Post traumatic stress disorder and the forensic radiographer

GLAYSHER, E., VALLIS, J. and REEVES, Pauline

Introduction

Forensic radiography involves the collection of legal evidence from either living or dead individuals [1]. In the case of the deceased, evidence may be obtained from whole cadavers and/ or from pathological specimens [1.] The Society and College of Radiographers (SCoR) and The International Association of Forensic Radiographers (IAFR) state that forensic imaging is a specialist area of post-registration practice and must be undertaken by experienced radiographers who are appropriately trained in forensic practice at postgraduate level [1]. However they also recognise that elements of forensic radiography could lead to possible Post Traumatic Stress Disorder (PTSD) for the individual undertaking the examination and therefore a forensic protocol must include the welfare of staff.

Forensic examinations must be preceded by a risk assessment and a forensic protocol developed which details the availability of support mechanisms for the forensic radiographer with the emphasis on primary prevention of PTSD [1]. The protocol should include information regarding

- the possible symptoms and common feelings associated with PTSD
- advice on coping strategies and other treatments.

There is no literature which provides this information in the specific context of forensic radiography and therefore this article aims to address these informational requirements for a radiographic audience and raise awareness of the effects of PTSD.

Method

A literature search was undertaken, the basics of which are documented in table 1.

Table 1 Outline literature search

Databases used	Search terms
CINAHL Google Scholar Science Direct	Forensic (+ radiographers) Mass fatalities MIND PTSD (+ recovery, prevention, training)

The chosen search engines were used, as the CINAHL database is an essential tool for nursing and allied health research which provides an easy-to-use interface with basic and advanced search features and searchable cited references. CINAHL Subject Headings help users effectively search and retrieve information and follows the structure of the Medical Subject Headings (MeSH) used by the National Library of Medicine. Similarly, Google Scholar provides a simple way to broadly search for scholarly literature which searches across many disciplines and sources. Science Direct is the world's leading source for scientific, technical, and medical research and also contains many journals related to medical imaging, including *Radiography*. As mentioned above, the majority of the literature was not specifically related to radiography.

What is Post Traumatic Stress Disorder?

PTSD is a unique, highly prevalent and impairing condition found to be a commonly occurring disorder that can have a duration of many years, frequently associated with exposure to trauma [2] caused by identifiable external forces such as acts of nature or willful human malevolence [3]. PTSD is a debilitating disorder affecting an individual's ability to lead a normal life [4] with risks of attempted suicide particularly high [2] along with a substantial risk of substance abuse [3].

Post-traumatic stress disorder (PTSD) was first officially recognised as a syndrome by the American Psychiatric Association in 1980 [5]. With PTSD, an individual's ability to function is impaired by experiencing emotional responses to a traumatic event. The defining characteristic of a traumatic event is its capacity to provoke fear, helplessness or horror in response to the threat of injury or death [7]. The term PTSD was first described in relation to the American veterans of the Vietnam War, however the disorder has existed for many years and has had many names; for instance during and after the First World War, many soldiers were said to be suffering from 'shell shock' or 'battle fatigue'; the symptoms referred to by these terms would now be called PTSD or 'combat stress'. The term PTSD is now used to describe the psychological issues resulting from any traumatic event, not only war related trauma [4].

There have been several major events reported widely by the media which exposed people to horrifying scenes, (including the 9/11 terrorist attacks in the USA in 2001, the Boxing Day tsunami in 2004, the London bombings in 2005, and the Parisian and Belgian attacks in 2015 and 2016). In particular, the latter two events were also the subject of widespread coverage on social media in addition to that of the global news media. Exposure to any one of such events can have lasting effects on individuals; however, for people actually present during these types of disasters (and those, such as radiographers, who deal with the aftermath) there is the potential for deep emotional injury to occur [4].

