Royal College of Nursing

This is defence nursing

An RCN guide for nursing staff

Acknowledgements

This is 'defence' nursing

Florence Nightingale once said, "Unless we are making progress in our nursing every year, every month, every week, take my word for it we are going back". (International Council of Nurses, 2015). Over 100 years later, defence nurses continue to echo Florence Nightingale's ethos and contribute to the advancement of nursing practice with the delivery of nursing care, both in combat operations and in support of international health care emergency responses.

To mark the closure of UK combat operations in Afghanistan and the contribution of defence to historic events, such as support during the Ebola outbreak in Sierra Leone, the Royal College of Nursing Defence Nursing Forum (RCN DNF) worked with *Nursing Standard* to capture the professional contribution of UK defence nursing. We are pleased to be able to provide you with this defence nursing special edition, affording insights into operational nursing care. These articles demonstrate the breadth and depth of defence nursing and capture the unique environments that Royal Navy, British Army, Royal Air Force and Ministry of Defence nurses work in. All the papers in this special edition highlight the care provided during the military operational care pathway, and will be of interest to those working with injured service personnel and veterans, and in rehabilitation centres.

'Role of the Military Community Mental Health Nurse' demonstrates the skill level and credibility needed by nurses when providing care on board a Royal Navy ship. 'Experiences of Military Nurses in Iraq and Afghanistan' explores the unique challenges of nursing on deployed operations such as environmental hazards, ethical issues, the uncertain nature of military operations and the threat of attack on health care facilities and workers.

Defence nursing is not solely focused on the 'operational' environment. The complex and continuing care needs of seriously injured military personnel from recent military operations is discussed in relation to trauma wound care and prevention of infection in the rehabilitation setting. During recovery and rehabilitation, many injured military personnel will transition from a military-specific health care environment into the National Health Service for ongoing care, and this process strives to be seamless and remain patient-centred.

UK military involvement during operations in Iraq and Afghanistan has highlighted defence health care expertise in the delivery of trauma care; however, the recent communicable disease epidemic in Sierra Leone emphasised the need for defence nursing to adapt in order to effectively provide health care outside of the conflict environment. 'Response to the Ebola Crisis in Sierra Leone' provides a fascinating insight into the knowledge, attitudes and culture of Sierra Leoneans towards Ebola and showcases the importance of understanding local cultures and traditions wherever we practise, in order to achieve the best outcome for those we care for. The importance of preparing for the uncertainty of future operations by utilising lessons learnt from previous operational environments is demonstrated throughout this special edition, but especially in 'Nurse Education in the British Armed Forces' and 'Managing a Major Incident in the Critical Care Unit'.

We hope you find these articles of interest and relevance to your professional practice. Collectively this special edition aims to provide a valuable resource for current and future generations of nurses.

Major Chris Carter
Queen Alexandra's Royal Army Nursing Corps
Chair, Royal College of Nursing Defence Nursing Forum

Anna Crossley
Professional Lead for Acute, Emergency and Critical Care
Royal College of Nursing

Reference

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Experiences of military nurses in Iraq and Afghanistan

Abstract

Since 2001 military nurses have successfully supported military operations in deployed field hospitals in both Iraq and Afghanistan. These deployments have presented unique challenges for military nurses. This article reviews the literature on the experience of nurses during these deployments and, using a thematic analysis approach, aims to understand their experience. The results provide an insight into the lives of military nurses who served in Iraq and Afghanistan and highlight some of the coping strategies adopted by nurses in conflict situations. The discussion outlines the key themes and, using excerpts from the literature, explores the challenges and coping strategies used.

Authors

Louisa Jane Kenward
Volunteer, Voluntary Services Overseas (VSO), Zimbabwe.

Gary Kenward
Nursing officer, Army Medical Directorate, Camberley, England.
Correspondence to: garykenward@hotmail.com

The involvement of nurses in conflict can be traced back to the earliest records of war in the third and fourth centuries BC (Nardi 2003). However, military historians generally credit Florence Nightingale as being the founder of British military nursing after she led a group of nurses to Scutari to support soldiers during the Crimean War (Gruber von Arni and Searle 2002, Nardi 2003). Since Nightingale's time, military nurses have supported soldiers in military conflict around the world, with key roles in both world wars and in most conflicts of the twentieth and twenty-first centuries (Stanley 2007).

Since 2001, military nurses have played an essential part in supporting military operations in both Iraq and Afghanistan. These deployments have presented unique challenges as military nurses have found themselves in austere environments, many miles away from their usual support networks and dealing with unprecedented numbers of polytrauma-injured casualties (Kelly 2010, Lang et al 2012).

This article reviews the literature relating to military nursing experience in Iraq and Afghanistan. The aim is to identify the challenges military nurses face in these environments and the coping strategies they adopt. The findings of this review may be of interest to both military and civilian readers and could be applied in various clinical settings.

Literature search strategy

A literature search was undertaken using the terms: military nursing AND war/conflict/ deployment AND experience/lived experience. Databases searched included the British Nursing Index, Cumulative Index to Nursing and Allied Health Literature (CINAHL) and Medline. Personal contacts of the authors were used to locate unpublished diary accounts of nursing in military conflict.

To be included, literature sources had to:

• Be primary research or personal accounts of experience from Iraq or Afghanistan.

• Deal with conflict or immediate post-conflict military nursing experience.

• Be published articles or 'grey literature', which includes all forms of unpublished work (The New York Academy of Medicine 2013).

• Be written in English.

- Relate to North American or British nursing experience.
- Be published or available from 2002.

North American literature was included because of the shared operational experience between the North American and British military forces since 2001, with military nurses from both countries often working side by side in the same clinical teams and command structures. Non-military nursing accounts and reports of purely humanitarian support were excluded from the review.

Thirteen articles met the inclusion criteria. The search for grey literature located one unpublished diary. Of the 14 sources identified in total, 11 were by North American authors and three by British authors (Table 1). Articles were either opinion only or qualitative research studies.

Published work that met the inclusion criteria was limited, and the articles identified were of varying quality. Most were opinion articles reporting personal experiences. As this article uses only 13 published sources and one unpublished diary, it might not be an accurate reflection of the views of all military nurses who were deployed to Iraq and Afghanistan.

All identified sources were subjected to thematic analysis. Themes in each text were highlighted, colour-coded and categorised using an iterative process. Content validity was confirmed by the second author using the same process (Boyatzis 1998). Identified themes were grouped into four main categories:

1. Unique environment (radically different to what the respondent would normally expect).

2. Uncertainty.

3. Polytrauma and death.

4. Coping.

Unique environment

Several subthemes identified from the literature collectively described the unique environment in which military nurses lived and worked. Even the journey to and arrival at an operational setting was a unique experience for some military nurses, often beginning with a long wait in an aircraft hangar and ending with a 'tactical landing', usually at night, with the aircraft in complete darkness and descending several thousand feet in a matter of seconds (Trossman 2007).

Table 1

Articles relating to military nursing in conflict identified from the literature search

Author	Year	Origin	Title	Methods
Agazio	2010	North America	Army nursing practice challenges in humanitarian and wartime missions	Qualitative. Interviews with 75 military nurses
Anonymous	2011	UK	Untitled	Personal account
Battey	2004	North America	The struggle for lives in Iraq	Personal account
Cotton	2007	North America	'The best worst job I've ever had'	Personal account
DeCunha	2007	North America	Nursing in the military: breaking boundaries and forging ties	Personal accounts
Duncan et al	2005	North America	Grace under fire	Personal accounts
Hagerty et al	2011	North America	Military nurses and combat-wounded patients: a qualitative analysis of psychosocial care	Qualitative. Interviews with 20 military nurses
Haynes-Smith	2010	North America	Nursing in the sandbox: a lived experience	Personal account
Kraemer	2008	North America	A military twist to the profession of nursing	Personal account
Philpott	2007	UK	Battlefield nursing	Personal account
Scannell-Desch and Doherty	2010	North America	Experiences of U.S. military nurses in the Iraq and Afghanistan wars (2003-2009)	Qualitative. Interviews with 37 military nurses
Schrader	2004	North America	Experience in Iraq makes nurse anesthetist appreciate the simple things in life	Personal account
Snow	2007	UK	Professionalism and courage in the heat of a desert	Journalist observation/interviews
Trossman	2007	North America	Serving abroad: nurses provide care literally on the front lines	Journalist observation/interviews

On arrival in a conflict zone, healthcare staff might then have to build their tented hospital (Schrader 2004). Medical equipment would have to be unloaded from containers, unpacked and primed, ready to receive casualties. Staff might also need to be self-sufficient for shelter and food, and manage with basic sanitation facilities (Agazio 2010).

Establishing a functioning field hospital and the teams to make it work effectively were not the only challenges for hospital staff. Dealing with extreme heat featured prominently in several accounts from both Iraq and Afghanistan, with summer temperatures ranging from the high 30°s to 60°C (Snow 2007, Agazio 2010, Haynes-Smith 2010). The high temperature affected personal and patient hygiene; one article described an instance during the early phase of a conflict when nurses were unable to shower for 11 days (Scannell-Desch and Doherty 2010). Working conditions in the operating theatre were described as 'like a litter box, we just scooped out bloody sand and other body secretions' (Scannell-Desch and Doherty 2010). These accounts are suggestive of the extreme working conditions experienced in a conflict zone.

Dust and sand were a recurring theme. Iraq was referred to as the 'sandbox' and Afghanistan as the 'dustbowl' (Haynes-Smith 2010, Anonymous 2011). Environmental factors caused equipment to fail or degrade more quickly. Agazio (2010) noted: 'Everything was fried, rubber and plastics were crispy and brittle and gloves turned to powder when you tried to put them on.' The difficulties of equipment maintenance were compounded by resupply delays, particularly during the early phase of a deployment. Staff had to be self-reliant and improvisation was frequently needed.

Battey (2004) sums up the 'can do' spirit of staff, describing a familiar scenario when hospital staff were called on to donate blood. 'John' was brought into the emergency department after sustaining life-threatening injuries from a roadside bomb: *'Several soldiers from John's unit sit in the hall waiting for news… I ask them quietly about their blood type. Two of them, like me, have the same as John. I also grab two medics who haven't donated in the last eight weeks, and the five of us roll up our sleeves to be typed and crossed to give the whole blood with platelets that John will need to make it through the night… When my bag is full, I mark it with my initials and carry it – still warm in my hands – to the ICU.'*

Hospital staff had to deal with ethical dilemmas too. Finite treatment resources meant that non-military patients could be treated only if their injuries were a result of action by coalition forces or if they had sustained life, limb or eyesight-threatening injuries (Duncan et al 2005, Philpott 2007, Kraemer 2008). An eligibility treatment matrix was used to aid decisions about the treatment of non-military patients; however, some staff still found it difficult when patients had to be turned away – the instinct was to treat them (Duncan et al 2005). For some staff, the treatment of insurgent or enemy forces proved ethically challenging because personal feelings had to be put aside (Kraemer 2008, Agazio 2010, Scannell-Desch and Doherty 2010).

The austere setting meant that staff also had to get back to the basics of nursing care and manage without sophisticated monitoring equipment, particularly during the early phase of a deployment (Kraemer 2008, Haynes-Smith 2010). Kraemer (2008) suggests that nursing in a combat zone 'brings a whole new dimension to the profession of caring and healing'. These factors all contributed to a unique and challenging environment in which to work and live.

Uncertainty

Several sub-themes collectively described the uncertainty of life on operations. Nurses had to adapt quickly to new surroundings, including the sights and sounds of war. Kraemer (2008) describes some of these sounds: *'Random mortar attacks, car bombs exploding, helicopters flying overhead, and the loud generators that provide the hospital with a consistent power supply… soon you become so accustomed to the constant noise that silence is eerie.'*

The sounds of war were a constant reminder of the threat to patients and staff (Hagerty et al 2011). Military nurses living in Camp Balad, Iraq, casually referred to the camp as 'Mortarville' (Cotton 2007) and some reported feeling constantly on edge (Kraemer 2008, Haynes-Smith 2010, Scannell-Desch and Doherty 2010).

The threat of mortar attacks had an effect on both staff and patients. Snow (2007) described the experience of one operating theatre nurse: *'Last night I was in a four-hour operation and the [mortar attack warning] siren went off twice… Each time that happens the operating table is lowered to the floor and the patient is covered with body armour. The surgeons and I put on our helmets and body armour and go to the ground, to minimise the chance of shrapnel damage.'*

That account, from a British nurse deployed in Iraq, demonstrates the volatile and unpredictable nature of nursing in a conflict zone. Some staff appeared uncertain about whether they would survive (Agazio 2010).

Uncertainty was also a feature of work patterns. Most staff were on call for the duration of their deployment and, when casualty surges occurred, they would be called in to support on-duty teams (Agazio 2010). This meant that some struggled to find routine in their daily working life.

In extreme situations, there were reports of staff working up to 36 hours non-stop (Schrader 2004, Snow 2007). Others described the experience of disturbed rest periods as like 'living in a twilight zone', as they moved from one shift to another while permanently on call (Anonymous 2011). The threat of attack and the unpredictable nature of their work added to a sense of uncertainty for many staff.

Polytrauma and death

The number and severity of traumatic injuries witnessed, particularly in Afghanistan, was for many nurses unprecedented. An American emergency nurse described a scenario involving three young soldiers whose jeep had been struck by a rocket-propelled grenade a little below sitting height, traumatically amputating all six of their legs (Scannell-Desch and Doherty 2010).

The authors described how one of the three soldiers was unconscious, another shocked and the third: *'Like a squirrel set out in the middle of the road that didn't know which way to go. He was panic stricken, sat up on the gurney and looked down where his legs used to be and screamed bloody murder… I had to leave the tent and go outside to throw-up'* (Scannell-Desch and Doherty 2010).

This harrowing description provides some insight into typical injury patterns witnessed daily. Although nurses expected to see traumatic injuries, some were surprised at the number and frequency of patients presenting with life-threatening injuries (Philpott 2007). Hagerty et al (2011) observed: 'There is nothing to prepare you for what you are going to see, and how you're gonna feel.'

Some groups of patients inevitably struck a particular chord with nursing staff, especially those who reminded them of loved ones at home (Scannell-Desch and Doherty 2010) or patients close to their own age with life-threatening injuries (Hagerty et al 2011). Treating severely injured colleagues was even more testing (Haynes-Smith 2010). Kraemer (2008) observed that: 'Your instincts take over immediately to provide care, but later when the dust begins to settle, you find yourself asking repeatedly – why?'

When patients died, both British and American nurses reflected on the effects of war. Duncan et al (2005) recollected: *'We send our American patients home – sometimes on their feet, sometimes in wheelchairs or on crutches or stretchers… others we send home in body bags after we lovingly wrap their bodies in woollen Army blankets.'*

An unpublished diary excerpt also dwells on the effect of death on staff: *'It seems a bit of a blur as one day melts into another. The last week or so has seen a dramatic increase in our casualty numbers with several amputees arriving on consecutive days. There were 5 or 6 deaths on one day… we try to deal with it in an objective way… but it is hard to remain detached'* (Anonymous 2011).

