	Firefighters—210	In total, 203 respondents (96.7%) endorsed the personal experience of at least one PTE over the past 5 years, as measured by the Traumatic Stress Schedule Exposure to more than one PTE type was common; 82.9% ($n = 174$) reported exposure to two or more PTE types and nearly half (45.2%; $n = 95$) reported exposure to four or more PTE types PLC-C mean score for this sample was M = 27.20 (SD = 10.51). Ninety-one per cent of the sample scored over the cut-off of 44. 21.6% of participants met the diagnostic criteria for at least one symptom cluster Trauma exposure, social support and coping style significantly contributed to variation in PTSD symptomatology, with maladaptive coping strategies accounting for more PTSD variance than adaptive coping

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TABLE 2 | (Continued)

Citation	Location	Aims/objectives	Study design	Methods	Population	Key themes/findings
Smith et al. (2022)	AUS	To explore the impact of the Black Summer bushfires on volunteer firefighters well-being and investigate how to deliver effective well-being support	Qualitative	Interviews	Volunteer Firefighters—58	Participants who experienced more than one traumatic event during the bushfires were more likely to report that their well-being had been seriously impacted. Almost one-half ($n = 28$) of all participants reported experiencing post-traumatic stress symptoms during the 12 months following the fires, while eight reported that they had been diagnosed with post-traumatic stress disorder (PTSD). Over one-half ($n = 32$) reported that they had not sought mental health support in the 12 months following the fires. When asked if they felt that their organisation had provided enough well-being support following the fires, the overwhelming response was an emphatic 'no'. Intense work demands, minimal intervals between deployments, the impact of cumulative exposure to trauma, and responding to fires in local communities all impacted well-being. Most participants reported multiple trauma exposures over a long period of time, with very little downtime for rest and recuperation. Fire-induced fatigue also resulted in subsequent impact on primary employment. Well-being support needs to be both proactive and reactive and empower local leaders to 'reach in' while encouraging responders to 'reach out'; (2) Employee Assistance Programs (EAPs) should not be the only well-being support option available; (3) The sharing of lived experience is important; and (4) Support programmes need to address self-stigmatisation
Wastell (2002)	AUS (one state only but not named)	What defence process do ESP use to control emotional reactions. What are the measurable consequences of using this process (defence) as a long-term coping mechanism	Quantitative	Survey	Ambulance officers—437	The results indicate that the prediction of the stress scores is positively related to affect focused defences at the immature (Level 1) and the neurotic (Level 2) levels, total service and alexithymia (the inability to recognise and articulate affective states). The use of emotion-suppressing defences (e.g., withdrawal or acting out) has a highly significant positive relationship with physical and psychological stress symptoms. There was a positive association between years of ambulance service and stress symptoms
Wongtongkam (2017).	AUS	To identify risk factors involved in violence and explore levels of distress and burnout in Australian paramedics	Quantitative	Survey	Ambulance officers—48	No significant differences between sites in timing of violent incidents, consequences of traumatic events or organisation provision. Surprisingly, over 90% of paramedics had not been pushed, slapped, beaten, scratched or spat on in the previous month. When considering burnout, female paramedics showed significantly higher levels of emotional exhaustion ($t(37) = -2.32$, $p = 0.02$) and lower levels of career satisfaction than their male counterparts. In response to violent acts, most paramedics felt frustrated and angry and showed increased vigilance

