

UNDERSTANDING POST-CRISIS TRAUMA RECOVERY

Understanding Post-crisis Trauma Recovery in Uniformed Services:

A Systematic Review

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Abstract

This systematic review explores mental health difficulties, including risk and protective factors, which may impact on symptom severity post exposure to crisis situations (war, terrorism, or natural disasters); among first responders from uniformed services. Eleven articles were included in the final analysis from an original screening sample of 94,036 articles. Post-traumatic Stress Disorder (PTSD) and depression were the most common diagnoses. Risk factors identified were (1) *Pre-deployment factors* of overweight/obesity, low cognitive ability and social support, existing emotional difficulties, negative childhood experiences, and stressful life events; (2) *During crisis situations factors* of higher frequency and subjective severity of combat exposure, increased rates of combat stress reaction (CSR), high levels of concern for life and family, more stressful position during the mission, threat of death/severe injury during combat to self and/or colleagues, and high rate of killing the enemy, and (3) *Post-deployment factors*, such as low social support and physical health, lack of coping mechanisms, use of avoidant strategies, and social stigma. Protective factors increasing resilience and lessening symptom severity, were reported to be pre-deployment cognitive ability, high social support and stable physical health, effective strategies of coping, post-traumatic growth, and high levels of perceived adequacy in pre-deployment preparation and training. Key findings are discussed.

KEYWORDS: trauma recovery; crisis respondents; post-disaster management; military; police.

Understanding Post-crisis Trauma Recovery in Uniformed Services: A Systematic Review

Independent of the type of crisis (i.e., combat and/or natural disasters) and location (Western or Eastern countries), uniformed services are regularly required to contribute their services as frontline crisis respondents. Constant exposure to stressful crisis situations may manifest as post-crisis psychological symptoms and difficulties such as Post-Traumatic Stress Disorder (PTSD), depression, and/or anxiety (Bowler et al., 2016; Ikin et al., 2020). Due to decreased income or unemployment, substance abuse and/or other personal factors (e.g., young age and ethnicity; Bowler et al., 2016; Elbogen et al., 2012; MacManus et al., 2019), these difficulties may be aggravated. In contrast, some factors, such as social support, stable living conditions, pre-deployment preparedness, and peer support (Elbogen et al., 2012; Kline et al., 2013) may reduce the intensity of crisis experiences being developed into severe mental health difficulties. However at present, research lacks an overview of these findings. In particular, there is an evident lack of research regarding protective factors of uniformed personnel, which may alleviate their mental health difficulties. Therefore, the present systematic review is timely.

While several theories could contribute to this research area, *Pluralistic Trauma Theory* (PTT; Balaev, 2018), *Self-Determination Theory* (SDT; Ryan & Deci, 2000), *Effort-Reward Imbalance model* (ERI; Siegrist, 1996), and *Job Demand-Control-Support model* (JDCS; Johnson, and Hall, 1988) are prominent theoretical frameworks to be considered. [Pluralistic Trauma Theory](#) (PTT; Balaev, 2018) suggests that trauma is not only about past experiences, but also about relations among experience, language, and knowledge. This approach conceptualises trauma as an event that changes perception and identity but awakes new knowledge about one's self and the external world. This theory relies heavily on external stressors; trauma can happen in specific individuals, times, cultures, and places, resulting in a

specific representation of trauma for each person. According to this theory, the effect of trauma is an interplay between external (e.g., cultural factors) and internal factors (e.g., personality traits), which creates a link between singular versus collective experiences of trauma. This subjective perception is important in determining what elements are considered salient, how the trauma is interpreted and encoded at the time, and ~~what is~~ what is socially acceptable to express (Balaev, 2018). In contrast to more traditional models of trauma (Freud, 1895; Caruth, 1996), which attributes more to unobserved neurobiological functions, PTT suggests that what remains hidden and unacknowledged is due to the influence of cultural values (Balaev, 2018). An earlier complementary theory that is also worth noting is Self-Determination Theory (SDT; Ryan & Deci, 2000). Emphasis here is placed on the notion that the human functionality depends on the social context; the interplay between intrinsic and extrinsic motivational factors which determines an individual's response to different social situations and further influences social, cognitive and personality development. It is suggested here that exposure to a traumatic event could serve as a social event that impacts on individual functionality, impacting on development, although this has not been applied to trauma per se but rather to symptoms that could be secondary to this, such as depression and anxiety. However, what it does note is how optimal levels of development comprise of competence (confidence to perform), relatedness (need to perform), and autonomy (independence to perform), and that once these are met, functionality is raised (Legault, 2017). How exposure to a traumatic event(s) impacted on these areas is not yet known.

