



## Original research

## Mass casualty education for undergraduate nursing students in Australia

Jane Currie<sup>a,\*</sup>, Sarah Kourouche<sup>a</sup>, Christopher Gordon<sup>a</sup>, Christine Jorm<sup>b</sup>, Sandra West<sup>a</sup><sup>a</sup> Sydney Nursing School, University of Sydney, Australia<sup>b</sup> Medical Education, Sydney Medical School, University of Sydney, Edward Ford Building (A27), Fisher Road NSW 2006, Australia

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## ABSTRACT

With the increasing risk of mass casualty incidents from extreme climate events, global terrorism, pandemics and nuclear incidents, it's important to prepare nurses with skills and knowledge necessary to manage such incidents. There are very few documented accounts of the inclusion of mass casualty education within undergraduate nursing programs. This paper is the first to describe undergraduate mass casualty nursing education in Australia. A final year Bachelor of Nursing undergraduate subject was developed. The subject focused on initial treatment and stabilisation of casualties predominantly within pre-hospital environments, and included a capstone inter-professional mass casualty simulation. Students experience of the subject was evaluated using the Satisfaction with Simulation Experience Scale (Levett-Jones et al., 2011) and a subject evaluation survey. Student satisfaction and evaluations were extremely positive. As a tool for developing clinical skills, 93% (n = 43) agreed that the simulation developed their clinical reasoning and decision making skills. In particular, the simulation enabled students to apply what they had learned (77%, n = 35, strongly agree). Due to the frequency of mass casualty events worldwide, there is a need for educational exposure in undergraduate nursing curricula. We believe that this mass casualty education could be used as a template for development in nursing curricula.

## 1. Introduction

The increase in frequency and severity of mass casualty incidents as a result of extreme climate events, global terrorism, pandemics and nuclear incidents, has made it important to prepare nurses with necessary skills and knowledge to manage such incidents. Nurses are essential health care workers during a mass casualty response but the performance of nurses at such times relies heavily upon their training and preparation (Cusack et al., 2010). Yet there are a limited number of educational examples of how this education can be delivered (Littleton-Kearney and Slepski, 2008) and no standardised mass casualty learning packages for nurses. This paper is the first to describe including mass casualty education within an undergraduate nursing program in Australia.

## 2. Mass casualty incident

A number of terms have been used to describe incidents of widespread destruction of an environment that involve casualties: disaster, major incident, mass casualty incident. In developing a program of education for nursing students, the term mass casualty incident was adopted because it specifically infers the need for an immediate health response. A mass casualty incident is defined as “an event which

generates more patients at one time than locally available resources can manage using routine procedures. It requires exceptional emergency arrangements and additional or extraordinary assistance.” (WHO, 2007, p9). Mass casualty incidents are generally classified as either man made or naturally occurring, examples are provided in Table 1.

## 2.1. Mass casualty incident nursing education

Historically, educational preparation for mass casualty incidents has focused on particular specialist groups of practising health professionals such as emergency clinicians. The Major Incident Management System (MIMS) course which was developed in 2002, was one of the first mass casualty courses. It provided training in a systematic generic approach, described as ‘all hazards’, for the out of hospital management of a mass casualty incident (Hodgetts and Porter, 2013). Similar courses were also developed in other countries, and perhaps one of the most well known is the American Red Cross Disaster Health and Sheltering course (American Red Cross, 2012). As such courses provide a multi-disciplinary approach to mass casualty incident management they aren't specifically tailored to address the educational needs of specific health practitioners and tend to assume a level of professional experience beyond that of beginning practitioners.

The distinctive characteristics of a mass casualty incident, which

\* Corresponding author. Sydney Nursing School, University of Sydney, 88 Mallett Street, Camperdown, Sydney, NSW 2050, Australia.  
E-mail address: [jane.currie@sydney.edu.au](mailto:jane.currie@sydney.edu.au) (J. Currie).

**Table 1**  
Mass casualty incident classification.

Classification	Incident	Date	Number of deaths
<i>Natural:</i>			
Earthquake	Earthquake, Haiti	12 Jan 2010	> 300,000
Tsunami	Tsunami Indian Ocean	26 Dec 2004	> 225,000
Pandemic	H1N1 (swine flu)	2010–2011	151,700–575,400 <sup>a</sup>
Bushfires	Black Saturday Bushfires, Australia	7 Feb 2009	173
<i>Man-made:</i>			
Transport	Costa Concordia cruise liner, Italy	13 Jan 2012	33
Industrial	Chernobyl nuclear disaster, Ukraine	26 Apr 1986	> 32 unknown
Mass gathering	Hillsborough Football stadium	15 Apr 1989	96
Terrorist	Twin Towers attack, New York	11 Sep 2001	2996
Chemical, Biological, Radiological, Nuclear, explosive	Ghouta chemical attack, (Sarin) Syria	21 Aug 2013	> 281 unknown
	The Dalles, Oregon Salmonella Outbreak	9–19 Sep 1984	Nil, 751 infected

<sup>a</sup> Estimated death rates (Centre of Disease Control and Prevention, 2014).

