NURSES AND MIDWIVES IN ACTION DURING EMERGENCIES AND DISASTERS
Case Studies from the Western Pacific Region

World Health Organization
Western Pacific Region

Asia Pacific Emergency and Disaster Nursing Network
NURSES AND MIDWIVES IN ACTION
DURING EMERGENCIES AND DISASTERS

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FOREWORD

Natural disasters—such as earthquakes, tsunamis, cyclones, floods, landslides and droughts—disproportionately affect the Western Pacific Region, causing devastation and destruction to communities, health infrastructure and health systems. Countries must strengthen disaster mitigation, prevention, response and recovery systems, including training for nurses and other health-care professionals.

*Nurses and Midwives in Action during Emergencies and Disasters: Case Studies from the Western Pacific Region* emphasizes the critical leadership role of nurses and midwives in preparing for and during times of health threats, emergencies and disasters.

Nurses and midwives contribute significantly to successful disaster response by engaging and partnering with local leaders, communities and schools, and communicating, collaborating and coordinating with other health workers. Adaptability, creativity, innovation, critical thinking, learning collaboratively and competency in public health and infection control are characteristics of nurses and midwives that are essential to disaster management.

Professional development and partnerships with other disciplines that integrate critical nursing and midwifery roles will strengthen capacities and empower these health professionals to lead the humanitarian response to disasters. More research is needed to evaluate the outcomes and impacts of disaster-related nursing and midwifery interventions. The Asia Pacific Emergency and Disaster Nursing Network supports communities in disaster prevention, mitigation, response and recovery efforts.

We hope these case studies will be instructive for health professionals at all levels. The lessons learnt in these case studies should foster more integrated disaster responses, with nurses and midwives advocating and leading the effort to improve the health and well-being of individuals, families and communities.

Shin Young-Soo, MD, Ph.D.  
*Regional Director*  
World Health Organization  
Regional Office for the Western Pacific

Grace Javier-Alonso, Ph.D.  
*Chancellor*  
University of the Philippines  
Open University
PREFACE

Nurses and midwives play an important role in preparing and attending to communities in times of emergencies and disasters. With the current threat brought about by climate change and the consequences of global economic challenges, communities need the support of competent nurses to be ready for any event and to recover quickly. Emergency and disaster situations call for nurses to respond with confidence and good intentions. Their assessment skills need to be rapid, discriminating, accurate and continuous given the different levels of presenting situations, their innate nurturing capability to respond to fear and anxiety is needed by families.

The Asia Pacific Emergency and Disaster Nursing Network (APEDNN) was formed in 2007 during the Joint Asia Pacific Informal Meeting of Health Emergency Partners and Nursing Stakeholders in Bangkok, Thailand to create opportunities for strengthening coordination and collaboration, furthering capacity building and the integration of nursing personnel more fully into disaster preparedness and response teams and activities. It was initially composed of 72 participants from 17 countries of the Asia Pacific region. Since 2007, more APEDNN members have come together every year to support each other in terms of building capacities and sharing best practices in emergency and disaster preparedness, response, recovery and rehabilitation.

This publication, written by members of APEDNN, documents the role of nurses and midwives in emergency and disaster management. In the featured case studies, different countries experienced different challenges and offered valuable lessons and insights on how nurses play a crucial role in health emergency management. The stories demonstrated readiness, willingness and courage to guide families and communities to have hope and work for a new beginning.

We hope that this publication would inspire more involvement of nurses and midwives in planning and strengthening national and regional disaster mitigation, prevention, response and recovery systems for safer and more resilient communities.

Araceli O. Balabagno, RN, Ph.D.
Dean, University of the Philippines Manila College of Nursing
Head, WHO Collaborating Center for Nursing Leadership and Development and APEDNN Secretariat (2012–2014)
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INTRODUCTION

Nurses and midwives constitute the largest group of health workers who provide a wide range of health services to individuals, families and communities, including health promotion, disease prevention and treatment and rehabilitation. In times of emergencies and disasters, nurses and midwives are also relied on to respond to the situation by providing immediate, acute and long-term care to individuals, families and communities. It is very important, therefore, that they possess the necessary competencies to respond effectively and efficiently with confidence and authority.

Together, the World Health Organization Regional Office for the Western Pacific, the University of the Philippines Open University, the University of the Philippines Manila College of Nursing and the Asia Pacific Emergency and Disaster Nursing Network (APEDNN) collected case studies of nurses and midwives in action during emergencies and disasters in the Western Pacific Region. Since 2007, with support from the World Health Organization, APEDNN has been responding to the growing needs of people affected by emergencies and disasters by supporting investments in capacity-building, policy-making and actions that enable nurses and midwives to respond to emergencies and disasters and mitigate the devastating effects of such events.

Nurses and midwives should be flexible and adaptable when working in emergency and disaster situations. They should be prepared to care for large numbers of patients in less-than-ideal situations. They should be competent at providing life-saving and emergency care as well as dealing with long-term public health issues related to emergencies and disasters. They should be able to work closely with others involved in emergency and disaster care. Finally, they should be familiar with the incident command system in their hospital or community and what their roles are when emergency operational centres are activated.

In the case of emergencies and disasters, nurses have demonstrated their value in a number of situations, especially those involving mass casualties, because they possess technical skills and knowledge in areas that support humanitarian efforts, namely, epidemiology, physiology, pharmacology, cultural-familial structures, and psychological issues. They have also played a central role in providing immediate and longer-term care for survivors and their families during the recovery and rehabilitation phases of disasters. Additionally, they have demonstrated great resilience and unselfishness by working around the clock during disasters.
Unfortunately, many nurses and midwives lack the necessary training to function fully in emergency and disaster response, especially during mass casualty events. A lack of understanding of their roles during the different phases of an emergency or disaster can create self-doubt and a sense of inability when called upon to respond. While many nurses and midwives have shown resilience during emergencies and disasters, many others suffer from vicarious psychological trauma or post-traumatic stress disorder after being involved in an emergency or disaster.

Nurses and midwives must also appreciate their roles in emergency preparedness, response, recovery and rehabilitation. They must seek the competencies they need and adapt these in their work context and country situation. While it is recommended for nurses and midwives to be trained on an all-hazards approach, it would also be wise for them to be familiar with the vulnerabilities and capacities in their settings. It is also important for nurses and midwives to understand the policies and guidelines in their own hospital, community or country.

Nursing and midwifery leaders from countries in the Western Pacific Region were invited to share their experiences in preparing for and responding to emergencies and disasters in their countries or abroad. Respondents used a standard reporting framework (attached as Annex) to submit information on the affected community or country, the nature and impact of the emergency and disaster, the health sector response and coordination, and recommendations aimed at lessening vulnerabilities of communities and improving the health sector response, including nursing and midwifery roles and functions. Fifteen case studies were selected to highlight the multitude of roles and contributions of nurses in different settings in times of emergencies and disasters and analysis of community, health system and nursing and midwifery needs during times of ongoing health threats and disasters.

The roles of nurses varied from contributing to the psychosocial response (e.g. bushfires in Australia and Sichuan earthquake in China) to carrying out public health interventions during natural disasters (e.g. typhoons and flooding in Cook Islands, Malaysia and the Philippines). Nurses showed their humanitarian nature by offering to give assistance to distant countries (e.g. Australian and New Zealand nurses lending a hand after the tsunami in Samoa, and Singaporean nurses helping after the Pakistan quake).
Nurses have also demonstrated long-term commitment as seen by the ongoing efforts of the nurses in Japan to address the needs of victims from the Chuetsu region after the Niigata Prefecture earthquake and the capacity-building efforts of Chinese nurses in Hong Kong (China), Jinan and Wuhan subsequent to the Sichuan earthquake. Responses to natural disasters as well as those secondary to disease outbreaks were illustrated in the H1N1 outbreak in Singapore and the fire incident in Viet Nam. In the 2011 earthquake in Japan, school nurses showed their dedication by addressing the needs of their school population. The contributions of nurses and midwives in these case studies span more than a decade (1990–2011), with the majority of the events taking place from 2008 to 2010.
AUSTRALIA

THE 2009 VICTORIAN BUSHFIRES: THE PSYCHOSOCIAL RESPONSE

Margaret Grigg, Wei Choong, Genelle Ryan, Brigid Clarke and Lothar Wahl

Victorian Department of Health
INTRODUCTION

Bushfires are naturally occurring events in Australia due to the country’s hot, dry climate. Over the years, many plants have evolved to depend on fire to reproduce. Furthermore, bushfires shape and rejuvenate the land. However, this natural phenomenon can also cause significant destruction if burning happens close to human settlements.

Before European settlement, bushfires were more frequent and less intense. Today, bushfires occur less often and generally under extreme weather conditions, but they burn more intensely and have more severe impacts and consequences on Victoria’s built environments. Bushfires are considered a risk particularly for communities living in or on the cusp of rural areas. Unless controlled and planned, bushfires can cause devastating damage and destruction to both the landscape and the communities.

Victoria has been hit by three severe bushfire disasters in recent history—the 1939 Black Friday bushfires causing the deaths of 71 people, the 1983 Ash Wednesday bushfires killing 76, and the most recent and severe 2009 Black Saturday bushfires resulting in 173 deaths. The magnitude of destruction of the 2009 Victorian bushfires on the lives of communities was devastating to say the least, and the response and recovery efforts were unprecedented in Victoria.

NATURE AND IMPACT OF THE DISASTER

Victoria had been experiencing severe drought conditions, water shortages and restrictions for a number of years preceding the Black Saturday bushfires. Severe weather conditions resulted in temperatures soaring above 40°C for a prolonged period from late January to early February 2009. The heat wave triggered a number of bushfires that caused unprecedented damage, destruction and loss of life in the state of Victoria. On 7 February 2009, extreme heat above 45°C was experienced across most of Victoria. Strengthening northerly winds ahead of a front and temperatures at record highs at numerous locations created perfect conditions for extremely hazardous bushfires.

More than 22 000 people were evacuated from their homes; 430 000 hectares of land were directly affected; 78 communities were impacted; more than 2000 homes were destroyed; thousands of people were displaced over the short and longer term; and most devastating and poignant, 173 lives were lost.
PSYCHOSOCIAL RESPONSE

The sheer magnitude and severity of the multiple losses caused significant emotional distress and grief that persisted over time and, for some severely affected individuals and communities, are likely to persist for many years. Within 48 hours of the disaster, a psychosocial advisory committee was established to provide advice on response and recovery efforts. A psychosocial coordination team was likewise established to implement and coordinate the response.

After the Bushfires: Victoria’s Psychosocial Recovery Framework was prepared in 2009 to articulate the government’s response to the disaster.¹ The Framework was informed by expert advice and national and international literature, including: an evidence-based review by the Sax Institute immediately after the bushfires; guidelines from the National Health and Medical Research Council; and the United Nations Inter-Agency Standing Committee (IASC) Guidelines on Mental Health and Psychosocial Support in Emergency Settings.² Figure 1 illustrates the intervention pyramid associated with Victoria’s response.

Figure 1: Intervention pyramid for psychosocial support

The Framework describes the key principles underpinning the psychosocial recovery response and the components and specific tasks needed to meet the psychosocial needs of the affected communities over time.
It articulates the principles and processes that have underpinned and shaped the state’s investment in psychosocial recovery and describes six core principles:

- coordination and integration
- enhancing local services
- community involvement
- flexibility
- sharing information
- training and support.

The Framework recognizes that psychosocial recovery is influenced by more than just the availability of psychological supports or mental health services. Psychosocial recovery is built on ensuring access to basic services and rebuilding community and family support structures. Psychosocial recovery requires extensive coordination and collaboration between all departments and agencies of the state government, such as health and human services, education, community planning and development, and other levels of government. In the case of the 2009 Victorian bushfires, a team was convened to coordinate the efforts of this diverse group of government and nongovernmental organizations and also to act as a contact point for various agencies and organizations. This team disseminated information and acted as a central point for communicating and working across different sectors. The team promoted new networks and partnerships for operation and service delivery, and prevented information jams that often occur during the chaotic transition from the period of relief to recovery.

**Education and training**

Focused education and training was an early priority of the psychosocial response. A tiered approach was developed to ensure that the development of knowledge and skills matched the roles of workers.

*Level 1:* This training targeted the people who were working with those affected by the bushfires but did not have a specific psychosocial support role. The intended recipients included teachers, youth workers, child care workers and community support staff.

*Level 2:* This training, developed for generalist counsellors and local doctors, was focused on understanding and enhancing recovery from trauma using *Skills for Psychological Recovery* (an evidence-informed curriculum developed following Hurricane Katrina). Training in specialist treatment of mental health trauma was also developed for mental health professionals. A specific curriculum was developed to address the treatment needs of children and adolescents.
Level 3: This training aimed to equip health professionals to respond to more complex mental health issues associated with the bushfires such as post-traumatic stress disorder. Specific training was also provided to specialist child and adolescent mental health workers to ensure treatment pathways for children and young people.

Case management programme

Due to the broad geographic impact of the bushfires, particularly in rural and remote communities, the government provided individual- and family-based support in the form of a case management programme for more than 5000 bushfire-affected people. The Victorian Bushfire Case Management Service was established in the days following the disaster to help people access practical assistance and support during the response and recovery phases. Case managers were also essential in providing emotional support to affected people, facilitating access to psychological services and providing feedback on the emerging issues and service gaps. For example, the case manager worked one-on-one with individuals and families to help them access assistance with matters including accommodation, finance, personal assistance, employment, education, counselling, health and legal services.

Case management fulfilled three critical roles in supporting the psychosocial recovery of individuals and families:
- It provided individualized support to assist people to meet their immediate needs following the disaster and support problem-solving.
- It facilitated access to psychological treatment services.
- It enhanced access to trained therapeutic professionals who were able to provide psychological first aid and psychosocial support to individuals and families.

Community development programme

Disasters can interrupt or destroy the normal social fabric, infrastructure and connections of communities. The government’s psychosocial response to the 2009 bushfires was the implementation of a wide range of strategies to support reconstruction in the form of community rebuilding. Over the years, community development workers have been used effectively in a wide range of disasters across Australia. Victoria implemented these roles to support the development of local community networks that served to inform the recovery and reconstruction process, to promote engagement with affected communities, to inform the development of local services, and to support accurate and timely information flows.
In conjunction with local community members and leaders, community development workers provided support to redevelop and create networks and facilitate communication about local community needs and strategies.

The community development programme supported the establishment of community recovery committees and community recovery processes involving personnel, activities and programmes. Community development officers were placed in local communities to assist committees with the reconstruction and recovery efforts. For example, with support from a community development officer, the Whittlesea Community Recovery Committee established a Wellbeing and Mental Health Working Group to ensure the availability of a variety of strategies to support the psychological recovery of the community. The working group sponsored a number of information and support initiatives such as community forums for parents and carers of children and young people to discuss strategies for the psychological support of children.

**Enhanced access to counselling**

While most people recover from trauma associated with a disaster without formal counselling services, enhanced access to counselling helped to support the normal recovery process and identify people at increased risk of developing mental health problems. A wide range of counselling programmes were available in the affected communities, and training was provided to facilitate the use of evidence-based treatments. Existing services were also increased.

For affected individuals needing financial assistance, the Bushfire Psychological Counselling Voucher Program was set up with resources from the Victorian Bushfire Appeal Fund. With these vouchers, individuals (including dependant children over five years of age) could attend up to six free counselling sessions. The vouchers provided a system of universal access to counselling for all people affected by the fires within a framework designed to support normal recovery. People with significant mental health problems were referred to specialist services.

**Bereavement support**

As a consequence of the large number of deaths, there was a significant demand for grief counselling. In the initial period following the bushfires, counselling support was provided to family members during the victim identification process. Support service providers such as case managers were trained in post-disaster bereavement support. In addition, more grief counsellors were recruited to provide support.
Location-based discussion and support groups were established for people who had lost someone close to them in the bushfires. These groups were facilitated by a professional psychologist, social worker or counsellor with experience working with traumatized and bereaved people. In general, group meetings were held monthly to address the needs of the participants. The groups provided an opportunity for people to share their experiences with others who had similar ones.

A bereavement participation process was established to ensure that people who lost loved ones in the bushfires were linked with each other and with the recovery activities. In conjunction, a process was established for the bereaved to be connected to and to participate in the development of memorials to acknowledge and remember those lost. Information forums (with strong emphasis on networking and peer support), newsletters and a website were also established.

**Children and youth**

Based on past disaster experiences, the Framework emphasized the impact of bushfires on children and young people. The Framework acknowledged the unique aspects of bushfires and how children and young people may perceive their exposure to the event such as how close the fire came to their homes, the response of their parents or carers, their individual temperaments, the effect of widespread media coverage, the levels of family support, their age and their personal losses.

