Emergency department nurses’ perspectives on responding to terror attacks: A review of the literature

Tilmann O’CONNOR1 and Karen Sheila HAMMAD2
1Emergency Department, Flinders University, Adelaide, South Australia, Australia
2School of Nursing and Midwifery, Flinders University, Adelaide, South Australia, Australia

Abstract
Aim: Emergency department (ED) nurses are among the first professionals to provide care for people affected by a terror attack. Given the ever-present threat of terror attacks, as evidenced by an upward trend in incidents worldwide, this review is highly topical. The aim of this review is to explore ED nurses’ perceptions and experiences in responding to a terror attack, identified in current, published literature.

Methods: This is an integrative literature review. A search of electronic databases was conducted in November 2014. Eleven articles (n = 11) met the criteria for review.

Results: Thematic analysis was applied and seven themes emerged from the review: i) training; ii) disaster plans; iii) anticipating the arrival of patients; iv) willingness to respond; v) safety; vi) caring for people affected by terror attack; and vii) psychological effect.

Conclusion: Terror attacks involving chemical, biological, radiological, or nuclear (CBRN) threats in particular emerged as a strong focus; present throughout most of the themes. The key findings to emerge from the review demonstrate that more focus needs to be placed on appropriate preparedness of emergency department nurses in order to mitigate negative long-term effects of responding to terror attacks.

Key words: emergency, emergency department, mass casualty, nursing, terror

INTRODUCTION

These events, which have predominately affected Western communities, comprise only a small portion of the total number of terror attacks globally, which remain largely under reported in Western media. The incidence of terror attacks internationally is reported to be increasing (National Consortium for the Study of Terrorism and Response to Terrorism (START), 2009–2014). In 2013, there were 11,952 terrorist attacks resulting in 22,178 deaths and 37,529 injuries (Rivinius, 2014) compared to 10 years earlier when there were 190 attacks, 307 deaths and 951 injuries (United States Department of State (USDS), 2004). With the rise of organizations such as the Islamic State of Iraq and al Sham (ISIS) and surge in home-grown terrorists, the threat of terror attacks is evolving. The ever-present threat and the upward trend in terrorist attacks has significance for hospital emergency departments globally, as these staff are at the forefront of the response, treating people affected by these events.

There are approximately 200 definitions for the word ‘terrorism’ (Jackson, 2008). Due to the inability of interest groups and organizations with varying interests and biases to reach agreement, there is currently no internationally agreed definition of terrorism (USDS, 2004; Bruce, 2013). The definition that underpins this paper is that proposed by the United Nations Security Council (United Nations Security Council (UNSC), 2004) in 2004:

Criminal acts, including against civilians, committed

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with the intent to cause death or serious bodily injury, or taking of hostages, with the purpose to provoke a state of terror in the general public or in a group of persons or particular persons, intimidate a population or compel a government or an international organization to do or to abstain from doing any act, which constitute offences within the scope of and as defined in the international conventions and protocols relating to terrorism, are under no circumstances justifiable by considerations of a political, philosophical, ideological, racial, ethnic, religious, or other similar nature.

Staff working in the EDs, including nurses, are among the first to care for members of the community affected by terror attacks (Masterson, Steffen, Brin, Kordick, & Christos, 2009). Nurses are an integral part of the day-to-day running of the EDs; therefore, the capacity and capability of the EDs to respond to such attacks is heavily dependent on nurses effectively triaging, treating, caring for, and managing those affected by the event. There is a great deal of literature from both medical and technical perspectives on the ED response to a terrorist attack. However, literature that explores the experiences of nurses is limited. As terror attacks become an increasing threat to society, it is important to understand how nurses perceive these attacks, and their subsequent ability to maintain their integral role in order to provide an effective medical response. This paper describes the process taken to review the current literature that explores the perceptions and experiences of ED nurses who have responded to terror attacks.

METHODS

To generate a deeper understanding of the topic, the aim of this review was to explore the perceptions and experiences of ED nurses who responding to terror attacks. To allow for the inclusion of diverse methodologies, an integrative approach to this review was chosen. An integrative review condenses both empirical and theoretical studies to provide a more comprehensive understanding of the reviewed phenomenon (Whittemore & Knaf1, 2005). Furthermore, this method allows for a clearly structured approach including: problem identification, literature search, data evolution and analysis, and presentation (Whittemore & Knaf1, 2005).

