

Review

Measuring trauma symptoms in paramedicine

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Abstract

Background

The trauma experienced as a paramedic can have a devastating psychological impact on both professionals and students in training, and increases the risk of developing post-traumatic stress disorder (PTSD). Paramedics are often placed in high-risk situations involving multiple or sustained trauma and also experience high levels of occupational stress, which can produce adverse psychological and physiological responses. Despite these risks, understanding trauma and its various manifestations in paramedicine has not been well documented.

Methods

This narrative review describes the history and changes in diagnostic criteria, and contrasts the methods of measuring PTSD symptomology with the current criteria.

Results

PTSD was first defined in the American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders, third edition (DSM-III) in 1980, however the diagnostic criteria and associated measurement tools failed to reflect the repeated and vicarious traumatic events experienced by paramedics. Currently, the majority of the measurement tools used to assess post-traumatic stress are still aligned with superseded diagnostic criteria and many only classify the symptoms of PTSD as present or absent with little consideration given to symptom severity. Consequently, these existing measurements of PTSD are outdated and inefficient in their ability to identify and measure PTSD using the revised criteria.

Conclusion

The development of a more specific measurement tool, which reflects the DSM-5 diagnostic criteria of trauma-related stressors within this population, will allow for a more comprehensive measurement of symptoms. Future research undertaken in this specific field will also help to inform education and training programs to assist with the negative impacts of trauma and aid in management and treatment of PTSD in paramedics.

Keywords:

allied health personnel; stress disorders; post-traumatic; paramedics; measurement

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Introduction

The trauma experienced as a paramedic can have a devastating psychological impact on both professionals and students in training. Almost 97% of paramedics will experience a single traumatic event in the field (1), and paramedic students are just as likely to experience trauma-exposure during their placements (2,3). Long-term exposure to trauma puts paramedics at an increased risk of experiencing adverse psychological and physiological reactions and developing serious mental health conditions including post-traumatic stress disorder (PTSD) (4,5). For paramedic students, these risks are compounded by inexperience, deficient levels of resilience, external assessment stress and lack of peer support (2,6).

Despite these risks, understanding trauma and its various manifestations in paramedics has not historically been well documented. Until the most recent publication of the Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-5) in 2013, the diagnostic criteria of PTSD and associated measurement tools did not include the repeated and vicarious traumatic events experienced by paramedics or other first responders as an associated diagnostic criterion (7). Moreover, many of the current measurement tools are still aligned with previous diagnostic criteria and only classify the symptoms of PTSD as present or absent without measuring symptom severity (8). Consequently, these existing measurements of PTSD are outdated and inefficient in their ability to identify PTSD using the revised criteria and the development of a more specific scale (particularly for emergency service personnel, students and trainees) is warranted.

The following narrative review will focus on the measurement of psychopathological responses to trauma among paramedics and paramedic students. The paper will describe paramedics and paramedic students and their response to trauma with a particular focus on PTSD and its associated diagnostic criteria. Specific attention will be paid to measuring symptoms of PTSD and existing screeners, and the importance of developing measurements consistent with the current diagnostic frameworks for paramedics and students.

Paramedics and trauma

In 2016, Australian statistics indicated almost 14,000 paramedics and ambulance officers were currently employed nationwide to respond to emergency situations and provide aid (9). The role of paramedics not only involves critical care of victims but places them in high-risk situations involving multiple or sustained trauma and high levels of occupational stress (5). Boyle et al (10) estimated almost 88% of Australian paramedics experience occupational-based violence including being punched, kicked, bitten, spit at and stabbed over their career. This type of traumatic exposure along with routine physical demands, working overtime and special duty shifts are considered to produce adverse psychological responses in

paramedics (5).

Although paramedics are highly trained to provide emergency medical care, dealing with victims of trauma and providing emotional support can also have psychological consequences (11). In a study by Regehr et al (12), higher levels of distress were found among paramedics who developed secondary or vicarious trauma compared to experiencing direct trauma, as a result of working with a traumatised individual. The authors contend the empathetic relationship developed between the paramedic and the victim increases the vulnerability to experience an emotional response to the victim's suffering and develop symptoms of traumatic stress as a result.