The challenge of dealing with severe injury and death were compounded by the language barrier when treating local nationals. Kraemer (2008) highlights the difficulty associated with using interpreters to explain a patient's injuries to a family member as meaning, context and compassion could be lost or misinterpreted. It was clear from the number of emotive descriptions of experiences of trauma that this had an effect on nursing staff.

Coping

Against a backdrop of challenging environmental factors, unpredictable work patterns and repeated exposure to polytrauma, nursing staff had to develop or adopt coping strategies. The term 'military family' was used frequently and broadly encapsulated the teamwork, camaraderie and kinship that developed between military medical staff (Schrader 2004). Regardless of rank or status in the hospital, nurses were all experiencing similar challenges and a shared experience that helped to unite them (Hagerty et al 2011). Strong bonds were formed and colleagues were often described as surrogate families (Duncan et al 2005). The military family concept is not new. However, these accounts suggest that in this environment these professional and social bonds are strengthened.

DeCunha (2007) reflected: *'We are all going through the same experiences – being away from family, going through training, becoming emotionally and physically exhausted after working 36 hours straight – and we are there to support one another.'*

Several accounts emphasised the importance of camaraderie during a deployment (Schrader 2004, Snow 2007). Nurses forged close-knit teams, adept at managing large influxes of patients and equally adept at providing a listening ear when needed (Scannell-Desch and Doherty 2010). The 'team' was deemed key for success in this environment and contributed to overall effectiveness (DeCunha 2007).

Other coping mechanisms emerged from the literature. Religion or faith was commonly cited as a coping strategy, particularly in North American accounts. One nurse disclosed that she 'Always carried… religious symbols and prayer cards that my loved ones sent' (Haynes-Smith 2010).

Adding routine and control to aspects of life in camp was also considered important. Regular physical exercise, for which personal targets were set, provided a topic for conversation and a goal for staff to work towards (Anonymous 2011). It also provided a focus outside the work setting and many staff adopted an even more proactive approach to their general fitness and health.

The allocation of specific roles when dealing with the severest of traumatically injured patients seemed an effective technique to prevent staff from becoming overwhelmed by the horror and complexity of some casualties (Hagerty et al 2011). This approach also seemed to help staff to assert control over their emotional responses in extreme situations (Hagerty et al 2011). Post-incident team debriefs were a common feature and helped staff to deal with these difficult and challenging events (Hagerty et al 2011).

Maintaining motivation was essential and some nurses found it helpful to focus on positive experiences during the deployment (Kraemer 2008). Assigning meaning and expressing pride appeared to be an important coping strategy. Some nursing staff reflected that providing world-class medical care and saving lives made their personal sacrifices seem insignificant and provided the motivation needed when their own spirits dropped (Cotton 2007, Kraemer 2008). Staff reported feeling honoured to have been involved in the delivery of exceptional care, and knowing that their patients would probably survive helped them to remain positive (Schrader 2004). For many staff, this was the pinnacle of their clinical career, bringing all their training and experience to bear and at times being pushed to the limit in what was often referred to as the busiest trauma centre in the world.

That some nurses had chosen to publish personal accounts and others had agreed to be interviewed about their deployment suggests a willingness to discuss, reflect and log their experiences. Veterans of the Vietnam War proposed that nurses at war should write a journal, noting activities, thoughts and feelings, as it could serve multiple purposes: from the expression of feelings and ideas to a memory jogger or serving as an historical record (Scannell-Desch 2005).

Are there lessons to learn?

Brennan (2010) suggests that the coping strategies adopted and lessons learned by military nurses on deployment may have wider relevance. The current article does not purport to offer a panacea for all nursing settings. However, it does highlight some of the coping strategies adopted by staff working in austere settings under unique pressures. The notions of camaraderie, kinship and the importance of teams were frequently reported (Schrader 2004). Teamwork is considered a cornerstone of military training and features in much of the pre-deployment preparation, aiming to bring disparate groups closer together with demonstrable benefits to patients and staff. Lessons learned from the training techniques developed for these deployments will undoubtedly play a part in future preparations.

Commitment and sacrifice were also required of staff. The literature suggests that this was achieved by assigning meaning to roles, sharing values and taking pride in the care delivered. Another common feature of almost all of the accounts was the positive language used to describe the experiences of staff. There was evidence of the benefit of strong leadership and, more specifically, strong clinical leadership, to ensure the smooth running of the hospital.

Conclusion

Through a thematic analysis of the literature, this article has highlighted some of the challenges experienced and coping strategies used by military nurses working in contemporary conflict zones. Key themes included the challenges of working in austere settings, dealing with irregular work patterns and coping with repeated exposure to severely injured casualties. Coping strategies that emerged from the literature included teamwork, leadership and shared values.

Some accounts were data-rich and insightful. However, the literature search also revealed a paucity of published accounts and a lack of contemporary research, particularly on the experiences of British military nurses. Further research into the experience of military nurses in contemporary conflict is essential, both to learn lessons from these deployments and also to capture the nursing history of modern conflict.

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Managing a major incident in the critical care unit

Abstract

This article analyses recent major incidents using a standardised structured approach and is relevant to nurses working in the critical care unit. Information on responding to a major incident is provided, and the need to support staff after an incident, especially critical care personnel, is discussed. The main themes associated with assisting critical care nurses in preparing to deal with a broad range of situations which they may be required to respond to is described and an overview of major incident training for nurses is provided.

Author

Chris Carter

Intensive care nursing officer, Department of Health Care Education, Birmingham City University, Birmingham, and chair, Royal College of Nursing Defence Nursing Forum, RCN, London.
Correspondence to: chris.carter946@mod.uk

The NHS is required to plan how to respond to a wide variety of incidents that could affect health or patient care, and all acute hospitals are expected to have a major incident plan (NHS Commissioning Board 2013). Any activation of a major incident plan will result in critical care services being put on alert. In recent years, the NHS has had to deal with a number of major incidents including riots, terrorist attacks and accidents such as train crashes (Vassallo et al 1997, Bradbury et al 2005, Crouch 2005, Duffin 2011). Not all major incidents will involve trauma; other countries have seen critical care departments being required to deal with infectious diseases such as pandemic influenza or small numbers of specialised cases, for example burns or paediatrics, which may overwhelm critical care resources (Rankin 2006, Leen et al 2010, Department of Health 2011, Hughes 2011).

Because of the nature of military operations, major incident planning often originates from military experiences (McBrien 2010). However, in recent years, major civilian incidents and events such as the London Olympics have raised the profile of major incident planning, training and response for health services in the UK. Major incident plans include details on the role of critical care units because severely injured patients will require intensive care. It is essential that critical care nurses understand the principles of major incident planning so they can respond effectively.

Defining a major incident

It is estimated that individual hospitals based in urban areas will deal with a major incident once every ten years, although the frequency depends on location, size of the population and whether the hospital is situated near lines of mass transportation (Advanced Life Support Group (ALSG) 2005). After the terrorist attacks in New York and elsewhere in America on September 11 2001, the need for major incident planning was acknowledged worldwide. In the UK, this requirement was highlighted further following the terrorist attack in London on July 7 2005 (Davies 2005, NHS Commissioning Board 2013).

A major incident is an 'event that owing to the number, severity, type or location of live casualties requires specialist arrangement to be made by the health services' (ALSG 2005). In the UK, the Civil Contingencies Act 2004 defines a major incident as 'an event or situation which threatens serious damage to human welfare in a place in the UK, the environment of a place in the UK, or war or terrorism which threatens serious damage to the security of the UK'. Both these definitions identify the broad nature of potential major incidents.

Incidents may be classified as simple or compound, and compensated or uncompensated. A simple incident occurs when the infrastructure remains intact, whereas a compound incident results in a breakdown of infrastructure, for example roads, communications and health services, and societal values such as when war or a natural disaster occurs. Compensated incidents occur when additional resources are mobilised to deal with additional workloads. However, when all additional resources have been activated, but they remain overwhelmed, the incident is defined as uncompensated (ALSG 2005).

Responding to a major incident

All acute hospitals are required to have a major incident plan, which often includes standardised terminology derived from the Major Incident Medical Management and Support course (ALSG 2005). For example, hospital personnel will be alerted using the terminology 'major incident stand-by' and 'major incident declared – activate plan' (ALSG 2005). While major incidents affect the whole hospital, the focus initially will be on the emergency department. Critical care resources may be required, so a structured major incident approach should be followed.

Once a major incident is declared, there are four main phases to managing it in a hospital setting: the pre-hospital phase, reception of casualties, provision of definitive care and the recovery stage (ALSG 2005). Each department involved in dealing with patients will go through these stages but, depending on the department, the phases will vary in duration. The mnemonic CSCATTT (Box 1) is used by emergency medical services, including the military, to respond to a major incident. The mnemonic stands for command, safety, communication, assessment, triage, treatment and transport. On activation of a major incident plan, these elements must be in place to provide a structured response and will be relevant in both the pre-hospital setting and various clinical areas in the hospital. These elements are discussed in relation to critical care.

Box 1

CSCATTT: a structured response to a major incident
C – Command.   S – Safety.   C – Communication.   A – Assessment.   T – Triage.   T – Treatment.   T – Transport.   (Advanced Life Support Group 2005)

Box 2

Example action card: senior nurse intensive care
Immediate action: • On being informed of a major incident, contact all staff in the intensive care unit (ICU).   • Appoint one nurse to initiate ICU call-in (including off duty consultants and technicians).   • Nurse in charge of ICU at the time will assume the role of senior nurse until relieved by a more senior ICU nurse.   • Assess current ICU staffing and bed state.
ICU nurses: • Preparation of ICU for major incident casualties.   • Treatment of critically ill or injured patients.
Priorities: • Liaise with senior intensivist regarding the predicted ICU availability.   • Liaise with the senior intensivist regarding the possibility of transferring current patients.   • Preparation of the maximum number of ICU beds for use by major incident casualties.   • Control of nursing in ICU, including liaison with the senior nurse for 24-hour shift cover at the necessary staffing levels and skills.   • Report by telephone to the senior nurse once the predicted ICU bed availability is known.   • Monitoring of ICU stores.   • Provision of hourly casualty statements to the medical co-ordinator.   • Operational debriefing of all ICU nursing staff involved in the major incident response.   (Advanced Life Support Group 2005)

Command

During a major incident, there is a need for clear command structures that allow a point of contact for personnel to deal with and also enable an effective hospital response (ALSG 2005). The critical care senior nurse will report to the senior nursing officer for the hospital and the senior intensivist to co-ordinate the response of the team and identify immediate clinical priorities. These command structures remain in place until the recovery stage of the incident, which may be days or weeks later. To assist the main personnel in performing their roles, action cards are used as a prompt and guide for staff (ALSG 2005) (Box 2).

Safety

Safety of staff, situation and survivors must be maintained at all stages of the major incident response (ALSG 2005). Hospitals need to ensure there is appropriate and adequate personal protective equipment for dealing with incidents, including chemical, biological and radiological incidents. The severe acute respiratory syndrome outbreak in Ontario in 2003 and the influenza A H1N1/09 outbreak in Australia in 2009 revealed that there had been insufficient fit testing of specialist masks before the outbreaks (Rankin 2006, Leen et al 2010). This resulted in delays and concerns in providing critical care because staff had not been measured appropriately for masks and a sufficient variety of appropriately sized masks was not available.

Medical facilities may be destroyed during an incident, for example when the Provisional Irish Republican Army bombed Thiepval Barracks in Northern Ireland on October 7 1996 (Vassallo et al 1997). The first of two car bombs exploded in a car park inside the barracks, causing serious damage and several casualties. A second bomb was detonated 12 minutes later outside the medical centre where casualties had been evacuated. This resulted in the destruction of medical facilities and burying of casualties and medical personnel. Similarly, after the earthquake in Christchurch, New Zealand on February 22 2011, medical facilities and local infrastructures were destroyed, which made nursing difficult (Dolan 2011). Water and electricity had also been disrupted, causing difficulties in providing longer-term care in the hospital environment. These examples show how medical facilities and medical personnel may be rendered unavailable in certain situations. Major incident plans, therefore, must consider this possibility.

Communication

Communication will be challenging during a major incident because of the changing nature of incidents and any breakdown in communication systems. Information may come from sources such as ambulance liaison officers, other emergency services, television, radio and the internet. McKee et al (2007) identified that communication may be absent, limited or even excessive, causing information overload.

Information gathered during an incident must be shared with department heads and the hospital's control room to ensure a structured response. However, information must be relevant to avoid overwhelming communication systems and individuals. If communication systems become overloaded, then alternative methods may be needed, such as radios or runners who will pass information between departments and the main personnel.

Communication will also need to be cascaded to staff, for example off-duty personnel may telephone the hospital switchboard, causing the system to become overloaded and freeze. Therefore, there is a need to ensure that off-duty staff understand what to do in a major incident. Calling in additional staff may also be difficult because transport links may be closed, and the initial response from critical care may need to be generated from resources within the hospital.

Assessment

Frequent updates from the scene of the incident to the hospital control room are required to ascertain the size and severity of the situation so that resources can be provided effectively. The bombings in London on July 7 2005 demonstrated that incidents may not be confined to one location, which may make assessment of the situation difficult (Douglas 2007).

The information about the incident may be dynamic and come from varying sources, and personnel must be flexible to respond to the evolving situation. Following the bombings in London, one of the leading trauma centres receiving casualties did not have an ambulance liaison officer and staff resorted to gathering information from the television, which resulted in limited information about what was actually happening at the scene and made it difficult to plan the response (Bradbury et al 2005). All information must be collated and assessed centrally to ensure an appropriate response can be gauged and resources allocated.

Triage

Triage is a dynamic process that enables treatment priorities to be identified for each patient. It should be undertaken at each stage of the patient pathway, from point of injury to definitive care in the hospital so that treatment priorities can be identified. Specific triage tools exist which will be used at the scene and in the emergency department (Castle 2006). In the critical care unit, triage will not only relate to casualties involved in the incident, but will also determine which patients may be discharged from the unit to create space for new admissions. During the bombings in London on July 7 2005, Bradbury et al (2005) noted that to create intensive care beds, non-urgent elective surgery was cancelled, and all intensive care patients were assessed. Patients who were deemed fit enough were transferred to other hospitals, high-dependency units and other wards.