A systematic search of the following online databases: Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, Scopus, Science Direct, and ProQuest was undertaken in November 2014. Database searches were restricted to articles published in English and utilized the following key words and variations: ‘nurse’, ‘nursing’, ‘emergency’, ‘emergency nurse’, ‘emergency nursing’, ‘terror’, ‘terrorism’, ‘attack’, ‘terror attack’, ‘mass casualties’, ‘bomb’, ‘bomb attack’, ‘experience’ and ‘perception’. From this search, 147 publications (excluding duplications) were identified. A review of their reference lists and of one literature review (Hammad, Arbon, Gebbie, & Hutton, 2012) identified four further publications. Once the inclusion criteria were applied (Table 1), 114 publications were excluded from the review as they focused on natural disasters or were written predominately from a medical perspective with no discussion of nurses.

The remaining 38 publications were then read through in greater detail; the majority were excluded as they did not contain a significant amount of discussion of nurses’ perceptions or experiences of an actual terror attack. Ultimately, 11 publications met all of the relevant inclusion criteria and are thus included in the literature review (Collins, 2001; Frank, 2001; Riba & Reches, 2002; Taylor, O’Connor, & St Leone, 2003; O’Boyle, Robertson, & Secor-Turner, 2006; Becker & Middleton, 2008; Masterson et al., 2009; Rokach, Cohen, Shapira, Einav, Mandibura, & Bar-Dayan, 2010; Ron & Shamai, 2013; Nadworny, Davis, Miers, Howrigan, Broderick, Boyd, & Dunster, 2014; Lenehan & Hughes, 2014). These publications are listed in Table 2.

Once publications were chosen for review, inductive thematic analysis was undertaken to identify major themes relating to nurses’ experiences and perceptions of terror attacks. Once in-depth reading of each publication was complete, a set of codes representing the identified topics was developed. Through successive readings of each publication, patterns emerged and the codes were grouped into major themes.

Seven themes ultimately emerged from the review of literature: i) training, disaster plans; ii) anticipating the arrival of patients; iii) willingness to respond; iv) safety; v) caring for people affected by terror attacks; and vi) psychological impact. These themes are discussed in

<table>
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<th>Table 1 Inclusion criteria used for review</th>
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<tbody>
<tr>
<td><strong>Inclusion criteria</strong></td>
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<tr>
<td>Published after 2000</td>
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<tr>
<td>Published in English</td>
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<tr>
<td>Primary research</td>
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<tr>
<td>Focus on emergency department (ED) nurses</td>
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<tr>
<td>Significant discussion of ED nurses’ perceptions and experiences with terror attacks</td>
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<tr>
<td>Focus on terror attack</td>
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Table 2 Summary of articles included for review