Abbreviations: ADF, Australian Defence Force; ES, Emergency Services; SES, State Emergency Services.
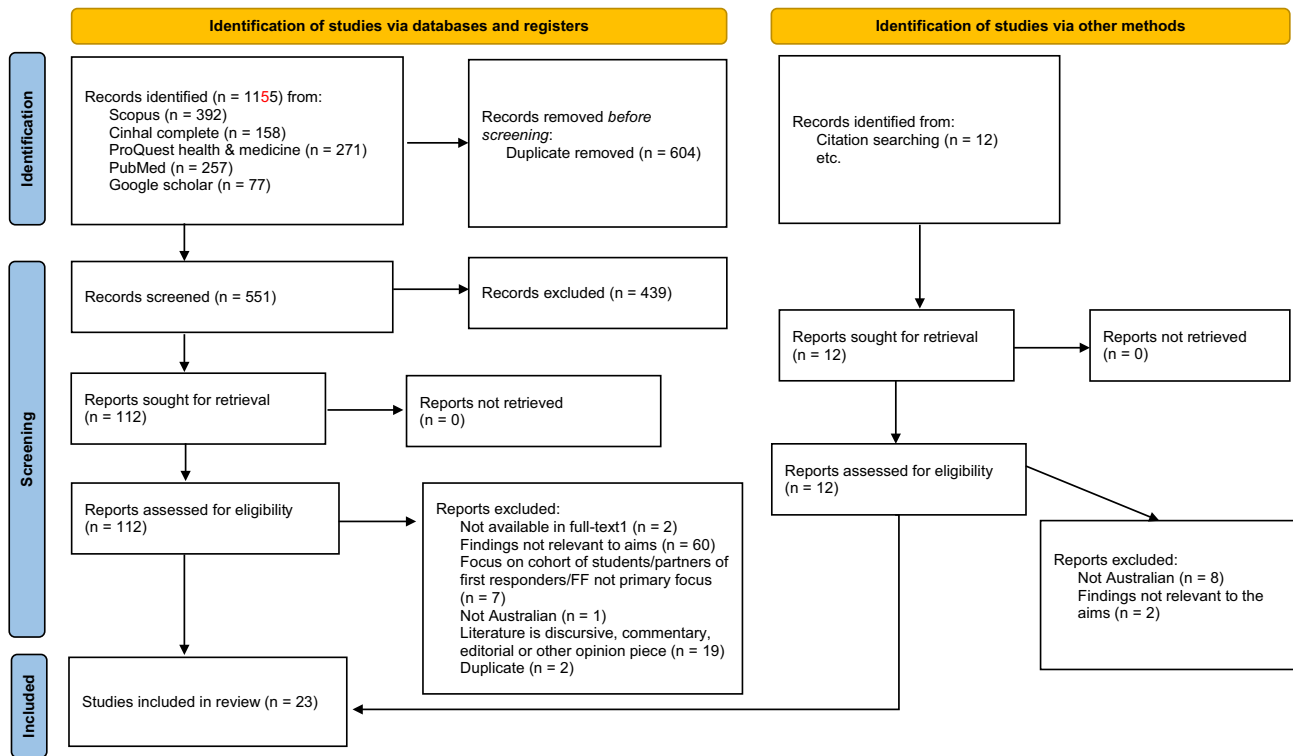
FIGURE 1 | PRISMA screening results.

there is a dearth of evidence in this area, as represented in Table 4 which provides an overview of the gaps in evidence. There are considerable gaps in Australian evidence related to trauma experience and impact of mental health in rural populations, the lived experience of first responders and interventions specifically evaluated using first responders as participants.

Findings synthesised under three categories (to answer the research aims) with the rural context as an overarching theme. Of the 23 studies included, only three explicitly included rural participants in their study (Bryant and Harvey 1996; Milligan-Saville et al. 2018; Pyper and Paterson 2016) and only two of these reported findings specifically for rural participants (Milligan-Saville et al. 2018; Pyper and Paterson 2016). The three categories for synthesis are as follows: (1) first responders lived experience of trauma (responding to traumatic situations while undertaking their work duties), (2) impact of trauma (while undertaking their work duties) on mental health of first responders, and (3) strategies and interventions (workplace specific) for improving mental health of first responders exposed to trauma. Table 5 presents the categories reported on by each paper include in this review.

3.1 | First Responders Lived Experience of Trauma

There were limited studies looking at the lived experience of first responders and trauma ($n = 2$), one study was qualitative (Smith et al. 2022), and the second study was mixed methods (Pyper and Paterson 2016).

Pyper and Paterson (2016) study is one of the few studies to focus on rural population (paramedics/ambulance personnel) and reported two key findings regarding stress and emotional trauma.

