

Up the creek without a paddle: An Australian take on disaster medicine

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Disaster medicine is a subject category that invokes thoughts of emergency medicine on a much grander scale; one that involves all levels of healthcare governance. But in reality, it is an area of medicine that is often neglected in Australia, despite its pertinence in this land of extremes. This has been shown to be currently so with the education of Australian medical students, where it is perceived as being too "young a branch on the old tree of medicine." [1] But what exactly is disaster medicine, and why is there a lack of discussion of this field in a country so often threatened by disasters, natural and man-made? This was recently investigated by a delegation of medical students across Australia during a summer course in disaster medicine and management. They were amongst the 41 students, across five continents, that converged upon Gadjah Mada University in Yogyakarta, Indonesia under the auspices of the World Health Organisation and the Indonesian Ministry of Health. The following article explores the nature of disaster medicine. It then outlines the experiences of students undertaking the summer course run in Indonesia in this area. Finally, it provides an insight into the potential value of incorporating disaster medicine training into the Australian medical education curriculum.

Introduction

Imagine you are on placement in a rural location in the middle of summer enjoying your free time when wildfires rapidly surround and engulf the town you are based in. Local gas explosions rock the area, as you see dozens of patients with severe burns or in critical conditions lying on the ground. Some are conscious, screaming or clutching their abdomens, while others are unconscious and there is word of hundreds more streaming into the local hospital to escape the fires. All desperately need your help. Hysteria erupts and communication lines are down due to the catastrophe that has suddenly occurred. With nothing in hand, what do you do with no one else on the scene? Who do you save and how do you deal with streams of panicking individuals?

The term 'disaster medicine' is difficult to define, and over the years numerous definitions have been proposed as the discipline began to flourish. The World Health Organisation (WHO) defines 'disaster' as an occurrence where normal conditions of existence are disrupted and the level of suffering exceeds the capacity of the hazard-affected community to respond to it. [2] The distinct difference between disaster and emergency being that external assistance would be required for a disaster but not an emergency. However, as seen with the various other definitions in existence, no real standard exists; and the prevailing view of those in the field is that the aim is to not only provide aid at the time of a disaster, but also before and afterwards. [1,3-4] This is in order to adequately prepare for the potential risks and address the full impact of a given disaster's consequences on the community as a whole. It requires a collaborative effort from numerous established medical disciplines, from emergency medicine to communicable diseases, paediatrics and non-medical organisations. The areas of logistics, potable water provision, food, sanitation and shelter also need to be



Figure 1. Participants are assessed in water rescue from a previous module during a water rafting exercise. Here, participants begin to resuscitate an unconscious patient during a disaster simulation.

equally addressed in the response process. [1,3-4]

The current view has shifted from simply providing emergency relief (as understood in the WHO's definition) to a more holistic approach incorporating risk reduction and management as preventative measures to decrease the overall impact of a potential disaster. [1,3-4] This is a key change in the mentality of the discipline, as it aims to address causal factors through the basic tenants of disaster medicine: prevention, preparedness, mitigation, response and recovery. [5] These demand a multi-levelled approach encompassing local, regional, national and international organisations.

The field of disaster medicine is both broad and unpredictable, and health workers need to be aware of the realities a disaster presents. Survivors are often forced to live in cramped overcrowded conditions with little access to safe drinking water and adequate sanitation, creating further health risks. [6] These conditions can consequently involve communicable and vector-borne diseases which serve to exacerbate the situation.

The fallout from a disaster situation cannot be neglected. It should be noted that the consequences are not only to infrastructure; nor are all injuries and diseases immediately treatable. The population is burdened with the long term health effects from physical and psychological trauma, as well as the reality of having to adjust to an altered way of life and the loss of loved ones. This can understandably leave an emotional and functional void. [7-8] Human dignity and proper protocols must be maintained despite the chaos that can ensue. [7] Triage is a necessity in times of crisis, as is the identification of bodies and correct management of the deceased - this is integral to the disaster response to not only gauge the extent of the human cost, but because it is just. [7] The terrible reality is that these are daily

occurrences worldwide. It is estimated that at least one natural disaster occurs per day somewhere in the world, with the potential for mass casualty being ever-present. [4] This estimation does sound alarming, but it does not even take into account the 'man-made' disasters which occur with similar frequency. It was thus with these diverse fields in mind that medical students from sixteen countries took part in disaster medicine training in Yogyakarta, Indonesia.

An Indonesian learning experience

Given its location on the edges of tectonic plates, Indonesia is at the epicentre of frequent earthquakes and volcanic eruptions. This is notwithstanding its long history of many other natural disasters including floods, landslides and tropical cyclones. As a consequence, the nation – especially through its network of health sectors – is particularly equipped with indisputable expertise when it comes to crisis management. In order to cope with these catastrophes, the Ministry of Health has established nine regional crisis centres around the country to formulate guidelines and respond to health crisis brought on by these disasters. [9] These centres are also responsible for strengthening the partnership between government, non-governmental organisations (NGO) and local communities, in addition to the capacity building of human resources. Coordination among all sectors is essential in disaster response, for better outcomes and to prevent the duplication of efforts.