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Country</th>
<th>Event</th>
<th>Aim</th>
<th>Design/Method</th>
<th>Sample</th>
<th>Themes</th>
<th>Major findings</th>
</tr>
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<tbody>
<tr>
<td>Lenehan &amp; Hughes (2014)</td>
<td>USA</td>
<td>Actual event (Boston Marathon bombing)</td>
<td>Explore ED nurses’ perceptions of the terror attack</td>
<td>Narrative, descriptive, interviews</td>
<td>4 ED nurses, ED nurse focus</td>
<td>Caring for patients, willingness to respond</td>
<td>Commitment of staff to attending work, the high level of team work, putting self after patients</td>
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<tr>
<td>Becker &amp; Middleton (2008)</td>
<td>USA</td>
<td>Hypothetical event (terror attack with ‘dirty bomb’)</td>
<td>Explore ED clinicians’ perception of a ‘dirty bomb’</td>
<td>Exploratory descriptive, focus groups</td>
<td>5 hospitals, 77 participants</td>
<td>Education and training, disaster plan, willingness to respond, anticipating the victims, safety for family and self.</td>
<td>ED personnel believed that neither they nor the hospital are sufficiently prepared to deal with a ‘dirty bomb’ terror attack; ED personnel are less prepared for radioactive terror attacks than conventional, chemical or biological attacks; disagreement amongst staff towards current guidelines; need for training and information</td>
</tr>
<tr>
<td>Collins (2001)</td>
<td>UK</td>
<td>Actual event (Omagh bombing)</td>
<td>Exploring psychological effects of nurses caring for terror victims</td>
<td>Descriptive</td>
<td>ED nurses at one hospital, focus on ED nurses</td>
<td>Willingness to respond, safety for family and self, caring for the victims, post terror attack</td>
<td>Not being in control, feeling overwhelmed, concern for family and friends, feeling of numbness, ‘just carry on with the job’; feeling awful, sleeplessness, sadness and development of post-traumatic stress disorder</td>
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<tr>
<td>Frank (2001)</td>
<td>USA</td>
<td>Actual event (9/11 terror attack)</td>
<td>Describe ED nurses’ perceptions and feelings when caring for terror victims</td>
<td>Descriptive</td>
<td>Five hospitals, 12 ED nurses, focus on ED nurses</td>
<td>Disaster plan, willingness to respond, anticipating the victims, safety for family and self, caring for the victims, post terror attack</td>
<td>Being afraid but focused, no time to be horrified – time passes in a ‘blur’, feeling sombre but determined; feeling great due to teamwork; feeling of pride; most difficult was dealing with family members looking for loved ones; disaster plan worked out smoothly</td>
</tr>
<tr>
<td>Nadworny et al. (2014)</td>
<td>USA</td>
<td>Actual event (Boston Marathon bombing)</td>
<td>Summarises the hospital’s experience including ED nurses in responding to the terror attack</td>
<td>Descriptive</td>
<td>One hospital, ED staff, sample includes physicians</td>
<td>Caring for the victims, safety for family and self, post event, willingness to respond</td>
<td>Staff were initially afraid and overwhelmed before their nursing instinct kicked in, they feared their safety and that of their friends and were pleased the hospital was concerned in this regard; importance of psychological care of staff</td>
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<tr>
<td>Masterson et al. (2009)</td>
<td>USA</td>
<td>Hypothetical event (terror attack with ‘dirty bomb’)</td>
<td>Explores ED personnel willingness to respond to terror attack</td>
<td>Exploratory descriptive, survey</td>
<td>Eight hospitals, 204 participants, sample includes physicians</td>
<td>Willingness to respond, safety for family and self</td>
<td>Reduced willingness to respond to radioactive ‘dirty’ bomb and biological terror attack (compared to non-terror disaster); concerns of exposure threat to oneself and family</td>
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<th>Major findings</th>
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<tr>
<td>O’Boyle et al. (2006)</td>
<td>USA</td>
<td>Hypothetical event bioterrorist attack</td>
<td>Explore nurses’ beliefs, feelings and concerns regarding a bioterrorism attack</td>
<td>Exploratory descriptive, focus group with semi-structured interviews</td>
<td>Three hospital – 33 ED and critical care nurses, sample includes critical care nurses</td>
<td>Education and training, disaster plan, willingness to respond, anticipating the victims, safety for family and self, caring for the victims</td>
<td>Human and material resources would be overwhelmed, expectation of confusion and chaos, feeling of inadequate knowledge, feeling of fear of being exposed to potential lethal agent, feeling of fear about the lack of support for their own families</td>
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<tr>
<td>Riba &amp; Reches (2002)</td>
<td>Israel</td>
<td>Actual bombing events attacks (ongoing suicide bombings)</td>
<td>Explore ED nurses’ perceptions, reactions and feelings when caring for terror victims</td>
<td>Exploratory descriptive - focus group</td>
<td>Four hospitals; 60 ED nurses, focus on ED nurses</td>
<td>Education and training, disaster plan, willingness to respond, anticipating the victims, safety for family and self, caring for the victims, post terror attack</td>
<td>Feelings of deep commitment and empowerment; extreme tension, stress and anxiety; working on ‘autopilot’; restlessness, sleeplessness and nightmares. Recommends the need for sophisticated training</td>
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<tr>
<td>Rokach et al. (2010)</td>
<td>Israel</td>
<td>Hypothetical event (terror attack with anthrax)</td>
<td>Explore ED clinicians’ willingness to care for anthrax terror attack victims</td>
<td>Exploratory descriptive, questionnaire</td>
<td>Three hospitals, 76 participants – 54 ED nurses, sample includes physicians</td>
<td>Education and training, willingness to respond</td>
<td>Willingness is significantly related to knowledge; sociodemographic variables have no impact on willingness</td>
</tr>
<tr>
<td>Ron &amp; Shamai (2013)</td>
<td>Israel</td>
<td>Actual event attacks (ongoing suicide bombing)</td>
<td>Exploring psychological effects on nurses caring for terror victims</td>
<td>Exploratory descriptive questionnaires</td>
<td>Five hospital trauma departments, 214 participants and 86 EDs. Nurses, focus on ED nurses</td>
<td>Education and training, post terror attack</td>
<td>Nurses caring for terror victims reported increased levels of personal stress, leading to symptoms of STSD (Secondary traumatic stress disorder)/PTSD and/or burnout; high degree of resilience possibly due to specific training</td>
</tr>
<tr>
<td>Taylor et al. (2003)</td>
<td>Australia</td>
<td>Actual bombing event (Bali bombings)</td>
<td>Describe ED nurses’ perceptions and feelings when caring for terror victims</td>
<td>Narrative descriptive</td>
<td>One hospital; 3 ED nurses, focus on ED nurses</td>
<td>Disaster plan, anticipating the victims, caring for the victims, post terror attack</td>
<td>Feeling scared, feeling of camaraderie, feeling of life-changing event, feeling of apprehension; feeling of pride, emotional rollercoaster afterwards, feeling overwhelmed; ‘quiet’ working, focusing on tasks and supporting each other</td>
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ED, emergency department