Paramedics/ambulance personnel reported several stressful aspects related to their role, such as personally knowing patients, working with children, critically ill patients, the death of patients, community expectations, 'office politics' (such as paperwork, colleagues and management), fatigue, working as a single officer and longer response times due to travel distances. Of the participants in this study, 80–90% reported emotional trauma, with a specific link between emotional trauma, and stress at work related to treating patients who are known to them, especially friends or family.

Smith et al. (2022) study took a phenomenological approach to exploring volunteer firefighters' well-being in the context of bush fires events (trauma). In the 12 months following the bush fires, 50% of participants accessed mental health support outside work, and most participants felt that in the wake of their traumatic experiences, their well-being was not sufficiently supported by their organisation. Particularly stressful aspects of their experiences of the bush fires included intense work demands, minimal intervals between deployments, cumulative exposure to trauma, responding to fires in local communities, and the impact of fire-induced fatigue on their primary employment. Other key findings include the importance of sharing first responder lived experience, and self-stigmatisation and shame associated with mental illness.

3.1.1 | Rural Context

It was not possible to compare rural and urban responses due to the limited number of studies that focused on lived experience and the difference in populations explored between the studies that did. However, unique experiential features reported in rural contexts included personally knowing the patient, community

TABLE 3 | Participants.

Citation	Police	Paramedic/Ambulance	Fire	SES/Other
Bryant and Harvey (1996)			V	
Deady et al. (2017)			C	
Evans and Coman (1993)	C			
Evans et al. (1993)	C			
Hansen, Iannos, and Van Hooff (2023)	C			C/R
Harnett, Kelly, and Gullo (2021)	C/R			
Harvey et al. (2016)			C/R	
Joyce et al. (2019)			C	
Kerswell et al. (2020)	C			
Kyron, Rikkers, LaMontagne et al. (2022)	C	C/V	C/V	C/V
Kyron, Rikkers, Bartlett et al. (2022)	C	C	C	C
Kyron et al. (2021)	C	C	C	C
McKeon et al. (2021)	C/R	C/R	C/R	
McKeon et al. (2023)	C/R	C/R	C/R	C/R
Milligan-Saville et al. (2018)			C/V	
Petrie et al. (2022)		C		
Pyper and Paterson (2016)		C		
Rosenbaum et al. (2022)	C			
Shakespeare-Finch and Daley (2017)		C		
Skeffington, Rees, and Mazzucchelli (2017)			C	
Smith et al. (2022)			V	
Wastell (2002)		C		
Wongtongkam (2017)		C		

Abbreviations: C, Current; V, Volunteer; R, retired/former; SES, state emergency services.

expectations, working as a single officer and distance impacting response times.

3.2 | Impact of Trauma on Mental Health of First Responders

Of the 23 included studies, 16 studies directly reported on the impact of exposure to trauma experienced while undertaking their work duties on mental health, with most studies using self-reporting to determine an occurrence of traumatic incidents. Nine of the studies reported the specific types of trauma experience and the most common forms of traumatic incidents reported were attending an incident involving a death ($n = 4$) (Evans and Coman 1993; Harvey et al. 2016; Milligan-Saville et al. 2018; Pyper and Paterson 2016) and violence ($n = 3$) (Evans and Coman 1993; Milligan-Saville et al. 2018; Wongtongkam 2017), with accident or trapped in fire (Bryant and Harvey 1996), personal injury (Evans and Coman 1993; Wongtongkam 2017), disaster (Petrie et al. 2022; Smith et al. 2022) and incidents involving children (Evans

and Coman 1993; Pyper and Paterson 2016) also reported (see Table 6). Across the available evidence and all first responder categories, the most stressful events identified included attending a violent death while undertaking their work duties, participation in police corruption, shooting someone and a nonaccidental death of a child. The most frequent nontraumatic stressful events identified were giving evidence in court, shift work, taking command, situations involving possible physical injury and unpredictable situations.