Treatment

During a major incident, the number of critical care beds will increase and providing enough staff may be challenging. During the influenza A H1N1/09 outbreak in Australia in 2009, it was difficult to find trained critical care nurses because staff members also became unwell. This resulted in the need to plan the delivery of care with minimal critical care trained nursing staff (Leen et al 2010). If patients' injuries are severe, then additional resources and increased staffing may be required – for the first 24 hours after the bombings in London in 2005, many patients required two nurses at the bedside (Bradbury et al 2005). During a major incident, treatment aims to do the 'most for the most'. This will differ from the usual clinical pathways for patients, and staff may be expected to deal with injuries such as blast trauma not usually seen in civilian practice (ALSG 2005, Stonehouse 2006). Changes to trauma care in the UK, have resulted in dedicated trauma centres being set up. However, patients may be admitted to non-trauma centres initially for stabilisation before being transferred to trauma centres or other designated hospitals.

During a major incident, hospitals will have acutely ill patients who cannot be discharged, and therefore departments such as theatres and critical care need to be prepared to deal with in-hospital emergencies as well as new casualties. For example, during the bombings in London, the receiving hospitals also had to manage other emergencies not related to the incident, such as a gynaecological emergency that required urgent surgery during the major incident (Stonehouse 2006). Likewise, once all the casualties had been evacuated from the scene, and had been processed by the emergency department, the department reopened to ambulances and the general public. However, other departments continued to deal with a range of casualties and remained on major alert (Stonehouse 2006). This situation highlights the fluctuating workloads in the hospital, and that each department will have specific challenges and roles in dealing with the aftermath of an incident.

Transport

Patients may arrive at the hospital by various methods, but it is expected that Priority 1 (immediate) casualties will be transferred by ambulance. Priority 2 (urgent) casualties are those with severe injuries who can wait, but will require treatment within two hours, and Priority 3 (delayed) casualties are those who can wait for up to four hours to be treated. Triage is dynamic, so at each stage of the casualty pathway casualties should be re-triaged and reassessed to ensure they are in the appropriate category (Ministry of Defence 2008). Ambulance control will co-ordinate where Priority 1 patients are transferred to, but people who have left the scene without being triaged may present at their nearest hospital some distance away and over a period of time (Winter 2012).

Ambulances will be a premium resource, but appropriate transfer capabilities will need to be identified. For example, during the bombings in London in 2005, three critically ill patients were transferred to alternative hospitals, which required a nurse and a doctor to undertake the escort and initially reduced capability. Incidents involving children or large numbers of burns casualties will require them to be transferred to specialist units, which will necessitate increased transfer resources. With casualties arriving and patients being transferred, correct handling of patient property, and identification of patients and liaison with relatives also need to be considered.

Correct handling of patient property Major incidents have the potential to be caused by a criminal act. For example, during the rail crash at Ufton Nervet, Berkshire, on November 6 2004, patient property needed to be appropriately handled, recorded and stored in case it was required for further forensic examination (Crouch 2005). Many patients may not be identified immediately because of the severity of their injuries, so patient property is tracked initially with the casualty number, with casualty details to be supplied later.

Identification of patients and liaison with relatives Because of the severity of their injuries, it may be difficult to identify patients if they are sedated and ventilated. Relatives and significant others are requested to telephone the casualty bureau, which is staffed by police who will collate lists of missing people and liaise with hospital services. However, gathering this information may be difficult because identifying information may not become available for some time.

Staff support

It is important to recognise that support for staff must continue once a major incident stand-down has been declared, and this should be included in the major incident plan. The National Institute for Health and Care Excellence (2005) recognised that up to 30% of people who experience a traumatic event will develop post-traumatic stress disorder (PTSD). Peer support such as the British Military's Trauma Risk Management (TRiM) aims to identify anyone at risk of developing problems at an early stage. Following a traumatic event, individuals take part in an informal interview to see how they are coping. This is then followed up one month later (British Army 2014).

The London Ambulance Service used a peer-support approach similar to TRiM after the bombings in London in 2005, with the aim of not preventing or treating PTSD, but of empowering staff to seek help with stress, rather than seeing it as a 'cause for embarrassment or shame' (Allen 2005). Staff at St Bartholomew's Hospital and the Royal London Hospital had access to a staff counselling service (Bradbury et al 2005). Since then, the *NHS Commissioning Board Emergency Preparedness Framework 2013* (NHS Commissioning Board 2013) requires NHS and NHS-funded organisations to ensure appropriate arrangements are in place to support the psychological needs of staff affected by significant incidents, emergencies and disasters.

Following any incident, a formal debrief needs to take place to enable staff to learn from the incident. This consists of four main stages: a 'hot debrief' should take place immediately after the incident at each location or department, then an 'organisational debrief' within two weeks of the incident, a 'multi-agency debrief' within one month and a 'post-incident report' within six weeks of the incident (NHS Commissioning Board 2013).

Training

All hospitals are required to have a major incident plan. However, because of the infrequent activation of such a policy there is a risk that practitioners believe a major incident will never happen, and this may result in hospital staff being inadequately trained or prepared (ALSG 2005, McKee et al 2007).

The military medical services and emergency services are well trained in dealing with major incidents. Internationally standardised courses, such as the Major Incident Medical Management and Support course, are available and local level training has also been devised, which includes competencies, table-top exercises and practical exercises (ALSG 2005, Douglas 2007, Linney et al 2011, Winter 2012). However, training should not focus solely on major incidents – other areas should also be considered in the overall training needs analysis, including trauma and transfer.

Little has been published on how prepared critical care staff are to deal with major incidents. However, Worrall (2012) used an adapted Emergency Preparedness Information Questionnaire (EPIQ) to review emergency nurses and healthcare assistants at two minor injury units and assess their familiarity with major incident preparedness. The results showed that before and after the learning intervention, participants were most familiar with the emergency preparedness dimensions that related to incident command, triage and reporting, and assessing clinical resources. Conversely, after the intervention, familiarity scores remained low in areas such as epidemiology, clinical decision making, psychological care and special populations (which relates to criteria such as chemical, biological, radiological, nuclear and explosive weapons, or CBRNE), and identifying PTSD in patients who are given routine health checks following a large-scale emergency.

As expected, these results demonstrated that emergency nurses showed confidence in areas they are familiar with. However, they reported less familiarity with rarer incidents such as those associated with CBRNE. Limitations of the Worrall (2012) study are that the EPIQ is done by the individual so it is subjective, and it was conducted in only two minor injury units, therefore it may be difficult to generalise these results to all emergency and critical care nurses.

Al Khalaileh et al (2012) conducted a larger-scale study of Jordanian nurses with varied backgrounds who were randomly selected from three Ministry of Health and university hospitals. Six hundred participants were invited to complete the Disaster Preparedness Evaluation Tool, with a response rate of 512 (85%); 474 questionnaires were fully completed and were analysed in the study. The nurses reported that they were weak-to-moderately prepared for disaster management and raised concerns about dealing with CBRNE, mental health issues and post-disaster situations. Interestingly, these issues were also raised in Worrall's (2012) smaller-scale study of 41 nurses and healthcare assistants working in a UK minor injury unit.

Recommendations

To adequately prepare staff in critical care units to deal with a major incident, the author recommends that:
- All personnel should be familiar with their role in the event of a major incident; this includes an opportunity to undertake simulation training and practice drills.
- Local level training on specific types of incidents, for example those involving CBRNE should be undertaken, to provide an insight into dealing with the types of patients that might be encountered.
- Senior nurses should attend nationally accredited courses to understand their role and the role of the critical care unit in dealing with a major incident.

- Core competencies should be developed so that nurses gain basic knowledge of dealing with a major incident. These competencies could then be expanded to include more senior roles and responsibilities as appropriate.
- Further study of nurses' and other healthcare professionals' ability to deal with major incidents, particularly in critical care, are needed to support development of core competencies, training and major incident plans.

Conclusion

Major incidents are not common in the UK, but all hospitals are required have a major incident plan in place, which will guide the role of critical care units in the event of such an incident. Critical care staff play an important role in major incidents and are often required to continue to deal with inpatient emergencies, as well as transferring patients to other locations. Critical care resources may remain stretched for several days while staff deal with the ongoing care of survivors.

Although many lessons have been learned from military operations in dealing with incidents, in recent years civilian incidents have provided a body of knowledge which has resulted in major incident plans evolving and becoming more structured. Reviewing civilian and military incidents allows experiences to be shared, and policies and responses to be improved and developed.

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Nurse education in the British armed forces

Abstract

Defence nurses form the largest registered specialty in the UK defence medical services. Once qualified, defence nurses maintain and develop their nursing and clinical skills in appropriate healthcare settings, and can be deployed in operational environments such as Afghanistan. Workforce planning and staffing establishment levels are defined to meet the needs of British armed forces, allies and, potentially, local populations. Since the workforce is geographically dispersed, deployed or undertaking non-clinical duties, there are constraints on nurses' attempts to maintain basic skills and access continuing professional development. This article explores the concept and the developing role of defence nurse lecturers in improving educational support for defence nurses.

Authors

Chris Carter
Army nurse lecturer, Department of Healthcare Education, Defence School of Healthcare Education, Birmingham.
Alan P Finnegan
Defence professor of nursing and head, Academic Department of Military Nursing, Royal Centre for Defence Medicine, Birmingham.
Correspondence to: chris.carter946@mod.uk

The beginnings of modern nursing are associated with the work of Florence Nightingale and the support provided to young men serving in the British armed forces. Whether military or civilian, all nurses share these foundations of nursing, in which care and compassion are intrinsic to all duties. Nurses must also be competent to be safely employed in their designated scope of practice, and their work underpinned by academic training and assessed to maintain registration.

Education of nurses in the British armed forces is provided by the Department of Healthcare Education, which offers a post-registration BSc (Hons) in defence healthcare studies. Defence nurse lecturers deliver the education and this article explores the role of these lecturers, outlining their similarities and differences with civilian nurse lecturers. It will also identify the unique challenges of being a uniformed nurse lecturer. There have been few peer-reviewed publications on the topic of educating the military, and this article addresses that gap by providing an overview of the structures and personnel required to educate a high-quality nursing workforce.

In this article, the term 'defence nurses' refers to those personnel serving as regulars or reservists in the British armed forces. The term includes civilian colleagues employed by the Ministry of Defence (MoD) and the wider nursing community that supports British army personnel.

Defence nursing

The UK's Defence Medical Services contain regular and reservist defence nurses from the Royal Navy (Queen Alexandra's Royal Naval Nursing Service), the army (Queen Alexandra's Royal Army Nursing Corps) and the Royal Air Force (Princess Mary's Royal Air Force Nursing Service). In addition, there are MoD civilian nurses and British army healthcare assistants. Defence nurses form the critical mass of registered healthcare clinicians and are the largest single specialty in the defence medical services (MoD 2011).

UK defence nursing practice spans deployed operations in places of conflict and humanitarian need, and UK health care. It encompasses a variety of specialties (Box 1).

Box 1

Nursing specialties in the UK defence medical services
• Aeromedical evacuation, including critical care.
• Apheresis.
• Burns and plastics.
• Chemical, biological, radiological and nuclear nursing.
• Critical care.
• Education.
• Emergency nursing.
• General medicine.
• Infection prevention and control.
• Mental health.
• Defence nurse practitioner.
• Occupational health.
• Operating theatre.
• Ophthalmology.
• Pain control.
• Patient safety and governance.
• Primary care.
• Rehabilitation, including sports medicine.
• Research.
• Sexual health.
• Surgical nursing.
• Trauma and orthopaedics.

In the UK, depending on the nurse's specialty, nursing care is provided mainly through primary health care and departments of community mental health, and in Ministry of Defence Hospital Units (MDHU) and the Royal Centre for Defence Medicine (RCDM). Such secondary healthcare facilities are embedded in NHS hospitals, and there is the Defence Medical Rehabilitation Centre at Headley Court in Surrey. The purpose of these organisations is to provide care for service personnel, to maintain clinical skills in preparation for deployments, and – depending on the organisation – to support injured military personnel.

Defence nurses require the skills to act as autonomous practitioners, working in hostile, unpredictable and challenging environments where flexibility is a necessity (Finnegan et al 2014a). Many of the skills that the military require – such as the ability to deal with emergencies and to provide life-saving measures under stressful circumstances – will be familiar to civilian colleagues working in city-centre emergency and trauma units or rapid-response community-based mental health teams. However, it is a question of perspective. In extreme cases, defence nurses may be providing care while under direct fire or in a field hospital. Following such events, defence nurses then have to deal with the psychological consequences of such experiences while removed from the usual constructs of family and friends.

Depending on service and specialty, nurses provide care in a variety of settings including primary health care, casualty evacuation, field hospitals, at sea and during aeromedical evacuation operations. Each setting provides a unique challenge for the nursing team. Recent wars in Iraq and Afghanistan involved providing care in difficult climates and in close proximity to conflict, where there were critical incidents including total power failures, extreme ambient temperatures, and chemical, biological, radiological and nuclear attack alarms (Lockey et al 2004, Batham et al 2012). Additional environmental factors include maintaining infection control practices and providing care in tents, where there are insufficient resources such as running water and limited isolation procedures (Hospenthal and Crouch 2009).

Risdall et al (2011) identified that the challenges of providing critical care on board a Royal Navy ship include a lack of space for care and medical stores and a shortage of cleaning and sterilisation equipment, especially on smaller ships. Bunks are immovable and all equipment is required to be secured. Patients may need to be transferred to ships from helicopters and other ships and to clinical facilities from the flight deck through a series of lifts, ladders and hatches.

With the exception of mental health (Kiernan et al 2013, Finnegan et al 2014a), there is no published research on the role of autonomous nurse practitioners in the British armed forces. However, educators must remain up to date, and work with experience and understanding of operational roles, to prepare defence nurses for those roles. Defence nurses need to be resilient and flexible to adapt to and provide care in challenging environments. With the formal ending of UK combat operations in Afghanistan in 2014, the focus of defence shifted to preparing for future contingency operations. This means being prepared to provide nursing care in any environment or type of operation including war, or peacekeeping or humanitarian missions.

Nurses' education should include not only the care of injuries and provision for psychological and physical needs that are familiar to civilian practitioners but also the skills to anticipate unique problems posed in the operational environment. These include challenging ethical decisions, adverse terrain and weather conditions, and lack of resources. This broad spectrum of potential environments and requirements also presents educational challenges.

Recruitment

Regardless of occupational role, the armed forces' recruitment model comprises a rigorous selection policy that uses interviews, psychometric testing, and medical and physical assessments. For nurses, the aim is to recruit men and women who have the ability to develop the correct skills to provide excellent and compassionate nursing in demanding military environments.

All nursing personnel (either enlisted or commissioned direct entrants) are required to undertake basic soldier and/or officer military training, which provides an introduction to service life, standards, ethos and culture (Harper 2006). In addition to recruiting qualified nurses, the British armed forces are some of the few that select individuals for pre-registration training. Defence nurse educators therefore equip qualified nurses for their operational duties and also help to educate students to achieve the nursing competencies that enable them to register with the Nursing and Midwifery Council (NMC).