The magnitude of the disaster had an enormous effect on children and young people who had lost their homes, schools, parents and friends, and in some cases, their entire community. These factors undoubtedly had a negative impact on the emotional and psychosocial well-being of many children and young people. It was evidenced from other disasters that some children and young people may develop post-traumatic mental health problems. These problems, if strong and persistent over time, have the potential to develop into serious mental health illnesses and other lifelong consequences including functional and developmental disruptions and adverse impacts on learning. In recognition of these needs, a project funded by the Victorian Bushfire Appeal Fund was developed to provide a systematic psychological screening service for children aged 8 to 18 years to identify any mental health issues that might have arisen as a result of the bushfires. This project was linked to the service system to ensure appropriate treatments were accessible to parents and their children.

In acknowledgement of the diverse needs of young people, the varied engagement methods in which these needs could be met, and the increasing
use and popularity of accessing online information by this particular age cohort, an online support portal was developed. The online portal allowed visitors to share their grief with others (peer-to-peer forum), ask questions and seek advice from experts, submit their own stories, stay up to date with fact sheets, and submit comments about their local community recovery and reconstruction efforts.

A wide range of school- and community-based programmes were also provided for children and young people, including targeted information for parents and children on the impact of trauma, community events, targeted recreational activities, opportunities to express grief and trauma through alternative means such as music and art, and enhanced access to formal counselling services.

CONCLUSIONS

A formal evaluation of the psychosocial response was conducted to evaluate the effectiveness of the response and to document lessons learnt to inform responses to future emergencies. Some of the themes that emerged included:

- establish a robust mental health system before a disaster;
- be prepared, particularly ensuring that services understand psychosocial recovery and their roles;
- ensure flexibility, promote partnerships and facilitate communication;
- develop multiple pathways to support; and
- ensure the response changes over time to reflect changing needs.

REFERENCES

INTRODUCTION

Under Australia’s federation model of government, each of the eight state and territory governments is responsible for the provision of health services within its respective jurisdiction. The Commonwealth and the jurisdictions share the funding of health services on a 50/50 basis.

The Australian Health Protection Committee (AHPC) is the leading national health emergency forum, composed of the Commonwealth Chief Medical Officer, the Chief Health Officers of each state and territory, disaster health experts and relevant Australian Government representatives. It is chaired at the Deputy Secretary level by the Department of Health and Ageing.

AHPC prepares the National Health Emergency Response Arrangements (NatHealth Arrangements) to articulate the strategies and mechanisms for the coordination of the health sector response to emergencies of national consequence. The NatHealth Arrangements direct how AHPC will work cooperatively and collaboratively to contribute to the response to and recovery efforts.

AHPC also oversees Australian Medical Assistance Teams (AUSMATs), which are jurisdictional-based civilian medical assistance teams with self-sustaining field deployment capabilities, for domestic and international response. AUSMATs have previously been deployed internationally in response to the Indian Ocean tsunami of 2004 and the Yogyakarta earthquake of 2006.

Following a tsunami that struck Samoa on 29 September 2009, the Department of Foreign Affairs and Trade (DFAT), the Australian Agency for International Development (AusAID), Emergency Management Australia (EMA), the Australian Defence Force and the Department of Health and Ageing worked closely with the New Zealand Government to provide humanitarian assistance to the Pacific island country. DFAT chaired an Interdepartmental Emergency Taskforce to coordinate the Australian response under the Australian Government Overseas Disaster Assistance Plan (AUSASSISTPLAN).

The Department of Health and Ageing was tasked under AUSASSISTPLAN to coordinate the medical component of the humanitarian response. The Department’s National Incident Room was activated and AHPC met via emergency teleconference to coordinate the rapid assembly of medical assistance teams overnight on 30 September 2009.
NATURE AND IMPACT OF THE DISASTER

On the morning of Tuesday, 29 September 2009, at approximately 06:48 local time (04:48, Wednesday, 30 September 2009, Australian Eastern Standard Time [AEST]), the Pacific island nation of Samoa experienced an 8.3-magnitude earthquake off the coast, followed minutes later by a tsunami impacting the main island. Tsunamis were also experienced in American Samoa and Tonga; however, Samoa suffered the greatest damage and loss of life. The Samoan Government quickly declared a state of emergency and requested assistance from the Governments of Australia and New Zealand.

The five-metre wave generated by the undersea quake impacted settlements along the southern coast of the main island of Upolu. The hardest hit area was a 40-kilometre (km) stretch of narrow coastline in the south-eastern section, home to Lalomanu and Poutasi villages, where most of the buildings were razed and many essential services lost. Significant sections of this area—where most settlements and resorts are located—are only 200 to 300 metres wide before merging into the foothills. In many areas, the land is steep and impassable with few formal roads or access points into the foothills.

The earthquake caused no significant structural damage to other parts of Samoa, including the capital city on the north coast, Apia, where the Tupua Tamasese Meaole hospital (The National Hospital) is located. The affected area is approximately 1.5 to 2 hours from the capital by car, with no significant towns en route for a base of operations. Therefore, the base of operations was established in Apia with an Urban Search and Rescue (USAR) forward command post established in Lalomanu alongside the medical clinic.

Samoans living in the tsunami-affected area belonged to large family groups and villages led by a mayor or chief known as Matai. The villagers have subsistence plantations in the foothills, cultivating crops such as taro, banana and paw paw. The coastal area is also a popular tourist destination with beachfront resorts and village-style fales. Most of the affected local population relocated to their plantations; however, lack of infrastructure and utilities in the foothills above the destroyed villages presented significant challenges. Access was limited via dirt tracks that frequently required four-wheel drive vehicles to negotiate.

Significant losses of life and injuries resulted from the tsunami. The population of Samoa at the time was 165,000, but without official census data, detailed information regarding the area affected could not be obtained. At the time, it was estimated by Government authorities that up to 20,000 people (12.5% of the total Samoan population) were affected throughout this area, with a resultant death toll of 163 people.
DISASTER RESPONSE

In response to the Samoan request for assistance, AUSASSISTPLAN was activated by AusAID at 13:40 AEST on 30 September 2010. The aim of AUSASSISTPLAN was to detail the coordination arrangements for the provision of Australian emergency assistance, using Australia's physical and technical resources, following a disaster/emergency in another country.

The first phase of Australia's assistance, was delivered by officials from AusAID, DFAT, EMA, the Australian Federal Police, the Queensland Fire and Rescue Service and a medical response team composed of 12 persons from South Australia, 12 from Queensland and 2 from New South Wales. The response was activated on 30 September 2009.

The team departed Brisbane at approximately 02:00 on 1 October 2009, and arrived in Apia some five hours later. A four person forward team from New South Wales departed Richmond Royal Australian Air Force base at 14:00 on 30 September 2009, and arrived in Apia the same day at 20:30. A further 33 person NSW team and 15-person Victorian team departed at 16:00 on 30 September 2009, and arrived the following day at 02:00.

The Australian response team consisted of 74 people including team leaders (from government, medical and nursing backgrounds), emergency physicians, public health clinicians, surgeons (general, trauma, plastic and orthopaedic specialties) and anaesthetists. A total of 23 nurses with operating theatre and emergency backgrounds were deployed, including a nurse practitioner who had a paediatric emergency background. A number of intensive care paramedics, many with dual qualifications in nursing and paramedics, were also deployed. All were trained or experienced in disaster and emergency management with many, for example, having undertaken Major Incident Medical Management and Support courses and many having experience working in other emergencies.

Key to the success of any offshore deployment is a team's willingness to cooperate and work together. Often, this means being flexible enough to undertake roles and tasks outside of the traditional or usual workplace. The nurses deployed were able to take on a number of roles because of their broad experience. For example, emergency nurses undertook roles in the operating theatre, while paramedics with nursing qualifications undertook anaesthetic support roles.

The initial medical response was conducted by the Samoa Fire and Emergency Services Authority (SFESA), with doctors, nurses and other emergency workers from The National Hospital in Apia attending the scene on the south coast. The vast majority of injured were transported to The
National Hospital with some also treated at the MedCen Private Hospital. Many others had initial treatment at the only remaining regional clinic in Lalomanu, which was located on high ground, before returning to their plantations in the foothills.

During the first day, the Emergency Department at the National Hospital saw approximately 300 cases, including some people who had survived a near-drowning experience. As some of the Emergency Department’s senior staff were deployed to the scene, the remaining staff were augmented with non-emergency department personnel. Volunteers including medical students played a key role in this initial response as well as expatriates and an ex-Victorian ambulance officer undertaking an AusAID project with SFESA.

The Paediatric Ward was reassigned as the Tsunami Ward. By the time the Australian medical team personnel arrived mid-morning on 30 September 2009, the ward was occupied by about 40 patients. A full schedule of operating procedures was under way and the Emergency Department was seeing an increasing number of patients with late presentations of tsunami-related injuries.

The hospital staff and initial volunteers are to be commended for their initial response. After the arrival on the morning of 30 September, an initial assessment was conducted in the company of senior local hospital staff who provided information and advice as to their needs. This initial assessment identified medical needs in four key areas:

- surgical support for injured victims
- emergency department support for ongoing new presentations
- aeromedical evacuation support
- field support and assessment.

The experience and maturity of the Australian nursing staff deployed to work alongside their Samoan colleagues in the operating theatre, in the Emergency Department and in the field contributed greatly to the success of this mission. Because of the overwhelming demands placed on the operating theatre, a largely nurse-led wound clinic was established in the Emergency Department. This enabled minor wounds to be assessed and treated, some under mild sedative support where debridement was necessary. Digital photographs of wounds were transmitted to the operating theatre via mobile phone whenever a surgical consultation was thought necessary. This facilitated timely management and reduced pressure on the theatre.

Village and in-field assessments identified a number of severely wounded people who were either treated in the clinic or in the field, or referred and transported to The National Hospital for more definitive care.
Foreign nationals were repatriated with the support of the Australian and New Zealand Defence Forces, with in-flight support provided by reserve nurses and medical staff. In all, 22 people were evacuated early, thereby providing extra space for local people requiring inpatient care.

While the Australian teams were working in Samoa, the Emergency Department treated 1060 presentations, the operating theatre performed 101 surgical procedures, and 33 village assessments were undertaken alongside Ministry of Health and National Health Service officials.

Transition planning was undertaken early to ensure a smooth handover from the Australian medical teams to those from New Zealand. The handover was negotiated with the assistance of both the Australian and New Zealand High Commissions. A core component of transition planning was projecting priorities to ensure the right skill-mix and specialties were represented on the teams.

Figure 2. Timeline of response efforts following the 2009 tsunami in Samoa

Source: Timeline developed by the authors based on personal logs and official situation reports.
CONCLUSIONS

Operational lessons

Lessons learnt from previous relief operations, those being, early and effective integration and engagement with existing local structures and adopting a support role, were applied successfully in all aspects of this mission, including repatriation of foreign nationals, operating theatre, Emergency Department and community health components of this response. In all, the response lasted for nine days, from deployment to transition and withdrawal of the Australian medical teams. Equipment brought with the teams was gifted to the hospital and SFESA. Australia continues to provide support to Samoa by conducting training in Advanced Paediatric Life Support.

Strategic lessons

EMA, in conjunction with AusAID, conducted a multiagency, post-deployment debrief and workshop on 26–27 November 2009. The objectives of the workshop were to discuss and share experiences of deployments and to identify strategies to assist with future international deployments. Participants were drawn from relevant Australian Government agencies at the Assistant Secretary level along with jurisdictional representatives. Representatives were requested to present a short brief on their agencies’ involvement at the workshop.

The forum highlighted priority areas on which Government agencies and state/territory jurisdictions agreed that additional work was required in building a national interoperable approach to respond to overseas disasters and emergencies.

1. AusAID to review and revise AUSASSISTPLAN in consultation with Australian Government and jurisdictional agencies. The following course of action was recommended:

   • consult with stakeholders to develop a tasking format/template for inclusion;
   • develop Official Development Assistance guidelines as well as financial guidelines;
   • develop and agree on clear roles and responsibilities of Australian Government departments and jurisdictional agencies;
   • agree on structured roles and reporting requirements for all officers deployed; and
• develop and include annexes that outline deployment and
demobilization strategies and plans including logistical supplies
and requirements.

(2) Convene a workshop to develop and progress associated training
and development programmes to improve international
deployments including preparing for and planning such deployments.
Training to consider:

• role of diplomatic posts;
• cross-jurisdictional training and interoperability;
• liaison officer training;
• dangerous goods management;
• effective reporting;
• deployment safety and security; and
• discussion exercises.

(3) Form a deployment working group to progress and enhance
deployment-related issues, including:

• enhancement of planning capability for response;
• rapid assessment capability with efficient assessment team
structure;
• whole-of-government expectations;
• information management;
• AUSASSISTPLAN ongoing enhancements;
• badges, uniforms and personal protective equipment;
• training options;
• advanced training for senior members; and
• interoperability between jurisdictions—equipment, personnel and
procedures.

It is also important to prioritize and implement recommendations in a
timely manner following operational reviews. Unfortunately, not all of the
recommendations arising from Operation Samoa Assist were implemented
prior to the next activation of AUSASSISTPLAN. In August 2010,
AUSMATs were deployed to form a joint civilian–military medical taskforce
operating in central Pakistan to assist populations affected by a large-scale
flood disaster.
ACKNOWLEDGEMENTS

The authors wish to acknowledge the Samoan medical and nursing staff of the Tupua Tamasese Meaole hospital (The National Hospital) for their outstanding work in a time of great sorrow for their nation. They also wish to acknowledge contributions made by the Commonwealth and the states of Queensland, New South Wales, South Australia and Victoria in responding to this emergency under the auspices of AusAID as a part of Australia’s assistance, and, in particular, the key leadership role played by the Australian High Commission to Samoa.
CHINA

PSYCHOSOCIAL CARE TRAINING TO SUPPORT VICTIMS AFTER THE 2008 SICHUAN EARTHQUAKE

Zang Yuli
Shandong University School of Nursing
INTRODUCTION

China's population of more than 1.3 billion are frequently affected by natural disasters brought about by complex climatic and geographical conditions. Around 70% of the country's land area is mountainous, facing the Pacific to the east, leaning against the Qinghai–Tibet Plateau to the west, and spanning 50 degrees of latitude from north to south. Furthermore, China is situated between the Euro-Asian and circum-Pacific seismic belts, which is why the country is continuously under the threat of serious and frequent occurrences of earthquakes. The Sichuan earthquake in 2008 was the strongest one in nearly 60 years.

With guidance and support from the Nursing unit of the World Health Organization Regional Office for the Western Pacific, Shandong University participated in a series of psychosocial care training programmes designed for health care providers who administered direct care to victims of the Sichuan earthquake. This case study focuses on Shandong University's contribution to the successful delivery of these training programmes.

NATURE AND IMPACT OF DISASTER

On 12 May 2008 at 14:28, a massive earthquake measuring 8.0 on the Richter scale struck south-western China. The epicentre (latitude 31.0°N, longitude 103.4°E) was in Wenchuan County, 92 km north-west of Chengdu, the capital of Sichuan Province. From the day of the quake to 21 October, a total of 34,417 aftershocks were observed, 8 of which measured between 6.0 and 6.9 magnitude, 32 between 5.0 and 5.9 magnitude, and 231 between 4.0 and 4.9 magnitude.

The earthquake occurred at the southern part of the famous north-south seismic zone along the base of Longmen Mountains, i.e. Longmenshan fault. Although the quake was not predicted by the newly completed China Geophysical and Geochemical Network, around 1400 strong ground motions were recorded by 360 observation stations of the China Strong Motion Network. The strongest recording was obtained at Wolong Station, which is an important habitat for the giant panda. Among the three horizontal and vertical earthquake components (i.e. simultaneous movement in three directions: up-down, north-south and east-west), the east-west horizontal component was the strongest, with maximum acceleration, velocity and displacement recorded at 959.1 gal, 50.1 cm/s and 12.7 cm, respectively.¹

The high-intensity earthquake in Wenchuan County was followed by near-constant aftershocks. Given the complicated geological structure of the affected areas, many of the aftershocks triggered tremendous secondary geological disasters (e.g. landslides, rolling rocks, debris flows, mud-rock
flows), which blocked the mountain roads and rivers, damaged towns and buildings, and caused numerous casualties.

A field investigation in the affected area suggested that of the five types of buildings and houses (i.e. reinforced concrete buildings, brick–concrete buildings, bottom-reinforced concrete buildings, brick–wood houses and adobe–wood houses), the reinforced concrete buildings sustained the least damage, followed by the bottom-reinforced concrete buildings. Buildings and houses built after 2000 suffered less damage than the older ones because many were constructed according to the National Building Seismic Design Code (2001). The greatest human loss was felt in the mountainous and hilly areas, particularly in Sichuan Province, where tens of thousands of people died because buildings and houses collapsed.

In the heavily hit areas, infrastructure and engineering structures suffered varying degrees of damage. The quake cut off 16 major arteries, 6 railways and around 400 bridges and paralysed electricity, water and gas supply, and communication systems. Most dams were not seriously damaged, except for Zipingpu Dam, where rolling rocks blocked the Qingshui River and its branch (i.e. Hongshi River), resulting in the formation of 34 quake lakes that posed potential dangers to people’s lives. Chinese authorities were concerned that unstable dams formed by landsides could suddenly collapse during aftershocks and possibly flood densely populated areas.