Alongside these more general models of understanding human reactions are those specific to the work environment, since focus in this current review is on trauma exposure as a result of exposure through work. The Effort-Reward Imbalance model (ERI; Siegrist, 1996), for example, captures the negative effects of occupational stress and work conditions in developed/rapidly-developing countries, due to an imbalance between high cost spent and

low gain received in return. This repeated imbalance ~~could~~may arguably frustrate related circuits of the brain's reward system and increase the risk to develop stress-related disorders, such as depression (Siegrist, 2016). This suggests that occupations where there is a high cost but a low gain could be most vulnerable to this. Arguably working in occupations, such as the uniformed services, where there is a potential high cost to employees, raises the risk for stress-related disorders, of which trauma could be a core example. Alongside this is the need to capture the Job Demand-Control-Support (JDCS) model (Johnson & Hall, 1988), which outlines how employees are primarily stressed when there is a high demand (due to work overload, time pressure, and role conflict), low control (lack of autonomy), and inadequate social support. This builds on what is referred to as the 'strain' hypothesis and would have parallels to the ERI 'high risk' components. The competing 'buffer' hypothesis views 'social support' as a protective factor, which moderates the negative impact of high demand—low control (Van der Doef & Maes, 1999), thus raising the importance of capturing social support as a variable of potential significant interest in understanding the impacts of exposure to trauma within occupational settings.

As yet, ~~however~~, research into the factors that could serve as risk and/or protective factors are not clearly indicated in terms of post-crisis recovery. The types of impacts are researched to a greater degree but not the factors that could serve as 'strain' and/or 'buffers' to the demands that crisis responders are exposed to. Clearly, available theory can suggest possible factors of importance, but the empirical basis remains less clear. In consideration of this, the systematic review ~~presented~~ will identify and assess ~~the existing research~~ literature to capture the following aims: 1.) To understand what mental health difficulties may manifest in a crisis responder, from uniformed services, when exposed to crisis situations; 2.) To capture the risk factors, ~~which which~~ aggravate mental health difficulties; and 3.) To identify ~~what~~ factors that protect crisis respondents from mental health difficulties.

Method

This systematic review was conducted in accordance with recommended guidelines by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA; (Moher et al., 2009).

Data Sources and Search

Databases such as ProQuest, Wiley, Google Scholar, and PubMed were searched for peer-reviewed full text journal articles published in English for the past 10 years. The keywords used for the search strategy ~~are~~ were: “Crisis respondents*” OR “Post-disaster management*” AND “Mental health difficulties*” OR “Mental health symptoms*” OR “*Trauma” OR “Trauma recovery*” AND “Risk factors*” OR “Protective factors*” AND “War*” OR “Terrorism*” OR “Natural disasters*” OR “Emergency*” OR “Rescue*” OR “Violence*” AND “Military*” OR “Police*”. Articles were excluded if they were duplicates, not relevant, not a primary research study, due to weak methodology, and if the publication language was not English.

Data Extraction and Quality Appraisal

Titles and abstracts of the articles were initially evaluated by Reviewer 1 (RS). Thereafter, articles eligible for full-text screening were assessed by two reviewers (RS and MA), who had high agreement on the final decision. Each paper was assessed for its quality by two reviewers (RS and MA), using the critical appraisal tools by the Joanna Briggs Institute (JBI). The overall appraisal is presented as, “Include”, “Exclude” or “Seek further info”. The screened articles were independently evaluated by both reviewers to be included in the review and are presented in Table 1.

Results

Literature Search

The initial search resulted in 94,036 articles. After 561 duplicates were removed, 93,475 article titles and abstracts were screened as either “Relevant” or “Not relevant”. This resulted in 166 articles to be full-text screened for relevance in total, 93,277 articles were excluded because they were: not relevant ($n=91,321$), not a primary research study, ($n=1,939$), or publication language was not English ($n=17$). Thirty-two articles were added to the screening as a result of hand searching full-text references. The final in-depth assessment resulted in 11 articles meeting the inclusion criteria for the systematic review (see Figure 1).

<Insert Figure 1 here>

Study Characteristics

The majority of the active duty or retired crisis respondents ($n=33,677$) were exposed to combat during deployment to Iraq and/or Afghanistan. Other occupation roles included first responders from the police, fire department, and coastguards. All studies were from Western countries, such as the United States of America, Sweden, and Denmark. This was with the exception of Horesh et al., (2010), which comprised of an Israeli population ($n=675$). The mean age ranged between the minimum of 24 years and a maximum of 63.96 years. Validated measures were utilised in each study to assess mental health difficulties and risk/protective factors. Detailed information on characteristics are collated and presented in Table 1.