Defence nursing students

After basic military training, nursing students then complete either adult or mental health nurse training at Birmingham City University. Defence students are integrated alongside civilian students and the course content is delivered predominately by civilian lecturers. However, defence students are deemed to be in military training and therefore have input and oversight from support officers, who ensure military disciplinary standards and advice are provided.

Bell (2013) conducted case study research to explore the effect of organisational culture on the learning experiences of defence nursing students. Information was gathered from defence students, support officers and lecturers. The results revealed that military personnel believed there to be a military subculture in the civilian learning environment. Defence nursing students were classified as high achievers, and image, ethos, environment, discipline, support and welfare were important to how they were perceived by others. Respondents felt these factors helped them to complete their studies successfully. However, Bell's (2013) study was conducted with military personnel only, and it would be beneficial to have gauged similarities and differences with civilian students in the same cohorts and civilian lecturers.

Post-registration training

The military medical workforce is unique because nurses work in different organisations, are geographically spread and are supported by reservists. Workforce planning and staffing establishment levels, including specialist requirements, are defined to meet estimated operational demands both in the present and in the future. Hence, many nurses from different specialties are required to provide the correct level of support to the British armed forces, allies and local populations.

Aiken et al (2014) demonstrated the importance of undergraduate pre-registration education and that better education can result in reduced mortality rates for patients. The military embraces this ethos. However, the basis of military nurses' employment is not their undergraduate academic profile but their achievements in post-registration education and development. These achievements are defined within the Defence Operational Nursing Competency (DONC) document, graded at levels 1, 2, 3 and 4. Level 1 relates to proficiency as a newly qualified nurse; the expectation is that nurses will achieve the entry-level grade 2 within one year of qualification or recruitment. This ensures a common benchmark before nurses are deemed fit to deploy. Specialist skillsets and knowledge are graded at levels 3 and 4, and depend on clinical experience and postgraduate academic training.

The Department of Healthcare Education's nurse lecturers provide an accredited postgraduate BSc defence healthcare degree (Box 2). This is then supplemented by specialist clinical courses, and master's and higher-level degrees provided by civilian universities. To complement this, defence nurses are placed in civilian hospitals that provide the correct clinical environment. If required, defence nursing supervisors, mentors and preceptors provide additional support. Higher degrees involve researching an appropriate defence nursing subject and identifying a university that can provide the optimum supervisory support.

Box 2

BSc (Hons) in defence healthcare studies
• Evidence-based practice: 30 credits. • Defence healthcare governance: 15 credits. • Professional issues in defence health care: 45 credits. • Diverse nature of defence health care: 30 credits.

Roles for deployable nurses and educational requirements are assessed by the specialist nurse advisors for each clinical cadre, nurse education advisors, and the chain of command, based on operational requirements and feedback from post-operational reports. When a nurse has been identified for mobilisation for war, his or her personal profile is assessed and bespoke courses are either provided internally or sourced from external suppliers (Box 3).

Box 3

Model for educational preparation of defence nurses
• Defence operational nursing competencies.   • BSc (Hons) in defence healthcare studies.   • Specialist training at MSc and higher degrees.   • For each deployable role, the nurse is assessed and the educational requirement denoted.

Competencies and fitness for task are assessed immediately before deployment during clinical exercises. This ensures the most up-to date operational and clinical information is available for the deploying nurse. Following this model requires significant time and human resources and has financial implications. However, it offers consistency and is perceived as providing the right educational profile for deployment (Finnegan et al 2014b), which is reflected in greater numbers of operational casualties surviving who previously would have died (Hodgetts 2012).

Service needs can place constraints on the ways in which nurses maintain competence in basic skills and access continuing professional development – they are geographically spread, may be deployed and may be undertaking non-nursing, military roles (Clifford 2007). The assessment of defence operational nursing competencies can also be challenging, especially for reserve nurses who do not work in a military healthcare environment every day (Finnegan et al 2014b). One other limitation is that many compassionate and able skilful nurses may fail to achieve the necessary physical standard requirement – as well as skilful and well educated, the deployed nurse must be physically and mentally fit.

Defence nurse lecturers

Over the past 20 years, nurse education in the UK has changed significantly, responding to extra pressures and developments in nursing where care must address multiple patient needs in environments in which there are increased demands on nurses' time (Larkin and Burton 2008). In defence nursing, the 'operational tempo' has remained similarly significant, particularly since 2003, with defence nurses deployed in Iraq and Afghanistan.

The World Health Organization (2009) identifies that nurse educators must hold an appropriate university degree and possess clinical and educational expertise in their chosen areas. Defence nurse educators, in line with civilian counterparts, must complete an NMC-approved postgraduate qualification in teaching and learning (NMC 2008). In addition, defence nurse lecturers undertake bespoke internal courses and professional development aligned to defence doctrine, ethos and standards, and provide courses that reflect nursing and military requirements.

Defence nurse lecturers work in military and civilian environments, and this may affect students' learning. There is minimal published information on this topic, but Stankiewicz Murphy et al (2012) reported that concerns were raised in relation to uniformed lecturers operating in a mixed military and civilian higher education establishment in the US. The military lecturers' perception was that their deployment would result in a highly structured environment that would not be conducive to learning, allowing less freedom for students to think and debate. The authors' findings indicated that students had preconceived ideas that army officers would be authoritarian and that the learning environment would change. However, with increased exposure, students identified that many of these ideas were erroneous and they gained a greater understanding of the role of the military. It appeared that nurses were ultimately more interested in the credibility of lecturers and their ability to teach (Stankiewicz Murphy et al 2012).

Operational requirement

As well as lecturing, UK defence nurse lecturers are required to complete operational deployments and undertake clinical practice. Recent research supports further and more formal implementation during deployment to help sustain the clinical skills and competencies that enhance military nursing. In particular, they may be suited to ward manager roles, supporting a clinically diverse and demanding patient population. For example, in Afghanistan, nursing care is provided to the International Security Assistance Force (ISAF), Afghanistan National Security Forces (ANSF) and the local population, including significant numbers of children (Finnegan et al 2014b). Practice educators in this environment would provide mentorship, practice development and supervision, and secure unique opportunities for operational nursing research (Hutchings et al 2013, Finnegan 2014b), pre-hospital treatment (Batham et al 2012), and multi-professional research, such as targeted or novel hybrid resuscitation, massive transfusion and early goal-directed transfusion (Kirkman et al 2011). The development of a specific deployable defence nurse lecturer role would also help ensure credibility and visibility, further enhancing operational nursing research and ultimately improving defence nursing care.

Educational developments in defence nursing and future directions

In addition to meeting the demanding expectations discussed above, the UK has made significant developments in supporting military nursing academia and research by establishing the Academic Department of Defence Nursing in 2012 (Finnegan 2013), the post of defence professor of nursing and most recently a Defence Nursing Research Society (Lamb 2013). In addition, the Army Nursing Research Professoriate ensures collaborative education and research with leading national universities and internationally with the US Army (Royal College of Nursing 2014). The result has been a significant increase in robust defence nursing research.

For nursing to continue to develop in the British armed forces, the following areas for future work should be considered:

- Formal evaluation of the educational model used, to ensure it meets the needs of the Defence Medical Services and other nursing requirements, such as NMC revalidation. This will ensure defence nurses remain fit for purpose.

- Expansion of the educational model for autonomous defence nurse practitioners. There is a need to deliberate further on what extended practice skills nurses can and should use.

- Nursing research, including qualitative research, audit and service evaluation.

- Reassessment of the roles of defence nurse lecturer and defence practice educator, and of educational programmes provided by the Department of Healthcare Education, once all healthcare professions have moved to all-graduate membership.

Conclusion

This article explored the pre and post-registration educational framework used by the British armed forces and the role of the defence nurse lecturer. Defence Medical Services aim to provide to military service personnel the correct clinical support at the correct time in whatever environment necessary. This can be pre-deployment with public, occupational and mental health resilience training or with direct front-line support. Defence nurses are deploying into demanding, often unique environments, where clinical competencies are aligned to the requirement to function autonomously. The role of the defence nurse lecturer in assuring that deployed nurses are fit for task is considerable, as indicated in this article.

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Role of the military community mental health nurse

Abstract

Aim To understand the role and effect of a community mental health nurse (CMHN) deployed to work with military personnel during sea-based operations.

Method Semi-structured interviews were conducted to ascertain Royal Navy aircraft carrier military unit commanders' perceptions and experiences of the CMHN's role.

Findings Three mutually inclusive components are necessary to ensure successful integration of the CMHN: familiarity, trust and credibility.

Conclusion For CMHNs to function successfully and provide mental health care to sea-based military personnel, they need to demonstrate familiarity, trust and credibility. This will enhance uptake of mental health services among military personnel and ensure they are fit for service.

Authors

Matthew Donal Kiernan
Senior lecturer, Faculty of Health and Life Sciences, Northumbria University, Newcastle upon Tyne.
Alan Finnegan
Head of Academic Department of Defence Nursing, Royal Centre for Defence Medicine, based at the Queen Elizabeth Hospital, Birmingham.
Derek Farrell
Senior lecturer in psychology, University of Worcester, Worcester.
Correspondence to: matt.kiernan@northumbria.ac.uk

Since the early 1990s, mental health care for British military personnel deployed to areas outside of the UK for land-based operations has been delivered predominantly by community mental health nurses (CMHNs) supported by visiting military psychiatrists. It is now common for CMHNs to be deployed as lone practitioners based in primary health care to support military personnel. However, there is a lack of research about the role of CMHNs deployed to work with military personnel during sea-based operations, in other words onboard ships.

Literature search

Conflict and war, and the need to provide clinical and nursing care to injured military personnel, have shaped healthcare services throughout the world. The lessons learned from managing the mental health and welfare of military personnel have influenced assessment and clinical practice in civilian mental health services, with interventions such as assertive outreach, community-based care, crisis intervention and group psychotherapy now considered routine (Harrison and Clarke 1992, Artiss 1997).

Military-related mental health problems

Well-motivated military personnel, whether during peacetime or deployment, generally have good mental health (Hughes et al 2005, Finnegan et al 2011). Serious mental illness is rare and out of the 1,600 people leaving the military each year on medical grounds, only around 150 leave as a result of a mental health-related problem (Busuttil 2010). The most common mental health disorders affecting British military personnel are depression, alcohol misuse and anxiety (Iversen et al 2009).

Military mental health care is based on maximising psychological support through timely provision of mental health aid, with the expectation that military personnel will return to duty. This requires an effective mental health service that is accessible, readily available, tackles stigma and positively acknowledges a duty of care to such personnel (Finnegan and Finnegan 2007).

Community-based mental health care

Military community-based mental health is an extemporised service that has evolved over two decades, with an assumption on the part of the Defence Medical Services that military unit commanders appreciate, understand and respect the work of CMHNs. The Defence Medical Services ensure that military personnel are prepared and medically fit to perform their duties. Since the closure of the psychiatric unit at the Duchess of Kent Military Hospital (the last military mental health hospital in the UK) in Yorkshire in 2003, there has been a need to provide an integrated care pathway between primary health care, military departments of community mental health and secondary health care. This is being achieved in military departments of community mental health through the involvement of multi-professional clinical staff, with nurses being supported by psychiatrists, psychologists and social workers.

Mental health support for sea-based military personnel

Although CMHNs provide support for military personnel during land-based operations, as previously stated there is a lack of support available for those working at sea onboard ships. The Royal Navy's mental health provision is based on land at three ports in the UK: Portsmouth, Plymouth and Faslane.

Aim

The aim of the study was to understand the role and effect of a CMHN deployed to work with military personnel during sea-based operations.

Method

The study used qualitative methods to elicit specific information concerning the CMHN's role. Applied research focuses on finding solutions to an immediate practical problem and has an important role in providing insight, explanations and theories of social behaviour (Ritchie and Spencer 2002). Framework analysis was used to meet set objectives of investigation within a limited time period (Pope et al 2000). The process consists of five linked phases of data analysis and interpretation, including familiarisation, identifying a thematic framework, indexing, charting, and mapping and interpretation.

Box 1

Interview questions
1. What were your pre-conceived ideas regarding the effect that the community mental health nurse (CMHN) would have when he/she joined the ship?
2. What was your level of awareness of the CMHN's role before, during and after he/she joined the ship?
3. What level of interaction have you had with the CMHN?
4. What effect did the CMHN's presence have on the provision of divisional support (divisions of approximately 30 personnel, which are usually overseen by a junior officer or a senior non-commissioned officer. It is the responsibility of these officers to ensure the welfare of personnel within their division)?
5. How do you think the presence of the CMHN onboard the ship affected the likelihood of any individual presenting to mental health services?
6. Would you be content to retain one of your personnel onboard, when he or she would usually be sent ashore, if the CMHN assured you that the situation could be managed onboard?
7. If the answer to question 6 is yes or no, ask why.
8. Reflecting on your answer to question 6, what aspects of the CMHN's professionalism, personality or behaviour would affect your view of this?
9. What effect has the CMHN had on the way you manage personnel?
10. What do you believe is the minimum rank the CMHN should be and why?
11. What problems do you believe might affect a CMHN's ability to perform his or her role within the ship's community?
12. What preparation or training of the CMHN would you recommend before joining the ship?
13. Do you believe that having a CMHN onboard the ship is beneficial and, if so, why?

The study took place on a Royal Navy aircraft carrier. A senior female non-commissioned CMHN was selected to work with military personnel on the aircraft carrier for six months. During the study period, the ship undertook multiple deployments, including a six-week exercise in the Baltic Sea. In the last week of the six-month period, the first author (MDK) joined the ship's crew to conduct semi-structured interviews with military unit commanders to explore their perceptions and experiences of the work of the CMHN.

Purposive sampling was used to select participants for interview (Mays and Pope 2000). To reflect the true diversity of the management role onboard the ship and interaction with the CMHN, key managerial positions were identified at all levels of command. These included personnel from the medical, human resources, engineering and warfare departments. Informed consent was obtained from all participants, and ethical and scientific approval was provided by the Ministry of Defence research ethics committee.

 Experiential knowledge, aided by consultation with senior colleagues in military mental health services, and a pilot study resulted in the development of a semi-structured interview template (Box 1). Interviews were conducted with 11 military unit commanders. Each interview lasted around 30 minutes and was digitally recorded and transcribed. Framework methodology (Ritchie and Spencer 2002) was used to organise the qualitative data for analysis using the Framework 1.1 software package. The familiarisation stage involved immersion in a selection of the data to produce an interim thematic framework and index. The framework was then applied to each interview transcript to allow the thematic framework to evolve as new phenomena were identified. This enabled themes to be established as well as the addition of new emerging topics. Once all the data had been indexed, the thematic framework was finalised and the data reorganised into charts. Pope et al (2000) described the charting stage as rearranging the data into the appropriate parts of the thematic framework. By this stage of the process, the data had been sorted into core themes that met the aims of the research. Guided by the research objectives identified in Box 2 and by the research aims, data were mapped and interpreted using framework analysis.