Of the 23 studies, 17 reported specific mental health symptoms experienced by participants. Overall, PTSD ($n = 17$), depression ($n = 11$) and psychological distress ($n = 10$) were the most common mental health symptoms reported, followed by suicidal ideation ($n = 5$) and emotional trauma/exhaustion ($n = 4$) (see Table 7). Rates of reported mental health symptoms varied across all studies with fire service participants reporting the highest rates of PTSD, police participants reporting the highest rates of depression and anxiety, and paramedics/ambulance personnel and fire service reporting the highest rates of suicidal ideation. Female police participants reported

TABLE 4 | Evidence gap map.

		No. Studies (n = 23)	Trauma impacting mental health				Mental health outcomes			Interventions for Mental Health	Reporting Lived experience	Rural/remote context considered
			Accident	Disaster response	Injury or violence	Death/fatal incident	Mental Health Symptoms	Well-being	Resilience			
Population	Police	11										
	Paramedic	10										
	Fire Service	12										
	EMS/SES	5										
	Gender comparison	8										
Location	NSW	6										
	VIC	2										
	QLD	1										
	TAS	0										
	WA	1										
	SA	0										
	NT	0										
	ACT	2										
	Australia wide	13										
Research Design	Mixed Methods	3										
	Qualitative	1										
	Quantitative	19										

Legend:
• = Retired • = Volunteer • = Current
• = Police • = Paramedic • = Fire • = SES
• = Low quality • = Moderate quality • = Good quality

lower PTSD rates and higher psychological distress rates compared with their male counterparts, while male paramedics/ ambulance personnel and fire services had higher rates of suicidal ideation. Female participants also had higher levels of emotional exhaustion after traumatic/stressful events and were more likely to internalise and depersonalise which negatively impacts emotional exhaustion (Wongtongkam 2017). However, a true comparison between genders is difficult due to missing results for some populations, and wide variation in study design, aims and measurements. For example, some studies required a current mental health diagnosis while others used self-reporting for mental health symptom rates. Table 7 presents the specific rates reported for mental health symptoms and details which of the included studies reported each symptom.

Mental health symptoms (such as PTSD, depression and substance abuse) reportedly increased, maladaptive coping strategies (such as self-distraction, denial, venting, substance use, behavioural disengagement and self-blame) increased, and engagement with social support decreased with the increased incidence of trauma experience while undertaking their work duties (Harvey et al. 2016). In addition, high levels of PTSD were associated with higher levels of psychological distress and lower levels of positivity (optimism, gratitude, self-compassion and mindfulness) (Harnett, Kelly, and Gullo 2021), and workplace belonging was a significant predictor for increased psychological distress (Shakespeare-Finch and Daley 2017).

3.2.1 | Rural Context

The findings for rural samples only specify rates of fatigue, emotional trauma and psychological distress, so a true comparison between rural and urban is not viable. However, Milligan-Saville et al. (2018) reported similar results between rural and urban groups, regarding the relationship between the number of traumatic incidents experienced while undertaking their work duties and increased mental health symptoms. Rural participants also reported the most common potentially traumatic experience was serious injury, death and fear for personal safety (Milligan-Saville et al. 2018), and emotional trauma was linked to high community expectations and to responding to situations involving friends and family (Pyper and Paterson 2016).

3.3 | Individual Level Strategies and Interventions for Improving Mental Health of First Responders Exposed to Trauma

Interventions can be targeted to one of three levels, that being across the whole organisation, at the team/manager level and/ or at the individual worker (Petrie, Joyce, et al. 2018). While an integrated approach is recommended, these interventions are often evaluated separately. Of the 23 included studies, 20 studies reported or discussed individual level interventions for first responders' mental health. Four of these studies reported the effectiveness of interventions using physical activity (n = 3) (McKeon et al. 2021, 2023; Rosenbaum et al. 2022) or assistance dog programmes (n = 1) (Hansen, Iannos, and Van Hooff 2023), one study surveyed participants about potential use of smart phones as an intervention (Deady et al. 2017), and one study measured resilience pre- and post-trauma experience to determine if resilience skills could be used as an intervention (Joyce et al. 2019).

Of these six studies, four utilised pre- and postintervention design (Hansen, Iannos, and Van Hooff 2023; Joyce et al. 2019; McKeon et al. 2021; Rosenbaum et al. 2022), one used pre–post step wedge RCT design (McKeon et al. 2023) and one used a cross-sectional survey (Deady et al. 2017). All studies had high loss to follow-up rates which affects the validity of the findings (Dettori 2011).