A range of speakers addressed issues that arise during emergencies and disasters. One concerned disaster victim identification and dead body management. In another session, Albert Maramis, WHO representative in Indonesia, spoke about the importance of tackling mental and psychosocial issues after a traumatic event. Psychiatrist, Dr Carla Marchira, also explored the use of therapeutic communication in managing these mental health problems. Nur Azid Mahardinata from the medical faculty of Gadjah Mada University discussed ethical issues in disasters and the principles in approaching these dilemmas. Dr Paul Byleveld from the Australian Red Cross brought forward issues regarding communicable disease control and introduced the participants to the Sphere Project, which is a set of minimum standards in providing humanitarian assistance.

As part of the course, the participants visited Yogyakarta's Sardjito Hospital and were briefed by the Chief of Emergency about the structure of the department. According to the Chief of Emergency, the department was very busy, with only a doctor and a nurse on call. During the participants' time there, two patients lay in the ward; one suffering from an acute myocardial infarction from a few hours prior and the other with dengue haemorrhagic fever and meningitis. Immediately, six patients were brought into the department – all of whom appeared to have been involved in a car accident - with head and chest wounds, and open leg fractures.

The students were immediately handed stethoscopes, asked to assess the vital signs and stabilise the patients. Needless to say, it isn't hard to

imagine that participants' hearts were racing and adrenaline pumping. Fifteen minutes in, the atmosphere in the department changed abruptly and applause was audible. Victims previously in pain were seen sitting up on the beds with broad smiles, apparently without any real injuries. It was in fact a simulation designed to assess student's responsiveness to the wounded, especially under stressful conditions such as that in an emergency department. It definitely comprised one of the most memorable experiences during the summer course.

Four sessions had particularly been devised in preparing students for practical scenarios. Students first learnt to save drowning victims in a swimming pool with and without equipment during water rescue training. This was followed by providing aid to the victims while water rafting. Furthermore, a clinical skills day on triage, basic life support, intubation, suturing and victim transport was conducted. The most intriguing session was one where participants were taught to fully utilise limited resources; including banana leaves as bandages, ice cream sticks as splints, jackets as stretchers and flip-flops as cervical collars. Lastly, participants took part in role-playing another simulation on the final day of the course to reinforce previously acquired knowledge on triage, treatment and transport of victims.

The participants also managed to visit YAKKUM Rehabilitation Centre, a foundation which empowers people with disabilities to achieve maximum independence in their daily lives. The organisation provides medical, psychosocial support, occupational therapy, vocational training and physical mobility aids to children and young adults to support their well-being and personal development. People with disabilities, regardless of their age and background, are able to resume their education and receive sufficient training for employment. [10] In short, the foundation plays a significant role in the rehabilitation phase of disaster management.

In all these aspects, this course provided an interdisciplinary learning experience related to all phases of the disaster cycle; from the aforementioned disaster simulations, interactive lectures and skills training, to field trips and group discussions to allow self-evaluation. It is thus a program that accurately reflects the real-world dynamics that determine our responses to disaster situations.

An Australian learning experience

So how does this all relate to back here in Australia? Australia is lucky enough to escape the Pacific Ring of Fire but let us not forget that this beautiful country is still very much plagued by many other calamities. It does not take long for one to look back at the memories of the south-eastern Australian heat wave that caused over 300 fatalities or the Victorian bushfires that claimed almost 200 lives. [11,12] Australia has a long-established reputation as a country that provides assistance in disaster response and reconstruction to various countries, especially those in the Asia-Pacific region. Nevertheless there is an apparent dearth of emphasis on the training of these skills in Australian medical schools. Instead, training is mostly available through emergency relief organisations such as the Red Cross, Caritas and RedR. Given this, it is not hard to imagine a scenario where disaster management is integrated into the curriculum of medical schools to give students an early exposure to this specific branch of medicine.

There have been several studies that have shown improved learning outcomes for medical students undergoing disaster medicine training. One such Italian study by Ingrassia *et al.*, [13] in a context similar to that of the WHO-approved Indonesian summer course, found improvement in final year students in terms of disaster medicine knowledge, triage skills and enthusiasm for further learning. This was despite a lack of significant improvement in theoretically-assessed knowledge. However, a more recent US study did find significant improvement in theoretical assessments before and after practical skills training – perhaps due to the performance-based characteristic of the training. [14] And the most recent study, coming from the University of California Los Angeles, found that the multidisciplinary training of medical students in disaster medicine by experienced practitioners motivated students,



Figure 2. Dr. Vijay Nath Kyaw Win guiding a disaster medicine summer course participant through stabilising and assessing a patient during a simulation.

refocused the medical school's service to the community and provided interaction between the many levels of government and community in a country not dissimilar to Australia's in terms of potential hazards. In all these studies, there is unanimity in recommending disaster medicine incorporation into the medical curriculum. [14-15] In 2003, the American College of Emergency Physicians recommended medical students, in addition to physicians, attain proficiency in response to disastrous events; [14] so why not the same in Australia, where we potentially face similar, if not more severe, disasters in the context of climate change?