Box 2

Main objectives of qualitative research
• Define concept.
• Map range and nature of the phenomena.
• Create typologies.
• Find associations.
• Provide explanations.
• Develop strategies.
(Ritchie and Spencer 2002)

Findings

The establishment of the final thematic framework was an evolutionary process. Box 3 highlights the six main themes that emerged from the data. Data were then reorganised into four themes for the purposes of data analysis and interpretation (Box 4).

Commanders' perceptions of impending CMHN placement

The commanders' perceptions of impending CMHN placement were mixed. There was concern among senior officers who managed discipline on the ship that personnel who were having difficulties would target the CMHN as a means to escape their problems and avoid disciplinary action or deployment.

Concern about the effect of the CMHN on military personnel was based on previous experience of the interface between military units and UK-based military departments of community mental health. There was a misconception among participants about the role of CMHNs, and concern about differentiating between mental ill health and bad behaviour. There was a perception that those facing disciplinary action would pretend to be mentally ill to avoid punishment:

Box 3

Intermediate thematic framework

1. Role
1.1 Perception of the community mental health nurse's (CMHN's) role.
1.2 Interpersonal interaction with the CMHN.
1.3 Effect on the ship's company.
1.4 Trust.
1.5 Appropriate professional and military seniority for the role.
1.6 Roles and responsibilities.
1.7 Insufficient mental health morbidity to justify the role.

2. Service credibility
2.1 Subject matter expert.
2.2 Validity of the trial period.
2.3 Preparation for sea duties.
2.4 Mental health liaison.
2.5 Effect of behaviour and personality.
2.6 Junior CMHN development.
2.7 Training requirements.

3. Perception of military mental health practice
3.1 Effect of the CMHN on the management of discipline standards.
3.2 Malingering and abuse of the mental health system.
3.3 Effect of the CMHN on the ship's operational role.
3.4 Effect on ship-wide management of mental health distress.
3.5 Presence of the CMHN was initially believed to be an easy route to discharge from service.
3.6 Effect on the management of medicalising behaviour.
3.7 Effect on the management of risk behaviour.

4. Stigma
4.1 Underlying misconception and stigma towards mental health practice.
4.2 Effect of the CMHN on reducing stigma and stimulating help-seeking behaviour.
4.3 Effect of the CMHN on reducing the barriers to help and care.
4.4 Stigma-reducing behaviours that promote trust with command.

5. Divisional system
5.1 Benefit to senior divisional personnel.
5.2 Divisional officer experience and personnel management skills.
5.3 Divisional support.
5.4 Temporal effect of the CMHN on the divisional system.
5.5 Personnel management avoidance within the divisional system.
5.6 CMHN role within the divisional system.

6. Embedded CMHN
6.1 Yes, it has been beneficial.
6.2 No, it has not been beneficial.
6.3 Should be deployed on aircraft carriers from now onwards.

Box 4

Final thematic framework

- Commanders' perceptions of impending community mental health nurse (CMHN) placement.
- Effect of the CMHN on military personnel.
- Effect of the CMHN on the divisional system.
- Factors associated with the CMHN's role.

'… Sometimes it makes me think damn it, why should they get out the easy way? But on the other hand, why should we continue to pay them … when they are obviously not suited to be in the military' (Participant 1).

More surprising were the views of the CMHN's future medical colleagues. They did not envisage fully the extended mental health liaison role routinely practised by CMHNs during military operations and felt that the workload would not be sufficient to warrant a CMHN. As such, additional clinical governance roles were included within the CMHN's job specification:

'… I felt that the workload would not be sufficient to keep her fully employed and therefore I wanted to explore what other ways she could contribute to the life onboard in the medical centre, which is why we made sure that she was first aid trained so she could support us in the first aid for action and basically take on some of the administrative roles such as clinical governance' (Participant 2).

Junior officers and senior non-commissioned officers were most supportive of the CMHN's presence. From the outset, they envisaged that the CMHN would be an asset, assisting them in meeting their responsibilities to ensure the welfare of their assigned personnel on a day-to-day basis. However, they also shared concerns about the CMHN being a target for those who wanted to escape the ship:

'Some members of the ship's company saw it as a way out and there was definitely that preconception around the ship's company' (Participant 5).

Effect of the CMHN on military personnel

From the outset, the CMHN divided her time between supporting the principal medical officer and the divisional system. Divisions comprise approximately 30 personnel, which are usually overseen by a junior officer or a senior non-commissioned officer. It is the responsibility of these officers to ensure the welfare of personnel within their division. Within a few weeks of the CMHN's deployment, it was evident that the medical team's perception changed, with the recognition that the CMHN provided not only a formal mental health service, but also a liaison service, assisting divisional officers in the management of junior personnel. Informal appointments were arranged to discuss problems that were causing junior personnel concern or distress. If an individual was found to be experiencing a mental health problem, he or she became a formal patient and his or her case was discussed at multidisciplinary team meetings within the medical centre:

'We were having a lot of TU [temperamentally unsuitable for military service] cases coming to the forefront and issues across the whole ship, and … as a divisional officer speaking personally, you don't get that much training and support to deal with those sort of instances so to have a point of contact, someone you can discuss issues with to assist, it was going to be great and indeed that is how it has proved to be' (Participant 3).

This model of mental healthcare delivery is well established in land-based operations (Jones et al 2008), but has not been implemented in sea-based operations. The CMHN in the study was given an office away from the medical centre. It was felt that by de-medicalising the act of speaking to the CMHN in this way, stigma attached to seeking mental health care would be reduced and personnel would feel more able to seek help. Within a short period of time, the CMHN was viewed as another member of the ship's personnel.

One participant identified that before deployment of the CMHN, any member of the ship's personnel that needed psychological help would have to go to the principal medical officer to seek referral. This practice medicalised social problems and placed the individual in a sick role:

'Once we had done that [moved the CMHN out of the sickbay] and we established, all of a sudden, there were the individuals who were initially having to go to the PMO [principal medical officer] for a referral to see [name], but that was quickly nipped in the bud and straight after that you could see the difference, without having to go the PMO, because obviously the individuals may have felt that there was a bit of a stigma attached to that, and I think that once it was established that they can actually go to see the mental health nurse for whatever reason, and the door was open' (Participant 4).

The medical team anticipated that the presence of the CMHN would result in an increase in mental health referrals. However, no changes were noted, although it was acknowledged that some personnel, through improved mental health management, were retained and received mental health input onboard the ship instead of being sent ashore:

'… there was always a concern onboard as to the quality of divisional support … and there was also the perception that a lot of the unhappy juniors and unhappy youngsters were not getting the divisional support that perhaps we would have liked. There is no doubt in my mind that the addition of the CMHN provided a useful backup support and guidance for the young divisional officers and some of the senior rates [ranks] onboard to manage some complex social and psychiatric cases, and in addition provided a useful link between the ship and the mental health service support ashore and also with GPs for patients who we had lost in the system' (Participant 2).

The CMHN's presence was viewed as positive by all participants. Senior officers and commanders were concerned about the lack of experience of young divisional officers, and felt the CMHN could provide mental health expertise, and could mentor and support divisional officers in managing social problems without having to seek medical intervention. Military unit commanders were concerned that once medical services became involved in the welfare of junior ranks with social problems, those personnel in need of help or support would be lost from the ship.

Effect of the CMHN on the divisional system

There was conflicting opinion among the participants with regard to the state of the divisional system and how well it supported its members. Senior officers who did not have a day-to-day divisional role believed that there was a general lack of experience among divisional officers, which led them to involve medical services in cases that made them feel uncomfortable.

There was evidence that senior officers believed that the service divisional officers provided depended on the divisional officer's personality, and as a result members of the division received varied levels of support. The system allowed divisional officers to avoid complex social cases by sending them to see the padre (spiritual leader) or medical officer:

'I think one of the issues we have by having a full-time PMO [principal medical officer], medical staff and a chaplain onboard is that it is quite easy for the DO [divisional officer] to sort of go "Oh my god that is a problem, go and see the chaplain, go and see the doctor", so for some the divisional system requires more support elements' (Participant 5).

The divisional officers felt that having the CMHN onboard gave them more confidence in dealing with complex social problems. Rather than seeing individuals herself, the CMHN supervised divisional officers in establishing management plans for personnel with social problems. This could range from relationship problems and alcohol difficulties to disciplinary issues. The divisional officers felt that the CMHN's presence was empowering, enabling them to deal with problems with confidence and to recognise that support was available should the situation deteriorate:

'… *She wouldn't tell me, right, I'm doing this, this and this. It was along the lines of, well have you tried this, what do you think you want to do next, I would give her an idea and she would say right okay, it was a support to the divisional system and the medical system, rather than she would run the case. We wanted to keep it as a divisional matter, and it was useful to go to her as a sounding board where necessary'* (Participant 6).

Participants felt that once the CMHN's community practice was established it reduced the stigma of seeking help for welfare and psychological problems significantly. The PMO reported a noticeable reduction in social problems and found that he was only seeing individuals that required medical input. Participants felt that having a mental health expert as part of the ship's company was a positive intervention, and viewed the CMHN's role as being primarily to support the divisional system and not solely to provide medical input.

Factors associated with the CMHN's role

Experience gained from land-based operations led participants to believe that the CMHN had professional experience and had been a senior non-commissioned officer. Participants felt that junior personnel would not have the correct experience to undertake the role of CMHN and an officer's rank would potentially discourage junior personnel from seeking help. It was evident that a senior non-commissioned officer would have the right experience and appropriate rank to encourage any member of the ship's personnel to seek help.

Trust is essential among military personnel. The success of the CMHN and her ability to reduce stigma associated with seeking psychological support was encouraged by her integration into the ship's community, whereby she was viewed as one of the crew. The CMHN's credibility was central to this. Participants identified the importance of professional and personal credibility. It was felt that the CMHN had a privileged role, as he or she would have unprecedented access to all personnel onboard. The person in this role would succeed or fail based on his or her professional acumen and personal behaviour. If personnel sought help and subsequently had a poor experience based on the CMHN's lack of professional knowledge, then it was felt that this would circulate rapidly among the ship's community and others would not use the service. Similarly, it was felt that if the CMHN behaved in a way that was deemed unacceptable, then personnel would avoid seeking help. Senior officers likened the CMHN's role to that of the padre or doctor, whereby the personality and conduct of the individual is integral to successful functioning:

'*They are very similar, I would imagine, to a service policeman who is always wearing that badge on their shoulder, living within the community that they are policing and I would imagine the mental health nurse would have the same problem. It is being able to stand back but without being too stand-offish, so still being part of the community and part of the team but at the same time you are standing back and you are there to support and assist that team and care for it. Living in a tin box there is only [one] way to do it and that is to live in the community… I don't think there is any other way the mental health nurse could do it. I think if they didn't live within the community then you wouldn't get the trust from the lads'* (Participant 1).

Divisional officers and commanders felt that within medical services, perception of the effect that medical occupational restrictions can have on a military unit's effectiveness is poor. It was felt that a CMHN should be deployed on military operations as soon as possible in a junior role to observe professional practice as well as to gain experience of living within the environment in which they are expected to work. The CMHN had previously been an engineer and had extensive military operational experience before becoming a nurse. It was accepted by participants that this level of experience would be difficult to replicate; however, it was felt that whoever took on the role of CMHN would need to have previous military operational experience or his or her credibility and effectiveness would be compromised.

Discussion

The data suggest that there are three mutually inclusive components that promote integration of CMHNs in the military setting. These are familiarity, trust and credibility.

Familiarity

The findings of the study show that for sea-based military operations, the presence of the CMHN was unfamiliar, and the commanders and medical team did not understand fully the CMHN's scope of professional practice. The divisional officers quickly recognised the advantage of having the CMHN onboard, and subsequently the commanders appreciated the CMHN's role in the management of mental health issues. This study demonstrated that after a relatively short period of time, the CMHN became a familiar and accepted member of the ship's community. It was imperative that the CMHN was integrated into the ship's community and considered part of the primary healthcare team; however, this did not mean that she had to work within the confines of the medical centre. Having a separate office away from the medical team gave the CMHN a distinct role and improved personnel's familiarity with the service she provided. In addition, the CMHN established a weekly routine of visiting each department.

Trust

The visibility and familiarity of the CMHN helped to develop trust. The CMHN was accepted as one of the ship's crew. By integrating progressively into the ship's community, any adverse effects of her presence were minimised and her inclusion was viewed positively. The CMHN was a member of the primary healthcare team and would discuss with colleagues those personnel who sought informal contact. Where appropriate, individuals were encouraged to access formal treatment as part of a multidisciplinary process. Working closely with the primary healthcare team in this way ensured that trust developed between the CMHN and the ship's community, and between the CMHN and the medical team.

The study data showed that both personal and professional conduct also played a part in establishing trust. Having previous military operational experience further assisted integration and acceptance, with the CMHN viewed as a member of the team. This was based on personnel's knowledge that the CMHN had served time at sea, knew her way around a ship, and had knowledge of the norms and values of the ship's community. The importance of integration within the community cannot be overestimated when attempting to reduce or remove barriers in a military setting. If individuals do not conform and adapt to the accepted norms of military society, they will be viewed as outsiders (Kiernan 2011).

Credibility

The CMHN's credibility was enhanced by previous experience of sea-based military operations, providing a shared experience with the ship's community and an improved profile with senior commanders.

The CMHN occupied a privileged role that transcended all ranks onboard the ship. It was an expectation of all participants in the study that not only did the CMHN's conduct have to be commensurate with that of a senior non-commissioned officer, but also that her personal conduct reflected her role as a medical professional who lived within the community in which she worked. The CMHN was viewed in a similar manner to the PMO, who would be judged in terms of his or her personal conduct and medical practice. CMHNs could provide the highest level of mental health care achievable, but if his or her personal conduct and behaviour was not commensurate with military personnel's view of acceptable behaviour onboard the ship, trust and credibility would be lost. This would inadvertently create a barrier to care because those seeking help would be put off by the personality and behaviour of the CMHN.

Study limitations

The small sample size means that the study findings cannot be generalised or confidently transferred to other settings. Future research could focus on developing an understanding of the relationship between familiarity, trust and credibility to inform CMHNs' practice and develop core competencies in this area.

Conclusion

The study provides an insight into the positive effect of the role of a CMHN in supporting military personnel deployed to work at sea. The CMHN provides expertise in mental health as well as supporting the divisional system. The presence of CMHNs may reduce mental health stigma, encourage help-seeking behaviour, and reduce inappropriate referrals and the medicalisation of social problems. Placement of CMHNs on Royal Navy aircraft carriers would reflect the support provided for land-based operations, potentially improving mental health care and ensuring that military personnel are fit for service.