TABLE 5 | Studies and content categories reported.

Citation	Lived experience of trauma	Impact trauma on mental health	Strategies support mental health
Bryant and Harvey (1996)		X	X
Deady et al. (2017)			X
Evans and Coman (1993)		X	
Evans et al. (1993)			X
Hansen, Iannos, and Van Hooff (2023)			X
Harnett, Kelly, and Gullo (2021)		X	X
Harvey et al. (2016)		X	X
Joyce et al. (2019)			X
Kerswell et al. (2020)		X	
Kyron, Rikkers, LaMontagne et al. (2022)		X	X
Kyron, Rikkers, Bartlett et al. (2022)		X	X
Kyron et al. (2021)		X	X
McKeon et al. (2021)			X
McKeon et al. (2023)			X
Milligan-Saville et al. (2018)		X	X
Petrie et al. (2022)		X	X
Pyper and Paterson (2016)	X	X	
Rosenbaum et al. (2022)			X
Shakespeare-Finch and Daley (2017)		X	X
Skeffington, Rees, and Mazzucchelli (2017)		X	X
Smith et al. (2022)	X	X	X
Wastell (2002)		X	X
Wongtongkam (2017)		X	X

3.3.1 | Interventions

Three studies focused on physical activity as an intervention for PTSD (McKeon et al. 2021, 2023; Rosenbaum et al. 2022). These studies ran an individualised exercise programme for either 10 or 12 weeks with some improvement noted for PTSD (McKeon et al. 2021; Rosenbaum et al. 2022) and psychological distress (McKeon et al. 2023) at 6 weeks, one study reported improvement in police depression (Rosenbaum et al. 2022) while another reported no improvement in suicidal ideation, depression or sleep quality (McKeon et al. 2021, 2023). Overall, there was little improvement when comparing baseline to 12-week measures.

One study focused on an assistance dog programme as an intervention for police participants with a PTSD diagnosis (Hansen, Iannos, and Van Hooff 2023). This study reported statistically

significant improvements in PTSD, depression, anxiety and sleep quality (insomnia) postintervention. Joyce et al. (2019) study focused on building resilience skills as an intervention for the future development of PTSD. This study highlights the need to consider baseline strengths and the possible role of early intervention, even pretrauma exposure for first responders. The last intervention study focused on the possibility of using smartphones as a mental health intervention. The study reported 64% would use a physical health app, 54% would use mental health app, 42% would prefer face-to-face mental health support, 75% wanted an industry specific app and 95% deemed confidentially as essential.

3.3.1.1 | Rural Context.
None of the studies evaluating effectiveness of these interventions reported specific findings for rural participants, so it is difficult to determine if these

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TABLE 6 | Trauma type reported.

Citation	Accident	Violence	Personal injury	Disaster response	Involving children	Death	Other
				Trauma type reported			
Bryant and Harvey (1996)	X						Incompetence, Threat of explosion, Smoke inhalation
Evans and Coman (1993)		X	X		Nonaccidental death		Police corruption, shooting someone, Taking command, Shift work, Unpredictable situations
Harvey et al. (2016)						X	
Milligan-Saville et al. (2018)		X				X	Serious injury or burns
Petrie et al. (2022)				X			
Pyper and Paterson (2016)					X	X	Knew patient, critically ill, Long response time (travel to), Office politics, Working alone
Smith et al. (2022)				X			
Wastell (2002)							X
Wongtongkam (2017)		X	X				

TABLE 7 | Mental health Illness.