Possible symptoms and common feelings associated with PTSD

To be diagnosed with PTSD a radiographer must have experienced a traumatic event that involved actual (or threatened) death or serious injury or a threat to the physical integrity of themself or others. In addition, the individual must have responded to the event with intense fear, helplessness or horror [5]; the key being the intensity of the response ("did that really happen?") and not being able to take the situation in. The three main groups of symptoms of PTSD are seen as characteristic: distressing and recurring recollections of the traumatic event; avoidance of stimuli associated with the trauma; and a range of signs of increased physiological arousal [8]. Individuals may relive frightening aspects of the trauma with vivid flashbacks, experience intrusive thoughts and images or nightmares and/or may become intensely distressed at real or symbolic reminders of the trauma [4]. Repetitive recall of traumatic memories and chronic intermittent hyperarousal are also characteristic of PTSD [9].

The prevalence of PTSD and its adverse emotional and psychological consequences are much greater in countries that are in the midst of armed conflicts involving racial, ethnic or political violence [2]. Deliberate acts of violence, terrorism, or exploitation seem to cause longer-lasting and more painful emotional consequences than natural disasters; the crucial factor being that such experiences destroy an individual's trust in others [4].

In the case of forensic radiography, mass fatalities work involves the process of recovering and identifying large numbers of victims or body parts [10]. Radiographers responding to mass fatalities incidents may be at increased risk of PTSD. Factors increasing the risk of PTSD are identification with the deceased and exposure to the dead, with identification with the dead as a friend or family member being associated with a higher risk [11, 12]. Duration of deployment to mass fatalities incidents also has an impact on the risk of PTSD, which is thought to be potentially higher for those who are deployed for more than three months [13]. Researchers found an association between PTSD symptoms and intensity and duration of exposure. They could also be triggered by direct involvement with the deceased and bereaved [14]. Exposure to media coverage (particularly the increasing use of social media) could also result in identification with the deceased victim in workers such as radiographers: thus causing further traumatic and emotional impact [15].

IAFR is the organisation that provides a register of trained radiographers (UK Forensic Radiography Response Team) to be deployed with UK DVI (UK Disaster Victim Identification) in the event of a mass fatalities incident. To join the register, the radiographer must attend a two-day training event, that provides training in DVI documentation and processes, imaging modalities utilised, the role of the radiographer in DVI, the role of radiographic imaging in DVI and health and safety. Some members of the IAFR committee are advisors to regional mass fatalities teams, and government. In addition, it is IAFR policy that radiographers are trained to be able to identify signs and symptoms of stress and Post Traumatic Disorder, how to minimise the risk of developing PTSD, strategies to cope with being deployed to a mass fatalities incident, and to know how to access support. Any psychological support required during or after such an event is currently provided by a service employed by UKDVI. The key emphasis is on primary prevention - the training event is to ensure that radiographers deployed to mass fatalities events know what to expect, what they need to do/what their role will be, so that the risk of PTSD is minimised. It is also standard practice by the Police in UKDVI to assess the personal circumstances of the individual prior to deployment[16]. It is about assessing whether

there is anything recent in the personal life of the individual that could increase their risk of PTSD if they were to be deployed, such as recent bereavement, illness, separation/divorce, or mental health issues.

Following a major trauma (such as a mass casualty and/or mass fatality event), the majority of radiographers will experience some level of psychological disturbance, with most recovering over time [17]. Traumatic experiences, for some, can lead to development of several other disorders, including depression, anxiety disorders of extreme stress, specific phobias or personality disorders; however some individuals are resilient and fully recover [18]. PTSD affects up to 30% of people who experience a traumatic event [7].

There is conflicting evidence in the literature about how much experience in such incidents can lead to PTSD. It has been reported that individuals with fewer than three disaster duty experiences suffered increased severity of PTSD symptoms [19] but also that those with previous disaster experience were 6.77 times more likely to develop PTSD [20]. This may be explained by the fact that previous disaster experience includes previous trauma exposure and the possibility of past PTSD. Disasters do not occur in a vacuum and people's experiences must be interpreted in the light of other social and interpersonal events [12]

Coping strategies and other treatments.