Implications for practice
• Community mental health nurses (CMHNs) should be deployed routinely during sea-based operations to ensure that all military personnel receive equitable standards of care and appropriate support.
• CMHNs require training to ensure that they are prepared for work in a military environment. CMHNs should be deployed on military operations as soon as possible in a junior role to observe professional practice and gain experience of living within the particular unit in which they are expected to work.
• Familiarity, trust and credibility are central to the successful integration of CMHNs into the military setting. More work needs to be done to identify the relationship between these areas and develop best practice standards.

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Preventing infection in rehabilitation centres

Abstract

Recent military conflicts have provided new challenges for Defence Medical Services, and the specialty of infection prevention and control has not been exempt from these. The mechanisms of injury and the harsh environments in which military injuries are sustained have resulted in unusual infections with multiple resistance to antimicrobial agents. Although the multidisciplinary team faces many issues in the acute phase of the patient's rehabilitation, it is the continued infection risk to patients that is the biggest challenge for both the infection prevention and control team and the wider multidisciplinary team. Rehabilitation centres may evoke an image of healthy individuals who require little nursing care but, for those attending the Defence Medical Rehabilitation Centre, this is not always so and staff are often challenged by continuing infection problems. There is also a risk of patients developing new infections as a result of unhealed wounds and the use of invasive devices, such as indwelling catheters, which are essential if patients are to maintain their everyday activities.

Author

Nicola Mousley

Infection prevention and control nursing officer, Royal Centre for Defence Medicine, Birmingham, England. Correspondence to: mousleyn1981@gmail.com

The nature of injuries sustained by military personnel may present infection control challenges when they are admitted as patients to the Defence Medical Rehabilitation Centre (DMRC) at Headley Court in Surrey. Nursing staff should be able to assess infection risks to protect both their patients and others at the rehabilitation centre. This requires them to ensure appropriate measures are in place to provide screening, monitoring and effective management. Of all the infection risks identified, wound and urinary tract infections (UTIs) have been the most problematic for this group of patients, with an additional risk of infection with multi-drug-resistant organisms.

In the past 20 years, infection prevention and control has changed from a subject to which most healthcare professionals gave little consideration to one that is high-profile and often political (Fraise and Bradley 2009). The perception of infection prevention and control has also changed, from its being a purely hospital-based problem to being an essential aspect of care in all healthcare settings, as demonstrated by the shift in terminology used from 'hospital-acquired infection' to 'healthcare-associated infection' (HCAI) (Fraise and Bradley 2009). Despite the acknowledgement that patients might be at risk of HCAIs in various acute and non-acute settings, there is little research demonstrating the prevalence of HCAIs in non-acute rehabilitation settings.

The identification of infection risks at the DMRC and importance of an infection prevention and control service were highlighted by an internal review of the setting by the Defence Medical Services. The conflicts in Iraq and Afghanistan significantly increased the number of patients being admitted to the rehabilitation centre and there has been a concomitant rise in the level of nursing care required.

Infection risks

Greater demand for treatment in the military rehabilitation setting is largely attributable to the increased survival of casualties created by modern conflict (Taylor and Jeffery 2009). This increase in survivability has been attributed to improvements in the management of casualties as well as the equipment issued to military personnel, for example body armour and tourniquets to stop catastrophic haemorrhage. Although these individuals are now surviving devastating injuries that not so many years ago would have certainly been fatal, these injuries still result in life-changing complications, the long-term use of invasive devices and wounds that take a significant time to heal. There is a misconception that military personnel admitted to the rehabilitation facility are fully recovered and healthy, when in fact they are at risk of contracting an infection as a result of complications resulting from their injuries.

Box 1 provides a list of the most common infection risks for patients attending the military rehabilitation centre. The most common infection problems encountered are superficial wound infections and UTIs. In the few studies that have investigated the prevalence of infections in non-acute or rehabilitation settings (Mullings et al 2011, Cotter et al 2012, Laurent et al 2012), UTIs are identified as a common type of HCAI, as observed at the military rehabilitation centre. The most common infection types in Scottish care homes were UTIs and respiratory tract infections (Mullings et al 2011). The most common indications for therapy in Irish long-term care facilities were respiratory tract infections (35.1%), UTIs (32.1%) and skin infections (21.8%) (Cotter et al 2012). The most common HCAI sites in a rehabilitation unit for older adults in France were the respiratory tract (48%) and urinary tract (37%) (Laurent et al 2012).

Box 1

Common infection risks for patients in the military rehabilitation centre
• Wounds (varying severity).
• External fixators.
• Kirschner wires (K-wires).
• Urinary catheters (urethral, suprapubic and those used for intermittent self-catheterisation).
• Peripheral cannulae.
• Vascular access devices (central venous catheters and peripherally inserted central catheters).
• Immunosuppression due to surgery or injury (for example, splenectomy) or immunosuppressive treatment.
• Colonisation with multi-drug-resistant organisms.

Urinary tract infections

It is widely recognised that urinary catheters are a key source of infection (Crouzet et al 2007). Because of the various injuries the patients who attend the rehabilitation centre have sustained, a high proportion will require a urinary catheter of some description to aid them with the normal bodily function of elimination. Patients have an increased risk (between 0.5 and 30%) of acquiring an infection from catheter insertion; this risk increases the longer the catheter remains *in situ* (Wilson 2006) and is reduced if the individual performs intermittent self-catheterisation to drain the bladder of urine (Siroky 2002, Wilson 2006 Stewart 2011, Rantell 2012). Most patients who are admitted to the rehabilitation facility will perform intermittent self-catheterisation.

Despite intermittent self-catheterisation posing less risk to patients in terms of acquiring an infection, patients who perform this method will regularly have urine samples, that are positive to the presence of bacteriuria. To further minimise the risk to patients and to prevent colonisation by bacteria that might potentially be pathogenic, it is important patients are taught the correct aseptic non-touch technique for intermittent self-catheterisation so that the key parts of the catheter are not be contaminated (Rowley 2001). It is also important that patients completing this procedure are regularly observed by nursing staff so assurance may be given that their technique remains as close to risk-free as possible.

Most patients who develop bacteriuria will be asymptomatic; however, a minority will become symptomatic if the bacteriuria is not treated (Prasad et al 2009). For those who are or become symptomatic, a minor UTI is the most serious outcome. However, if treatment is withheld, more serious systemic infections can follow. Box 2 describes the case of a patient who developed a bacteraemia following an untreated UTI. This case study highlights that, despite the perceived wellbeing of patients who attend the rehabilitation centre, they are a vulnerable group of individuals who are at risk of acquiring infections that can become serious if left untreated.

Although intermittent self-catheterisation is the preferred method of urinary catheter management, not all patients who attend the rehabilitation centre are able to perform self-catheterisation because of injuries they have sustained which have affected their physical ability and dexterity. For patients who are unable to perform the procedure, suprapubic catheters are favoured over indwelling urethral catheters because of the perceived reduction in risk (Bonkat et al 2013). Patients with a suprapubic catheter are less likely to develop bacteriuria than those with a urethral catheter, when the urethral catheter is used as a short-term urinary management device (Bonkat et al 2013). There is also evidence to suggest that suprapubic catheters pose less of an infection risk than intermittent self-catheterisation when used for a short period (Siroky 2002).

Box 2

Infection in the rehabilitation setting: a case study

A patient sustained a spinal injury two years previously that caused long-term damage to the spinal cord and paralysis. After the incident, the patient was hospitalised for a long time, after which he was sent to the rehabilitation centre where he practised intermittent self-catheterisation. The patient experienced recurrent urinary tract infections (UTIs), the exact reason for which could not be determined, and was prescribed cranberry capsules to try to prevent these. The patient was known to have a problem with bladder stones and personal hygiene, especially when it came to self-catheterisation.

On the patient's last admission to the rehabilitation centre, he acquired another UTI. At the time of urine sample collection for culture and sensitivity testing, the patient was asymptomatic and so antibiotic treatment was not started. The urine sample returned with mixed organisms (>108 organisms/L), which contained a highly antibiotic-resistant organism. Shortly afterwards, the patient started to become symptomatic with uncharacteristic incontinence and became unwell one week following admission, with temperatures reaching almost 41˚C, tachycardia, low oxygen saturation and vomiting. His condition deteriorated quickly before treatment was initiated. Blood cultures were obtained and antibiotic treatment was started, but the patient's condition had worsened to the point of requiring hospital admission. Twenty-four hours following deterioration of the patient's condition, blood cultures confirmed he had become bacteraemic; the organism identified was an extended-spectrum beta-lactamase-producing Escherichia coli. The patient recovered after treatment with intravenous antibiotics and there were no long-term effects.

Those patients at the rehabilitation centre who require a suprapubic catheter usually require help with urine elimination for a long period. Some patients even wish to continue with this method of bladder draining for the whole time they require a catheter, rather than switching to other methods. The risks that are associated with suprapubic catheters (such as microbial colonisation and biofilm formation) increase with the length of time they remain inserted, as is also the case with urethral catheters. Although most of the patients who had UTIs and complications while at the rehabilitation centre had indwelling urethral catheters or performed intermittent self-catheterisation, those with a suprapubic catheter were more closely observed for complications, especially those who were known to be colonised with potentially pathogenic bacteria. A suprapubic catheter breaches the skin integrity, giving bacteria direct access to the bladder, so it is not surprising it can lead to serious bladder infections (Bonkat et al 2013). Although bacteria that colonise the surface of the skin (such as *Staphylococcus aureus* and *Staphylococcus epidermidis*) are considered an infection risk, any bacteria can potentially enter the bladder via the catheter site, including bacteria that are commonly associated with UTIs, such as *Escherichia coli* and *Klebsiella pneumoniae*. With this in mind, all staff who perform catheter care are trained in aseptic non-touch technique to minimise risks to the patient when accessing catheters. Patients who are self-caring for their hygiene needs including catheter care should be supervised at first to ensure their technique does not put them at risk of acquiring an infection.

Wound infections

In the past, wound infection had a significant effect on morbidity and mortality. In the Crimean War (1853-1856), more military personnel died from infectious diseases and wound infections than were killed in action (Hutley and Green 2009). Since then, there have been improvements in wound management to reduce the risk of infection, for example the discovery of antibiotics and improvements in wound dressings. Despite these advances, the risk of wound infection is still high. Most patients admitted to a rehabilitation setting are referred after sustaining injuries while on operational tour, although a significant number are referred following injuries or operations that did not result from being wounded in conflict, for example road accidents or accidents during training. A large proportion of patients will begin their rehabilitation while they still have wounds, regardless of how they may have been injured. Although those with wounds sustained from non-battle conditions may be at risk from infection if correct standard precautions and aseptic non-touch technique are not implemented, the wounds of the patients injured on operational tour may be at an increased risk of infection because of the environment in which the injuries were sustained and their nature and severity.

In current conflicts, military personnel are most likely to sustain injury from explosive devices or gunshots (Taylor and Jeffery 2009). Because of the way patients are injured, it is likely they will sustain multiple, severe injuries (Box 3). Despite being admitted into secondary care to receive treatment, their wounds will not always be completely healed by the time they are admitted to the rehabilitation centre and are likely to become contaminated with a range of microorganisms, including multi-drug-resistant bacteria and unusual fungi isolates, which can often cause significant infection (Hutley and Green 2009). These infections may still be problematic when patients arrive at the rehabilitation centre and this will require the patient to continue with treatment that might have been started in secondary care.

For other patients with wounds that are still undergoing the healing process, the less exotic and more common microorganisms, for example *S. aureus*, more likely to be the cause of infection. For these patients, a short course of oral flucloxacillin will usually be sufficient. However, there are an increasing number of patients who require intravenous antibiotics to treat their wound infection because of the severity of infection. These patients may have additional risk factors, including external fixators that breach the skin's defences, allowing microorganisms direct entry into the body.

Drug-resistant organisms

Microorganisms and their environment are a common source of contamination for individuals injured while on operational tour. Although some of these organisms are considered of low pathogenicity, the conditions in which some individuals live before sustaining their injuries, for example a hot, dusty atmosphere where there is a lack of water for maintaining personal hygiene, make them more susceptible to these opportunistic organisms. Two of the most common organisms that cause wound and various other infections are A*cinetobacter baumannii and Pseudomonas aeruginosa*, both of which have developed significant antimicrobial resistance (Hospenthal et al 2011). The treatment and control of *A. baumannii* infection is difficult because of the virulence of the organism (Maragakis and Peri 2008). Those patients infected or colonised with multi-drug-resistant *A. baumannii* will remain positive for the bacteria for the foreseeable future, due to the lack of a reliable screening programme or decolonisation or suppression therapy. This will affect patients admitted to the rehabilitation centre because of the strict standard precautions and cohorting or isolation required for these individuals to prevent possible onward transmission.

Box 3

Common injuries sustained during modern conflict
• Traumatic limb amputation.
• Soft-tissue injuries anywhere in the body.
• Fractures, open and complicated.
• Perineal and external genitalia injuries.
• Traumatic orchidectomies.
• Burns.
• Damage to internal organs requiring a laparotomy.
• Ruptured tympanic membranes.
• Crush injuries.

Infection with other common multi-drug- resistant organisms has been reported on admission to secondary care or to the rehabilitation centre, including extended-spectrum beta- lactamase-producing bacteria (mainly *E. coli* or *K. pneumoniae*), Vancomycin-resistant enterococci and meticillin-resistant *S. aureus* (MRSA). MRSA is the second most common multi-drug-resistant organism acquired by patients in the rehabilitation centre after multi-drug-resistant *A. baumannii*. To determine the risk to patients when they are admitted to the rehabilitation centre, all are screened for MRSA when they arrive. A swab of the nose and groin, any wounds or lesions, venous access catheters and a urine specimen are obtained from patients who are catheterised, as required by Department of Health (DH) guidance (DH 2006). Patients infected with MRSA, including those in a rehabilitation setting, were usually found to be colonised previously (Davis et al 2004, Hospenthal et al 2011). Isolation of an MRSA-positive patient is usually the preferred measure to reduce the risk of onward transmission of infection. However, because of historical isolation problems (for example, not having enough side rooms) and the number of MRSA-positive patients admitted to the rehabilitation centre, it has not been possible to isolate all MRSA-positive patients. Instead, these patients were cohorted with other MRSA-positive patients. The side rooms can then be prioritised for use by patients with a complicated infection history. Although infection status is an important factor in deciding bed allocation on arrival at the rehabilitation facility, long-term isolation is considered psychologically detrimental to the rehabilitation process because of the nature of how the patient became injured, therefore consideration has to be given to the patient's overall health. By cohorting individuals with a known infection history and maintaining good standards of infection precautions, the patient's wellbeing can be considered, as well as reducing the infection risk to others.

To reduce possible risks to other patients through infection transmission, not only were healthcare workers practising strict standard precautions but also the patients themselves would take ownership to keep the risk to a minimum. This ensures staff and patients are involved in maintaining high standards of hygiene and preventing onward transmission. Examples of this include making sure all equipment used, either on the wards or while participating in exercise programmes, is decontaminated correctly with the antimicrobial wipes provided. Patient and staff reactions to this have been positive.