Mental health symptom rates

Specific population rates

	PTSD	Psychological distress	Suicidal Ideation	Depression	Anxiety	Emotional trauma	Fatigue insomnia
Police	11%–80% Male—13%–43% Female—9%–29%	14%–61% Female—10%–26% Male—18%–20%	4.7% Males—5.2% Females—3.9%	16%–47%	16%–43%		
Paramedic	8–15%	29%–61%	6.5% Male—7.2% Female—5.8%	16%–26%	21%–31%	72%–90%	56%
SES	6.4%	33%–62%	4.5% Males—5% Females—4.1%	16%	16%		
Fire	9%–91%	9.8%–58%	6.9% Males—7.2% Females—5.5%	11%–14%	12%		
Volunteer	48%						
Rural		9.8%				79%	56%

Mental health symptoms reported across literature

Citation	PTSD	Depression or anxiety	Suicidal ideation	Psychological distress	Emotional trauma	Fatigue insomnia	Substance use	Other
Bryant and Harvey (1996)	X			X	X			
Evans and Coman (1993)		X						
Hansen, Iannos, and Van Hooff (2023)	X	X						
Harnett, Kelly, and Gullo (2021)	X	X		X				Well-being
Harvey et al. (2016)	X	X					X	
Joyce et al. (2019)	X	X						Resilience
Kerswell et al. (2020)	X	X		X				
Kyron, Rikkers, LaMontagne et al. (2022)	X	X	X	X				

TABLE 7 | (Continued)

| | | | | Mental health symptoms reported across literature | | | | |
Citation	PTSD	Depression or anxiety	Suicidal ideation	Psychological distress	Emotional trauma	Fatigue insomnia	Substance use	Other
Kyron, Rikkers, Bartlett et al. (2022)	X		X	X				Well-being
Kyron et al. (2021)	X		X	X			X	Resilience
McKeon et al. (2021)	X	X		X				
McKeon et al. (2023)	X	X	X	X				
Milligan-Saville et al. (2018)	X	X		X	X			
Petrie et al. (2022)	X	X			X			
Pyper and Paterson (2016)					X	X		
Rosenbum	X	X						
Shakespeare-Finch and Daley (2017)								Well-being
Skeffington, Rees, and Mazzucchelli (2017)	X							
Smith et al. (2022)	X		X			X		
Wastell (2002)				X				
Wongtongkam (2017)	X				X			Burnout, Anger, Frustration

interventions would potentially be effective at managing mental health of first responders in rural Australia.

3.3.2 | Other Treatment and Prevention/Promotion Strategies

A total of 14 studies suggested other possible strategies that could be used to improve mental health and well-being of first responders, which were summarised as either treatment or prevention/promotion strategies. Promotion/preventative activities that potentially could improve mental health and well-being of first responders included screening (Harvey et al. 2016; Milligan-Saville et al. 2018), promoting mental health services (Kyron et al. 2021), developing mental health programmes (Kyron, Rikkers, LaMontagne et al. 2022), mental health literacy (Kyron, Rikkers, Bartlett et al. 2022) and organisational change (policy development, cultural change to recognise mental health and well-being and reduce stigma, developing organisational culture that supports mental health, improves workplace belongingness) (Harvey et al. 2016; Kyron et al. 2021; Kyron, Rikkers, Bartlett et al. 2022; Kyron, Rikkers, LaMontagne et al. 2022; Petrie, Milligan-Saville et al. 2018; Shakespeare-Finch and Daley 2017; Smith et al. 2022; Wongtongkam 2017). In addition, interventions and health promotion needs to focus on retired emergency services personnel as well as currently serving personnel (Harvey et al. 2016). Treatment interventions that potentially could improve mental health (including PTSD, psychological distress and depression) and well-being included: stress management skills (Bryant and Harvey 1996), problem-focused coping skills (Evans et al. 1993), reducing maladaptive coping strategies (Skeffington, Rees, and Mazzucchelli 2017), physical activity (Harnett, Kelly, and Gullo 2021), social support (Harnett, Kelly, and Gullo 2021; Kyron, Rikkers, LaMontagne et al. 2022; Smith et al. 2022) and emotional regulation and recognition (Wastell 2002).