<Insert Table 1 here>

Main Findings

This systematic review identified core themes and sub themes via [the](#) use of Grounded Theory. These are described as follows:

Pre-deployment Factors

Only one study (Sørensen et al., 2016) had assessed the presence of mental health difficulties prior to deployment; when Danish soldiers ($n=42$) were screened for PTSD, six weeks prior to deployment, an inverse relationship (0.97) was revealed between PTSD (PCL ≥ 44 ; moderate to severe) and cognitive abilities. This inverse relationship between pre-deployment cognitive ability and symptoms of PTSD persisted, even when ~~controlled~~ controlling for traumatic life events, level of education, and perceived war zone stress (Sørensen et al., 2016). However, the most resilient subgroup of participants did not have a higher mean score of pre-deployment cognitive ability ~~score~~ than the mildly distressed subgroup of participants with [pre-deployment] moderate severity of symptoms ~~which that~~ decreased after deployment. The most resilient subgroup of participants with the highest proportion of combat soldiers also reported increased pre-deployment emotional problems and low [perceived] social support.

During-deployment Factors

As previously, only Sørensen et al. (2016) had assessed the Danish soldiers during deployment ~~as well~~. Study findings added to the aforementioned association between the higher mean score of pre-deployment cognitive ability and lower reports of PTSD symptoms: participants from the most resilient subgroup stated the highest level of danger/injury score during the mission, a higher proportion of soldiers being wounded or injured during the mission, and a higher proportion of having killed an enemy.

Post-deployment Factors

The following sub themes were identified as part of post-deployment factors; mental health difficulties, risk and protective factors for difficulties.

Mental Health Difficulties

The following mental health symptoms were noted in uniformed personnel exposed to crisis situations:-

PTSD and Depression. According to Chapman et al. (2014), combat medics appear to have sought more assistance for their mental health difficulties, in comparison to participants who have not been exposed to crisis situations; exposed medics were more likely to receive depression and Post-Traumatic Stress Disorder (PTSD) diagnoses. Chapman et al. (2014) reported that three months post deployment, depression and PTSD were not sustained, but once controlled for demographic variables, PTSD was reported at 12-month re-assessment. Symptoms of depression (14%) and moderate to severe range of PCL-M score (21%) were also reported by Groer et al. (2014), in addition to anxiety (17%); whilst similarly to Chapman et al. (2014), 11 veterans who were not exposed to combat, did not report any symptoms of PTSD. Further adding to Chapman et al. (2014) findings, Naragon-Gainey et al. (2012) also reported depression and PTSD to be the most common post-combat diagnoses, which was further affirmed by Litz et al. (2018), where combats described to have experienced more severe flashbacks, guilt, and sadness in their reports of PTSD symptoms.

Horesh et al. (2010) and Sørensen et al. (2016) studies were conducted with a special emphasis on symptoms of PTSD, and results revealed its presence in both studies as a post-combat mental health difficulty. These findings were further supported by Tracie Shea et al. (2013) in which it was reported that 12.6% of the veterans fulfilled the full criteria for PTSD within first six months post deployment. Adding to aforementioned research findings, Shea et al. (2017) presented that veterans who endorsed danger to themselves or, exposure to death/serious injury of others revealed increased levels of depression, anxiety, avoidance, re-experiencing, and hyperarousal symptoms; whilst killing someone else had not significantly associated with any symptom measures or guilt.

Notwithstanding with previous findings, a study by Presseau et al. (2019), which assessed the prevalence of mental health difficulties by types of trauma, reported that none of the complex traumas: Life Threat to Self (LTS), Life Threat to Other (LTO), Moral Injury by Self (MIS), and Aftermath of Violence (AV) were significantly associated with more severe symptoms of mental health difficulties; even when approximately 40% of the participants had endorsed multiple types of trauma. There was no difference in the prevalence of PTSD among different types of trauma. Only 10% of the participants exposed to Criterion A trauma reported symptoms of PTSD, increased anxiety, depression, suicidal ideation, combat exposure, and a high use of alcohol. Veterans who endorsed LTS and AV in Criterion A types of trauma revealed their deployment to be more stressful and experienced severe suicidal ideation. LTS and LTO were the most endorsed events while MIS and AV were the least endorsed events. Emotional numbing, anxiety, and depression were commonly reported for MIS, and SCID-PTSD symptoms were positively related with AV. Though LTO and LTS did not report anxiety or arousal, LTS reported symptoms of depression.