Economically, total direct economic losses due to the Sichuan earthquake were estimated to be 852 309 million Chinese yuan, representing 3.3% of the country’s gross domestic product of the previous fiscal year. Losses in the three most severely affected provinces (i.e. Sichuan, Shaanxi and Gansu) were estimated at 845 136 million yuan, making up 99.16% of the total losses attributed to the earthquake. More specifically, losses in Sichuan, Gansu and Shaanxi Provinces were 771 770 million yuan, 50 535 million yuan and 22 830 million yuan, respectively, making up 91.32%, 5.98% and 2.70% of the total losses.

The total disaster area covered 500 000 km², with the worst affected 51 counties (cities, districts) in Sichuan, Gansu and Shaanxi Provinces spread over 130 000 km². The initial shock was felt in 30 provinces and municipals, and affected 10 provinces/cities (i.e. Sichuan, Gansu, Shaanxi, Chongqing, Yunnan, Hubei, Guizhou, Henan, Shanxi and Hunan), 417 counties, 4667 towns and 48 810 villages.

Most of the affected areas in Sichuan Province were 3000 metres above sea level. Because of the region’s high elevation, the earthquake caused long-lasting secondary geological disasters (e.g. landslides, collapses and
mud-rock flow) that had a profound impact on the affected areas, both in the mountains and below. Such areas included not only economically less developed ethnic regions, such as the home of the Qiang minority, but also more advanced regions, like the high-tech industrial zones in Chengdu, Deyang and Mianyang. As of 25 September 2008, 69 227 people were officially confirmed dead, 17 923 people were missing and 374 643 people were injured. A total of 46.25 million people were affected by the earthquake².

After the earthquake, more than 15 million internally displaced persons were moved to temporary shelters and camps in more than 430 locations in Sichuan, Shaanxi and Gansu Provinces. The affected communities were provided with basic medical attention, clean water, food and sanitation as well as services such as schooling. Business and trade were run at minimum levels. Because many survivors suffered psychological trauma and acute shock, psychological services were also provided, especially to injured school children and orphans.

DISASTER RESPONSE

China started building a rapid response and relief network after the occurrence of severe acute respiratory syndrome (SARS) in 2002–2003. The network allows local governments to tackle and monitor natural disasters independently, but when an event is serious and beyond the ability of local governments to manage, the central Government can activate appropriate contingency plans, including the four-level emergency response system for natural disasters. In this system, disasters that call for a level 4 response include devastating earthquakes with 20–50 deaths, 100 000–300 000 people transferred and resettled, and 10 000–100 000 houses collapsed. All activities initiated by central and local governments after the Sichuan earthquake were consistent with a level 4 response.

As soon as the Sichuan earthquake was reported, the State Council set up the Earthquake Disaster Relief Headquarters, and the Premier took the role of commander-in-chief. Under the guidance of the Headquarters, the Premier and central Government division leaders organized large-scale disaster relief efforts, working together with local governments in disaster-affected areas. The Ministry of Health was mainly responsible for: (1) rescuing injured people; (2) carrying out disease and environmental sanitation monitoring and conducting surveillance on possible major outbreaks of communicable diseases in disaster-affected areas; (3) implementing epidemic prevention and emergency treatment measures, including preventing and controlling the occurrence, proliferation and spread of disease, and ensuring the safety of drinking-water and food; and (4) providing psychological support to disaster-affected areas.
Medical rescue teams consisting of doctors, nurses and epidemic-prevention and support personnel were immediately organized by major hospitals across the country and deployed to the affected areas. The nurses had expertise in trauma, wound care and infection control, but lacked proficiency in preparedness and competency in post-disaster rescue activities. Given the limited local response capability, many seriously injured victims including trauma patients and schoolchildren were transferred as organized groups to hospitals or schools that gave up space for treatment, education and recovery. Shandong University, with its main campus located in Jinan, prepared volunteers to support the transferred victims.

**Post-disaster psychosocial support**

**World Health Organization’s visit**

More than a week after the Sichuan earthquake, the World Health Organization (WHO), represented by Kathleen Fritsch, Regional Adviser in Nursing at the WHO Western Pacific Regional Office, and Chunmei Wen, Nursing Programme Manager at the WHO Representative Office in China, visited Shandong University and its affiliated Second Hospital to render support and to plan for improving disaster preparedness and response in nursing education and practice.\(^3\) The visit was also an opportunity for them to plan a meeting for the Asia-Pacific Emergency and Disaster Nursing Network (APEDNN), which was held in Shandong University in Jinan on 16–20 October 2008. The WHO representatives met 35 of the injured victims who were transferred to Shandong Province. They also met some nurse volunteers who were helping in the response efforts. The visit caught the attention of the media and was broadcast on China Network Television (CNTV) and China Radio International.

**Post-disaster psychosocial care training programmes in Jinan**

WHO facilitated the visit of Dr Margaret Grigg, a mental health nursing expert, to conduct a training-of-trainers course on post-disaster psychosocial care for volunteer faculty and students at Shandong University.\(^4\) Under her guidance, two more training courses on post-disaster psychosocial care were given to school staff members looking after schoolchildren and teachers who were displaced by the Sichuan earthquake.

The first training programme, held on 1–5 June 2008, focused on post-disaster mental and psychosocial support. The five-day training targeted faculty and student volunteers who would work in the affected areas or in the hospitals where injured patients were admitted. At the time,
around 223 injured patients and 214 family members were being looked after in hospitals in Jinan. A majority of the 35 trainees were students from the School of Nursing, School of Public Health and School of Medicine at Shandong University. On the last day, the trainees participated in hands-on clinical training in the hospitals treating injured quake patients. After the training, 17 trainees were involved in providing care to a total of 155 patients and their family members in four local hospitals. Three of the trainees from the first course trained an additional 95 students in a second training. These 95 students worked as volunteers in two local hospitals to help 83 injured patients.

Two subsequent trainings, one on 14–17 June and another on 19–21 June, were conducted with support from the Jinan Bureau of Education. The trainings targeted teachers from different academic levels: three from primary level, one from secondary level and one from college. The teachers were prepared for the arrival of 808 primary school pupils, 617 junior high school students and 70 teachers from Sichuan Province and were taught how to help the 1425 affected students with assistance from the Sichuan teachers. Given the tight schedule, the five-day training programme was compressed to three days, with particular emphasis on mental health and psychosocial support to children and adolescents.

As to the trainees' participation in the programme, the exercises that involved interacting with affected people were often very productive and touching. Those who had previous experience with treating disaster-affected individuals disclosed that the stress was intolerable and sometimes overwhelming, especially when they encountered difficulties in their own lives. Participants were particularly interested in the discussions on “normal responses to trauma”. Trainees were often surprised to learn that psychosocial conditions experienced by the affected persons and themselves, such as insomnia and depression, were normal. With this knowledge, trainees stopped perceiving affected individuals as sick, leading to a better understanding of the influence of the earthquake on people and society.

These training programmes were reported on government websites, radio and television. Furthermore, three articles were published in peer-reviewed nursing journals, namely: (1) A draft project on the curriculum design of disaster nursing;5 (2) A review on post-earthquake psychosocial support training programmes;6 and (3) Characteristics analysis and development expectation for disaster nursing.7
Post-disaster psychosocial care training in Chengdu

The success of the training programmes in Jinan convinced WHO, China’s Ministry of Health and Shandong University to conduct the same training in Chengdu, the capital of Sichuan Province. The one-day psychosocial care training used materials prepared by Dr Margaret Grigg. Around 50 nurses, including nursing managers from the most seriously affected areas, participated. The training programme’s participatory learning approach encouraged nurses to describe the cases they encountered and then suggest appropriate steps for psychosocial care. Many participants cried because of the sudden and overwhelming surge of sadness and stress. The reactions were similar to those of the school staff who looked after transferred victims in Jinan. Such phenomena reveal that psychosocial support is important not only for victims, but also for health care providers.

2008 APEDNN meeting

The 2008 APEDNN meeting, with the theme “Innovative Emergency and Disaster Nursing Education and Training – United for Action”, was held in Jinan, Shandong on 16–20 October 2008. The meeting was designed to identify strategies to expand the emergency and disaster nursing network’s membership, to advance communication technologies and partnerships, and to evaluate progress made by members. Around 30 technical experts delivered speeches during the first two days of the conference, followed by three days of workshops on pandemic prevention in community settings, trauma and wound care, and psychosocial support in emergency and disaster settings.

A total of 130 participants from 20 countries and areas attended the first two days of the conference, and around 220 participants attended the workshops. The Jinan Call for Action was formulated and announced at the end of the meeting. Shandong University also launched its APEDNN web platform. All participants and representatives of related organizations (e.g. International Federation of Red Cross and Crescent) spoke highly of this meeting.

Considering the importance of APEDNN in disaster preparedness and response, two articles were published in peer-reviewed journals to introduce the network and its web platform. One article in Mandarin focused on an analysis of the roles played by APEDNN for safe communities, while the another in English focused on describing all aspects of APEDNN.
CONCLUSION

Providing psychosocial care to victims of the Sichuan earthquake was a challenge for China's Government and other sectors of society including the nursing profession. However, the strong leadership of the Government and all-around support of communities, schools and institutions like Shandong University helped in preparing volunteers to care for the earthquake victims and demonstrated possible ways to back up post-disaster relief responses to severe disasters.

REFERENCES


AFTER THE SICHUAN EARTHQUAKE: NURSES INVOLVED IN DISASTER MANAGEMENT TRAINING IN CHINA

Wang Ai Ling and Marcia A Petrini

Wuhan University School of Nursing
INTRODUCTION

China is susceptible to serious natural disasters. From 2006 to 2009, China was inundated with earthquakes, flooding, landslides and other major natural disasters that caused thousands of deaths and economic losses in the tens of billions of yuan (Table 1).

Table 1. Major natural disasters in China (2006–2011)

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of people dead or missing</th>
<th>Direct economic losses (billion yuan)</th>
<th>Types of natural disasters</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>3186</td>
<td>252.81</td>
<td>Earthquakes, typhoon, drought</td>
</tr>
<tr>
<td>2007</td>
<td>2325</td>
<td>236.30</td>
<td>Flood, landslide, debris flow</td>
</tr>
<tr>
<td>2008</td>
<td>88928</td>
<td>1175.24</td>
<td>Snow disaster, earthquake</td>
</tr>
<tr>
<td>2009</td>
<td>1528</td>
<td>252.37</td>
<td>Drought, excessive rainfall, snow disaster</td>
</tr>
<tr>
<td>2010</td>
<td>5857</td>
<td>534.00</td>
<td>Drought, flood, earthquake</td>
</tr>
<tr>
<td>2011</td>
<td>1126</td>
<td>309.64</td>
<td>Snow disaster, drought, earthquake</td>
</tr>
</tbody>
</table>


China faces several problems with disaster response, the major ones being: limited preparation for disaster management; deficient warning mechanisms; out-of-date emergency response plans; and lack of an efficient incident management system.

China’s difficult terrain puts many rural and geographically isolated populations at risk from natural disasters. Disaster response in remote areas is especially difficult and challenging because of the lack of health services, of easy transportation and of access to tertiary facilities. The military are often the first to respond because they have the equipment to gain access to and extract individuals from these areas. Other responders include local Centers for Disease Control (CDC) personnel and public health personnel, supported by local police, fire departments and hospitals in the region. While waiting for assistance from specialists, communities take action as best as they can with health care workers in the area. In most communities, doctors and nurses are on hand to serve as front-line providers until the military arrives. However, more people need to have a basic knowledge of triage and care.
During natural disasters, roads are often blocked, food and water supplies are interrupted, sanitation becomes a problem, and safe shelter and warm blankets are in short supply. As part of a study of international disasters in recent years, survey responders consistently pointed to “lack of management” as a major problem. In addition to the absence of an effective management system, responders admitted that their knowledge of appropriate interventions was not fresh in their minds during a disaster.\(^1\)

In the 1980s, emergency services were developed in hospital emergency departments. Project HOPE assisted in the development of emergency services for the Second Affiliated Hospital of Zhejiang University School of Medicine in Hangzhou, China. Through a fellowship programme, doctors and nurses were sent to the Massachusetts General Hospital in the United States of America to learn life support and trauma care and to develop courses and materials to teach others in China. Disaster, emergency and trauma care were further developed in the Emergency Department of Zhejiang Medical College, Zhejiang University in Hangzhou, China. Many doctors and nurses were trained at the college and throughout China to respond to emergencies and disasters. In 2004, a major conference was held on disaster and emergency care to celebrate the 20th anniversary of the Centre. At the same time, a Chinese version of *Advanced Disaster Medical Response Manual for Provider*,\(^2\) translated by Gan Jian Xin and Zhang Mao and Zhang Yi Jin, directors of the Centre, was introduced.

The modernization of China and the significantly improved economic situation in recent years have led to the quick development of emergency services. However, a recent report on the development of emergency medicine in China noted that the country has only four Emergency Medicine Service Systems (EMSS), located in Beijing, Shanghai, Chongqing and Guangzhou.\(^1\) Compared with other industrialized countries, China has a dearth of emergency medicine services.

Emergency medical staff include doctors, nurses, patient carriers and drivers who provide pre-hospital services. More courses are being offered for doctors, nurses and other responders on the immediate care and treatment of victims of disasters. In 2006, Wuhan University School of Nursing hosted an international conference with emphasis on disaster care including skill stations for triage, initial assessment, insertion of airways, immobilization, assessment of head trauma, assessment and treatment of shock, and assessment and treatment for blasts and biohazards. In late 2007, the school was asked by a director of the Hubei Provincial Health Bureau to host a disaster management training programme for key staff of Hubei Province. The intent was to train people who would return to their communities, teach others, update their community disaster plans and enhance the abilities of others to respond.
NATURE AND IMPACT OF DISASTER

The 2008 Sichuan earthquake that measured 8.0 on the Richter scale occurred at 14:28 on 12 May 2008 in Sichuan Province. The epicentre was 92 km north-west of Chengdu, the capital of Sichuan Province, in Wenchuan County. Around 69 000 people were confirmed dead, more than 374 000 injured and nearly 18 000 listed as missing. It was the deadliest earthquake to hit China since the 1976 Tangshan earthquake, which killed more than 240 000 people.

The Sichuan earthquake, similar to other mass disasters, occurred in an austere place with few or limited resources. In disaster response, specialists are often discharged to the field, but many of them have forgotten how to do triage. Furthermore, when patients seek skilled care in facilities, the specialists are often elsewhere. These commonly reported problems, in addition to inappropriate supplies and inability to transport needed supplies to the disaster site, arise from poor management.

DISASTER RESPONSE

In order for disaster response to be effective, a command-and-control system must be in place and all personnel involved must follow the direction of the incident commander and the command team. Medical personnel are comfortable working independently or in teams of doctors and nurses, but in disasters, working with others is critical to the success of the intervention. Triage is extremely important so that those in most need of care can be stabilized for transport and more complex care. The major principle of disaster medicine care, “the greatest good for the greatest number,” is very different than that of traditional health care, which is the greatest good for the individual.

Wuhan University School of Nursing conducted its training for emergency medical staff in August 2008 after the Sichuan earthquake. Part of the sessions reflected on lessons learnt from the Sichuan earthquake since many of the attendees had been sent to respond to the disaster. About 120 participants came from Sichuan Province and included representatives from CDC and the Government, doctors, nurses, police officers, fire officials and emergency response personnel. Since 2008, Government-issued directives that call for improved disaster planning in communities have resulted in training throughout the country.

Disaster management was the focus of the post-quake course. The curriculum, which covered the knowledge and skills needed for specific responses, was derived from the Advanced Disaster Medical Response Manual for Providers by Briggs and Brinsfield, a manual based on years of responses to international and domestic disasters, including earthquakes,
earthquakes, terrorist attacks, biohazard disasters, nuclear accidents, the Sarin gas attack, explosions, blasts, natural disasters, and biological and chemical disasters.

The curriculum included interactive didactic presentations on:

- mass casualty management (defined as event[s] causing a number of casualties large enough to disrupt the health care services of the affected community);
- incident command system;
- evacuation;
- public health issues (water, sanitation, disease prevention, safe food, etc.);
- initial assessment;
- triage;
- identification of life-threatening illnesses/injuries and appropriate treatments to stabilize patients (disaster triage is important to identify patients needing immediate care);
- decontamination stages, types and use;
- basic principles in response to any hazardous material incident (same regardless of the agent involved);
- biological agents, routes of exposure, types (bacterial, viral, toxins) and intervention;
- chemical agents (nerve agents, vesicants, cyanide, pulmonary agents, riot control agents);
- radioactive agents and emergency management of victims;
- blast injuries;
- crush injuries;
- extremity injuries including non-surgical and surgical management;
- anaesthesia in austere conditions;
- burns (types, care, management of fluids, airways; thermal, chemical and electrical burns);
- paediatric injuries (all types) and special consideration and needs;
- psychological intervention for victims and for responders; and
- care of the dead and their families.
The following skill stations were set up for all participants:

- airway
- immobility
- initial assessment
- shock
- triage
- head injuries
- decontamination.