Conclusion

Over the past 20 years, the infection prevention and control service has witnessed many changes, including the recognition that infections can occur not only in hospitals but also in all other healthcare settings. Despite this recognition, the perceived risks that settings such as rehabilitation centres may present to patients can be underestimated. The DMRC at Headley Court has seen an increase in patient numbers, largely attributable to advances in emergency care that mean patients injured in current conflicts are surviving injuries that would have been fatal only a few of years ago.

When patients are transferred to rehabilitation settings from secondary healthcare settings, or from their homes if they have been on hospital sick leave, they are not without risk of infection. These individuals will require the same standard of care with regard to infection prevention, that is, standard precautions and aseptic non-touch technique, as would be expected in a secondary healthcare setting because of long-term treatments and possible colonisation or infection with multi- drug-resistant organisms.

Of all the risks identified, those associated with urinary devices and wounds present the greatest risk, and it is these patients who cause staff at the rehabilitation centre the most concern. The case study (Box 2) in this article emphasises the risk urinary devices can present and demonstrates that, even though individuals are considered to be recovering, they are just as vulnerable and susceptible to serious infections as those who may be more acutely unwell in hospital.

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Response to the Ebola crisis in Sierra Leone

Abstract

The Ebola outbreak in 2014 marked the first time that an epidemic of this viral haemorrhagic fever had occurred in West Africa. From its origin in Guinea, the outbreak rapidly increased to become a humanitarian crisis affecting all aspects of life in the three countries worst affected: Guinea, Sierra Leone and Liberia. Improving understanding of Ebola virus disease among the general population and instigating the behavioural changes required to help break the epidemic were central to the public health response. This article explores some of the misconceptions about Ebola as it spread into Sierra Leonean communities, and the social mobilisation response of the government of Sierra Leone. It is a reflective account of conversations with Sierra Leonean nationals during a military deployment at the International Security Advisory Team headquarters medical treatment facility in Freetown.

Authors

Beauty Chiedza Davies
Army nurse, 22 Field Hospital, Normandy Barracks, Aldershot, England.
Douglas Bowley
Army surgeon, Royal Centre for Defence Medicine, Birmingham, England.
Katrina Roper
Technical officer for bio-safety, World Health Organization, Freetown, Sierra Leone.
Correspondence to: doug.bowley@heartofengland.nhs.uk

Early in human history, infectious diseases were variously attributed to the actions of evil spirits, vengeful gods or natural events such as comets or earthquakes (Karamanou et al 2012). Human beings have always made assumptions about the world around them and the diseases that afflict their communities. Malaria remains the most common cause of death in Sierra Leone (Centers for Disease Control and Prevention (CDC) 2013). Until the identification of the malaria parasite by Charles Louis Alphonse Laveran in 1880, followed by the confirmation by Sir Ronald Ross in 1900 that the disease was transmitted by mosquitoes, the idea that malaria fevers were caused by miasmas, or poisonous vapours, rising from marshland, was widely held (Cox 2010). Indeed, the word malaria comes from the Italian *mal'aria*, meaning 'spoiled air'. Misunderstanding of the cause of epidemics was also prevalent in early human history. The miasma theory was used to explain outbreaks of cholera and plague. For example, the miasma thought to have caused the plague that decimated the city of Thebes, as described in Sophocles' play *Oedipus Rex* (467 BC), was originally thought to have arisen as a result of 'religious pollution'. However, in the play the cause of the plague is attributed to the wicked actions of Oedipus himself in, albeit unknowingly, killing his father and marrying his mother (Kousoulis et al 2012).

The works of both Louis Pasteur and Robert Koch on germ theory finally explained the basis of infectious diseases in the late 19th century (Baxter 2001), but even today public misunderstanding about infectious diseases and public health efforts to control them are prevalent in every society around the world. This is exemplified by attitudes in the west towards human immunodeficiency virus (HIV), where a small but vocal minority stigmatise those with the virus (Stangl et al 2013). In the recent past, public reaction to 'scares' about childhood vaccines for infectious diseases has led to reductions in vaccinations and the return of previously rare diseases such as measles (Lewis and Speers 2003).

Ebola virus disease in West Africa

The first case of Ebola virus disease in West Africa occurred in Guinea at the end of 2013. By August 2014 the epidemic had increased rapidly, crossing local international borders to Sierra Leone, Liberia, Senegal and Nigeria, and with some patients either transported or travelling to the United States, Spain and the UK. The size and rapid spread of the epidemic quickly overwhelmed the health facilities of Sierra Leone. Margaret Chan, Director-General of the World Health Organization (WHO), described the crisis as 'not just an outbreak… a social crisis, a humanitarian crisis, an economic crisis and a threat to national security well beyond the outbreak zones' (Chan 2014).

Sierra Leone is a developing nation emerging from a long and damaging civil war (1991-2002), with a total adult literacy rate of 43% in 2008-2012 (Unicef 2013). Across West Africa, misconceptions about health are widespread. For example, only 12% of those surveyed in Nigerian villages in 2011 attributed epilepsy to a brain disorder, while more than 80% thought witchcraft was involved (Osungbade and Siyanbade 2011).

Previously, a co-ordinated response to an Ebola virus disease epidemic has been shown to have a positive effect on management of the disease, and has also resulted in improved health infrastructure and longer term health resilience for the population of the affected nation (Mbonye et al 2014). With this in mind, an international joint civilian and military response to the new epidemic was mounted. The UK committed to building and helping to staff Ebola treatment units across Sierra Leone, a country with strong historical ties to the UK. This was a joint, inter-agency taskforce response from the Department for International Development, the UK government department responsible for administering overseas aid, and the Ministry of Defence.

The Ministry of Defence deployed a force comprising a headquarters, an engineer group, a logistics regiment, a field hospital and a Royal Fleet Auxiliary vessel to host helicopters and act as a logistics hub. The team of engineers began constructing the treatment units and a forward (or first point of contact) military medical treatment facility arrived in Freetown on September 29 2014 to provide medical support for the team and to conduct a training course for treatment unit staff members.

In preparation for this training course, the authors either led or attended the Basic Ebola Course delivered by the WHO at the National Football Stadium in Freetown. A core component of this course was engaging with local healthcare worker candidates and discussing current beliefs and attitudes towards Ebola virus disease. Subsequently, as part of the training course for staff, the authors met with Sierra Leonean trainers and healthcare worker candidates multiple times.

Ebola response

Management of previous haemorraghic fever outbreaks in Africa, for example Ebola and Lassa fever, have demonstrated actions that must be taken to break the epidemic (Kinsman 2012). It is necessary to establish the following without delay (Mbonye et al 2014, Reaves et al 2014):

- Command and control structures for outbreak management.
- Social mobilisation – the provision of health education messages.
- Early recognition and isolation of affected patients.
- Rapid set up of specific testing facilities.
- Disposal of all materials that come into contact with infected individuals.
- Barrier nursing methods, with clear case management protocols for confirmed cases in dedicated units.
- Safe and dignified burial of the dead.
- Active surveillance and effective quarantine.
- Reintegration of convalescent patients into the community.

Knowledge of and attitudes to Ebola in Sierra Leone

One of the authors, a military nurse, provided medical support to the guards at the military compound in Freetown, where mandatory handwashing was enforced and temperature checks were made on everyone entering and leaving. During this work, the nurse discussed with the Sierra Leonean guards how Ebola was affecting the local people's way of life. The most common topic was the attitudes and behaviours of the local population in response to the crisis.

Guards said there was a general belief among the local population that Ebola was a punishment from god, and that it was a supernatural phenomenon or curse. They said religious leaders were preaching that good Christians and believers were safe from Ebola and only non-believers were becoming infected. A Bible verse was used to support this belief: 'For nation shall rise against nation, and kingdom against kingdom: and there shall be famines, and pestilences, and earthquakes, in divers places. All these are the beginning of sorrows… But he that shall endure unto the end, the same shall be saved' (Matthew 24:7-13). The guards said many locals believed that Ebola was a plague, a punishment from god because Sierra Leoneans had 'lost their way' and forgotten to worship god. In May 2014, Archbishop Lewis Zeigler of the Catholic Church of Liberia said that '…one of the major transgressions against god, for which he may be punishing Liberia, is the act of homosexuality…' (Hussain and Caspani 2014).

Guards also said the Sierra Leonean people had been advised to wake up in the early hours of the morning and bathe in salt water to cleanse the body, noting that there was a verse in the Bible that mentioned ill people bathing in seawater to cleanse the body. The WHO (2014) reported that two people in Nigeria had died from drinking large quantities of salt water. During previous outbreaks in Uganda, traditional healers had told people to tie banana fibres around their wrists as a means of avoiding Ebola (Kinsman 2012).

At the Basic Ebola Course held in the National Football Stadium in Freetown, the healthcare worker candidates knew that Ebola was a viral haemorrhagic fever and that it was transmitted through the bodily fluids of an infected person. However, they said that many in the general public believed Ebola was a curse from god; some Sierra Leoneans believed it was a result of witchcraft. This had led to infected people being treated as outcasts, especially if quarantined. People who survived Ebola became outcasts and were referred to as 'zombies'.

One of the Sierra Leone armed forces members said there were people who believed the Ebola epidemic was the result of a conspiracy, and the virus had been engineered by the west to control Sierra Leonean population growth and gain economic influence over the country.

Some of the healthcare worker candidates said they knew that the body of a person who had died from Ebola was contagious. However, their beliefs and traditional burial ceremonies involved touching the dead person and washing the body with bare hands, as well as hugging and kissing the dead person to demonstrate how loved they were. The Sierra Leoneans believed that mourning in this way and praying for the dead person gave them safe passage to the next life.

The healthcare worker candidates also said the local population believed that when people became infected with Ebola, they should not be taken to hospital or treatment facilities because they did not come out alive. Some Sierra Leoneans said they had heard rumours that ambulance drivers were paid a bounty for each body they collected, with no bounty being paid for living patients. The candidates suggested that chiefs and community religious leaders needed to be educated about Ebola virus disease and its spread, because the local population respected and listened to them, and valued their opinions.

In September 2014, the children's charity Focus 1000, a non-governmental organisation (NGO) in Sierra Leone that invests in the first 1,000 days of a child's life, and Catholic Relief Services, the official international humanitarian agency of the Catholic community in the United States, undertook a house-to-house survey across Sierra Leone of nearly 1,500 people (Catholic Relief Services et al 2014). All those surveyed had heard of Ebola virus disease. However, in the district of Kambia, 9% of people said they did not believe it existed in Sierra Leone. Overall, nearly one third thought mosquitoes transmitted Ebola, 40% thought protection could be derived from washing in hot, salty water, and nearly 20% thought that spiritual healers could successfully treat the disease.

There were some encouraging responses to the survey: 87% agreed that contact with blood and body fluids should be avoided; 85% agreed that people could protect themselves by avoiding funeral or burial rituals that required body contact with someone who had died from Ebola; and more than 90% agreed that people with Ebola had a higher chance of survival if they went immediately to a health facility.

Social mobilisation

Social mobilisation is defined by Unicef (2014a) as 'a process that engages and motivates a wide range of partners and allies at national and local levels to raise awareness of and demand for a particular development objective through face-to-face dialogue'. As in previous Ebola outbreaks, the epidemic in West Africa has been associated with public fear of the disease (Kinsman 2012). In the early days of this epidemic, this fear led to people seeking solace in superstitious beliefs or faith, whether traditional, Christian or Muslim, and to health workers leaving their posts, patients fleeing their hospital beds and the bodies of those suspected to have Ebola being left in homes or in the streets (Associated Press 2014). Misconceptions about Ebola initially led to denial, mistrust, hostility towards health workers – especially foreign health workers – and rejection of public health interventions (Mbonye et al 2014).

In response to the crisis, a Social Mobilisation Action Committee was established in Sierra Leone in August 2014. The committee is a consortium funded by the Department of International Development, consisting of youth charity Restless Development, international humanitarian agency GOAL, the BBC's international development charity BBC Media Action, Focus 1000 and the CDC (Restless Development 2014). The staff members have recruited almost 2,000 volunteers from affected communities to reach nearly 8,000 communities in 13 districts. This sophisticated community-led response will enable more than 600,000 households to receive life-saving messages on Ebola and empower communities to lead their own responses.

In addition, 849 healthcare workers and Ebola treatment unit cleaners were trained by the WHO and the Sierra Leone Ministry of Health over a six-week period, and a further 4,000 individuals were given basic Ebola training by joint UK Ministry of Defence and Sierra Leone Ministry of Health training teams in the following weeks. Unicef and other NGO partners helped to train more than 1,000 people, including social mobilisers, community workers, young people, market traders and motorbike riders, to pass on preventive health information about Ebola to communities throughout the country.

The forms of communication used in the social mobilisation programme included loudspeaker announcements in public places, radio, television, newspapers, flyers and posters, mobile telephone text messaging and community meetings, including at religious venues such as mosques and churches. A house-to-house campaign was mounted by healthcare workers to spread the basic messages of avoiding bodily contact, presenting to health facilities at the first sign of infection, and following safe, dignified burial practices (Start Fund 2015, Unicef 2014b).

Radio is a powerful medium for reaching disadvantaged communities in Africa, coverage is widespread and local languages can be used to good effect, particularly when literacy levels are low (Medeossi et al 2014). In the house-to-house survey by Unicef, Focus 1000 and Catholic Relief Services in September 2014, radio was the preferred medium for people to receive health messaging about Ebola, followed by house visits from healthcare professionals, and television and religious venues (Catholic Relief Services et al 2014). In and around Freetown, more than 40% of people had seen messages about Ebola on television, however in rural districts this figure was as low as 2%. Indirect means of communication, such as radio jingles or newspaper advertisements, are not thought to be as effective as direct communication via house-to-house visiting, because healthcare and medical professionals are perceived to be the most trusted source of information on Ebola-related issues (Start Fund 2015).

The first stage of mass communication is to inform (reach). The more difficult task is to effect behavioural change (effect). In a study of radio campaigns to promote condom use in Malawi, radio programmes were found to have a significant effect on family planning discussions between women and men, however their effect on condom use was limited (Meekers et al 2007). In the September 2014 house-to-house survey in Sierra Leone (Catholic Relief Services et al 2014), 95% of respondents said they had changed their behaviour because of the Ebola outbreak, but only 36% said they would avoid bodily contact with a person they suspected had Ebola virus disease. Getting correct messaging across to people is crucial. During a previous epidemic in Uganda, the use of bleach as an effective personal external and environmental disinfectant against the virus was heavily promoted; several people misunderstood public messaging and bathed in and even drank undiluted bleach 'in a desperate attempt to rid themselves of Ebola' (Kinsman 2012).

National telephone hotline

A national call centre using the telephone number 117 was established in Sierra Leone in August 2014. It received an average of 1,400 calls per day in November 2014. People could call for advice on clinical management of people suspected of having Ebola, on safe and dignified burial, or for general advice.