Diagnostic radiographers are generally used to dealing with individuals who have experienced a traumatic event; indeed there will always be a degree of psychological distress in response to any disaster [21]. Although most radiographers are able to deal with wide ranges of trauma, strong emotional reactions may arise from critical incidents and these emotions could interfere with function [8]. Undertaking forensic examinations can be distressing for radiographers; the imaging of children, for example, (especially with respect to non-accidental injury) can stir deep emotions [22]. Forensic radiographers must be adaptable to the challenges that traumatic incidents present, whether they be single or multiple. For those who have volunteered to be involved in mass fatality work this can include being deployed overseas, working in

unfamiliar surroundings and exposed to imaging the possibly mutilated, decaying or dismembered remains of the deceased [21].

There are many common reactions to a traumatic event. Feelings of distress may not emerge immediately and many people find that symptoms disappear over time. However, if emotional and physical reactions are present for longer than a month, or if they are extreme and leading to a change in behaviour (which was not present before the trauma), then this may be symptomatic of PTSD [4]. In the minority of cases (less than 15%) there may be a delay of months, or even years, after a traumatic experience before symptoms appear [7]. Many individuals have severe symptoms that are constant, however some experience long periods when these become less noticeable; this is known as symptom remission; unfortunately these periods are often followed by an increase in symptoms [7].

Avoidance of stimuli, such as keeping busy and avoiding situations that are reminders of a trauma, avoiding thoughts, memories, people and places associated with the event, repressing memories (being unable to remember aspects of the event) feeling detached and emotionally numb, being unable to express affection, and feelings that planning for the future is pointless, are all symptoms of PTSD [18]. Individuals may also be angry, easily upset or startled, with behaviours such as disturbed sleep, irritability and aggression, lack of concentration or extreme alertness affecting their lives [4]. Often accompanied by other psychological disorders, PTSD is a complex condition associated with significant morbidity, disability and impairment of life functions [18] which can disrupt lives, lead to the breakdown of relationships, cause work related problems [7] and alter an individual's sense of identity, self worth, faith or purpose of living [3].

Radiographers who are affected may not seek treatment for many months or years after their symptoms appear and PTSD diagnosis may be difficult as it is common for those who experience traumatic events not to discuss their emotions [7]. Several factors deter individuals from seeking treatment; some are unaware that help is available; some assume symptoms will dissipate over time, many wish to avoid

reminders of the event and others may feel an element of shame [18]. Radiographers with PTSD are more likely initially to visit their GP regarding their symptoms than the mental health professionals; therefore primary care plays a vital role in identifying and treating this disorder [2]. Within the first month following a traumatic event, individuals may be diagnosed with acute stress disorder (ASD). Although PTSD does not always follow ASD, it is associated with increased risk [6]. In order for a diagnosis of PTSD to be given, the individual must have been exposed to an extreme stressor or traumatic event provoking feelings of fear, helplessness or horror [6]. In cases where symptoms are mild or been present for less than four weeks after the traumatic event, monitoring of the symptoms "watchful waiting" may be considered in the first instance to examine the symptoms for improvement or deterioration determined by a follow-up appointment within one month [23]. Determination of whether the individual is experiencing a natural coping process without the need for any treatment or whether a diagnosis of PTSD can be given must be undertaken initially with a detailed assessment of the symptoms, in order to effectively treat the disorder [7].

Immediately after a traumatic event, simple practical social support provided in a sympathetic manner by non-mental health professionals seems most helpful [24]. Trauma-focused psychological treatment such as cognitive behavioural therapy (CBT) should be offered to individuals with persisting PTSD, with beneficial treatments provided on an individual outpatient basis [23] within a few months of the trauma. Other psychological treatments include eye movement desensitisation and reprocessing (EMDR). EMDR treatment, involves the use of rhythmic eye movements whilst recalling the traumatic event. The eye movements are designed to stimulate the information-processing system in the brain, with the aim of the treatment to help process the traumatic events in order for readjustment and recovery to occur [4]. Supported by the current evidence, for those who develop chronic PTSD, CBT and EMDR treatments are most effective in the management of individuals involved in a traumatic event [24].