greater detail below.

RESULTS

Publications included for review were those that explored the experience or perception of ED nurses in relation to terror attacks. Many of the publications described the experiences of nurses who had worked in the EDs during a terror attack (Collins, 2001; Frank, 2001; Riba & Reches, 2002; Taylor et al., 2003; Ron & Shamai, 2013; Lenehan & Hughes, 2014; Nadworny et al., 2014). Implicit within these publications are the perceptions of nurses in relation to that experience. Other publications that were reviewed explored nurses’ perceptions in
relation to hypothetical events and the willingness to respond, and concerns about responding (O’Boyle et al., 2006; Becker & Middleton, 2008; Masterson et al., 2009; Rokach et al., 2010). The majority of the publications specifically explored the experiences and perceptions of ED nurses. However, a smaller group of publications were also included for review, which explored the perceptions or experiences of ED staff, including nurses (Becker & Middleton, 2008; Masterson et al., 2009; Rokach et al., 2010; Nadworny et al., 2014) and the perceptions of ED nurses combined with those of critical care nurses (O’Boyle et al., 2006). While the focus was not on ED nurses in these publications, they are valuable in informing the emergency nurse perspective because their views could easily be differentiated from the views of other clinicians (Becker & Middleton, 2008; Masterson et al., 2009; Rokach et al. 2010; Nadworny et al., 2014) and because there is a paucity of information in this area.

As is common with literature that informs disaster knowledge, the majority of publications reviewed were descriptive. A narrative approach, which describes the experiences of nurses or the ED during terror attacks, was utilized in six publications (Collins, 2001; Frank, 2001; Riba & Reches, 2002; Taylor et al., 2003; Lenehan & Hughes, 2014; Nadworny et al., 2014). The rest of the reviewed literature (n = 5) employed an exploratory descriptive approach, with surveys or focus groups as the data collection tool (O’Boyle et al., 2006; Becker & Middleton, 2008; Masterson et al., 2009; Rokach et al., 2010; Ron & Shamai, 2013). Publications originated predominately from Western countries including: USA (n = 6), Israel (n = 3), United Kingdom (n = 1) and Australia (n = 1). Four publications (O’Boyle, et al., 2006; Becker & Middleton, 2008; Masterson et al., 2009; Rokach et al., 2010) focused on hypothetical events, and seven (Collins, 2001; Frank, 2001; Riba & Reches, 2002; Taylor et al., 2003; Ron & Shamai, 2013; Lenehan & Hughes, 2014; Nadworny et al., 2014) focused on actual terror attacks.

**Theme 1: Training**

Training nurses to respond to terror attacks is perceived in the literature as having a positive impact on ED nurses’ ability to respond to and cope with terror attacks (Riba & Reches, 2002; Rokach et al., 2010). Relevant training may be linked to higher levels of resilience and help to counterbalance the negative effects of dealing with terror attacks and helping those affected by terror attacks (Ron & Shamai, 2013). However, it is generally acknowledged in the reviewed literature that current training is insufficient. This is particularly the case in relation to biological (Rokach et al., 2010), radiological, and nuclear preparedness (Becker & Middleton, 2008). Nurses with limited experience and those who get called into the ED to increase staffing at the time of a terror attack may be less confident than more experienced ED nurses, creating a heightened level of anxiety among this group of nurses (Riba & Reches, 2002). In the absence of experiential learning through actual disaster response, training may be a useful way to support less experienced nurses to feel more confident.