The teaching team was composed of experts from different disciplines and included nurses. Nurses not only taught in the didactic portion because of their years of experience in responding to disasters, but also led some of the skill stations. The workshop participants who took part in the skill stations included doctors, nurses, CDC professionals, public health officers, fire officials, police officers and government officials. Disaster management experts acknowledge that when the training is done at the community level, these professionals are often the first responders at the site of a disaster.

In the discussion of the incident command system, it was noted that all members of a disaster response team must be well versed in all of the roles. For example, a nurse could hold any one of the command positions. Roles are often assigned based on the sequence of arrival, with the most important roles assigned early to ensure a positive response to a disaster. The disaster response teams must have a detailed plan and regular drills to be sure that all responders are up to date with their skills and knowledge. Disaster response materials are stored and checked on a regular basis to ensure that they are safe and have not expired. The incident commander has access to scarce resources in disasters such as transportation, supplies and personnel.

In addition to the lectures and skill stations, a pre-test and post-test were given to all participants. The incoming scores regardless of educational level or background were generally low, but by the end of the workshop, the scores had jumped to around 90%.

**CONCLUSION**

To lessen vulnerabilities of communities and to improve capacities to prepare and respond to emergencies and disasters, more individuals and health care providers should learn about incident command systems and appropriate immediate responses to the different types of disasters. The concept of teamwork is extremely important. In disasters and emergencies, individuals must be prepared to follow instructions rather than only see the situation from their normal limited professional orientation. The inability to follow orders can exacerbate disasters and impede effective intervention.
Nurses need to increase their knowledge of how to respond effectively to disasters and be keenly aware of the public health issues that accompany disasters, particularly natural disasters. Until now, nursing education has been too narrowly focused on hospital care. Since local hospitals might be destroyed during a disaster, nurses must be able to think critically in order to devise alternative ways to provide care to the injured. During disasters, responders must be able to answer questions such as: What can be used to immobilize a patient when I do not have high-tech equipment from a hospital or laboratory? What can be used to stop bleeding? How can I keep a victim warm?

Nurses can play a key role in disaster management because of their extensive knowledge in many areas, including principles of public health. Nurses and midwives should continue to develop their roles and functions in health emergency management and do more to foster public awareness programmes. Success in this area can be measured by counting the number of people knowing what to do in a disaster, i.e. storing sufficient drinking water, establishing plans for temporary sanitation, and knowing how to prevent the spread of disease. Nurses can also play a part in designing disaster management plans that include details on necessary supplies, evacuation routes, evacuation centres, and the need for a diversified team.

REFERENCES


CHINA

THE 2008 SICHUAN EARTHQUAKE: ACTION RESEARCH IN POST-QUAKE RECOVERY

Sijian Li, Sunshine Chan, Wai-Shan Chan, Timothy Lai, Kevin Leung, Amanda Leung, Annie Yip and Samantha Pang

School of Nursing, The Hong Kong Polytechnic University, WHO Collaborating Centre for Community Health Services
INTRODUCTION

Disaster management is an ongoing process of organizing and managing resources and responsibilities for dealing with emergencies. Nurses participate in this process by observing, listening, interacting, as well as constantly reflecting and learning. The following case study describes the Sichuan earthquake, which coincidentally took place on International Nurses Day, and its impact on society, local health care institutions and the population's health. It then discusses responses to this disaster by individuals, local governments, the central Government and nurses. Finally, it addresses action research to develop community-based rehabilitation and health promotion strategies for quake survivors and to build capacity of health workers.

NATURE AND IMPACT OF DISASTER

On 12 May 2008, an 8.0-magnitude earthquake shook Sichuan Province, China. Fifteen million people and 51 counties, spread out over 130 000 km², were seriously affected in Sichuan, Gansu and Shaanxi provinces. According to the Ministry of Civil Affairs, as of 1 July 2008, 69 195 people were confirmed dead, 374 177 people had been injured, 18 392 people were missing, and more than 1.47 million people had been rescued and relocated. According to the Ministry of Health, hospitals admitted 96 373 quake survivors and treated more than 2.42 million. Local health care facilities were unable to cope with the sudden influx of seriously wounded individuals due to structural damages to the hospital buildings, disruption of power and water supplies, breakdown of communication networks, deaths of health care providers, and lack of medical supplies due to road blockages.

There is no doubt that this earthquake was one of the most destructive in China's history. It took away so many lives and destroyed so many roads, bridges and homes. However, when viewed from a different angle, this disaster provided us with a moment to reflect on the meaning of our existence. Our consciousness was raised when we met death face to face. This earthquake awakened the nation and brought out the strength, solidarity and social responsibility of all citizens, including health care professionals.

DISASTER RESPONSE

The magnitude and extensiveness of this earthquake precluded health professionals from immediately responding to those in need. People affected by the disaster had to help each other on the spot while waiting for professional services. For those who witnessed serious injury and deaths,
the psychological impact was so great that they demonstrated fear with the slightest arousal, be it a post-quake tremor or emotional stress. While trying their best to evacuate the injured victims, volunteers were fearful that they might cause further damage. For them, time stood still and waiting seemed to be endless.

Within 20 minutes after the earthquake, troops from the Chengdu Military Command were deployed by the central Government to rescue the disaster victims. As communication networks were down and roads were blocked, the military had to proceed on foot for part of their journey to the affected areas. In the first 24 hours, each of them had walked more than 15 km with 40–60 kg of medical provisions in their backpacks. Some of them recalled the narrow escapees that they had experienced while rescuing people using helicopters. As this massive disaster was beyond Sichuan’s capacity to cope, the central Government put together a detailed counterpart support programme that assigned different provinces in China to help with the aftermath in the hardest hit areas (Table 1); it also decided that there might be a need for humanitarian relief from other countries. With help from the mass media, assistance flooded in from all directions. These humanitarian actions were most helpful in the provision of water, food, medical supplies and tents. The Ministry of Health decided that emergency services would be most efficient and effective if patients, specialists and resources were assigned to health care facilities based on the type of injury. In this connection, health care specialists could work together as a team and support each other, while patients could be transferred to different health care facilities once their medical conditions allowed it. Diverting patients to distant health care facilities posed some difficulties for families who wanted to visit, but it was conceived as inevitable at the time because of the volume of casualties.

Table 1. Sichuan earthquake restoration and reconstruction counterpart support programme

<table>
<thead>
<tr>
<th>Shandong supports Beichuan County</th>
<th>山東支援北川縣</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guangdong supports Wenchuan County</td>
<td>廣東支援汶川縣</td>
</tr>
<tr>
<td>Zhejiang supports Qingchuan County</td>
<td>浙江支援青川縣</td>
</tr>
<tr>
<td>Jiangsu supports Mianzhu City</td>
<td>江蘇支援綿竹市</td>
</tr>
<tr>
<td>Beijing supports Shifang City</td>
<td>北京支援什邡市</td>
</tr>
<tr>
<td>Shanghai supports Dujiangyan City</td>
<td>上海支援都江堰市</td>
</tr>
<tr>
<td>Hebei supports Pingwu County</td>
<td>河北支援平武縣</td>
</tr>
<tr>
<td>Liaoning supports Anxian</td>
<td>遼寧支援安縣</td>
</tr>
<tr>
<td>Henan supports Jiangyou City</td>
<td>河南支援江油市</td>
</tr>
<tr>
<td>Fujian supports Pengzhou City</td>
<td>福建支援彭州市</td>
</tr>
</tbody>
</table>
Shanxi supports Mao County 山西支援茂县
Hunan supports Li County 湖南支援理县
Jilin supports Heishui County 吉林支援黑水县
Anhui supports Songpan County 安徽支援松潘县
Jiangxi supports Xiaojin County 江西支援小金县
Hubei supports Hanyuan County 湖北支援汉源县
Chongqing supports Chongzhou City 重庆市支援崇州市
Heilongjiang supports Jiahe County 黑龙江支援剑阁县
Shenzhen, Guangdong supports Gansu 广东省深圳市支援甘肃省
Tianjin supports Shaanxi 天津支援陕西省
Provincial government of each county to provide their own support if not mentioned above
未纳入对口支援的受灾县（市、区）由所在省人民政府组织本省范围内的对口支援


In response to this disaster, local governments were pivotal in performing search-and-rescue functions. They were also responsible for monitoring the provision of clean water and food when the supplies were limited. Immediately after the initial response, they began working on the identification of dead bodies and provision of aftercare. They also built temporary toilets and took other infection control measures to safeguard the public health of the survivors. Among the 15 million people who were evacuated from their homes, about one-third were forced to live in tents initially. Temporary houses were gradually built by the local governments with assistance from their counterparts to ensure that people could survive the cold winter months. It was observed later that local government leaders suffered the most from post-traumatic stress disorders because they were too busy helping constituents to grieve normally for the loss of family and friends. Though disasters like this one cannot be prevented, it was generally opined that the situation could have been better managed if we were better prepared.

NURSING CONTRIBUTION IN RESPONSE AND RECOVERY

In order to cope with the number of casualties, local nurses helped convert general wards into intensive care and high dependency units, transformed parking slots into triage zones and decontamination areas, and worked side by side with nurses from other provinces on health care teams. In all these events, nursing managers in local hospitals acted as team leaders. Every effort was made to control infection so that death would not take its toll on those who survived the earthquake.

Apart from working in hospitals, some nurses joined search-and-rescue teams, while others worked in the community. They saved lives, alleviated
physical and emotional suffering, ensured safety when transferring patients to health care facilities, and helped survivors find and comfort their families. Nurses volunteered to work overtime and in unfavourable working conditions. Remarkably, nurses who lost loved ones clearly demonstrated a strong sense of calling to care for those in need. Nursing students also volunteered to help as personal care workers and interpreters. Patients and families expressed gratitude to nurses in treating them as close relatives.

Post-disaster research has shown that the health status of all survivors, even those not physically injured during the disaster, can be seriously compromised. Populations with “special needs”, including individuals and families with disabilities, younger children, pregnant or single women, and the elderly with chronic health conditions or living alone, are especially vulnerable because of their unique needs after a disaster. In order to better support community health after the quake, Sichuan University and The Hong Kong Polytechnic University collaborated on an action research project in post-quake recovery entitled: “An action research approach to developing community-based rehabilitation and health promotion strategies for quake survivors and capacity building of health workers”.

The overall aim of this project was to examine the health status of individuals living in temporary houses and to propose effective strategies to enhance their well-being. The specific objectives of this project were: (1) to assess general health conditions; (2) to identify specific health problems such as sleep disturbance, pain, emotional upheavals, alteration in skin integrity, and functional limitation; and (3) to formulate an action plan to develop health education programmes for health workers working in the community and for quake survivors living in temporary houses.

Action research has been defined as:

"... a participatory process concerned with developing practical knowing in the pursuit of worthwhile human purposes. ... It seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities."

Action research is particularly useful because it is a shared commitment to social change through constant participation and problem solving in partnership with people living in their own systems, context and culture, to ultimately achieve the goal of shaping our practice and better serving our local community. Brydon-Miller and colleagues have further stated that action research is able to:
"... provide people with the support and resources to do things in ways that will fit their own cultural context and their own lifestyles. The people,... not the experts, should be the ones to determine the nature and operation of the things that affected their lives."\textsuperscript{10}

From September to December 2008, local residents who were living in temporary houses in Dujiangyan City, in the townships of Ju Yuan Zhen and Xiang E Xiang (都江堰聚源镇及向峨乡板房社区), were invited to participate as research subjects. An initial comprehensive health assessment was performed on 1200 respondents. The most frequently identified health needs were hypertension, sleep disturbance, pain, mental health concerns, constipation and arthritis. In response to these health demands, educational programmes were developed to educate quake survivors on how to cope with these problems. Two health activity rooms were built and opened on 12 May 2009 (coinciding with the one-year anniversary of the Sichuan earthquake) to provide an optimal venue for health education. Self-management of health conditions were encouraged through health booklets, video recordings, demonstrations and mini-lectures. These cycles of health assessment and intervention were repeated two more times. It was noted that the residents were keen to discuss their health concerns with the local community nurses instead of visiting the emergency departments. The quake survivors also verbalized that they were more confident in dealing with their own health problems.

This action research also aimed to improve the local health care system by taking steps to reduce hospital admissions. It was proposed that hospitals and local clinics could share their workforce and workload. Health care providers in clinics would be responsible for maintaining the health of the community and for referring patients to hospitals. With regular meetings between hospitals and clinics, service gaps were identified and services were improved.

This process of co-learning during all phases of the project (i.e. from the study design, to the presentation of results, to the discussion of implications) was particularly important as it allowed each participant to constantly reflect on and explore the potential of his or her role as a nursing professional responding to a disaster situation. However, it also challenged the nurses’ partnerships with other health care providers and local community leaders in areas such as: (1) determining service needs based on priorities (e.g. family planning and reproduction needs versus health promotion and prevention for hypertension self-care management); (2) role ambiguity in post-disaster recovery in terms of expectations and responsibilities; (3) conflicting philosophies and values (i.e. intra-professional versus inter-professional); (4) education preparation and training (i.e. knowledge base and specific skills needed for disaster nursing
and medicine management); (4) title and position (i.e. hierarchy structure and level of involvement in decision-making process); and (5) unfamiliarity with the surroundings and local culture, including language and communication barriers.

The action research approach provided an opportunity for teams of health care providers from different locales to gain first-hand experience in conducting home visits, carrying out educational activities and meeting with local community leaders. It also created a collaborative platform for the exchange of skills and knowledge between academics and nursing specialists (e.g. pre-hospital care, trauma and emergency care, intensive care, orthopaedic nursing and rehabilitation nursing). Subsequently, a training course was developed to build competencies among undergraduate nursing students based on the International Council of Nurses Disaster Nursing Competency Framework.11

This collaborative project of the Hong Kong Polytechnic University School of Nursing with local communities won an Honorable Mention Award from Sigma Theta Tau International for its commitment and partnership with local communities to enhance their ability to provide safe and effective care and to maintain an optimal level of health for community members.12

CONCLUSION

The Sichuan earthquake was a misfortune and a calamity that occurred suddenly and unpredictably. Its suddenness as well as its magnitude made preventive action on a large scale extremely difficult. Nurses have indispensable roles to play in disaster response and recovery; however, it is often a challenge to enhance their knowledge base and skills to improve their effectiveness in disaster situations. Using an action research approach was valuable as it allowed health care workers to share culturally relevant and evidence-based health interventions to solve the identified health problems in post-quake recovery and rehabilitation.

ACKNOLEDGEMENTS

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REFERENCES


COOK ISLANDS

THE 2010 CYCLONE IN AITUTAKI: THE ROLE OF NURSES AND MIDWIVES IN A NATURAL DISASTER

Ikokopeta Ngari, Nga Manea

Cook Islands Ministry of Health
INTRODUCTION

Aitutaki is one of 15 islands that make up Cook Islands. This magnificent and remote island is situated in the southern group, a 45-minute flight from the capital island of Rarotonga. Known for its famous lagoon, Aitutaki is one of the country’s most popular tourist destinations, attracting 90 000 visitors annually as well as television producers and filmmakers since the 1950s. This triangular-shaped atoll, rising up 4000 metres from the floor of the Pacific Ocean, is home to a population of approximately 1700.

The Pacific region has become increasingly vulnerable to cyclones due to the effects of climate change. The warming that every Pacific island is experiencing reflects the overall increases in temperature globally. Climate change is worsening existing vulnerabilities and is creating new vulnerabilities. While small countries like Cook Islands are contributing very little to climate change, they are unfortunately more likely to experience its worst effects.

Everyone living in Aitutaki was vulnerable to the 2010 cyclone, but the elderly, disabled, mentally ill, chronically ill or bedridden and people living on their own were especially susceptible. Other people at risk were those living in coastal areas prone to high seas, those living atop or near sloping hills, those with huge trees next to their homes, those living near hanging electric lines, and those living in homes that were not securely tied down.

NATURE AND IMPACT OF DISASTER

The Aerodrome Disaster Management Plan was used in preparing for Cyclone Pat. This plan identified schools or village halls as cyclone centres, where people who were evacuated from vulnerable areas were relocated. Nurses and other health professionals (e.g. health inspectors) were allocated to these centres. All nurses were prepared to work an extra shift in the event that roads were blocked.

At around 02:00 local time on 10 February 2010, the stunningly beautiful island of Aitutaki was hit head on by winds with speeds of more than 185 km per hour, which later developed into a cyclone. Cyclone Pat—classified as category 3 on a scale where 5 is the most severe—tore roofs off homes, ripped schools apart, snapped power lines in half, devastated agriculture and vegetation, and sent tonnes of debris flying into the air. It was described by one survivor as the worst cyclone he has ever experienced in his lifetime. Although houses were tied down with wires and ropes, the preventative measures did not stop the wind from ripping through houses and trees, as revealed the next day. The situation affected everybody. Although a few houses withstood the storm, up to 90% were damaged and some were totally
houses withstood the storm, up to 90% were damaged and some were totally destroyed. Many of the flattened houses, some crushed by fallen trees and concrete power poles, looked as if bulldozers had run through them. Remarkably, and thankfully, the cyclone did not claim a life, and only nine people suffered minor injuries. Injuries were mainly nail puncture wounds and minor lacerations sustained after the cyclone as people started cleaning and clearing debris from their homes. Damage to Aitutaki was estimated at 15 million New Zealand dollars.