PTSD can be successfully treated and resolved but may reoccur on reactivation by new stressors, life crisis, trauma, specific stimuli or cues that reawaken the disorder in the individual, such as recurring involvement in forensic imaging [3].

Management of predisposing factors

The reasons why particular individuals develop PTSD are unknown, however psychological, genetic, physical, and social factors are involved as PTSD changes the body's response to stress, affecting the hormones and chemicals that carry information between the neurotransmitters [25].

In recent years, a more robust evidence base regarding the management of radiographers and other individuals involved in traumatic events has emerged [24]. Effective strategies for prevention and early treatment are required to reduce the risk of PTSD [16, 26]. Under the UK Health and Safety at Work Act [27] employers have a responsibility to protect the physical and psychological well being of their employees [28]. Departmental forensic protocols should include matters pertaining to the welfare of imaging staff. Any significant incidents undertaken, should be followed with an operational debrief covering all aspects of the traumatic incident [23]. Although debriefing is sometimes offered voluntarily, there are individuals for whom debriefing is compulsory following trauma (such as members of the UK police force). It is believed that debriefing will prevent onset of PTSD and policies developed may reduce the threat of litigation over any future occurrence of PTSD [29]. Consideration should be given by those responsible for coordination of the disaster plan to the routine use of a brief screening instrument for PTSD at one month after the disaster [23]. Research has shown that psychological debriefing *immediately* after traumatic events may actually increase the risk of PTSD. To do so may help to establish memories of the event by bringing them into the conscious mind, increasing the risk of flashbacks or nightmares [4].

PTSD symptoms are likely to develop when the traumatic event (and the radiographer's own physical and mental response to the event) are outside their pre-existing understanding. Events that are unpredictable, uncontrollable, or threatening,

such as mass casualty events, are more likely to be perceived as stressful and increase the risk of PTSD [10]. For radiographers undertaking mass fatalities work, the move from the structured environment of the hospital to working in field conditions can be disorientating and traumatic. In the case of fluoroscopy and plain radiography, body bags often have to be opened and the body may have to be manipulated [30]. Training and education prior to deployment, which attempts to change expectations about the event, can make it more likely that "sensations, perceptions, emotions and thoughts will be recognized and integrated into existing ways of thinking about events and emotions." [10]. It has also been argued that shift rotations should be utilised to enable a shorter duration of deployment [13].

Postgraduate education in forensic radiography is available and accessible to radiographers via distance learning. Such training typically includes types of mass fatalities incidents, variety of working environments, particular stressors of mass fatalities, coping strategies and expectations of what will be required of individuals. Equally radiographers are briefed about the psychological aspects of the work, such as when to seek help, possible coping strategies, and also how to recognise negative coping strategies (alcohol and drug abuse, social isolation)[19].

Conclusion

PTSD is a condition whose existence has long been recognised. There has been a growing interest in clinical approaches that emphasise identification of risk factors, early detection and acute intervention for the symptoms of PTSD. Developments in forensic radiography, including the proposed national strategy for replacement and increase in numbers of CT scanners (as well as the use of mobile CT scanners for disaster victim identification (DVI) [30,31] are perceived by some as having the potential for a decrease in incidence of PTSD. The use of CT may result in some emotional distance from the work [32] but any impact on the incidence of PTSD has yet to be demonstrated. Conversely, the use of dental radiography in identification may actually increase the problem, although this work may be undertaken by an odontology team rather than by radiographers [30] Dental identification may however increasingly be done by CT rather than plain radiography. As forensic imaging

develops, radiographers need to be aware of the potential debilitating effects of PTSD and those writing forensic imaging protocols must take the condition into account and build in safeguards and welfare strategies for their staff.

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