Aggression and Increased Psychiatric Symptoms. In addition to PTSD and depression, aggression and elevated psychiatric symptoms were also reported to be more prevalent in outpatient care settings and emergency rooms, respectively. Frequent aggressive behaviours were reported in addition to increased sense of betrayal/humiliation (Litz et al., 2018).

Risk Factors Aggravating Mental Health Difficulties of First Respondents, Post Exposure.

These themes were collapsed into personal circumstances and situational circumstances, as follows:-

Personal Circumstances. According to Tracie Shea et al. (2013) study findings, PTSD could not be predicted by demographic factors such as age, gender, and ethnicity, but negative temperament, life events prior to deployment, combat experience, and concerns

about life and family did. However, pre-deployment variables were not significant by the final model. Low support post deployment significantly predicted PTSD beyond the impact of pre- and during-deployment variables.

Arble ~~and~~ Arnetz (2016) reported that veterans who have been exposed to stress, with low social support, increased use of substances, and decreased physical health who used avoidant strategies and did not want to utilise coping mechanisms, have reported negative well-being. Adding to this, Chapman et al. (2014) revealed that the well-being of combat medics who screened positive for mental health difficulties were affected by their reluctance to seek professional intervention because of their concerns about stigma associated with mental health and barriers to care. A positive correlation was revealed where the higher the level of assistance needed, ~~the~~ perceived barriers to ~~their~~ care and stigma were greater.

A study by Funderburk et al. (2014) categorised the participants according to their level of treatment requirement. The four risk factors assessed; overweight/obesity, smoking, at-risk for alcohol use, and symptoms of depression or PTSD were least positive for the Low Treatment Need (LTN) group. ~~Whereas~~ the Moderate Treatment Need (MTN) group reported increased smoking and at-risk alcohol ~~use than their comparison to the~~ LTN group. The High Treatment Need (HTN) group reported the highest levels for all four risk factors where PTSD was a significant discriminator. Majority of the participants had endorsed more than one risk factor, ~~where with~~ overweight/obesity ~~was the found to be the~~ most prevalent. MTN group revealed the lowest number of visits for treatment, whereas LTN and HTN groups reported a similar number of treatment visits. This is further supported by Naragon-Gainey et al. (2012), ~~which who~~ reported that only 36% of ~~the~~ participants had visited the treatment centre for more than eight mental health visits.

Adding to Funderburk et al. (2014) ~~and~~ Groer et al. (2014), from 68% participants who reported combat exposure, half were smokers. The overall sample reported increased

levels of C-reactive protein (CRP), which was positively correlated with hair cortisol levels, along with Depression and PTSD, but not with Combat Exposure Scale (CES) scores. The previous combat exposure and Center for Epidemiological Studies–Depression Scale (CES-D) scores had a significant relationship with PCL-M scores, but hair cortisol and CRP levels did not predict PCL-M scores in the regression model once combat experience and depression was added.

Situational Circumstances. Shea et al. (2017) reported that “having killed” did not significantly contribute to any symptom measures, including guilt. Rather, mental health difficulties were associated with danger to own self and exposure to death or serious injury of others. Over 50% were related to incidents of being attacked/ambushed, exposure to explosive devices, receiving small arms fire, witnessing dead bodies or remains, and the knowledge of a colleague being dead or seriously injured. Killing an enemy or endorsing killing non-combatants were the least endorsed events.

Findings by the Shea et al. (2017) study was further supported by Litz et al. (2018), which revealed that among participants receiving treatment for PTSD, more severe symptoms were reported by veterans who endorsed a traumatic loss trauma-trauma, moral injury-others, moral injury-self, and violence trauma type, than those who endorsed life threat-self. Life threat-self events were mostly reported by young participants with a short service duration and low exposure to combat. In contrast to other findings of Shea et al. (2017), participants of Litz et al. (2018) study reported non-threatening events to be more distressing than threatening experiences in the war zone. In a study by Presseau et al. (2019), Life Threat to Self (LTS; 51%) and Life Threat to Other (LTO; 31%) were more commonly endorsed by the participants, even though there was no association of these events with symptoms of mental health difficulties.