There have been moves towards recognising disaster medicine training as a valued commodity. The Emergency South Australian Conference has involved the disaster management training of health professionals across the entire spectrum of doctors and allied health staff in the field of emergency medicine. However, such conference opportunities are limited for medical students - being primarily aimed at those already specialised in the field. Medical students thus miss out on valuable opportunities to expand their knowledge-base to deal with potential disaster situations, should they occur. There have been valuable attempts at addressing this through the Emergency Medical Challenge, an integral part of the Australian Medical Students' Convention, and the AMSA Global Health Conference Challenge Day. These give students a taste of what it is like to participate in triage, emergency relief and stabilisation; and are much appreciated by students across Australia. But for the medical students of today to be adequately prepared for the 'what if' scenarios that we may face as future doctors - be it bushfires, floods or cyclones - the role of standardised disaster medicine training in medical student education should be properly recognised.

The reality

So what will it all mean on an individual level for medical students who may face the difficult prospect of being caught in a disaster, however rare that may be? One must not forget medical students are of course, human beings. One would expect that students would be caught too, in the initial period of shock that tends to follow abrupt disasters. Indeed, this was thoroughly and embarrassingly reflected in the Sardjito Hospital experience. But, as students tended to find through the duration of the training course, knowledge, attitude and conduct in simulated disasters progressively and quantitatively improved. This improvement was shown in the final assessment, a scenario with similar characteristics to the first assessment in Sardjito Hospital - an unknown environment, makeshift communication lines, panicky patients and a myriad of potential injuries, ranging from the mundane to the life-threatening.

This time, after two weeks of intensive education in theory, protocols and foundation ethics, the initial period of shock for the assessed students was drastically reduced. The skills ingrained in leadership, communication, basic triage, stabilisation and transport proved valuable in cutting the time of panic down from minutes to seconds - a difference medical students know can prove crucial in an emergency. But the difficulties in performing under duress cannot be overlooked. Some students, in the heat of the moment, missed gradual changes in patient's vital signs, leading to potentially dangerous complications later on. Others, too focused on transport or treatment, neglected patient stabilisation. This resulted in mishandling of the patient, causing them to fall from their stretcher and collapse onto the ground. And for one other set of students, the contention came to be in leaving particular victims beyond rescue, and rescuing those out of the danger zone deemed recoverable. It brings up another potential flashpoint for the individual medical student in a disaster situation; the ethics of that momentous instant in deciding which patients are believed to be beyond care and those that are not.

These were all lessons that were taken on board by all students in the debriefing session that followed, and will surely be decisions faced by all medical students regardless of any standardised training

course, such as that mentioned. But such individual difficulties are not unmanageable. They can be overcome with prior teaching and experience. These are skills that can be gradually learnt, through ethics tutorials, critical thinking scenarios and practical experiences that get students to think outside of the box of what could happen, not of what does happen as in textbooks.

The wider world

Not only will incorporation of disaster medicine into school curricula provide solid knowledge bases for participants to develop into the future, it will also allow greater collaboration with the community that medical students serve, and be flexible enough to allow interdisciplinary training across varying curriculums. And isn't that what the changing fabric of our society now demands?

Though many lives can be saved through preparedness, evacuation protocols and early warning systems, there is always more that can be done, as seen unfortunately in the case of the 2009 Victorian bushfires. Such hazardous scenarios demand the flexibility, cross-professional communication and individual leadership training that disaster medicine-oriented curricula can provide. Even in the region of the Asia-Pacific, where Australia is seen to naturally take a humanitarian leadership role, expertise in disasters is relegated to a niche level. But as found in Indonesia during the summer course in disaster medicine, any individual can learn life saving disaster-oriented skills and work together with people from across different cultures and disciplines. Medical students, as future health practitioners, are in the especially privileged position of having the clinical knowledge, professionalism and ethical training to deal with casualties on a mass scale. This is reason enough why training in disaster medicine can be so valuable. With the required knowledge in international law, human rights and cross-cultural understanding that can already be found in Australian medical curricula, it is not hard to imagine a competency-based addition to an education system already geared to producing high quality doctors in this corner of an increasingly interconnected world.

In the past year, torrential floods ravaged Pakistan in the worst natural disaster in a generation, landslides destroyed entire villages in China and over 600 wildfires burnt through Russia into the radioactive fallout zone of that other disaster of yesteryear, Chernobyl. The impacts of climate change loom upon the horizon, and the critical evaluations of the Australian response to the Victorian bushfires continue. It is not surprising that the world needs future leaders in disaster management; people who, in that moment of shock immediately after a catastrophe, can provide logical and inspirational direction. The question then is: will you be able to answer the call when that need arises?

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Figure 3. Disaster management requires interdisciplinary and cross-cultural cooperation under difficult circumstances. Here, course participants of different backgrounds work closely together to achieve success by triaging and stabilising the patient quickly and efficiently.

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Conflicts of Interest

None declared.

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