may include resource constraints, quantity of casualties, and a chaotic or indeed absent therapeutic environment require educational preparation to enable the nursing workforce to perform competently in these situations (Alfred et al., 2015). While the Nursing Emergency Preparedness Education Coalition (NEPEC, formerly known as International Nursing Coalition for Mass Casualty Education), was formed prior to the 2001 terrorist attacks in the United States (Conway-Welch, 2002); the enormity of the 9/11 terrorist attack provoked an increase in awareness and importance in nursing, resulting in calls for all nurses and primary health care workers to have a rudimentary level of mass casualty response training (Alfred et al., 2015; Veenema, 2006; Markenson et al., 2005; Decker et al., 2005; Kobayashi et al., 2003). The NEPEC considered core mass casualty nursing competencies to be: critical thinking; assessment; communication; technical skills; health promotion, risk reduction, disease prevention, and health care systems and policy (Conway-Welch, 2002). The International College of Nursing (ICN and WHO, 2009) and the World Health Organisation (WHO, 2007) have since formalised similar competencies as being relevant for nurses to respond to mass casualty irrespective of global location (Alfred et al., 2015; Cusack et al., 2010). There are also calls to implement a minimum Australian national standard in disaster preparedness education (Chapman and Arbon, 2008) and whilst one has been developed, there has been little traction in its implementation (FitzGerald et al., 2010). Currently, the College of Emergency Nursing Australasia (CENA) includes competencies for mass casualty preparedness within its practice standards (CENA, 2013), yet there are still no standardised mass casualty educational packages for nurses.

Many practising nurses have never received mass casualty education either as an undergraduate or once practicing and paediatric specific mass casualty education is even more limited (Austin et al., 2013). Schmidt et al., 2011 survey of US student nurses (n = 338) confirmed their general under-preparedness to respond to a mass casualty incident (Schmidt et al., 2011); and less than half of Australian emergency nurses reported never receiving mass casualty education when surveyed in 2009 (Duong, 2009). In the face of the reported increase in mass casualty incidents worldwide, the absence of universal mass casualty nursing education for nursing students is a serious educational concern (ICN and WHO, 2009). The benefit of including mass casualty incident education to undergraduate nursing programs is to ensure that all nurses receive a baseline level of education that would prepare them to develop initial awareness to increase willing engagement with future professional development in this area. This baseline could then be refreshed through rehearsal and training in the workplace.

## 2.2. Mass casualty incident education: how should it be done?

Currently there is only limited evidence as to the effectiveness of existing models of mass casualty education. The major approach to mass casualty education remains delivery of theoretical content,

followed by a simulated learning experience (Zinan et al., 2015; Hutchinson et al., 2011; Atack et al., 2009; Chapman and Arbon, 2008; Bartley et al., 2006). However, some studies also suggest that mass casualty drills can be effective in training hospital staff (Hsu et al., 2004; Austin et al., 2013).

Exemplars of undergraduate mass casualty education are also limited. Atack et al. (2009) developed an eight-week online subject, requiring 3 h of student learning per week. Developed for an inter-professional audience, the unit of study included four multi-layer games that affect a progressively larger community (Atack et al., 2009). In week six students then participate in a live mass casualty simulation involving professional staff from local emergency response and health organisations. Results indicate that the subject helped raise student awareness of, and appreciation for, other members of the health care team, as well as mastery of fundamental disaster management content (Atack et al., 2009).

Using a different approach Ireland et al. (2006) designed a 3-h didactic mass casualty session followed by a one-day symposium including a simulation; anecdotal comments from the undergraduate nursing students indicated that the experience was beneficial. Zinan et al. (2015) provided a 1-h didactic lecture prior to exposing 107 bachelor undergraduate nursing students to a mass casualty simulation using casualty actors and mannequins. They reported significant improvements in self-perceived knowledge, attitudes and skills. These studies suggesting that learning about nurse response to mass casualty incident can be achieved over a short educational exposure.

One of the learning outcomes for responding as a nurse to a mass casualty incident is development of the ability to provide care for patients in a chaotic environment and simulation lends itself extremely well as a medium to create chaos. In all examples of mass casualty education (Jeffries, 2015; Cant and Cooper, 2009; Gough et al., 2012), simulation-based experiential learning has been used extensively, albeit in different ways. Simulation aligns with constructivist pedagogy and encourages learners to draw from interactions with the learning environment to form their own understanding (Humphreys, 2013). Clinical simulation also offers an ideal opportunity for inter-professional activities, which has been shown to increase confidence and knowledge (Gough et al., 2012), and appreciation of the differences and similarities between different professional groups (Barnes et al., 2010).

Considering described examples of mass casualty education delivery, the authors chose a layered approach to undergraduate mass casualty education in developing a subject entitled 'First Line Interventions', in which theory was delivered through lectures and applied in tutorials and using simulation in clinical laboratories. The subject then culminated with a capstone inter-professional mass casualty simulation. Herein, we describe the mass casualty subject, including the pedagogical underpinnings and its evaluation. The aim of the evaluative component was to determine the student experience and satisfaction with First Line Interventions and the capstone inter-

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