According to Horesh et al. (2010), participants with a shorter onset of PTSD reported high and more severe exposure to pre- and post- war incidents, more damage during the war, more stressful position in service, and increased rates of combat stress reaction (CSR) which was the most powerful predictor of PTSD, followed by subjective combat severity (SCS), whilst negative childhood events was the found to be the weakest predictor. Horesh et al. (2010) further revealed a negative relationship between the length of PTSD onset and the number of stressful experiences during a participant's lifetime, and also delayed PTSD onset and level of combat exposure. Yet, the Tracie Shea et al. (2013) study reported that participants' perceived adequacy of pre-deployment training and preparation, and concerns about life and family during deployment, had a significant relationship with the combat exposure severity; full criteria for PTSD was fulfilled by 26.6% of the participants who endorsed increased combat exposure and high levels of concerns for life and family, out of which only 2.4% participants were diagnosed with PTSD once they endorsed increased combat exposure with low levels of life and family stress. If they endorsed a low severity of combat exposure, it reported an increased perception of adequacy in training, yet, independent of perceived adequacy of training level, 17% of the participants with high combat exposure reported PTSD.

Protective Factors Supporting Positive Management/Emergence of Mental Health Difficulties.

According to Arble and Arnetz (2016), the well-being of veterans who have been exposed to combat has been positively influenced by stable physical health, high social support, use of approach coping, and post-traumatic growth. Furthermore, Tracie Shea et al. (2013) has revealed that participants with high levels of perceived adequacy of training and low exposure to combat did not report PTSD, thus indicating that meaning pre-deployment

preparation and training, and low severity of exposure during deployment ~~have~~ contributed as protective factors against developing mental health difficulties ~~amongst soldiers~~.

<Insert Table 2 here>

Discussion

The findings demonstrate that PTSD and depression appear the most common diagnoses, followed by anxiety. These mental health difficulties are prone to be aggravated by specific risk factors, which may be personal (e.g., obesity, decreased physical health, low cognitive abilities, existing mental health difficulties, job position, threat to self, peers and family, use of avoidant strategies such as substance abuse) or situational (e.g., lack of social support, past stressful experiences, combat frequency and severity, and social stigma). In contrast, post-crisis mental health difficulties can be minimised with the influence of protective factors, such as, high cognitive ability and social support, effective coping strategies, pre-deployment preparedness, and/or robust physical health.

There was evidence of veterans receiving PTSD and depression as the most common diagnoses, post exposure to crisis situations (Chapman et al., 2014; Groer et al., 2014; Naragon-Gainey et al., 2012); even sometimes reporting symptoms six ~~–~~months post deployment (Shea et al., 2013) and sustained for 12-months post deployment (Chapman et al., 2014). This implies a short onset yet lasting effects of the combat exposure on an individual's mental health state. The relationship between PTSD and combat exposure can be clearly stated, independent of any confounding variables, as service personnel who have not been exposed to crisis situations, or have a short period of exposure to combat, report no or low symptoms of PTSD (Chapman et al., 2014; Groer et al., 2014).

Contrary to the common assumption that an individual may be more distressed by having to kill someone else due to sense of morality, the review findings revealed that

veterans who reported a higher number of mental health symptoms endorsed more concern about their personal safety and apprehension for fellow veterans (Shea et al., 2017). A strong sense of self and solidarity are demonstrated here, over the effects of moral injury. This arguably aligns with both Self-Determination Theory (SDT; Ryan & Deci, 2000) and the Pluralistic Trauma Theory (PTT; Balaev, 2018), namely that individuals are more affected by their subjective perception and what is considered to be socially acceptable (e.g., eradicating terrorism is essential), rather than by the objective outcome (e.g., death) of a crisis situation—especially during militarised tasks where individual autonomy could be compromised but the need and confidence to perform are boosted.

Several research findings have continually revealed that exposure to crisis situations may manifest as mental health difficulties, in veterans. Yet, there exist research findings that report that even when multiple types of trauma, such as threat (life and/or moral) to self and/or others, are analysed, there is no significant relationship between the exposure to a crisis situations and mental health difficulties (Presseau et al., 2019). This differential finding cannot be attributed to the status of the sample or geographical location (i.e., American veterans in active duty), as other research had analysed samples of American veterans in active duty (Groer et al., 2014; Litz et al., 2018). Therefore, further analysis of the sample, measures, and methodology is warranted to determine the possibility of veterans not significantly affected by exposure to crisis situations. However, this differential finding may be somewhat explained by Litz et al. (2018); ~~which-who~~ reported that effects of life threat-self events were mostly endorsed by participants of young age with low exposure to combat and service period, which is supported by the Job Demand-Control-Support (JDCS) model (Johnson & Hall, 1988). ~~JDCS~~, ~~which~~ states that individuals may be stressed by their tasks only if there is high demand, low control and social support. Alternatively, it is plausible, as per the Effort-Reward Imbalance model (Siegrist, 1996), that uniformed services were not

affected by the exposure to crisis situations, as they found their experience to be highly rewarding (e.g., safeguarding civilians). Additionally, the PTT also states that the impact of trauma comes to play *as a result* of the interactions between external (i.e., situation) and internal (i.e., personality) factors. Therefore, due to their subjective perception and diminished exposure to crisis situations, the trauma response may have not manifested as mental health difficulties in them.