The Emergency Operational Centre in Rarotonga lost contact with Aitutaki for several hours on Thursday morning, 11 February 2010.

Damage to the Aitutaki Hospital, estimated at 300 000 New Zealand dollars, included partial damage to the waiting room ceiling, women’s ward ceiling, paediatric ward and maternity ward. Hence, expectant mothers were flown to Rarotonga to deliver their babies. The hospital did not have power supply for a few weeks due to exposed electric wiring.

The island’s supply of drinking-water was inadequate to meet the demands of individual households. Running water from the main reticulation system was unavailable because there was no electricity. As such, water stored in individual water tanks (mostly plastic 3000-litre tanks) was used for daily chores as well as drinking. People were advised to boil the water to prevent gastroenteritis.

Food outlets that had been damaged in the storm began selling from the intact sides of their buildings. The products sold were still fit for human consumption, especially the canned and dry products. In terms of food hygiene in the homes, people were advised during the initial assessment to be aware of the risks of gastroenteritis related to poor food-handling practices; hence, regular hand-washing practices were encouraged. Flyers on “Wash your Hands” were sent from Rarotonga to Aitutaki.

Areas with stagnant water, such as low-lying areas where flooding was evident, were identified as potential breeding sites for mosquitoes. It was anticipated that mosquito larvae infestation would erupt five days after the cyclone.

About 70% of households on the island had inadequate sanitation. Toilet facilities were damaged with no physical indicator of damaged septic tanks or leaking sewage. People somehow managed to use the same (damaged) toilet or in worse cases, shared with their neighbours. Sanitation in terms of sewage was not a priority problem. Although the seepage pond was not flooded, a lot of debris from the cyclone ended up in the pond.
coming through the windows; hence, electrical appliances could not be used until fully cleared as safe to use by an electrician.

**DISASTER RESPONSE**

At the time of the disaster, the health workforce on Aitutaki consisted of a doctor, six registered nurses, four enrolled nurses and two health inspectors. Two doctors and three nurses were deployed from Rarotonga to Aitutaki to assist the hospital staff for a couple of weeks.

Members of the Cook Islands Red Cross (CIRC) from Rarotonga were deployed to Aitutaki to distribute tents, kitchen sets, blankets and mosquito nets; to reduce the risk of waterborne and water-related diseases; to provide counselling to psychologically disturbed people; and to ensure safe water supply, adequate sanitation and hygiene promotion.

The Cook Islands Investment Corporation (CIIC) was requested to start repairs on the Aitutaki Hospital at the earliest possible time in order for hospital services to be fully re-established. The Ministry of Health electrician was deployed to Aitutaki Hospital to thoroughly check all electrical wiring and appliances to ensure that they were safe to use, especially in areas where ceilings were ripped and exposed, and in some places had buckled. Special attention was paid to power points that were wet as a result of rain entering from the ceiling and through the windows.

The hospital plumbing was thoroughly checked and repaired, especially leaking water tanks. The solar panel system and the ceiling were likewise inspected and damages fixed. Rarotonga Hospital deployed a biomedical technician to Aitutaki to carry out repairs to damaged equipment. An autoclave was also provided to sterilize dressing equipment for patients with wounds. For infection control purposes, Aitutaki was supplied with cleaning products, including Domestos and Janola bleach, sterile and cleaning gloves, hand-washing gel, paper hand towels, mops and buckets.

Public Health Inspectors were deployed to Aitutaki to spray mosquito breeding places with larvicide, to assist with health promotion programmes, and to promote awareness of the importance of hygiene to prevent waterborne diseases. CIRC, in partnership with the Cook Islands Government, coordinated the deployment of assessment teams and the sharing of information. The International Federation’s Disaster Relief Emergency Fund (DREF) liaised directly with CIRC on the need for support and coordinated partner national societies in the region to assist in mobilizing personnel and relief funds.
The lack of a Hospital Cyclone Management Plan hindered an effective response outcome. DREF allocated 150,000 New Zealand dollars to CIRC for the relief operation. With this money, water and sanitation personnel, together with public health inspectors and water works personnel, conducted water and sanitation site inspections to identify solutions for the inadequate supply of safe drinking-water and poor sanitation. Water samples from three different sites on Aitutaki were collected and tested for bacteria and salinity. The Vaipae Gallery was identified as a site for possible chain-of-water distribution: water pumped from the Gallery to a storage tank would be channelled through a treatment plant onto a storage water tank mounted on a truck with 5000-litre water bladders (collapsible water containers). A water filtration treatment system (ultraviolet disinfection) was sponsored and imported by Red Cross Australia. Each household was provided with two 10-litre water containers that were replenished every two days and/or when the need arose.

Nurses and midwives contributed to the disaster response. The experience with Cyclone Pat revealed the following lessons:

- In Cook Islands, nurses were left out of disaster preparedness and response planning even though they constitute the largest group of health professionals, work closely with disadvantaged and vulnerable groups and are well recognized and trusted in communities.
- During a disaster, hospital nurses and midwives are expected to work extra hours to cater to patients' needs. When Cyclone Pat struck, nurses on duty were prepared to work until nurses assigned to the next shift could report for duty. Absences were inevitable as a couple of the nurses' homes were destroyed, roads were blocked by falling trees, and telephone lines were down.
- Nurses and midwives in each village were required to report to cyclone centres to care for the injured.

Two weeks following the cyclone, nearly 50 members of the New Zealand Army and Royal New Zealand Air Force were deployed on "Operation Cook Islands Assist" to deliver emergency supplies and to help with urgent repair work. A C130 Hercules transport plane shuttled around 43,600 kg of cargo to Rarotonga and onward to Aitutaki. The cargo included a water purification plant, two bobcat diggers, emergency shelters and tents, water containers, food, blankets and electrical cabling. Twelve army engineers helped to build emergency shelters, restore power and fresh drinking water, and repair Araura School, which was the largest school on the island.
CONCLUSIONS

Lessons learnt on lessening vulnerabilities of communities and improving capacities to prepare for and respond to emergencies and disasters:

- The first step is to increase awareness among communities of what climate change will mean with regard to their homes and lifestyle.
- People need to be informed of practical steps that can be taken to adapt their homes, including building new houses well away from the seashore and building raised houses in flood-prone areas.
- Existing buildings can be strengthened by adding cyclone-resistant fixings for roofs or walls at a comparatively lower cost.
- Rain-water harvesting, using individual household water tanks, is the most effective and rapid means of obtaining drinking-water during disasters.
- Better communication of warnings is needed if a hurricane is approaching the island.
- People should be educated to prepare 72-hour kits for future disasters as no one ever knows when disasters will strike (first aid kits included).
- As climate change progresses, Aitutaki and Cook Islands are likely to face furious and frequent cyclones. A plan is needed to review local building codes and to train carpenters in disaster-resilient building techniques.

Lessons learnt on coordination, planning, development and implementation of emergency preparedness and response:

- Since nurses and midwives provide essential health services, and are usually the first responders to an emergency, they should be invited to participate in the development and implementation of the island’s emergency preparedness response plan.
- Nurses are skilled in all areas of emergencies including preparedness, acute response, risk reduction and recovery, and, therefore, can offer assistance throughout all stages of an emergency.
- Hospitals should have their own plan for emergency response to disasters.
- Better hurricane shelters and additional emergency supplies are needed. Some homes did not have any emergency supplies.

Lessons learnt on improving the roles and functions of nurses and midwives in health emergency management:

- Nurses and midwives need to be included in the disaster preparedness planning activities of the Ministry of Health.

- Training courses need to be developed and implemented for nurses and midwives to be effectively deployed in emergencies.

- Mock exercises in implementing disaster plans should be held annually to test staff responses to emergencies.

- An emergency protocol for nurses and midwives needs to be developed to assist them in emergencies.
JAPAN

THE 2004 MID-NIIGATA PREFECTURE EARTHQUAKE: THE ROLE OF NURSES IN ADDRESSING WOMEN’S HEALTH NEEDS AFTER A DISASTER

Aiko Yamamoto¹, Satoko Watanabe², Mitsuko Sayama³, Emiko Sadakata³, Kayoko Sekishima³, Etsuko Satoh³, Mayumi Ishida³ and Yoshiko Kudou²

¹University of Hyogo, Research Institute of Nursing Care for People and Community, WHO Collaborating Centre for Nursing in Disasters and Health Emergency Management, ²University of Hyogo, ³Niigata University
INTRODUCTION

Niigata Prefecture has been hit by numerous earthquakes in recorded history. On 16 June 1964, it was hit by a 7.5-magnitude quake, killing 28 people, causing major damage and triggering a tsunami that destroyed a port in Niigata City. On 23 October 2004, a strong earthquake measuring 6.8 on the Richter scale hit the same region, causing more deaths and injuries. On 16 July 2007, about three years later, another 6.8-magnitude earthquake was felt off the shore of Chuetsu region in Niigata Prefecture. People living in this region, therefore, experienced two large earthquakes in a relatively short time.

Natural disasters such as earthquakes can have long-term impacts. This case study is based on the results of a five-year longitudinal study of the health needs of women who experienced the mid-Niigata earthquake in 2004. The role of nurses in addressing the health needs of women is highlighted by showing how the disaster affected the lives of two women and how their health needs were addressed.

NATURE AND IMPACT OF DISASTER

On 23 October 2004, at 17:56 local time, an earthquake of magnitude 6.8 (maximum seismic intensity 7) hit the Chuetsu region in Niigata Prefecture, Japan (known as the Mid-Niigata Prefecture Earthquake). This earthquake's epicentre was located in the mountainous rural areas that are experiencing depopulation and demographic aging. The earthquake's strong ground shaking triggered numerous landslides, blocking roads and isolating some villages. The Disaster Relief Act was applied to 10 cities, 27 towns and 17 villages, and about 80,000 residents were ordered or warned to evacuate their homes. At the peak, 603 evacuation shelters were in operation.

The earthquake caused 68 deaths and 4795 injuries. It also caused extensive damage to buildings (3175 were completely destroyed, 2167 were half-destroyed and requiring large-scale repairs and reconstruction, 11,643 were half-destroyed and requiring small-scale repairs and reconstruction, and 1,046,109 were partially damaged). Households affected by power outage, water outage and gas outage numbered 310,000, 130,000 and 57,000, respectively. Of the 3018 medical institutions in Niigata Prefecture, 5 sustained severe damage to their buildings and 21 reported severe damage to their equipment.
DISASTER RESPONSE

A Disaster Control Headquarters was established by the Ministry of Health, Labour and Welfare on the day of the earthquake to coordinate health care-related disaster relief efforts at the national level. The Headquarters, in cooperation with related organizations in the neighbouring cities, dispatched medical teams to the quake-hit areas, distributed first-aid drugs including toxicants, and made arrangements to transfer patients with serious illnesses from damaged hospitals to other hospitals. In addition, mental health care specialists were dispatched to the affected areas to provide psychological care to earthquake victims to prevent post-traumatic stress disorder. Health consultation counters were also established to provide telephone and in-person health counselling services, including mental health counselling, to workers affected by the earthquake. Public health nurses were also dispatched from prefectures across Japan to the affected areas to support health management of local residents.

To coordinate disaster relief efforts at the prefectural level, a Niigata Prefecture Disaster Control Headquarters was established on the day of the earthquake, and emergency relief teams were sent to the affected areas. The prefectural government investigated the damage situation of welfare facilities, nursing homes and social rehabilitation facilities for people with mental disabilities. In addition, disaster food assistance teams were established to assess the situation and provide emergency food assistance.

In addition to the organizations mentioned above, the Japanese Red Cross Society (JRCS), Japanese Nursing Association (JNA), Japan Disaster Medical Assistance Team (DMAT) and Niigata Prefecture Volunteer Centre participated in disaster relief activities. During the period from 24 October to 21 December, JRCS dispatched a total of 162 relief teams (1129 staff members) to the affected areas, and provided treatment in temporary treatment centres and other facilities. With the cooperation of the Niigata Prefecture Nursing Association, JNA began support activities on the third day after the earthquake. JNA operated the Disaster Nursing Support Network System, and, in cooperation with the prefectural nursing associations across the country, it dispatched nurses to evacuation shelters and hospitals in the affected areas.

By the end of December 2004, a total of 994 nurses had been dispatched to the affected areas. Relief activities conducted by the dispatched nurses included provision of care for disaster survivors in treatment facilities, visits to emergency shelters and health consultations. The dispatched nurses also provided mental health care to local nurses in the affected areas. DMAT, whose main activity was providing medical assistance in the
acute phase of the disaster, dispatched a total of 14 relief workers (including doctors, nurses and staff members of the Bureau of Social Welfare and Public Health) from 24 to 25 October, and carried out treatment in clinics and emergency shelters. Regarding volunteer activities, the Niigata Disaster Relief Volunteer Headquarters was set up in the Volunteer Centre of the Niigata Social Welfare Council to perform liaison and coordination duties. From 24 October 2004 to 31 March 2008, a total of 49,811 volunteers, including coordinators dispatched by the Social Welfare Council of the prefectures concerned and designated cities, provided a wide variety of services, including distribution of food, transportation of emergency goods, traffic control, haircuts, and cleaning of affected houses.

ROLE OF NURSES IN ADDRESSING THE LONG-TERM EFFECTS OF DISASTERS ON WOMEN’S HEALTH

The following case studies tell the stories of two women who were pregnant during the earthquake. The first woman, referred to as Ms A, developed depressive tendencies two years after the earthquake. The case study outlines the physical and emotional state of Ms A during the five years following the earthquake, based on interviews conducted one year, two years, four years and five years after the disaster. The second woman, referred to as Ms B, can be described as someone who went through a regular course of recovery. The case study is based on interviews conducted from one to five years after the disaster.

Case 1: A woman who developed depressive tendencies

At the time of the earthquake, Ms A was 33 years old and was expecting her second child (26 weeks pregnant). Her nuclear family consisted of herself, her husband and her daughter (four years old). When the earthquake struck, she was on her way home from a store. Her husband and daughter were at home (third floor of an apartment building). Ms A joined her husband and daughter on the street in front of their building. Damage to their belongings was not severe; some pieces of furniture had toppled over, objects on the shelves had fallen off, and some windows and dishes were broken. Fortunately, no family members were injured.

Ms A wanted to take shelter in an evacuation centre, but since she and her husband did not know how and where to evacuate, they spent the night in the parking lot next to their apartment building. At night, her daughter complained of the cold—she was wearing only light clothes because she and her father had hurriedly run out of the house, taking nothing with them. Ms A asked her husband to go inside the house and pick up some clothes for their daughter, but he would not do so, saying, “It’s dangerous to go inside the house because aftershocks might strike at any time.” Instead of asking
her husband again, in the break between quakes, Ms A herself went back to
the apartment and got some clothes for her daughter. Ms A said that she
had wanted her husband to show an “I will protect you” attitude. She also
said that when her husband told her that she did not look scared, she felt
that her husband did not understand her feelings at all. However, it was
ture that she felt more secure when she was with her husband. Immediately
after the earthquake, she struggled to calm down her nervous daughter. She
always told herself, “I should remain calm because my daughter is nervous
and gets frightened easily.” She also thought, “Parents must remain calm in
any situation, because if parents panic, the child will feel anxious,” and “I
must protect my child at any cost.” She felt uneasy and scared inside, but
she was always holding her fear in check, trying to calm her child.

Soon after the earthquake, her husband went back to work, often staying
late or not coming home at night. Although she often thought, “Why does he
go to work at a time like this?” She did not communicate her feelings to her
husband. Her husband and parents recommended that she return to her
parents’ house and give birth to their second child there. However, since she
did not want to leave her husband alone in the earthquake-hit area, she
decided to stay home and give birth in the nearby hospital. She felt unsure
of her decision and uneasy about staying home alone while her husband was
away. While her husband was working, she looked after her child alone at
home and hardly went out.

A couple of months after the earthquake, her daughter, who was four
years old at the time, began to wet her pants from time to time, and this
lasted for about one year. Her daughter was also very scared of the
darkness, and this reaction was observed for five years. Ms A described her
daughter as crying too easily and violently, overly frightened, and gentle,
nervous and patient. Ms A said that every time she said she was going out,
hers daughter asked, “What should I do if an earthquake happens while you
are away?” and “Where should I stay if an earthquake happens?” One day,
when Ms A was away from home for a short time, her daughter said in a
scared voice, “I thought I was going to the police station.” Ms A considered
that her daughter’s reactions might be associated with how she had related
to her daughter, saying, “My daughter might have become too easily
frightened because I often scare her. ... Since I depend on my daughter, she
might not be able to behave like a baby although she wants to do so, and this
may have caused her to become emotionally unstable.”