**Theme 2: Disaster plans**

Disaster plans exist to guide an organization’s response; however, disaster plans have been described as insufficient, particularly in relation to biological (O’Boyle et al., 2006) and radiological attacks (Becker & Middleton, 2008). Evidence suggests that disaster plans are, at times, insufficient or that staff do not trust that they will work, particularly in relation to special events (Taylor et al., 2003; Becker & Middleton, et al., 2008). This was reported in the Bali bombing response in Darwin, where the plan did not address the unique aspects of the situation, and staff had to be flexible and adapt the disaster plan accordingly (Taylor et al., 2003).

While some plans, when activated, have proven to be inadequate, other studies report that once activated, a disaster plan ensures that resources become available and the response moves more smoothly (Frank, 2001).

**Theme 3 Anticipating the arrival of patients**

Anticipating the arrival of patients encompasses the period of time from when the ED first receives notification of the event until the arrival of the first patients. This period is described as being very stressful, where nurses feel extremely tense, full of emotion and worry (Frank, 2001; Riba & Reches, 2002; Taylor et al., 2003). These feelings were also identified during the long search for survivors following 9/11; nurses described a feeling of hope and desperation to find survivors, resulting in frustration and disappointment when none arrived (Frank, 2001).

Feelings of fear and anxiety during this period were more commonly reported among junior nurses and those with minimal emergency or disaster experience (Riba & Reches, 2002). This is related to a fear that they might not function properly and would be inadequate during the response (Riba & Reches, 2002). Fear expressed by nurses during this phase is also associated with hospital preparedness and with nurses fearing that the hospital in a bioterrorism event may become overwhelmed (O’Boyle...
et al., 2006). This is particularly so for biological events, where staff concerns relate to the department becoming overwhelmed with people who are, or may be contaminated (O’Boyle et al., 2006).

**Theme 4 Willingness to respond**

Willingness of ED nurses to respond to terror attacks emerged in the literature as a strong theme. ED nurses appear to be motivated to respond to terror attacks regardless of the barriers that could potentially prevent them from doing so. It has been reported that following terrorist attacks, nurses self-present at the hospital to offer their assistance, suggesting that they manage to overcome the barriers that stand in their way (Collins, 2001; Frank, 2001; Lenehan & Hughes, 2014). This includes nurses who were not on duty or not currently employed by the hospital they presented to (Frank, 2001; Lenehan & Hughes, 2014). In her article about nurses’ responding to the 9/11 terror attack, Frank (2001) reported that the willingness of nurses to respond was so great that staff in the ED department sometimes outnumbered the patients. Nadworny et al. (2014) reported that the number of nurses prepared to work outweighed the number required.

Following a CBRN event, however, the willingness of ED nurses to respond is diminished. During a biological event, while some nurses would remain to treat the affected patients, it is reported that for many nurses, the willingness is diminished and some even leave the hospital or not turn up for work (O’Boyle et al., 2006; Rokach et al., 2010). The willingness of ED personnel, including nurses, to respond to a terror attack with a radioactive bomb was reduced by 18.4% and even further for a biological element (42.7%), when compared to a conventional disaster such as an airplane crash (Masterson et al., 2009). In their article about ED staff willingness to respond to a biological event (anthrax), Rokach et al. (2010) found that training may mitigate the diminished willingness in the case of a biological event where nurses had knowledge of the pathogen.

**Theme 5: Safety**

This theme addresses two issues; concern that ED nurses have for the safety of their family members (Collins, 2001; Frank, 2001; Riba & Reches, 2002) and concern that they have for their own personal safety (Nadworny et al., 2014). ED nurses stated that they had a feeling of fear that someone they know or even worse, someone from their own family, might have been affected and could be the next terror victim coming in through the door of the ED (Collins, 2001; Frank, 2001; Riba & Reches, 2002).