Defining these varying types of psychological stressors is also complicated by the duration and frequency of the trauma exposure (1). Student paramedics, who experience a relatively short time in the field during their placements, are also at risk of exposure to the same physical and psychological stressors that long-term career paramedics experience (2,5). From single events to repeated exposure, the impact of trauma on present and future paramedics varies considerably therefore making measurement of trauma in this field particularly difficult.

Responses to trauma and PTSD

Individual responses to traumatic experiences vary considerably and can be dependent on the persistence and intensity of symptoms (13). Typical responses to trauma include symptoms of intrusion (distressing dreams, dissociative flashback episodes), avoidance (efforts to avoid activities or people, inability to recall the trauma, restricted range of affect) and hyperarousal (irritability, difficulty sleeping and concentrating, hypervigilance) (14). For the majority of individuals who experience these symptoms initially following trauma, the responses extinguish over time (13). However, if these symptoms continue to persist, they can become pathological and can lead to a range of psychological disorders including major depressive disorder, generalised anxiety disorder and PTSD (15).

In regards to the specific trauma responses in paramedics, research has suggested the processes of sensitisation and kindling influence the response one has to repeated trauma. Sensitisation is the progressive intensity of reactions to repeated traumatic events over time; and kindling is increased responsivity to exposure of repeated traumatic events, such that the individual becomes affected by events that would not have previously triggered a response (16). Further research examining trauma responses has shown paramedics report increased feelings of disengagement and emotional distance, anger and irritability, generalised fears for family members' safety (6,17), increased alcohol abuse and increased absenteeism for mental health stress (12). It is also often the case that childhood exposure to trauma influences career choice among paramedics, which may also increase the risk of experiencing episodes of PTSD (18).

In the most recent (fifth) edition of the Diagnostic and Statistical Manual of Mental Disorders a new category, 'Trauma and Stressor-Related Disorders' has been established separately from anxiety and fear disorders and in which specifically define psychopathological diagnoses that occur in response to trauma (7). Discussion of all trauma and stressor-related disorders is beyond the scope of this review therefore attention will be paid to the manifestation of PTSD as a response to trauma.

PTSD is characterised by four clusters of symptoms that develop following direct, witnessed, learned or repeated exposure to one or more traumatic events involving 'actual or threatened death, serious injury or sexual violence' (7). The clusters of symptoms include intrusive recollections of the event (e.g. distressing dreams or flashbacks), avoidance of stimuli associated with the event (e.g. distressing memories, feelings or objects), negative alterations in cognitions and mood (e.g. inability to remember, blaming oneself, fear or anger), and marked alterations in arousal and reactivity (e.g. irritability, hypervigilance and sleep disturbance). The DSM-5 specifies symptoms have to be present for more than 1 month, must cause clinically significant distress or impairment, and must not be attributable to the psychological effects of a substance (e.g. alcohol or medication) or another medical condition (7).

As mentioned above, the clinical presentation of PTSD varies considerably between individuals and symptom patterns. For example, some individuals experience symptoms dominated by fear-based re-experiencing of the event, whereas other may find dysphoric mood states and distorted cognitions more distressing. Also, in some cases, the full diagnostic criteria are not met until at least 6 months after the event and is therefore specified as a delayed expression (7). Further complicating the diagnosis, 80% of individuals with PTSD are likely to have comorbidities including depressive, bipolar, anxiety or substance use disorders (19). These comorbidities, particularly major depression and substance abuse, are commonly seen in paramedics who have been diagnosed with PTSD (3,4,20).

PTSD in paramedicine

Due to the 'routine' nature of providing emergency medical assessment and treatment to victims in distress, research has shown the exposure to cumulative stressful emergencies for paramedics is associated with elevated levels of PTSD and termed a high-risk profession (1,2,5,6,21). Previous literature has found varying prevalence rates of PTSD in paramedics ranging from 5% (6), to 10% (1) and 16% (2) which is considerably higher than the PTSD prevalence in the general population. Within Australia, McEvoy et al (22) found 4.4% of participants of the National Survey of Mental Health and Wellbeing had met the diagnostic criteria for PTSD within the past 12 months and estimated a life-time prevalence for the general adult population of 7.2%.