Ms A gave birth to her second child about six months after the
earthquake. Ms A described her son as not crying very often, playing
happily when mother is beside him, and emotionally stable. At that time,
she was emotionally overwhelmed and often irritated. She often took it out
on her daughter, saying, “Do by yourself what you can do by yourself,” and
“You can do it.” For example, when her daughter asked for her help, saying, “Mom, I can’t open the door,” she forced her daughter to open the door by herself, saying, “If a fire occurs when you are alone at home, what will you do? If you cannot open this door, you won’t be able to evacuate from the house and you’ll die.” She sometimes treated her daughter unkindly, but she regretted her attitude afterward, thinking “I treated her coldly, I wonder if she is all right,” and “I’m not a good mother.” While watching her children sleep, she often felt regret and wished she had cared for them more.

In the spring two years after the earthquake, Ms A did not want to meet anyone or do anything. She thought that she was suffering from depression. When she had to go out for shopping or other errands, she prayed not to see anyone she knew, and when she did not meet anyone, she felt relieved. Although she did not feel like doing anything, she thought that she had to do cleaning and cooking properly because her children suffered from atopy. Someone told her that there was no connection between cleanliness and atopy, but she did not believe that theory. She attributed the fact that her children’s atopy did not get better to her insufficient or improper cleaning. Her husband sometimes said to her, “I know you are busy caring for the children, so you don’t have to clean or tidy up the house. Take it easy.” But she could not take it easy. She said that she could not feel comfortable if she did not clean the house. She was also worried she might be suspected of child abuse because her children had scratches on their skin. She felt depressed when she could not do things as properly as she thought she should. She believed that her lack of sleep also affected her mental state. Around that time, she did not get enough sleep at night because she was breastfeeding and because her two children frequently woke up due to atopic itching (once they woke up, they stayed awake for about two hours). She also sometimes stayed up waiting for her husband to come home from work.

About two and a half years after the earthquake, when she took her son to his 18-month health check-up (around June), she wrote on the questionnaire that she had been in low spirits. She was advised by a public health nurse to consult a doctor of psychosomatic medicine. The doctor advised her not to push herself too hard and to take medicine, but she resisted taking the psychiatric medication. After that, her depressive symptoms got worse, and she was advised by her husband to return to her parents’ house. She followed his advice and stayed with her parents for one and a half months. She felt comforted by talking with her parents, and her condition improved a little. Although she still felt reluctant to meet people, she began to feel she could meet certain friends. Around that time, she went to the citizen centre to see a play that was themed on the struggles after an earthquake. The story was about an earthquake victim who was assailed by
a sense of emptiness and a feeling of exhaustion when things had settled down a bit. When she saw the play, she felt that her feelings were similar to those of the characters, and thought, “Maybe I also worked too hard, and I’m a bit tired now.” She also said, “I am often told by my friends and others, ‘You are working too hard.’ Although I didn’t think so before, I have come to think maybe I have been working too hard.”

After the earthquake, Ms A began to feel scared of staying in a room with furniture taller than her waist, and she avoided placing tall furniture in her house. She said, “When I’m in a room with tall furniture, I can’t help but imagine what would happen if there was an earthquake right at that moment. That object might fall off. ... If that gets broken, it will be dangerous here.” She said, “A disaster can happen at any time, and since it may come today, I am preparing for disasters.” The preparation measures included tidying up the room before going to bed, securing an evacuation route, arranging shoes neatly in the entrance hall so as not delay an evacuation, placing a bleached cotton cloth at her bedside (to use it to carry her child on her back, to go downstairs, or to dress a wound). She said that she explained the preparation measures to her children, but she also said, “My explanation might allow my children’s imagination about disasters to run wild, intensifying their fear.” She did not want her child to sleep alone in a room with a chest of drawers. She said, “When my child said that she wanted to sleep alone, I said, ‘What if an earthquake occurs while you are sleeping alone? Even if you can’t move, I won’t help you. So it’s better to sleep in the same room with your family.’” She also said, “When my children leave the door of the closet open, I said, ‘Heavy things might fall on you. If you don’t put away your toys before going to bed, you might stumble over them and get injured, and you might not be able to evacuate.’” Her attitude and words toward her children only intensified her fear, rather than assuage it.

Four years after the earthquake, Ms A still felt somewhat depressed in the autumn and winter. She said that there were times when she did not feel like meeting or talking to other mothers, and that sometimes she felt tired just being with people. Occasionally, she made her son skip school because she did not want to take him to kindergarten. Around that time, she was told by another mother at kindergarten, “Recently you have looked gloomy.” She spoke honestly about her feelings: “I don’t know why, but I’ve gotten tired of everything.” Then this mother said, “That happens. I also sometimes feel depressed.” Hearing this mother’s words, she came to feel: “Everybody feels depressed from time to time, so I don’t have to try to be happy too much when I’m depressed.” In the past, there were times when she could not move no matter how hard she tried, but her condition gradually improved, and five years after the earthquake, her spirits recovered to the level that she was motivated to do something.
Case 2. A woman who went through regular course of recovery

At the time of the earthquake, Ms B was 28 years old and six months pregnant. She was a member of a nuclear family comprising herself and her husband. When the earthquake occurred, Ms B was at her home with her husband in their apartment. Damages at her home were limited to fallen furniture and broken cookware.

On the day of the disaster, Ms B stayed with her husband in their car in the parking lot. The following day, her husband returned to work outside the prefecture. For two to three days after the quake, Ms B felt strong tightness in her abdomen. People around her told her to calm down, but she was unable to relax her body and to be mentally calm. During a check-up before the disaster, a doctor had told her that tightness in the abdomen could be a sign of miscarriage. Remembering this, she became more anxious and sensitive to the sensation of tightness in the abdomen. As recommended by a colleague, she took time off work and rested at her parents' house for a couple days.

While staying at her parents' house, she read in the newspaper that the library in which she worked had been damaged. She felt frustrated that she was the only one on leave. She hated that she could not be of any help. At a time when everyone was helping everyone else, she could not do anything; she felt like she was dragging everyone down, a burden to society. Feeling stressed from being away from home, she returned to her apartment two days later.

When she was alone at home, her husband and her mother-in-law worried about her. Urged by the two of them, and also because she felt more at ease with people than alone during the aftershocks, she decided to stay at her in-laws' house. However, she felt stressed from having to sleep in the same room as her brother-in-law's family who lived there, having the lights turned off early, and having no choice but to obey her mother-in-law. Consequently, she went back home after one week. Ms B resented that everyone around her worried about her and felt that she'd rather be alone, even if it were dangerous.

Ms B gave birth to her first child six months after the quake. She saw her child as having a fierce disposition and cries violently. Regarding these strong reactions from her child, Ms B connected such reactions with her status during pregnancy, saying "my irritation during pregnancy was conveyed to my child," "during the earthquake, I planted stress and anxiety in my child's subconscious," and "it's my fault." She felt this way until about four years after the disaster, but after her husband told her "that's not true," she gradually stopped making these connections, and started
attributing such behaviour to the personality of the child. “Before, I didn’t understand why the child was fussing, and couldn’t accept the child’s behaviour as it was, but now, I understand that careful observation will tell me what is wrong, and I feel that I can accept the child completely.” Ms B gave birth to her second child three years after the disaster, and then returned to her job in the library.

The following is Ms B’s account of the disaster and the years that followed.

“Up until the end of the second year, I sometimes suddenly remembered about the earthquake and cried from feeling scared, but from the third year, I calmed down a lot, and didn’t cry anymore even when thinking of the earthquake. When speaking with my husband about the earthquake, I tried to be honest about how I felt, like how scared I was of the shaking, how extremely stressful it was to spend time at my in-laws’ house, and how I held a grudge against him for a while for going to work and leaving me alone. In response to my honesty, my husband told me how he felt, such as how hard it was for him to have to go to work right after the earthquake without doing anything, how he worried about me being pregnant and alone, and how he felt better knowing that I was at his parents’ house.”

“Before, I didn’t speak my mind, keeping difficult things bottled up or thinking saying won’t change anything, but this experience made me realize the importance of being open. By confirming each other’s thoughts and feelings, we were able to reconfirm how invaluable we are to each other. Now, I can speak much more freely to my mother-in-law as well. My mother-in-law accepts everything I say, saying, “Oh, really,” enabling me to say what’s on my mind, and I am grateful for that. As I spend more years with my husband, my connection with my in-laws has also become stronger, giving me a sense of security.”

“Until now, I thought I should not depend on anyone even when things were difficult, and I bent over backward to do everything on my own. However, after I gave birth to my second child, I was freed from this idea that was constricting me. I began to think that asking for help or depending on someone when necessary is not a bad thing, and that it’s OK to prioritize my children’s well-being as well as my physical condition. I feel that having children, whom I must protect, gave me strength.”

“Three years after the earthquake, my husband and then my child were hospitalized, and I had to take time off work due to mastitis. In this difficult time, everyone around me, including my parents and my husband’s parents, teachers at the day care centre and co-workers, helped me out. I realized that people support me with the spirit of mutual cooperation. And
then. I understood how much people have been helping me inconspicuously during the earthquake as well as in everyday life. Especially towards my parents, I began to feel an even stronger sense of gratitude. This feeling was enhanced by giving birth, which brought into my life someone whom I regard more important than myself. Even after growing up, my parents give to and do for me more than I can give to or do for them. It makes me realize the greatness of my parents, and I wonder if I will be able to do for my children what my parents have done/are doing for me. Childrearing is half joy and half pain, but when things are difficult, I think about the difficulties that my parents endured to raise me and it sustains me."

"Lately, I have even begun to think that I should initiate more open communication with my neighbours, from the aspect of raising children. Having connections is good for me and my children. This is something that I am able to do because I have children. If we are taking a walk around the neighbourhood and people greet us, it gives us a sense of being a part of the community. I think that things like this on a daily basis will result in cooperation when something happens. During disasters, procuring information, milk and other things is important, but I think that the most important thing is to not be alone and to help and support each other. This is an analogue connection and bond, and maybe we can do something for people we have never even met. Or, maybe we have something to ask of them, and they help us. Through this experience, I have become acutely aware that to understand each other, we have to say what's on our minds. So, I think that creating many opportunities to speak with different people in various situations is a good thing."

"After the earthquake, my family became the most important, irreplaceable thing for me. We never know when something's going to happen, so I try to live without regret, such as ending a fight and making up before parting or going to work. The earthquake experience made me realize the preciousness of normal everyday life, life at home, and time at home with my family. I've also realized that now is the most important time, and that there may not be a tomorrow. This is not pessimism; it is a realization of the importance of now, and the determination to do what I want while I still can. I now think that I should do whatever and go wherever I want, whenever I have the chance. This applies to childrearing too. When a child cries to be held, this child wants to be held now, not later. If I don't hold this child now, and something happens that prevents me from holding the child ever again, I will regret it for the rest of my life."

"As long as I am alive, I feel that it's impossible to avoid earthquakes. When I was young, I lived under the conviction that nothing will ever happen to me, but now, I realize the possibility of all kinds of unreasonable troubles in my life, earthquakes and otherwise. I would like my children to
know this as well. There are things that cannot be blamed on anyone, such as catastrophes. So, I want my children to value each day, and if there is something they want to do, I want them to do it without restraint. I want to tell them that if it's within my and my husband's power, we will help them.”

“When I talked to friends and colleagues about their experiences during the earthquake, I realized that I had no idea about these circumstances. When I heard of the inconveniences, how scary it was at night, and the anxiety involved with lack of electricity, I realized that the same earthquake was experienced differently by each person. Listening to the experiences of each person helped me to see and understand my experience from a wider perspective, not just as my personal experience. Although it's true that I cannot understand the hardships that some people went through since I did not go through the same experience, I've come to realize that it's still possible for me to sympathize with them. So, I now feel that I don't have to feel sorry for not experiencing such hardships. Until now, I thought I don't understand people's feelings because I am immature without character. But now, I think that it's natural to not be able to understand.”

After the disaster, Ms B increased her safety awareness in her home and workplace. She always maintained a safe and secure home because she thought it was a matter of life and death for her children. Instead of thinking that she could buy supplies at any time, she began buying them whenever she could. She kept a stock of necessities for her children, such as milk, diapers and water. She and her husband decided on a meeting place in case they were parted and could not contact each other. Her husband also prepared emergency items in the house and in the car, and regularly checked and replaced them. One never gets used to earthquakes no matter how many they live through, but experiencing just one prepared Ms B for possible future events.

CONCLUSION

Considering the above two cases, here are a few suggestions regarding nursing care.

(1) Assess a mother’s state of health, keeping in mind the following:

• During disasters, pregnant women may experience stress not only from pregnancy, but also from the disaster. Therefore, in addition to physical and mental reactions regarding pregnancy and delivery, nurses should simultaneously assess other concerns such as level of disaster, post-disaster living conditions, personal background (e.g. depressive tendencies), status of health of family members, relationship with family, personal relationships at work, and status of support.
• In some cases, children sense the emotional reactions of mothers and are affected. In others, the emotional reactions of mothers are brought on by a child’s response to the event. Therefore, when observing and assessing the health status of mothers with children, nurses should treat mother and child either as separate individuals or as one unit.

• Emotional reactions may emerge either immediately after the disaster or much later. Some reactions are temporary, whereas others are long-term. Therefore, in addition to asking women about their health, nurses should make long-term observations of their mental well-being.

• A mother’s instinct to shield her children from being scared or to protect them can sometimes cause her to repress her own feelings. Also, a mother’s sense of fear in her subconscious can result in actions that amplify the fear that children feel. It is necessary for mothers to be able to express how they feel. To this end, nurses should ask these women if they are having conversations with their husbands or family members about the earthquake, and what they talk about.

• A mother or pregnant woman might remain tense and nervous over time because her husband prioritized work after the disaster, because she was isolated at home, or because she feels she is raising the child completely alone. When assessing the health status of these women, nurses should take into consideration the transition of husbands returning to work, changes in lifestyle that accompany that transition, and emotional reactions.

• At times, mothers blame themselves for the post-disaster reactions of their children, thinking they are connected with the earthquake and her own reactions to the earthquake. Therefore, nurses should pay attention to how the mother perceives her children’s behaviours and reactions. Also, perception of children’s reactions may change over time, so continue asking.

(2) Create an environment that encourages women to express their feelings and share their experiences.

Allowing women to talk about their feelings and experiences with other disaster victims helps them to organize their thoughts, relieve anxiety, share feelings and sympathize with each other. Being free to share or listen to feelings of hardship and pain leads to increased self-worth as well as worth of others, and strengthens bonds. Also, hearing and retelling experiences help disaster victims to see their own experiences more objectively and, in so doing, to understand them better. Therefore, it is important for nurses to create opportunities for disaster victims to hear and
tell each other's experiences. Make adjustments so that each victim can choose what to tell, when to tell, and whom to tell. Further, by being allowed to speak without reserve about their experiences, or by speaking to someone who listens, some victims are able to recognize their own changes of feelings or to express feelings that they had repressed. Nursing care providers should be devoted listeners in order to allow disaster victims to speak voluntarily of their experiences.

(3) Make support available to all pregnant women and mothers.

Being supported and feeling supported are critically important in the event of a disaster. When someone is supported, such as a child supported by a parent, a wife supported by her husband, and a mother supported by a friend or relative, it gives the supported individual the feeling of wanting to reciprocate the help. They want to support others, just as they were supported, and they feel that they are capable of helping others. On the other hand, for mothers with children who are isolated and alone, mothers often feel, "I have to protect (or support) my children," and this results in tension and nervousness. Therefore, nursing care providers must be aware that some mothers are in this situation, and should go into the community to assess whether support is needed or not. If women are not receiving the support they need, nurses should take steps to remedy the situation. One way to do this is to assess promptly the whereabouts of pregnant women and mothers with children, and visit the homes of women who will not or cannot come out. Another way is to attend events such as regular health check-ups for children and seminars after a disaster, and use these opportunities to assess the health of women. If medical intervention is necessary, then refer them to a specialist.

(4) Create a situation that provides a sense of safety.

For pregnant women and postpartum mothers, having the family stay together leads to a sense of safety. Therefore, during disasters, try to keep women with their families and close friends.

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THE GREAT EAST JAPAN EARTHQUAKE OF 2011: HOW NURSES MANAGED AT SCHOOLS

Megumi Kamei

School Nurse, Yokohama International School
INTRODUCTION

On 11 March 2011, at 05:46:23 GMT, a 9.0-magnitude earthquake struck the north-east coast of Japan. It was the most powerful earthquake in Japan's recorded history. The quake triggered a 9.3-metre tsunami that devastated the coastal areas of Tohoku and southern Hokkaido and then made its way across the Pacific. Compounding the situation in Japan, serious damage was inflicted on nuclear reactors in the earthquake area, particularly the Fukushima Daiichi complex, where there are six units. The sequence of events was considered the worst crisis experienced by Japan since the Second World War.

The following case study showcases the earthquake management efforts of school nurses at the Yokohama International School in Japan. The Yokohama International School is located in Kanagawa prefecture, and caters primarily to the expatriate community in Yokohama. It consists of a preschool (Early Learning Centre), an elementary school (grades K–5), a middle school (6–8) and a high school (9–12). School enrolment for the 2011–2012 school year was 648 students from more than 40 countries.