Some of the studies that reported mental health difficulties for veterans of uniformed services, who have been exposed to crisis situations, have also identified risk factors that may aggravate these mental health symptoms. Low social support and physical health, lack of good coping mechanisms (low treatment visits) and increased use of avoidant strategies, such as substance abuse, and especially the reluctance to seek professional assistance due to perceived barriers to care and concerns related to social stigma, were key risk factors revealed by this systematic review (Arble & Arnetz., 2016; Chapman et al., 2014; Naragon-Gainey et al., 2012). These findings are supported by both PTT and SDT theories, which focus on the influence of internal/external stressors and intrinsic/extrinsic motivational factors, which contribute to an individual's social, cognitive and personality development, including one's specific manifestation of trauma. All aforementioned risk factors are domains that will aggravate mental health issues, post the deployment, upon return. Addressing these factors require treatment and intervention strategies, over a preventive approach.

In order to lessen the effect of combat exposure manifesting as mental health difficulties, aforementioned intrinsic/extrinsic risk factors should be a focal point to be identified and assessed *pre-deployment*. This will contribute to a more effective recruitment and training within uniformed forces, and improved trauma recovery post deployment. Even though Tracie Shea et al. (2013) reported that demographic factors (e.g., age, gender, and ethnicity) and pre-deployment variables (e.g., negative temperament) could not predict

PTSD, low cognitive ability, overweight/obesity, pre-deployment emotional problems, [perceived] low social support, negative childhood experiences, and stressful experiences during a participant's lifetime were reported by other research studies as pre-deployment factors that may increase the vulnerability of a veteran to be effected by combat exposure (Horesh et al., 2010; Sørensen et al., 2016).

Crisis respondents and their respective organisations have low control regarding factors during deployment that may enhance the risk to develop and worsen mental health difficulties. However, it is useful to be mindful of following intrinsic/extrinsic risk factors for post-deployment assessment, treatment, and intervention, as its importance emphasised by PTT and SDT theories. Higher frequency and subjective severity of combat exposure, more stressful position during the mission, increased rates of combat stress reaction (CSR), non-threatening events such as high levels of concerns for life and family, danger/injury during combat to self and/or others, exposure to death, and higher kill rate of the enemy were the most prominent risk factors revealed by this systematic review (Horesh et al., 2010; Litz et al., 2018; Shea et al., 2013; Shea et al., 2017; Sørensen et al., 2016; Tracie Shea et al., 2013). Even though Shea et al. (2017) reported that "having killed" an enemy did not contribute to mental health difficulties, this can be explained by the low number of "having killed" endorsed by study participants as an event experienced during combat. In contrary to aforementioned research studies, by-Presseau et al. (2019) reported that even though Life Threat to Self (LTS) and Life Threat to Other (LTO) were more commonly endorsed by the participants, these events had not contributed to mental health difficulties of the participants. As previously explained, these findings align with rationales of PTT (i.e., the impact of subjective perception and societal acceptance of trauma experience and response), SDT (i.e., the encouragement of need, confidence and freedom to perform), and Effort-Reward Imbalance model (i.e., high gain over cost) theories. Additionally, more in-depth analysis of

this study (e.g., methodology and population) is required to determine if it is an exception to existing research findings.

Despite its very important role in trauma recovery, there is a low report of factors that lessen the severity of mental health difficulties of crisis respondents post traumatic events. This may be either due to lack of such factors or the low interest of researchers in investigating the existence and influence of protective factors. Post-traumatic growth, high social support and physical health, effective strategies of coping, and high levels of [perceived adequacy in] pre-deployment preparation and training have reported to contribute as factors which lessen the effect of combat exposure to be manifested as mental health difficulties in crisis respondents (Arble & Arnetz., 2016; Tracie Shea et al., 2013). Even though the most stable subgroup did not report a higher mean score of pre-deployment cognitive ability compared to the subgroup of participants with symptoms with moderate severity, Sørensen et al., (2016) revealed an inverse relationship between pre-deployment cognitive ability and PTSD symptom severity, even after ~~controlled-controlling~~ for many confounding variables.