When considering responding to a CBRN event, nurses discussed concerns for their own safety regarding personal protection equipment and education, and the safety of their family being affected by their work. Becker and Middleton (2008) highlight nurses’ concerns in relation to a terror attack with a ‘dirty’ (nuclear) bomb, while O’Boyle et al. (2006) identify concern among nurses working during a bioterrorism event, which could place themselves or their families at harm. Additionally, Becker and Middleton (2008) found that ED nurses had high levels of concern for their own personal self-protection (against radiation from a nuclear bomb). Furthermore, the study linked concerns about their own safety to a lack of information, particularly related to radiation detection, triage and personal protection (Becker & Middleton, 2008).

Concerns for personal safety and that of nurses’ families may result in a decreased level of willingness to respond among ED nurses (Hammad et al., 2012). This may create staffing problems for the ED, as nurses might leave the hospital or stay at home with their families. These fears could be mitigated through the introduction by hospital management of guaranteed appropriate treatment or prophylaxis and training and equipment to maintain protection of staff (Hammad et al., 2012). Contradictory to these concerns, in their study exploring nurses’ perceptions of responding to a hypothetical event, O’Boyle et al. (2006) found that despite all of the concerns about their safety, nurses still felt a sense of commitment to care and protect all victims.

**Theme 6: Caring for people affected by terror attacks**

When caring for people affected by terror attacks, nurses commonly describe a feeling of setting emotions aside and working on auto pilot while absorbed in the task at hand (Collins 2001; Riba & Reches, 2002). Nurses appear to absorb their emotion into the challenging task of dealing with family members of those affected by terror attacks (Riba & Reches, 2002).

This state of being devoid of emotion during the event appears to be replaced after the event with a sense of pride. Nurses describe the act of caring for people affected by terror attacks as the ultimate embodiment of their professional lives, providing them with a feeling of deep satisfaction derived out of a sense of empathy with the people affected (Frank, 2001; Riba & Reches, 2002; Taylor et al., 2003). Adding to this rewarding feeling is the reported strong sense of teamwork among ED staff whereby a silence pervaded the ED as staff focused on the task at hand and rose to the occasion, working well...
together (Frank, 2001; Taylor et al., 2003; Lenehan & Hughes, 2014).

**Theme 7: Psychological impact**

This theme is divided into two sub themes: short term and long term. Short term refers to the hours and days following the terror attack, and long term refers to all time thereafter.

**Short-term impact**

In the immediate aftermath of a terror attack, a strong mix of emotions surface for the ED nurses who have been involved in the response. Nurses reported a mix of different emotions after caring for the terror victims; including great sorrow, empathy, honor, being in a state of shock and an overwhelming sadness (Frank, 2001; Taylor et al., 2003). To manage these emotions, a debriefing session is considered by the nurses to be important in providing support and feedback, and helping them to understand why some victims could not be saved (Riba & Reches, 2002). Staff, including ED nurses, stated that a quick support meeting during the event was also helpful for the healing process (Nadworny et al., 2014).

At the other end of the emotional spectrum, as discussed previously, ED nurses also report positive feelings. Nurses reported a sense of pride in themselves and the team they had worked with who pulled together (Frank, 2001; Taylor et al., 2003). While recognised as a moving and unforgettable experience, nurses also described a feeling of being on an emotional rollercoaster directly following the event (Riba & Reches, 2002; Taylor et al., 2003).

**Long-term impact**

ED nurses reported that there is a medium-to-high level of personal stress that stays long after the actual event and which manifests physically and mentally (Riba & Reches, 2002; Ron & Shamai, 2013). Nurses report restlessness, sleeplessness, nightmares and intrusive memories (Collins, 2001; Riba & Reches, 2002). Following a response, emotions are largely negative including; sadness, grief, depression, anxiety, dread, horror, fear, rage, shame and an altered perspective of life and death (Collins, 2001; Riba & Reches, 2002). In particular, nurses experienced higher levels of anxiety and fear that in the future they or their family could become a victim of a terror attack (Riba & Reches, 2002). Physical manifestations of stress were identified by the study of Collins (2001) as persistent headaches, backaches, and gastrointestinal distress. Post-Traumatic Stress Disorder, depression, suicidal tendencies, panic attacks and an over reliance on alcohol is also reported among ED nurses (Collins, 2001). These negative effects of responding to terror attacks may affect absentee rates of ED staff, as nurses use coping mechanisms such as avoidance and express difficulties in returning to work (Collins, 2001).