In 2012, Berger et al (21) conducted a meta-analysis of the worldwide prevalence of PTSD in rescue workers from 28 studies and found approximately 10% of first responders

(firefighters, ambulance personnel, police officers and canine search and rescue teams) met the PTSD diagnosis criteria. Specifically, ambulance personnel were found to have the highest prevalence of PTSD among all occupational groups (14.6%). The authors suggested the greater frequency of emergency calls and closer contact with victims, coupled with greater pressure and stress at work, may explain why paramedics experience increased rates of PTSD. However, the authors inferred these figures are likely conservative as studies only investigated active workers and failed to include paramedics who may have prematurely retired as a result of trauma exposure.

Additionally, these figures do not include subsyndromal distress, which is commonly experienced in paramedics. Subsyndromal symptoms of PTSD – also known as 'partial PTSD' – occur when the combination or intensity of symptoms are not sufficient for a diagnosis (16). Research has shown subsyndromal PTSD symptoms are associated with increased rates of depression, suicidal ideation, anger and hostility and sick leave (23). In a study that examined full and partial PTSD in 234 Brazilian ambulance workers, Berger et al (24) found 15% of participants exhibited symptoms of partial PTSD compared to 5.6% of participants who displayed full PTSD symptoms. It can be argued that subsyndromal symptoms of PTSD can have just as debilitating of effect on a paramedic's mental health, and warrant further investigation.

Recent literature has also identified paramedic students to be at an even greater risk of developing PTSD (2,3). Student paramedics are exposed to a range of new environments and experiences often hard to prepare for, often undertake placements without peer support and have to endure the added pressure of being assessed on the job. Lowery et al (6) investigated trauma-related symptomatology in paramedic students and reported the actual exposure to traumatic events rather than the duration of service was more predictive of negative health outcomes. This is concerning as paramedic students need time to accumulate experience, establish support systems and develop resilience in the field. Therefore, their vulnerability to experiencing adverse effects of trauma exposure is considerably higher as students than fully qualified paramedics who have already established support systems to help cope with traumatic event exposure (2). Paramedic students may also be more likely to employ maladaptive coping strategies as they attempt to hide their distressing emotions from their supervisors in order to safeguard their future career opportunities (6). As such, Lowery argued that paramedic students risk developing PTSD by continuing these learned maladaptive strategies as they progress through their training and into the workforce.

Contributing to the limited research of this vulnerable population, Wild et al (3) investigated health outcomes for newly recruited paramedics during the first 2 years of training, and found among 386 participants, 8.3% experienced an episode of PTSD and suffered significant clinical distress including

increased absenteeism, poorer sleep, burnout, weight gain and lower quality of life. Additionally, Fjeldheim et al (2) examined trauma exposure and PTSD in paramedic students in South Africa. Their data indicated paramedic students had high prevalence rates of PTSD (16%), depression (28%) and alcohol abuse (24%), poorer physical health and low levels of social support and resilience. The risk of developing pathological responses when exposed to trauma did not discriminate based on duration of time spent in the paramedic profession in these studies, which is an important characteristic when considering future measurement and treatment of trauma.

Although PTSD has been well researched in common population samples such as war veterans (25) and victims of sexual assault (26), the impact and measurement PTSD in high risk occupations such as paramedics, particularly paramedic students, has been a relatively understudied group in trauma literature. Much of the research investigating PTSD among paramedics relies on self-report measures, which are less rigorous than structured clinical interviews (5). This reliance on self-report is limited by participants who under-report or minimise their reactions due to the fear of being negatively evaluated by peers and not being able to meet job expectations by leadership (1,6). Furthermore, the variation in diagnostic frameworks of PTSD over the past 30 years has made analysing trauma effects across occupations particularly difficult, especially as PTSD diagnoses fail to indicate severity of symptoms (5).

Measuring symptoms of PTSD

Considering the history of the diagnostic changes to PTSD and adherence to strict criteria, the process of diagnosing PTSD has been wrought with difficulties. In a study of PTSD in urban primary care, it was estimated that PTSD was only accurately diagnosed in 50% of cases, and for those individuals that held co-occurring disorders, even less so (27). With the new changes to the PTSD criteria in the DSM-5, trauma survivors now have the possibility of experiencing over 635,000 different symptom combinations, which only reinforces the need for the development of valid, reliable and accurate measurements of PTSD (28). Particularly for paramedics who are exposed to repeated traumatic experiences throughout their career that leave them vulnerable to developing adverse psychological responses, the need for greater understanding of responses to trauma, and post-traumatic distress within this population cannot be overstated. As mentioned earlier, research has examined the impact of experiencing vicarious trauma in paramedics (12), however these concepts of 'secondary trauma' and 'vicarious traumatisation' are still yet to be formally recognised in the DSM, which suggests further investigation of trauma symptoms is needed. The development of accurate and effective measurement tools that are psychometrically sound and reflect the most current diagnostic frameworks is the first step to reaching a better understanding of the PTSD-related symptoms experienced in paramedics (2).