Limitations

All eleven articles included in the systematic review are research studies that have assessed crisis respondents from Western countries. ~~Therefore,~~ this review ~~therefore~~ lacks insight into mental health difficulties, and risk/protective factors post exposure to crisis situations across different cultures and geographical locations. Additionally, the majority of the crisis situations ~~were involved~~ combat exposure where uniformed forces ~~have had~~ been deployed to foreign countries. The effect of other crisis situations, such as natural disasters, and the response of service personnel in attending to crisis situations in their home country, have not been explored. ~~The~~ findings ~~further~~ cannot be generalised as the search strategy was limited to English language publications.

Evidently, all articles except one had focused on post-deployment phase of ~~the soldiers~~ uniformed personnel; whether it ~~is~~ was to assess mental health difficulties, risk and/or protective factors. ~~Therefore~~ Consequently, t- the current research domain is greatly disadvantaged due to the lack of insight during pre- and during deployment stages. As a result of such, it would be difficult for practitioners to encourage prevention, in addition to treatment. It was also difficult to determine the impact of gender, mainly due to the nature of recruitment and deployment in uniformed forces where women report low numbers of opportunity to have served as first respondents. This is a major limitation as current research is unaware of the influential nature of gender; if it serves as a risk or protective factor against mental health difficulties in combination with other contributing variables post exposure to crisis situations. Future research should seek to address the gaps in the literature revealed by this systematic review, ~~and as well as~~ expanding inquiry beyond Western understandings.

Conclusion

This systematic review demonstrates clear indication of mental health difficulties; post exposure to crisis situations among first responders, which are enhanced or minimised by various ~~and multiple~~ risk and/or protective factors ~~difficulties~~. Post-traumatic Stress Disorder and depression were the most common diagnoses. It argues for a clear impact of risk and protective factors, which should be considered for effective pre-deployment recruitment and training, and post-deployment trauma recovery.

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Figure 1. Extraction of articles