4 | Discussion

The aim of this scoping review was to gain insights into the lived psychological experience of Australian first responders being exposed to potentially traumatic events while undertaking their work duties, understand the impacts of those events on mental health, evaluate interventions and preventative/promotional supportive strategies for first responders' mental health and compare the evidence between rural and urban first responders. The findings in this review highlight the complexities and challenges facing first responders, in relation to traumatic exposure and mental health symptoms, which also have relevance to healthcare professionals, especially clinicians (such as mental health nurses) working in regional, rural and remote areas of Australia. Trauma has a significant impact on first responders' mental health, and current services need to ensure they evaluate the effectiveness of current mental healthcare services (such as screening and well-being checks, health promotion and education, and trauma specific interventions) (Jones, Jackson, and Usher 2024; Petrie, Milligan-Saville et al. 2018) to ensure mental health care is tailored to the unique issues faced by specific groups of first responders (including those in rural contexts). This is particularly important considering this review identified that well-being was not sufficiently supported by some first responder organisations.

In addition, this review identified major gaps in evidence within rural and remote contexts which hinders effective planning and delivery of support for rural and regional first responders (see Table 4). For first responders in rural areas, the mental health impacts of accumulative exposure to trauma and violence may be exacerbated by geographical distance from major services, prolonged wait times to access services, perceived threats to confidentiality and reduced resources to respond to traumatic, complex and violent situations (Betts et al. 2024). Rural areas do not always have the same access to professional or paid first responders or availability of sufficiently trained first responders as urban areas do (Jones et al. 2023), often relying on volunteers to meet service demands. Reduced staffing levels and a lack of specialised staff (e.g., intensive care paramedics) impact how rural first responders manage callouts for violence and trauma, and exacerbate workloads, which increases the impact on first responder's mental health (Roberts et al. 2021). Excessive workloads can result in staff burnout and negatively impact staff retention (Roberts et al. 2021), which in turn further impacts mental health of first responders and staff retention in rural areas.

The particular gaps in knowledge that need to be addressed as priorities include the need to conduct research that focus' on rural and/or remote services, use of qualitative methodologies to explore the lived experience of trauma while undertaking their work duties and the impacts on mental health, designing quality mixed methods studies, focus on exploring the types of trauma experience in more detail, including well-being and resilience as aspects of mental health and conducting a broader range of good quality intervention studies. Furthermore, while gender was reported in several studies, comparisons of the results by gender were limited, with only a limited number of studies ($n = 8$) reporting different mental health concerns by gender (Harnett, Kelly, and Gullo 2021; Kerswell et al. 2020; Kyron et al. 2021; Kyron, Rikkers, Bartlett et al. 2022; Petrie et al. 2022; Skeffington, Rees, and Mazzucchelli 2017; Smith et al. 2022; Wongtongkam 2017) and none reporting the impact of interventions on different genders. In addition, while current professional first responders are the most reported population group, it is clear from this review that both retired and volunteer populations are also at risk of developing mental health issues due to experiencing trauma as part of their first responder roles. Further research needs to include retired and volunteer populations in this area of study and compare results to determine if one gender is at increased risk of developing mental health impacts related to trauma, particularly given some emerging evidence of potential heightened risk in these groups (Harvey et al. 2016).

Regarding the research on interventions, physical activity interventions were the only intervention type to be examined in multiple studies, demonstrating some potential promise in improving mental health outcomes, although relying on limited and relatively low-quality evidence. High drop-out rates appear to be a prominent issue within the reviewed intervention research which limits the conclusions that can be drawn and

indicate a need to investigate ways to keep first responders engaged in interventions to both improve their real-world applications and the quality of evidence evaluating them. Additionally, research on interventions and preventative/promotional strategies for first responders' mental health needs to consider breaking down the results for regional, rural and remote contexts, and assessing and testing the effects of the intervention/strategy with these cohorts of first responders.