NATURE AND IMPACT OF DISASTER

As of 5 July 2011, almost four months after the disaster, the number of deaths stood at 15,534 and missing at 7092. The majority of people who died were from Miyagi (9293), Iwate (4575) and Fukushima (1600) prefectures. As of 16 June (latest data available), a total of 112,405 persons remained displaced; however, less than one third remained in evacuation centres.

The 2011 Tohoku earthquake did not damage many buildings, as evidenced by the integrity of buildings that were unaffected. However, there were multiple coinciding disasters including fires, aftershocks and a large tsunami that followed caused widespread damage to buildings, nuclear power plants lifeline infrastructure, communication, transport and human health. Several hospitals were destroyed and other health services impacted by loss of electricity and essential supplies.

The overall response was robust and timely (with rapid deployment of medical responders and clearing of affected roads), given the extent of damage and the overwhelming situation. Acute health outcomes included hypothermia, carbon monoxide poisoning, tsunami-associated pneumonia, skin irritations caused by chemical exposure, and adverse outcomes associated with dehydration and lack of appropriate access to toilet facilities.
At Yokohama International School, the earthquake was felt around 14:46 local time. All students were asked to stay in their classrooms and get under the tables. The school nurse and office staff played a big role in making sure students were safe and released from schools to their families systematically.

**DISASTER RESPONSE**

Fifteen minutes after the first earthquake shocks, teachers were asked to check their students and report to the school office. All elementary school students were gathered in the library. Middle and high school students stayed in their classrooms with their teachers. Thirty minutes later, when there were no more large aftershocks, the office started contacting parents to pick their children from the school. Students were then released systematically. Around 40 students stayed in the staff house to wait for their parents, the last ones arriving around 02:00 on 12 March 2011.

After the incident, Yokohama International School sent surveys to 33 international schools in Japan to gather information on how schools managed during the earthquake, and to review the school's preparedness in terms of emergency logistics and policies.

Out of 33 survey questionnaires sent to school nurses, 22 came back completed. Most of these schools (64%) had student enrolment ranging from 200 to 600. The profile showed that all school nurses were in the schools when the earthquake happened. Some were even in the clinic with students (54%). After the earthquake, schools released younger students to parents by contacting them through e-mail (45%) and phone (23%). Some older students were released by themselves (23%). Most of the students were released between two and six hours after the earthquake. Some school nurses reported injuries (27%) and sickness (18%) as a result of the earthquake. Most schools were well stocked with food (91%) and emergency medical supplies (100%). Most also had policies and procedures for emergencies (91%).
When asked about the earthquake, school nurses responded as follows:

- “It went basically okay. I am very glad that there were no injuries from falling objects. Most of our students were gone by 18:00. The last parents came at 21:00, and a few students went to their friends' houses to stay overnight.”

- “Scary and devastating to know the outcome of the quake, everyone at school still not at ease!”

- “It was so scary that I can’t forget for a long time. It made me think more about my life, family and friends.”

- “After 11 March, I [felt] that our school should [proceed] with getting together an emergency and crisis management team and procedures. I believe that being prepared will make a big difference in how we can keep our students/staff safe at a chaotic situation and under pressure. My heart goes out for the people affected. I hope we can all learn from what they’ve been through and better prepare for the next one.”

- “It would be good to know how the other schools prepare for an emergency, especially medical supplies, emergency drills, and the policy and procedure.”

Students were also asked to share their feelings about the earthquake:

- “I suddenly started feeling dizzy and sick, then I realized it was an earthquake. My heart was pumping so fast and I could hear it. My eyes were ready to start producing tears. I kept saying to myself, ‘Make it stop!’ When it stopped, tears started running down my face because I was happy that it was over.” Grade 5 girl

- “I used to think that there will only be a small one, but now I know that big and scary things can happen to me, too.” Grade 2 boy

- “Many people were panicking all around. People were trying to contact home, but they couldn’t. Then I realized, when you think something isn’t so big, it actually really is.” Grade 4 girl

- “First I thought that it was the shake because of the bump, but the shake got bigger and bigger, the pole was shaking like it would almost fall down. The kids in kindergarten were screaming, shouting and crying.” Grade 1 boy
Most schools reported that it took about 16.6 minutes for the tsunami warning to reach them—mostly by television and some by radio, especially in the Tohoku area. During the earthquake shocks, many people stayed where they were. It took an average of 3 hours and 15 minutes after the earthquake to communicate with families. The waiting time was longer in Tohoku, where it took an average of 4 hours and 9 minutes to communicate again. The most difficult situation was the traffic problem since trains stopped working. In the Tohoku area, food and drinks became scarce.

Some of the lessons learnt about preparedness involved the following key concepts:

- identifying needs and goals;
- establishing crisis policies, procedures and plans;
- developing crisis response structure (Incident Command System);
- identifying roles and responsibilities, including lines of authority and emergency priorities;
- coordinating communication; and
- conducting training and exercises.

For example, the Incident Command System should involve the school and school district, first responders (fire, police, emergency medical teams) and partners (mental health staff, public health staff, parents, media, etc.).

Furthermore, training and exercises such as drills and tabletop exercises are invaluable tools for preparing staff and testing crisis plans. Training and exercises should reinforce concepts in the school and school district crisis plan. Training should be conducted regularly.

Policies about the student release system were also deemed important. Some recommendations were as follows:

- No student should be released from school early unless a parent/guardian or authorized adult comes for the child.
- No student should be allowed to leave with another person, even a relative, unless the school has prior written permission from the parent or guardian or the individual is designated on the student’s Emergency Card.
- All parents or designated adults who come to pick up students must show a photo ID.
- Parents should not be allowed to pick up their children directly. They must sign out the student at the school office.
- Adults and students should leave the campus as quickly as possible after being reunited.
Finally, preparedness kits ought be put together and maintained by potential users, including school nurses, students, teachers, evacuation shelter personnel and others in the community.

Preparedness kits for school nurses should contain the following:

- **Water**
  - 1 gallon per day for three days

- **Food**
  - three day supply of non-perishable food
  - food that does not require refrigeration, cooking or preparation
  - food that is compact and lightweight
  - canned goods (e.g. meats, fruits and vegetables, soups, juices)
  - and high-energy foods such as trail mix and granola bars

- **Special items**
  - three-day supply of medications
  - contact lenses and cleaning supplies
  - extra glasses
  - tools and other supplies
  - sanitation products
  - clothing and bedding

- **General bag (additional supplies as needed)**
  - copy of students’ emergency phone numbers
  - copy of students’ allergy and medical condition lists
  - class lists
  - copy of crisis plan
  - walkie-talkie
  - whistle
  - paper and pen
  - basic first aid supplies
  - medicines (glucose tablets, asthma inhaler, etc.)
  - one-way resuscitation facemask
  - stethoscope
Special preparedness kits for schools and students should include the following:

* Each classroom, gym, library and office should have hard helmets to wear during an earthquake.
* Schools should keep up-to-date emergency contact cards (parent’s information, student’s medical condition, etc.)
* All students should have personal emergency kits (renew every school year).
* Student preparedness kits should include water, juice and snacks; pencil, paper, books to read, games/toys; torch and spare batteries; whistle; and antiseptic and bandages.

The following items were identified as needed by the City of Yokohama Evacuation Shelter:

* relief materials;
  * hand cart x 2, blanket x 20, ground sheet x 10, warm sheet x 50, crutches x 5, special plastic bags for toilet x 600, Western-style portable toilet x 2, water tank for distributing water (1000 litre), water filtration machine x 1;
* daily necessities;
  * diaper for elderly x 210, diaper for babies x 1350, sanitary item x 425, toilet paper x 192, rice cooker x 1 (for 500 people), gas cooker x 1;
  * food and drinks; and
  * biscuit x 3000, milk powder and feeding bottle x 40, rice porridge x 200,
  * canned water x 3000.

Finally, everyone should prepare the following in advance of a disaster:

* Valuables
  * cash (small coins for public phone)
  * bank book, cash card, credit card
  * driving license and health insurance card
  * list of telephone numbers

* Evacuation goods
  * flashlight
  * mobile radio
  * spare batteries
  * helmet
• Everyday items
  - gloves
  - blankets
  - tin opener
  - lighter and/or matches
  - knife
  - portable toilet
  - pocket warmer

• First aid items
  - first aid box
  - copies of prescriptions
  - gastrointestinal drugs, laxatives, medicine for chronic diseases
  - feminine protection products

• Emergency food and drinks
  - dried bread
  - canned food
  - nutritional supplements
  - candies and chocolate
  - drinking-water

• Clothes
  - underwear and socks
  - long-sleeved shirt and long trousers
  - thermal jacket
  - rain gear
  - comfortable walking shoes

**CONCLUSION**

It is too early to conclude the full set of lessons learnt from the 11 March disaster. Nevertheless, the experiences of schools in Japan after the earthquake suggest some important lessons for the future, including preparing for the unexpected. Many schools in Japan were prepared for the earthquake and had practised evacuation drills repeatedly. However, many were not prepared for the tsunami because of the lack of lessons documented. It is not enough to learn from the past. There is a need to prepare for anything and be more agile and adaptive in responding to any emergency in the future.
MALAYSIA

MALAYSIA'S EXPERIENCE: DISASTER PREPAREDNESS AND RESPONSE DURING THE 2006 JOHOR FLOODS

Dato’ Hjh. Fathilah Hj. Abd. Wahab

Director of Nursing and Registrar of Nursing Board Malaysia and Secretary of Midwifery Board Malaysia
INTRODUCTION

Malaysia has experienced its share of fatal disasters in recent decades, including an air crash in 1977; a jetty collapse in 1988; a school fire in 1989 and a factory fire in 1991; mudslides in 1996; a tropical storm in Sabah, an enteroviral outbreak and environmental haze in 1997; Japanese encephalitis outbreaks in 1999; severe acute respiratory syndrome and avian influenza in West Malaysia in 2003; a tsunami in 2004; and a landslide in 2008. Adding to this long list, the devastating floods that swept through Johor in 2006–2007 showcased the commitment and dedication of Malaysian nurses in helping respond to the needs of the population.

NATURE AND IMPACT OF DISASTER

The State of Johor, which is located in the southern region of Peninsular Malaysia, experienced two waves of floods in December 2006 and January 2007. The first wave lasted for 13 days from 19 to 31 December 2006, and the second wave occurred from 12 to 17 January 2007. The floods were caused by above average rainfall, up to 279 mm in one day, which was attributed to Typhoon Utor, which had hit the Philippines and Viet Nam a few days earlier. The heavy rainfall caused rivers and dams to overflow. Weather officials described the flooding as the worst in the area in a century and the costliest flood in Malaysian history, with the total cost at 1.5 billion Malaysian ringgit.

Six people were reported killed and around 60 000 to 70 000 people in Johor were evacuated. Most of the flood victims had been without clean water or electricity for days. Meanwhile, relief centres suffered from food shortages, and reports of waterborne diseases were on the rise. In other areas affected by the massive flooding, Malacca, Pahang, Negeri Sembilan, Singapore, North Sumatra and Aceh an estimated 400 000 people were displaced at the peak of the flooding and at least 118 people were dead and 155 people were missing as of 29 December 2006.

DISASTER RESPONSE

In general, nurses in Malaysia are involved in emergency preparedness and response by participating in training and simulation exercises, risk assessment and analysis studies, development of Emergency Response Plans, and communication and information sharing. In particular, nurses are involved in a number of activities before, during and after a disaster.

Pre-disaster (prior to the monsoon season)
- Participate in an alertness and awareness programme.
- Plan staffing rosters (shifts).
- Prepare logistics for an emergency, including transport, medication, first aid equipment, and meals for staff on duty.
- Provide health education to the community (by nursing personnel with other health care workers).
- Ensure pamphlets on disaster management are issued to individuals in the community.
- Ensure vaccinations are given following directives from the Ministry of Health.

During a disaster
- Receive warning and alert levels for the emergency and/or disaster.
- Alert all operational staff concerned.
- Ensure availability of healthworkers and logistics at all times.
- Ensure readiness to begin disaster operation.
- Coordinate assistance from other agencies in terms of transportation.
  - Give health talks on personal hygiene and prevention of diseases to flood victims in disaster camps.

Post-disaster
- Evaluate the impact of the disaster on victims and on health facilities in the affected areas.
- Ensure health talks are given on prevention of diseases, stress and the importance of clearing areas with stagnant water.
- Prepare a report on activities carried out during the disaster.

During the Johor floods, nurses reached flood victims by wading through flood waters on foot, travelling in boats and joining flying squads. In rescue camps and rural areas, nurses conducted health checks, provided medical care and administered vaccinations. Health education sessions, which were focussed on sanitation, hygiene and prevention of vectorborne diseases and waterborne diseases caused by the flooding, were conducted by nurses through mobile health care vehicles and schools. Nurses also provided counselling services to the flood victims.

CONCLUSION

Strong coordination among different sections of nurses and other agencies is the key to effective disaster management. Health emergency and disaster management in Malaysia has been mainly focused on the provision of clinical services during disaster response. The continuous impact of natural hazards on communities across Malaysia and emerging new threats require an increased level of preparedness at all levels of the Ministry of Health. International collaboration will pave the way towards a global network of care among nurses. Finally, because new challenges continue to arise in this area, nurses' competencies and skills must also continue to improve.
NEW ZEALAND

CANTERBURY EARTHQUAKES (2010–2011)

Mary Gordon

Executive Director of Nursing, Canterbury District Health Board
INTRODUCTION

A 7.1-magnitude earthquake that struck Canterbury on 4 September 2010 claimed no lives but resulted in a series of damaging aftershocks. The deadliest aftershock, which rocked Christchurch on 22 February 2011, claimed 181 lives and caused widespread damage across the city, especially in the central district and eastern suburbs. Significant liquefaction affected the eastern suburbs, producing around 400 000 tonnes of silt.

As part of the health care system, nurses played a major role in the response to the Canterbury earthquake and aftershocks, delivering health services at hospitals, primary health centres and community settings and coordinating public health response at the local level.

NATURE AND IMPACT OF DISASTER

The 2010 Canterbury earthquake struck the South Island of New Zealand, 40 km west of Christchurch, at 04:35 local time on 4 September 2010. The quake caused widespread damage and several power outages, particularly in the city of Christchurch. Only two people were injured, one by a collapsing chimney and another by flying glass. Mass casualties were not reported because the quake occurred at night when most people were off the street.

Aftershocks continued into 2011, with the strongest one measuring 6.3 on the Richter scale on 22 February. The quake resulted in 181 people confirmed dead and many buildings totally or heavily damaged. Claims from the earthquake were confirmed at being between 2.75 billion and 3.50 billion New Zealand dollars.

DISASTER RESPONSE

4 September 2010 earthquake

Major public health issues that resulted from the earthquake included sewerage water running into rivers and floodwaters from broken pipes, power outages, food safety, and displaced people. Immediate response was carried out by hospitals, local Civil Defence and Emergency Management (CDEM) controllers, and the Canterbury Medical Officer of Health. District Health Board Control was activated at Christchurch Hospital and contact was made with all Canterbury District Health Board hospital sites. Contact was also made with primary care emergency operational centres that had status reports on general practices and community pharmacies. Response came from the whole health system—community and public health, primary care and hospitals—all linked to the National Health Control Centre (NHCC).
Emergency back-up systems (e.g. power) turned on automatically, initial structural assessments were carried out, hospitals were prepared, and welfare centres were set up for people who had to evacuate.

In the early days after the earthquake, Christchurch Hospital was used as an emergency control centre, safe drinking-water was brought in from outside the city, possible evacuations were carried out, and the first waves of staff from outside Christchurch arrived to assist. Non-resident staff supported the public health teams, the communications team and the neonatal intensive care nurses who were inundated with women who went into labour following the earthquake. Another feature of the September earthquake was the increase in admissions of cardiology patients. Daily briefings were held between all of the emergency operational centres across seven hospital sites (five public and two private hospital sites), primary care, public health, St. John Ambulance and the Ministry of Health (including NHCC).

Public health teams, including nurses, worked with CDEM to convey consistent key messages to reduce anxiety. The public was advised on water safety, hand washing and the use of alternative toilets to prevent disease. They were also told it was normal to feel anxious. Other messages dealt with the safety of key health facilities such as hospitals, general practices and community pharmacies, some of which had to be relocated due to damaged facilities.

22 February 2011 earthquake

At approximately 12:50 on 22 February, a 6.3-magnitude aftershock occurred, resulting in deaths, significant numbers of injuries and widespread damage to the city’s infrastructure.

St. John Ambulance provided and coordinated emergency medical response and triage stations immediately following the quake, as well as medics to support Urban Search and Rescue (USAR) teams. The Canterbury District Health Board coordinated health and medical support across the city. This included sending medical and nursing personnel to the triage stations established in the city’s business district. Other triage stations were established at the Burwood Hospital on the eastern side of the city and at The Princess Margaret Hospital on the opposite side of the city. Both of these facilities are rehabilitation hospitals and do not have acute services such as emergency departments. The primary care accident and medical centres within Christchurch established three triage stations. One of them, which was linked with a private surgical hospital located on the same street, acted as an observation facility and performed minor
orthopaedic procedures to avoid congesting Christchurch Hospital. The District Health Board cancelled elective surgery and outpatient procedures, and evacuated existing patients from the hospitals to other centres to increase capacity. A number of intensive care patients including seriously injured patients from the earthquake were stabilized and then transferred to other centres within New Zealand.