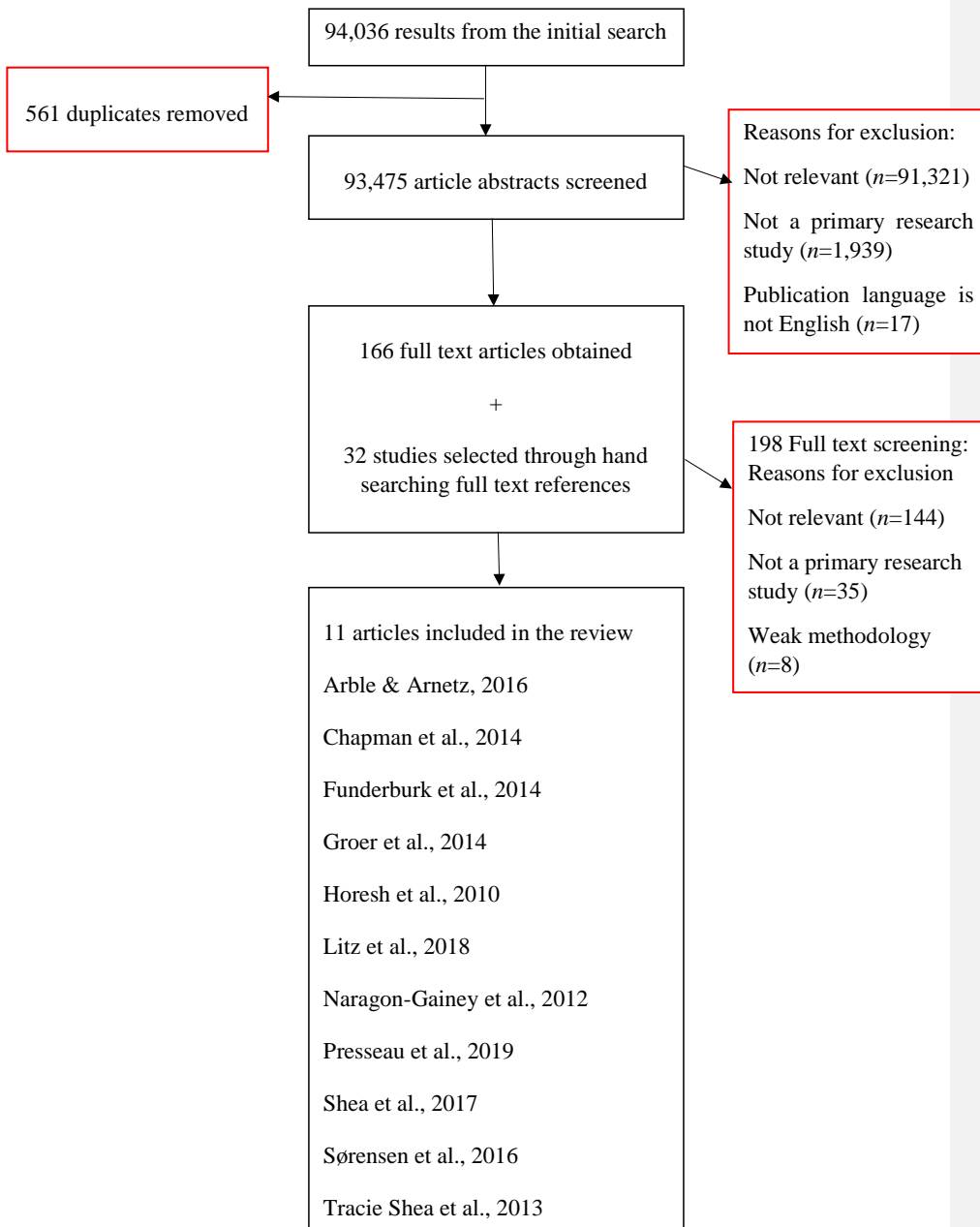


Table 1: Study Characteristics

Author	Sample	Age (M, SD)	Type of Crisis
Arble & Arnetz, 2016	First responders: coast guard, customs control, military, emergency medical services, fire department and police services, Sweden (N = 3,656)	67% in the age range was between 30 -55 years	Not available
Chapman et al., 2014	Army combat medics served both as a soldier and medic, USA (N=799)	Never deployed (M=25.86, SD=6.01); 3 months post-deployment (M=27.97, SD=6.16); 12 months post-deployment (M=31.32, SD=6.36)	Combat
Chapman et al., 2014	Army combat medics served both as a soldier and medic, USA (N=799)	Never deployed (M=25.86, SD=6.01); 3 months post-deployment (M=27.97, SD=6.16); 12 months post-deployment (M=31.32, SD=6.36)	Combat
Funderburk et al., 2014	Veterans, USA (N=28,578)	Exploratory (M=63.96, SD=13.41); Confirmatory (M=63.88, SD=13.53)	Not available
Groer et al., 2014	Active-duty Army and National Guard soldiers (enlisted and reservists) in Bold Quest at Camp Atterbury, USA (N=52)	Mean age of 25 years and a range between 19 and 42 years.	Combat
Horesh et al., 2010	War veterans, Israel (N=675); "1983 PTSD" group (soldiers with PTSD in the first assessment; N = 299), "1984 DPTSD" group (soldiers who did not have PTSD in the first assessment, but in the second assessment; N = 58), the "2002 DPTSD" group which did not have PTSD in the first and second assessments, but in the third assessment; N = 53), and the "no PTSD" group (soldiers who did not suffer from PTSD at any point of the assessments; N = 265)	1983 PTSD (M=29.65, SD=5.90); 1984 PTSD (M=27.88, SD=4.78); 2002 PTSD (M=28.42, SD=5.87); no PTSD (M=29.68, SD=6.13)	Combat

Litz et al., 2018	Active-duty military service members and recently retired veterans, USA (N=999)	Life threat-self (M=32.06, SD=7.28); Life threat-others (M=33.67, SD=6.87); Aftermath of violence (M=34.28, SD=7.97); Traumatic loss (M=32.14, SD=7.47); Moral self-injury (M=32.68, SD=6.66); Moral injury-others (M=32.99, SD=7.33)	Combat
Naragon-Gainey et al., 2012	Veterans returning from Iraq and Afghanistan, USA (N=618)	M=30.8 (SD=8.1)	Combat
Presseau et al., 2019	Active duty military service members, USA (N=789)	Initial sample (M=26.57, SD=6.08); postdeployment sample (M=26.57, SD=6.08); Final sample (M=27.47, SD=6.5)	Combat
Shea et al., 2017	Returnees of the National Guard and Reserve units from Iraq and Afghanistan, USA (N=238)	M=33.79 (SD=9.65)	Combat
Sørensen et al., 2016	Danish soldiers deployed to Afghanistan, Denmark (T1:N=743; T6: N=429)	M=24	Combat
Tracie Shea et al., 2013	Returnees of the National Guard and Reserve units from Iraq and Afghanistan, USA (N=238)	M=33.5 (SD=9.5)	Combat

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