Mental healthcare professionals need to be aware of the following key points that may help to alleviate the issues identified with workplace interventions for this population. Firstly, the need to tailor programmes to suit first responders, including those working in rural and remote areas. Tailoring or adapting messages is an effective method used in health promotion programmes to increase the relevance of the content and strengthen the message being promoted (Eldredge et al. 2016). This approach has been applied to evidence-based workplace mental health training programmes adapted for specific audiences (Gayed et al. in press) and achieved through co-design with representatives from the target population to ensure the information and case studies presented are meaningful and relevant. Such co-design of the tailored content is conducted to increase engagement and learning outcomes of users. Therefore, it is imperative that interventions delivered to first responders working in rural and remote areas are not products that are 'off the shelf' but rather the evidence-based content is tailored in collaboration with first responders working in rural and remote areas to ensure the relevance of the content to their work environment. Secondly, in order to sufficiently address the impacts of trauma on the mental health of Australian first responders, a more integrated approach encompassing interventions delivered not just at the individual worker level but also targeting the manager and the organisational culture is required (Harvey et al. 2014; LaMontagne et al. 2014; Petrie, Joyce et al. 2018). Evidence-based programmes and apps targeting individuals to build strategies to manage mental health may have positive impact on resilience or mental health outcomes for workers (Deady et al. 2017; Joyce et al. 2019); however, delivering interventions solely at the individual level places the onus on addressing broader work-related mental health risk factors upon the individual. Workplace initiatives must also be implemented to upskill managers and organisational leaders in evidence-based strategies to adequately address mental health risks or psychosocial hazards present in the workplace and support the mental health of workers (Gayed et al. 2019; World Health Organization (WHO) 2022). There is a strong relationship between higher levels of manager support and lower levels of psychological distress in employees (Petrie, Gayed et al. 2018). Manager behaviour is a modifiable work-related mental health risk factor, and there is evidence to support the value of upskilling managers through tailored mental health training to optimise the application of strategies to prevent or minimise risks, and respond to employees who are experiencing mental ill health (Gayed et al. 2019).

4.1 | Limitations

There are several limitations to this review that need to be considered when viewing the results. Firstly, the aim of this review was to explore the available peer-reviewed original research, and as such excluded books and grey literature (such as government reports) which may have been based on primary data. Excluding grey literature may have limited the pool of available research and introduced a degree of publication bias; however, had the benefit of minimising the potential inclusion of research prone to unreliable reporting, lower or unknown methodological quality, and other potential biases (Hopewell, Clarke, and Mallett 2005). Secondly, minority groups (such as racial/ethnic or Indigenous groups) are not considered in the studies in this review, limiting the generalisability of results to these populations and should be considered as a possible area for future research. Thirdly, this review focused on trauma and the impact on mental health, which limited the inclusion of non-mental health/trauma interventions for first responders (e.g., work-related or physical health outcomes).

5 | Conclusion

This review highlights the complexities and challenges facing first responders, in relation to traumatic exposure and mental health symptoms. The reviewed evidence suggests cumulative exposure relates to greater PTSD, and factors that increased mental health symptoms for rural first responders included responding to situations involving family and friends, high community expectations, working as a single officer and time taken to travel longer distances. However, there are major gaps in evidence related to the rural and remote context which impacts effective planning and delivery of support for rural and remote first responders. It is likely that there are challenges in first responders work that are unique and/or more prevalent in the geographic rural context, and more research is needed to assess these issues and their mental health impacts. Mental health professionals need to ensure adequate access to mental health services, ensure screening services can identify trauma exposure and resulting mental health symptoms, and interventions are tailored to suit the specific needs of regional, rural and remote first responders.

Relevance to Practice

This paper presents a discussion on the impact of trauma on mental health of first responders, highlighting the complexities and challenges facing first responders daily, which are also relevant to mental health professionals. It is important that mental health nurses and other clinicians in rural areas are aware of the key mental health issues faced by first responders, such as the impact of trauma on mental health (depression, suicidality, anxiety, emotional trauma, psychological distress, fatigue and PTSD), cumulative exposure to trauma increases the likelihood of developing PTSD and reduced access to services in rural areas which may impact effective planning and delivery of support for rural and remote first responders. Integrated approaches encompassing interventions, programmes and apps targeting individuals' mental health and targeting the manager and the organisational culture are needed, and mental health nurses and other mental health clinicians in rural and remote settings are in prime positions to deliver and evaluate these programmes.

PRISMA/PROSPERO

The authors confirm the Prisma-ScR guidelines were followed for this scoping review. A protocol was developed to guide the scoping review but was not registered with prospero as it is a scoping review not a systematic review.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.