**DISCUSSION**

This review highlights a need to enhance preparedness of ED nurses to respond to terror attacks. An emphasis on preparedness related to CBRN events and targeting less experienced nurses is necessary to alleviate nurses’ fears and anxieties around responding to terror attacks. An emphasis on the future preparedness of ED nurses to respond to terror attacks is also essential to mitigate more detrimental long term effects.

This review found that ED nurses felt they were potentially unprepared, or not well prepared to respond to terror attacks. This largely relates to nurses’ perceptions that their training and knowledge is limited. This was highlighted in relation to CBRN events, for which nurses felt their knowledge and preparedness was particularly lacking. This finding is reflected in other studies that have explored ED nurses’ perceptions of disaster response not specific to terror attacks (Considine & Mitchell, 2009). A perceived lack of knowledge and experience related to CBRN events is understandable given that they are not a familiar or everyday occurrence in the ED. A greater emphasis on appropriate education and training for ED nurses in relation to CBRN event response will increase nurses’ confidence to respond safely and effectively. A continued lack of emphasis on CBRN event preparedness may affect absentee rates during terror attacks, as nurses opt to stay at home to ensure their personal safety and that of their families.

Another area of preparedness that requires more focus is that of preparing less experienced staff. This includes junior nurses and those who are sent to the ED to enhance the ED response. A lack of experience among these groups can have negative consequences on nurses who may feel a heightened fear and anxiety. This in turn may place increased workload pressures on more experienced nurses. While CBRN event training would benefit from targeted education around personal safety and pathogen identification, training for junior and less experienced staff should focus on drills and exercises. Repeated exposure to a similar situation will enhance confidence in this group.

Another finding of this research was that disaster plans, which are available to guide staff in an organized
response, are often inadequate. Repeated drills and exercises will also be beneficial in ensuring that disaster plans are regularly tested and adapted as required.

Although responding to a terror attack can be a highly rewarding endeavor associated with feelings of pride and professional satisfaction, there are a number of negative consequences that need to be mitigated in order to ensure that ED nurses are better prepared and able to cope effectively with disaster response. Negative emotions experienced by ED nurses during and after responding to terror attacks were reported in the literature more commonly than positive emotions. Negative emotions experienced by nurses as a result of responding to a terror attack can potentially prevent ED nurses from operating to their full capacity both during and after the event. Fear, derived from a perceived or actual lack of experience or a feeling of diminished preparedness, was commonly discussed in the literature (Riba & Reches, 2002; O’Boyle et al., 2006).

Long-term negative effects on ED nurses were notable throughout the literature. Although ED nurses report a strong sense of satisfaction and camaraderie after responding to a terror attack, implying a high level of commitment, altruism and compassion even in the most challenging of circumstances, this appears to diminish over time. In the long term, ED nurses who looked after people affected by terror attacks reported a variety of negative effects ranging from high levels of stress, sleeplessness and intrusive memories to more severe conditions like depression, anxiety, post-traumatic stress disorder, suicidal tendencies and also somatic issues (Collins, 2001; Riba & Reches, 2002; Ron & Shamai, 2013). This finding aligns with previous research that reports the range of emotions experienced by ED nurses responding to disasters, including terror attacks (Hammad et al., 2012).

Limitations
The main limitation of this review is that the identified articles were restricted to research conducted and published in English. This limits the ability to generalize the results and learn from non-English speaking countries that may have had significantly more experience with terror attacks.

CONCLUSION
An effective medical response to terror attacks is not achievable without nurses, as they are the largest cohort in the health-care workforce (Hammad et al., 2012). This review highlights that although caring for people affected by terror attacks can be extremely rewarding and viewed as the epitome of an ED nurses’ professional working life, the negative effects can be detrimental to individual nurses. Building resilience among ED nurses to better manage potential long-term effects may be driven by focused education aimed at building confidence and knowledge around responding to terror attacks, most notably CBRN events.

In terms of addressing the findings of the review, there are three key recommendations. First, enhanced education and training around CBRN events may help to boost confidence and eliminate some of the negative effects of terror attack response as well as mitigate staff absenteeism rates. Second, hospitals need to recognize the value of repeated drills and exercises aimed at testing disaster plans and preparing staff to confidently respond to terror attacks. Finally, due to the ever-present threat of terrorist attacks, the need for future research to explore the long-term impacts on nurses who have responded to terror attacks is recommended. This again highlights the role of education focused on teaching nurses coping techniques that may mitigate long-term negative effects of responding to terror attacks.

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A review of the literature