Community reintegration

In previous Ebola epidemics, survivors found that fearful neighbours had burned their bedding, beds, clothes and, in some cases, even their huts. Others' spouses fled and they were shunned by their community (Kinsman 2012). In the Sierra Leonean house-to-house survey (Catholic Relief Services et al 2014), 96% of respondents reported having a 'discriminatory attitude' towards Ebola survivors and three quarters said they would not welcome a neighbour back into their community if they survived the disease. Therefore, an important component of social mobilisation in Sierra Leone was a survivor reintegration programme. Community education aimed to portray survivors as 'heroes' and emphasised that they could contribute to the fight against Ebola by working in the treatment units. Survivor welcome celebrations were arranged and survivors presented with a medical certificate. Some companies donated a solidarity package to the survivor, which included essential household items, such as bedding and mosquito nets (Reaves et al 2014).

Another major problem is the number of Ebola orphans. By October 7 2014, there were 3,700 Ebola orphans in West Africa, often rejected by other relatives for fear of infection (Unicef 2014c). Significant resources will be required to protect these children and reintegrate them into Sierra Leonean society.

Conclusion

Sierra Leone had not dealt with an Ebola crisis before 2014 and, because of the lack of understanding about the spread of Ebola virus disease, and culturally entrenched misconceptions and practices, the crisis was difficult to control. Added to these factors, the Sierra Leonean health infrastructure was already under great strain, coping with a severe disease burden and years of chronic underfunding and underdevelopment in part due to a long civil war. Social mobilisation is a crucial component of managing an Ebola epidemic. A co-ordinated response has been shown to have a positive effect on an Ebola epidemic and may also result in improved health infrastructure and longer term health resilience for the affected nation's population. Public health information must reach all of the at-risk population in a trusted and acceptable form, as it is meaningless unless it can effect behavioural change.

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Challenges of treating military wounds

Abstract

Military personnel are surviving with more severe injuries than have previously been seen. Their wounds are often heavily contaminated and have high levels of exudate. This article describes the challenges that healthcare professionals encounter when treating military wounds and emphasises the need for multidisciplinary working to provide the best possible care for injured soldiers.

Author

Steven Jeffery
Consultant burns and plastic surgeon, the Royal Centre for Defence Medicine, Birmingham.
Correspondence to: slajeffery@rcsed.ac.uk

For many years, the UK has been involved in conflicts in Iraq and afghanistan. all injured troops are brought back to the royal Centre for Defence medicine, which is based in the University Hospitals Birmingham NHS Foundation Trust. These patients often have challenging severe injuries, most often caused by improvised explosive devices. Improvements in body armour have resulted in fewer trunk injuries but relatively more limb injuries, particularly of the lower limbs (Jeffery 2009). The routine use of combat tourniquets, novel haemostatic agents, rapid helicopter evacuation and consultant-led surgical resuscitation have resulted in patients surviving with injury patterns that have not been seen previously. The resulting wounds pose a challenge to both nursing and medical staff.

Initial treatment

Treatment begins before the patient arrives in the UK. Today's technology allows details of casualties to be made available to the receiving clinicians. Details such as a list of the injuries sustained, the blood group and the patient's blood products administered will enable clinicians to make arrangements for the early management of the patient. an understanding of the injuries sustained will enable the appropriate clinicians to be present in theatre waiting for the patient, for example plastic surgeons, general surgeons, orthopaedic surgeons, ophthalmic surgeons and urologists. It is important that a senior plastic and/or orthopaedic surgeon assesses the wounds so that a plan can be made for the reconstruction of the soft and bony tissues.

On arrival at the centre, patients with heavily contaminated wounds, patients with sepsis and patients whose limbs have compromised vascularity need to go to theatre as soon as they have been stabilised, irrespective of what time they arrive. other more stable patients will benefit from being cared for by a rested surgical team during normal working hours, when access to services such as X-ray and haematology will be more easily achieved. Generally, soldiers with open wounds will benefit from having their first dressing done in an operating theatre. This will allow assessment of all wounds under general anaesthesia.

At this first theatre session, all wounds, no matter how small or inaccessible, should be explored and debrided (Jeffery 2009). This requires the patient to be turned in theatre so that wounds to the back and buttocks can be assessed. Foreign material can be driven far up into the tissue planes, and can often be found far removed from the original injury (reichert 1928). It is vital that all such potentially heavily contaminated material is removed if subsequent infections are to be avoided. The use of a hydrosurgery system such as Versajet is particularly useful in ensuring the removal of all ingrained mud, sand and dirt from the wound surface (Jeffery 2009). This device incorporates a high pressure jet of water which debrides the tissues. The debris is continuously removed, so that the surgeon can assess the extent of the soft tissue damage.

After complete wound excision, all wounds are irrigated with hydrogen peroxide – this has an antimicrobial and haemostatic action, and fluffs up the loose tissues, allowing for easier detection of loose material – and then with copious amounts of warmed saline (0.9% sodium chloride). Wound swabs as well as samples of tissue should be taken and sent for microbiological and histological examination so that the presence of fungal spores can be identified. In heavily contaminated wounds, samples of healthy and dead muscle should be taken. all wounds should be photographed digitally at every theatre session to inform the surgical reconstruction plan. such imaging will prevent unnecessary disturbance of dressings by subsequent medical teams, and will ultimately aid classification of wounds and the retrospective analysis of injuries, which will aid the continuing development of best practice.

Dressings

Military wounds are often associated with extensive soft tissue stripping and produce high levels of exudate. The volume of exudate produced will exceed the absorbency of conventional dressings and the outside of the dressing will become wet. as soon as this occurs, the physical antimicrobial barrier property of the dressings is lost (Jeffery 2009). Anything the patient comes into contact with will become soiled and contaminated, and the patient is at risk from the environment. Such dressings will have an odour, which may be unpleasant and embarrassing for the patient.

The most effective method of treating heavily exudating wounds is the use of negative pressure wound therapy (NPWT). There is a lack of published evidence on the use of nPWT in military injuries (Fries et al 2011), but in the author's experience these dressings should be used for all but the most minor military wounds after they have been debrided completely (Jeffery 2009). There is, however, well documented evidence for the use of NPWT in treating traumatic wounds not sustained in conflict (Krug et al 2011).

NPWT can be used in all open wounds, even in the head and neck, as long as a seal can be formed. superficial wounds are not associated with much exudate, so for these wounds a simpler dressing such as a silver impregnated, soft non-woven pad containing hydrocolloid fibres is sufficient.

NPWT promotes wound granulation tissue formation, increases the speed of wound closure and decreases the complexity of the reconstruction required (Krug et al 2011). subatmospheric pressure is applied to the wound bed though a wound filler material, which is covered with an airtight seal. Exudate is drawn into a collection device, allowing for wound isolation and containment. Until recently, the only filler material available was an open-cell polyurethane foam (Morykwas et al 1997). subsequently, an alternative filler (gauze) has been 'rediscovered' and numerous other devices have become available which use gauze and are based on the Chariker-Jeter technique. This method uses a layer of gauze that is impregnated with polyhexamethylene biguanide, an antimicrobial agent with broad-spectrum activity, and laid directly onto the wound bed. A drain is then connected to the dressing and an occlusive film applied (Chariker et al 1989).

The Royal Centre for Defence Medicine has found the use of gauze to be invaluable in the management of irregularly shaped wounds. Staff at the centre have also found that the use of gauze prevents the problems of retained pieces of sponge, and allows for dressings to be left in place for up to two weeks without the ingrowth of tissue into the dressing. Large rolls of gauze are used; if inserted into a deep wound, a 'tail' of gauze is left to ensure that no gauze will be retained at subsequent dressing changes. no incidence of retained gauze has yet been experienced at the Centre, despite extensive use in very deep wounds. The use of a wound contact layer between the filler and the wound is avoided because this reduces the efficacy of the negative pressure by impeding the transfer of pressure. a wound contact layer is essential, however, if there are exposed vessels or tendons to avoid tissue dessication, and when NPWT is applied over a skin graft to avoid the skin graft being accidentally removed with the dressings.

Before applying NPWT, the skin edges should be thoroughly cleansed and dried. The application of an alcohol preparation, such as chlorhexidine in alcohol, will degrease the skin if necessary. a seal is created by the use of an adhesive solution or spray, such as Whitehead's varnish or tincture of benzoin. For difficult areas, such as the perineum or near a stoma, the use of a silicone sealant is recommended to create and maintain an effective seal.

It is not unusual for large wounds to produce litres of exudate per day, and such fluid loss needs to be compensated for when calculating the patient's overall fluid requirements. Big wounds may also require the use of more than one pump to maintain negative pressure. The overall fluid requirements of the patient are calculated based on physiological parameters.

Wound closure

Reconstruction should not be attempted until the patient is physiologically stable: the patient should be apyrexial, his or her nutrition should be optimised, and all inotropic medication should be discontinued as they reduce the effectiveness of skin grafting. The microbiological profile of the patient should also be understood before any reconstructive attempts are made (Taylor et al 2009).

Reconstruction should only take place once the wound has been prepared fully: necrotic tissue and any potential sources of infection should be eliminated and exudate levels should not be excessive. This often takes several debridements; the number of debridements required reflects the state of the patient's wounds on arrival (Penn-Barwell et al 2011).

The prognosis for the patient will be adversely affected by the following (evriviades et al 2011):

- Extreme contamination.
- Massive blood transfusion.
- Suboptimal debridement before transfer.
- Delay transfer, for example due to volcanic ash affecting flights.

The use of dermal reconstruction templates should be considered, particularly for amputation stumps. If a prolonged hospital stay is envisaged, for example because of multiple fractures, hospitalisation for reconstruction becomes less of an issue, as the patient will already be an inpatient.

Microbiological contamination

The nature of the explosive devices used means that wounds are often heavily contaminated. In cases of suicide bombing, this situation may be further complicated by contamination with foreign human material within the wound.

Because of the high risk of fungal as well as bacterial infection, systemic antifungals should be prescribed after tissue samples have been taken for patients who meet the following three criteria:

- Injury by blast in the 'green zone' (the area of vegetation close to a water supply) while on foot patrol, or gunshot wound in the green zone which is then heavily contaminated during evacuation by being dragged though the dirt.
- Huge blood transfusion, probably because of the subsequent immunological consequences.
- Extensive, contaminated wounds.

Nutrition

The arduous nature of operational deployment, combined with a hot climate and difficulty in accessing fresh fruit and vegetables, means that soldiers who have been deployed on operations for some time will inevitably lose weight. This means that they will be relatively malnourished at the time they get injured. It is therefore vital that every opportunity is taken to improve their diet on return to the UK. Patients should all be weighed and assessed by a dietitian on arrival. The nutritional requirements of all patients with a significant injury are supplemented with enteral feeding. soldiers seldom complain about the passage of a fine-bore nasogastric tube if they are told that this will shorten their hospital stay. For patients who require frequent surgery, a nasojejunal feeding tube is passed to minimise starvation times, as nasojejunal feeding does not need to be discontinued before undergoing general anaesthesia. This is especially important for patients who become contaminated with organisms such as meticillin-resistant *Staphylococcus aureus* (MRSA), which often results in them being placed last on the operation list.

Pain

The effect of pain on the recovery of the military casualty should not be underestimated. Pain is detrimental to wound healing (nimmo and Duthie 1987). Insufficient analgesia may result in a patient becoming petulant, exhausted and non-compliant (emflorgo 1999). such patients become primed to expect pain and discomfort at every subsequent intervention and this will have significant bearing on dressing changes, cannula and catheter changes, suture removal and subsequent rehabilitation. The ability to place nerve block catheters, whether regionally for the limbs or by epidural, in the field hospital has greatly improved the pain management of patients during aeromedical evacuation to the UK. nerve block catheters should be left in situ and used for subsequent surgery and dressing changes. Increased requirements for analgesia may be due to dislodgement of the catheter or the development of compartment syndrome (Lueck and ray 1972).

If patient-controlled analgesia is used, this should be continued during aeromedical evacuation. If the patient continues to experience pain, attention must be paid to whether the cannula has become dislodged or blocked, preventing administration of the drug.

Bilateral testicular injuries

While uncommon, bilateral testicular injuries are becoming more frequent as soldiers are surviving injury patterns which were previously fatal. Because of the potential for significant psychological disturbance, special consideration is required when debriding these injuries. a consultant urologist and embryologist are routinely involved in the patient's care on arrival so that attempts at sperm harvest and retrieval can be made.

Psychological aspects

Injured soldiers should be admitted to the same open ward if at all possible. This will promote camaraderie, with soldiers essentially debriefing each other. However, soldiers who grow resistant species of acinetobacter, Panton-Valentine leukocidin or mrsa will require isolation in a side room, where they will have less contact with other injured soldiers and less opportunity to come to terms with their injury.

All soldiers with combat-related injuries should be reviewed by a trained psychiatric nurse from the military mental health team. The nurse will arrange for referral to a psychologist and/or follow up by the military community mental health team if necessary. Patients can be referred to counsellors from specific organisations, such as the British Limbless ex service men's association (BLesma) or the royal national Institute of Blind People, as required. amputees often benefit from a visit by a soldier who has recovered from a similar injury, particularly if that soldier is coping with his or her rehabilitation.

It is important that the nursing staff looking after a severely injured soldier get to know the soldier's family. effective communication is paramount as the soldier's family will be anxious about the injuries and the prognosis.

Patients with military wounds often require prolonged hospital admission. It is also likely that the patient will experience setbacks during this admission, as complications such as infection, wound dehiscence or slow healing may occur. This will come as less of a shock to the soldier and his or her family if they are forewarned this is likely to happen. These patients will often require prolonged follow up, so it is important that a trusting relationship develops between the surgeon, the nursing staff, the patient and family members.

Discharge

Patients do not need to be kept as inpatients until their injuries are completely healed, if the rehabilitation centre to which they will be sent can cope with undertaking relatively simple dressings. Before transfer to the rehabilitation centre, it is helpful if a prosthetist can assess the amputee to cast stumps, so that those prosthetic devices are ready when the patient arrives. The prosthetist can also reassure the patient that the loss of one or more limbs is still compatible with an independent, meaningful life. It is particularly helpful if a patient who has had a similar combination of injuries can come to visit the newly injured soldier to show him or her what can be achieved, and to discuss realistic expectations and goals.

Conclusion

The injuries caused during the latest military campaigns are posing challenges for all those practitioners involved in wound care management. Pre-existing practices have been adapted to cope with the extreme contamination and exudate associated with military wounds, as well as the nutritional and psychological care needs of patients with these wounds. nursing and medical staff work collaboratively as a well-integrated team to provide the best care for injured soldiers. In conclusion, advances in wound care technologies and dressings, in addition to developments in prosthetic devices and rehabilitative care, mean that more soldiers survive and can enjoy a good quality of life.

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