Research involving paramedics has also been complicated by the stigma of acknowledging trauma-related distress in the workforce (29). This reluctance to participate in research and provide accurate data has the potential to create a barrier against effective measurement. Furthermore, it has been reported that some organisations are wary of investigations involving workplace trauma (29,30). Therefore it is necessary that future research be conducted by independent parties and organisations unaffiliated with the population being measured in order to reassure respondents and provide an environment where accurate and reliable data can be gathered. Generally, research measuring post-traumatic stress employs two methods of measurement: clinical interviews and self-report measures. Each mode of measurement has been thoroughly utilised to diagnose PTSD in paramedics since its conceptualisation and will be discussed in further detail below.

Clinical interview

Clinical interviews are an interactive clinician-administrated assessment used to investigate dichotomous and continuous data about symptoms, with the aim of screening and ultimately diagnosing DSM disorders including PTSD (8). Structured clinical interviews are generally considered the gold standard in measurement (31), however interviews which involve unstructured or semi-structured question sets in order to gain rich information related to specific symptoms are more accurately described as the gold standard in classification, and are not actually considered a measurement from a quantitative perspective. Structured interviews address the question about whether an individual may be experiencing PTSD, but offer little insight of the severity of symptomology.

Although clinical interviews are rigorous and somewhat flexible, they are limited by their administration protocols. Structured interviews can take up to 1 hour and must be administered by a trained professional. Furthermore, most interviews only categorise symptoms as present or absent and fail to assess the frequency and intensity of each symptom. Not only does this limit the documentation of symptom changes over time, the concept of 'measuring' PTSD is undermined as these structured clinical interviews tend to be used more as a classification tool which impacts upon the overall diagnostic status (8).

Self-report measures

Conversely, self-report measures allow researchers and clinicians to easily screen for PTSD due their ability to be relatively non-intrusive and administered to large samples, cost-effective, flexible in format (online or hardcopy) and time-efficient (32,33). Self-report assessments also have the ability to provide a continuous measure of trauma and differentiate between traumatic events, which has the potential to aid in measurement and treatment of primary and secondary trauma symptoms (34). Similarly to clinical interviews, most self-report measures are based around the diagnostic criteria of PTSD in the DSM-IV (27,32-37), however a revised version of the

Posttraumatic Stress Disorder Checklist (38) has been developed to meet the DSM-5 criteria.

Self-report measures generally provide respondents with an overall PTSD sum score derived from each cluster of symptom scores, which are then interpreted without clinical subjectivity or additional information such as personal suffering or background characteristics (33). These measures have important clinical utility for paramedics exposed to trauma. Used as a screening tool, self-report surveys can identify individuals likely suffering from PTSD symptoms in a brief and efficient manner using threshold scores, which can inform management plans such as seeking further clinical validation and treatment. In a recent investigation of the IES-R, Hogan et al (39) examined the psychometric properties of the scale with a sample of Australian paramedics and found the IES-R to be a useful and robust screening measure of some trauma symptoms.

Previous research has explored the clinical accuracy of self-report measures of PTSD with varying results. In a review by Norris et al (40), 24 standardised self-report instruments of PTSD were found to have acceptable reliability and validity. Alternatively, Brewin (41) conducted a systematic review examining performance levels and applicability of 13 self-report measures of PTSD in civilian trauma populations. Brewin concluded brief measures performed as effectively as longer measures, however none of the measures met his pre-determined criteria of sensitivity, specificity, positive predictive power, negative predictive power and overall efficiency, highlighting the need for better screening measures. This was further confirmed by Del Vecchio et al (42) who reviewed 41 PTSD self-report instruments and concluded instruments used for specific trauma populations or events could be more widely applicable than originally intended, and more high-quality self-report items are needed to augment the screening of PTSD symptoms in high-risk populations, including paramedics.

Self-report measures also have limitations that need to be addressed. Due to the subjective nature of the screeners, sole-reliance is given to participants providing honest information without any objective verification of trauma exposure or symptoms (43). A recent Australian study explored the diagnostic assessments of emergency service workers claiming PTSD-related compensation and found a majority of cases were diagnosed with PTSD without meeting minimum diagnostic standards (44). This reliance on the claimant also raises concerns over potential malingering of symptoms and difficulty in assessing this without gathering further information from multiple sources (45). Nonetheless, the benefits and need for efficient and reliable self-report screeners of PTSD cannot be minimised.

PTSD screening tools and the DSM-5

The continuous changes to the diagnostic framework of PTSD in the DSM since being formally recognised represent a greater understanding of the symptoms and developmental course

of PTSD. However, for screening tools to work effectively and accurately, they also need to evolve and be restructured to reflect the most current diagnostic frameworks (46). The majority of the aforementioned PTSD self-report measures existed before the fifth edition of the DSM and therefore fail to accurately screen for the most recent changes to the major symptom clusters (7). For example, Criterion D3 and D4 symptoms are new to the DSM-5 and are not captured by any of the past measures. Some screeners that do not directly correspond with the revised version of the DSM-5 attempt to replace the diagnostic criteria with a cut-off point that indicates if PTSD is present or absent. This approach has limited utility as the critical scores likely vary with sample characteristics and restrict the generalisability of the scale (47).

It is therefore imperative that new self-report tools are developed to meet DSM-5 criteria to ensure greater accuracy in measurement and remain consistent with the most current diagnostic frameworks of PTSD. As mentioned earlier, the PCL-5 is a current measure developed to meet the DSM-5 criteria (48). The PCL-5 is a 20-item self-report measure used to screen and make a provisional diagnosis for individuals with PTSD. This brief scale, while efficient to administer, does not measure all symptom categories within the 20 items and therefore risks construct underrepresentation (49). Ideally, measurement scales aim to demonstrate a level of severity of experiences across the spectrum, from little or no symptomology to extremely high levels. Simplistic or very short scales such as the PCL-5 may be useful for classification purposes but do not offer measurement properties beyond this.

Research focussing on the psychometric properties of the PCL-5 is also currently lacking. A recent study by Blevins et al (38) evaluated the measure and found strong reliability and validity using a civilian sample of trauma-exposed college students, however the authors stated generalisability to clinical samples is unknown. Similarly, Wortmann et al (50) and Bovin et al (51) examined the PCL-5 among military veterans and found strong psychometric properties, however the authors suggested any threshold scores were only applicable to clinical settings treating military personnel. Examination of the psychometric properties of the PCL-5 among paramedics is yet to be conducted. However, considering the construction of the scale and inability to provide severity ratings, the development of a more sensitive and specific scale that does not simply classify PTSD but measures the symptoms is warranted.

Conclusion

Research related to the measurement of trauma, specifically in paramedics, is variable and scarce. With the constantly evolving classification of PTSD in the DSM, much of literature relies on outdated measures and is characterised by inconsistent definitions, incidence rates and reports. Considering that paramedics and paramedic students may be

more susceptible to developing PTSD (relative to the general population and first responder units), limited research exists regarding the impact of trauma on paramedics, particularly the maladaptive responses to trauma exposure and the development of PTSD. Many instruments have been designed to assist with identifying and categorising PTSD symptoms, however discrepancies in diagnostic criteria and a focus on specific clinical samples (war veterans and victims of assault), have prevented an accurate representation of PTSD measurement in paramedics from being obtained.

To develop effective intervention and prevention strategies for paramedics, a greater understanding of the psychological impact of trauma, including experiences of vicarious and repeated trauma exposure, is needed. The development of self-report instruments that reflect the DSM-5 diagnostic criteria of trauma-related stressors within this population will allow for a more comprehensive measurement of symptoms. In particular, measures that assess symptom severity and have the ability to identify between traumatic events are recommended. Research undertaken in this specific field will help to inform future education and training programs to assist with the negative impacts of trauma and aid in management and treatment of PTSD in paramedics.

Conflict of interest

The authors declare they have no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement. Brett Williams is an Associate Editor of the *Australasian Journal of Paramedicine*.

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