The District Health Board managed primary care facilities, including pharmacies and general practices to ensure city-wide coverage, and organized evacuations from damaged aged care and disabled-care facilities to other regions. Medical staff and nurses from the New Zealand Air Force and New Zealand Army assisted with the evacuations of elderly residents out of Christchurch to other centres throughout New Zealand. The city lost 635 aged-care residential beds, which resulted in approximately 300 residents having to be moved out of the city. Public health issues, such as contamination and infection control, were also managed by the District Health Board.

New Zealand asked for additional support from Australia. In response, the neighbouring country sent counsellors and a disaster medical assistance team comprising 23 emergency and surgical personnel. A field hospital providing 75 beds arrived on 24 February and was set up in the badly affected eastern suburbs. It was equipped to provide triage, emergency care, maternity care, dentistry services and isolation tents for gastroenteritis, and also provided primary care since most general practices in the area were unable to open. While isolated cases of gastroenteritis were treated during this time, there was no outbreak. This major success was a consequence of the way in which public health and the wider health services responded to the issues facing the city.

On 8 September a big aftershock led to the closure of more buildings and the relocation of some emergency services. During the recovery phase, some people left the area, and the community was now looking at ways to rebuild and strengthen.

Since the earthquakes, the Canterbury health system has continued to work together to develop and execute an integrated recovery plan. The emphasis of this plan is on the health of the people, keeping people connected with their primary care health providers and ensuring vulnerable people have access to health services. A significant number of changes to service delivery models for health have occurred, including the establishment of new services to meet the needs of the elderly, e.g. more services being delivered to the elderly in their homes to reduce the impact on aged-care facilities. Nurses continue to play a significant role in these changes. Fragile infrastructure and uncertainty regarding insurance issues continue to impact on health services and people.
CONCLUSION

The Canterbury health system remains intact and operational, and public health is actively involved in the recovery of the region. People who worked through the quake put in an outstanding effort, although there are ongoing effects on community health with more aftershocks being recorded. Recovery will be Christchurch's real test.
PHILIPPINES

FLOOD DISASTER RESPONSE: THE ROLE OF NURSES DURING TYPHOONS KETSANA, PARMA AND MIRINAAE IN THE PHILIPPINES

Sheila Bonito1,2 and Josefina Tuazon2

1University of the Philippines Open University
2University of the Philippines Manila, College of Nursing, WHO Collaborating Centre for Leadership in Nursing and Development
INTRODUCTION

The geographical location of the Philippines along the Pacific Ring of Fire and the typhoon belt exposes the country to natural disasters such as earthquakes, volcanic eruptions and typhoons. Since 1900, the deadliest natural disasters have been storms (54%), followed by earthquakes (35%), volcanic eruptions (6%) and mass movements (5%). Of these, storms affect the most people. In terms of economic damage, storms contributed 63% of losses due to natural disasters (US$ 2.2 billion), followed by floods with 26% (US$ 920 million) and earthquakes with 11% (US$ 369 million).1

The country’s emergency response efforts are highly devolved, with the local disaster coordinating councils tasked to respond immediately to any local emergency and to seek support from the national Government through its National Disaster Coordinating Council and the Department of Health’s Health Emergency Management Staff (DOH-HEMS) when needed.

In the last decade, the country has been consistently on the top-10 list of countries in the world most often hit by natural disasters. In 2009, it ranked third in terms of number of deaths (1334) and second in terms of number of affected people (13.4 million).1 In a country where resources are limited, the impact of strong typhoons is more than the national and local governments can handle.

Because of the country’s high-risk profile, its devolved system of health care service delivery and its limited resources, a strong workforce for health emergency preparedness and response is needed. Nurses and midwives, being at the forefront of primary health care, are routinely involved in emergency care and relied upon to coordinate response and relief efforts in times of emergencies and disasters.

This case study describes the response and recovery efforts by nurses in the Philippines during a series of strong typhoons in 2009 that caused deaths and displacement of people and widespread damage to properties and infrastructures. It also challenges nurses and the national nursing organization to put in place a better system of organizing nursing response and relief efforts.

NATURE AND IMPACT OF DISASTER

On 26 September, typhoon Ketsana (local name Ondoy), inundated Metro Manila with the heaviest rainfall in more than four decades, resulting in massive flooding in the National Capital Region and neighbouring Region IV-A. A week later, typhoon Parma (local name Pepeng) criss-crossed the northern part of the country, affecting 27
provinces, but mostly Cagayan Valley, and causing landslides and unprecedented flooding. With people still reeling from the effects of Ketsana and Parma, another typhoon, Mirinae (local name Santi), struck the eastern portion of Central Luzon (Regions III, IV-A, IV-B, V) and Metro Manila. Areas that had barely recovered from the earlier typhoons were again subjected to heavy rains.

The typhoons displaced thousands of people and caused massive destruction of agriculture, infrastructure and private properties. DOH-HEMS reported that 4.9 million people were affected by Ketsana, 4.64 million by Parma, and 795 734 by Mirinae. The number of casualties included 386 deaths and 1111 injured in Ketsana, 492 deaths and 163 injured in Parma, and 23 deaths and 7 injured in Mirinae.

The health sector sustained significant damage through the destruction of hospitals and health centres and loss of medical equipment and supplies. It was estimated that damage to health facilities, ranging from barangay (community) health stations to major referral centres, was more than US$ 30.6 million, and two tertiary hospitals sustained damage worth US$ 7.9 million and US$ 9.5 million, respectively.²

Persistent flooding further limited access to health services and hindered patient referrals to health facilities. Primary care services in affected communities, including immunization, were disrupted. Records, medical supplies and cold chain equipment in barangay health centres were submerged in the floods. Outbreaks of acute watery diarrhea were reported in two municipalities in Metro Manila. Leptospirosis was also reported in some of the affected regions. There were 268 deaths due to leptospirosis out of 3600 admissions during the week of the storm and flooding.

Health staff at different levels were also among those affected. The health system was described as stretched to its limits, given the increased demand for health care in the midst of shortages in functional services.

**DISASTER RESPONSE**

The Health Cluster—composed of the Department of Health, World Health Organization and other United Nations agencies and nongovernmental organizations (NGOs)—coordinated response efforts and complemented efforts of the national and local governments. There was strong collaboration with the National Disaster Coordinating Council for operation, assessment and monitoring of response, including funding assistance in the rehabilitation and repair of damaged health facilities and equipment.
Primary activities included a rapid health assessment of affected areas, mobilization of available stock and emergency procurement of medicines and supplies. Response efforts also included coordination with various local and international agencies through the health, nutrition and water, sanitation and hygiene (WASH) clusters for the mapping of affected areas, distribution of medicines, medical supplies and other health equipment, and deployment of medical, WASH, nutrition and public health teams to the affected areas.

An appeal for donations and assistance was launched through Health Emergency Relief Operations (HERO). Health promotion and advocacy activities were done through television, radio, newspapers and social networks on the Internet. Local communities were advised to conduct continuous monitoring, testing, disinfection and treatment of potentially contaminated sources of water.

Medical teams were deployed to provide acute and ambulatory care services in evacuation centres and referral system services in hospitals. Portable toilets were distributed in evacuation centres and water safety was monitored. Nutrition assessments and counselling were made available for pregnant women, lactating mothers and mothers with older children. Public health services including measles immunization and vitamin A supplementation to children under five years were also provided. Mental health and psychosocial support services were made available. Disease surveillance, especially diseases with outbreak potential, was carried out in evacuation centres. Table 1 provides data on health teams deployed during the Ketsana, Parma and Mirinae storms.

Table 1. Health teams deployed during typhoons in 2009.

<table>
<thead>
<tr>
<th>Health teams</th>
<th>Number of teams deployed</th>
<th>Number of personnel deployed</th>
<th>Number of sites visited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical</td>
<td>302</td>
<td>1681</td>
<td>350</td>
</tr>
<tr>
<td>Psychosocial</td>
<td>66</td>
<td>509</td>
<td>70</td>
</tr>
<tr>
<td>WASH</td>
<td>52</td>
<td>246</td>
<td>114</td>
</tr>
<tr>
<td>Nutrition</td>
<td>4</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>Public health</td>
<td>94</td>
<td>84</td>
<td>104</td>
</tr>
<tr>
<td>Disease surveillance</td>
<td>7</td>
<td>21</td>
<td>11</td>
</tr>
<tr>
<td>Assessment</td>
<td>25</td>
<td>64</td>
<td>36</td>
</tr>
<tr>
<td>NGOs</td>
<td>37</td>
<td>380</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>587</td>
<td>3001</td>
<td>731</td>
</tr>
</tbody>
</table>

Given the outbreak of leptospirosis, the Department of Health implemented the following strategic activities in the communities:

- formulated guidelines on prevention and control of leptospirosis;
- circulated public health advisories on prevention and control of leptospirosis using different media – print, television, radio, Internet;
- monitored and carried out active surveillance of leptospirosis cases;
- distributed prophylaxis to affected areas;
- augmented necessary medicines for treatment of leptospirosis;
- networked with hospitals for proper management and referral of cases; and
- designed Department of Health subsidy packages, including PhilHealth packages, for patients with leptospirosis.

In a post-incident evaluation conducted by the University of the Philippines Open University in 2010, the strengths and limitations of the health emergency response were analysed to come up with recommendations on how to improve future response efforts. A post-disaster review of the health emergency response efforts revealed successes in the following areas: management of the event, resource mobilization and coordination of partners.

1. **Management of the event** – Mobilizing health teams to respond immediately to the disaster was not difficult given the strong commitment and humanitarian orientation of health workers. The presence of the following factors also contributed to the immediate response efforts: (a) strong leadership (e.g. DOH-HEMS and Local Chief Executives), (b) systems and policies in place (e.g. Incident Command System and Operations Centre, Code Alert System, Mass Casualty Management); and (c) a coordinated approach (cluster approach involving health, WASH, nutrition and mental health and psychosocial support service [MHPSS]).

2. **Resource mobilization** – Acquiring needed resources for the emergency response was made easier due to the presence of the following: (a) regular feedback meetings, (b) interagency and intra-office coordination, and (c) a fully operational and competent Incident Command System, which, when activated, shifted organizations to emergency mode and allowed faster implementation of response efforts.

3. **Coordination with partners** – Coordinating with partners became easier due to existing networks within the Department of Health and with other government agencies through the National Disaster Coordinating Council, hospital networks, NGOs, and other local agencies.
Challenges to the health emergency response efforts included the following:

(1) Policies – More policies and guidelines are needed for the following specific issues during emergencies and disasters: (a) surveillance of diseases with potential outbreak, (b) community hospital referral systems, (c) health care financing schemes, (d) management of volunteers, (e) camp management focusing on health concerns, (f) risk communication for local health managers, and (g) integration of private health workers during mass casualty incidents.

(2) Plans – A contingency plan or back-up teams are needed in the event that designated members become victims in an emergency. There is also a need to provide necessary support for health teams and their families during emergencies so that health workers can focus on their duties and not worry about their families.

(3) Organization – There should be (a) reinforcement of the Incident Command System at the different levels of implementation: national, regional and local; (b) staff mobilization at the regional level; and (c) reactivation of disaster preparedness and response at the barangay level.

(4) Systems development – Systems should be improved in the following areas:

(a) risk assessment – rapid assessment and monitoring of occurrence of preventable diseases to have good planning and better situational analysis; development of surge capacity of hospitals (patient care, laboratory and human resources) and enhanced risk communication;

(b) information management system – harmonization of integrated public health surveillance system and corresponding conduct of training; provision of clear-cut operational guidelines for response and reporting to include separation of response tasks from reporting; technical assistance to the region to strengthen coordination and communication from the local government units to regional and national levels; agreement of all levels on information requirements expected including sufficient initial information though partial in nature; good documentation e.g. use of bulletin boards; data analysis and consolidation ready for use given the available data in the region and provinces;

(c) coordination – reinforcement of partnership with the private sector even before disasters; strengthening of coordination system; limiting of cluster coordination meetings to tri-cluster meetings; strengthening of networks, e.g. with Department of Social Welfare and Development for
training on camp management, Hospital Network and Philippine Hospital Association, Integrated Urban Health Systems in the National Capital Region, Interlocal Health Zones; and mutual assistance between local government units and other regions;

(d) human resources – expansion of the pool of responders, public and private; training on shifting to emergency mode, media management and risk communication; focus on subspecialties, e.g. information management, coordination, communication, logistics, health, WASH, MHPSS, nutrition; training of regional and local staff (provincial and Department of Health representatives); definition of type of support for affected staff; how to measure commitment; definition of a reward system; continuous review of systems to build on the positive aspects and good performances;

(e) logistics – simplification of policies to facilitate procurement process during disasters; ensuring agency distribution of supplies after coordination with the Center for Health Development; reimbursement of gasoline expenses for use of private vehicles in the absence of available public vehicles; and

(f) risk communication – enhancement of risk communication for the general population including the health sector (e.g. leptospirosis).

ROLE OF NURSES IN FLOODS RESPONSE

During typhoons Ketsana, Parma and Mirinae, nurses were part of the public health teams deployed to the affected areas to provide services (e.g. basic emergency and acute care, nutrition assessments and counselling, prenatal care for pregnant women and immunization for babies and children) and to augment primary health care services in disrupted health facilities. Nurses were expected to “hold the fort”, working extended duty hours until their replacements came or the surge of patient admissions declined.

In some areas, nurses acted as health team leaders, planning and coordinating response efforts in local communities. Some nurses in hospitals were also designated as health emergency coordinators, dealing with management of logistics and resources and coordinating with DOH-HEMS at the regional and national levels. They ensured that adequate supplies were ready to be mobilized in case of an emergency or disaster.
The national nursing organization—Philippine Nurses Association—supported the Philippine Medical Association in relief operations during typhoon Ketsana, providing free medical services to 80,160 patients in 100 sites in Metro Manila and Region IV-A.

However, while nurses are called upon in times of emergencies and disasters to help in the response and relief efforts, they are not represented in the health cluster meetings conducted by the Department of Health and are seldom part of the emergency planning of hospitals and community health units. The nursing sector is not identified as a distinct member of the health sector.

In effect, there is an underutilization of nurses in times of emergencies and disasters. The roles of nurses in disaster preparedness and response are not clearly defined in emergency response systems. There is a lack of training and preparedness of nurses in health emergency management.

Having realized these limitations and the potential of nurses and the nursing sector to offer more in times of emergencies and disasters, nursing leaders from the academe and the Philippine Nurses Association are planning ways to implement the following strategies:

- formalize the representation of the nursing sector in the Health Cluster within the Department of Health;
- implement the existing policy to integrate disaster preparedness in pre-service education;
- validate competencies of nurses in emergency and disaster preparedness;
- encourage in-service training of nurses in health emergency management; and
- organize mobilization of nurses in responding to emergencies and disasters, especially during mass casualty incidents.

**CONCLUSION**

Despite the numerous disasters that have hit the Philippines, the country has been able to weather these events due to the commitment of the health sector and the resilience of the people. However, there is a need to improve policies, plans and systems in emergency preparedness and response and strengthen the capacities of the different health sectors, especially the nursing sector.
Nurses are usually mobilized in emergency and disaster situations without proper training on health emergency management, without knowledge of hospital and/or community emergency plans, and with very few resources. Nurses are at risk since they have limited knowledge on how they should function in an emergency or disaster.

Developing the competencies of nurses in emergency preparedness and response is imperative in sustaining and improving the performance of health facilities. This is also critical in improving coordination among health personnel.

Supporting capacity-building of nurses in health emergency management is an important step in sustaining and further improving health care delivery in emergencies and disasters. Involving them in emergency response planning and in the Health Cluster coordination further expands their potential contribution in times of emergencies and disasters.

REFERENCES


SAMOA

RESPONDING TO THE 2009 TSUNAMI IN SAMOA

Pelenatete Stowers

Assistant Chief Executive Officer,
Performance and Quality Assurance,
Nursing and Midwifery, Ministry of Health, Samoa
INTRODUCTION

A magnitude 8.0 earthquake south of the Samoan island chain triggered a tsunami that struck the country’s south and south-east coasts on 29 September 2009. The clinic in Poutasi was destroyed and hundreds of people were killed and injured. Safe water supply, care for displaced persons, hygiene and sanitation, and the risk of vectorborne diseases were priority challenges following the tsunami.

NATURE AND IMPACT OF DISASTER

A five-metre tsunami hit Samoa and American Samoa following an 8.0-magnitude earthquake south of the Samoan island chain on 29 September 2009. A 40-km stretch of coastline in the southern and south-eastern parts of the island of Upolu was affected. Surging seawater caused widespread damage to houses and infrastructure. Among the worst affected villages were Lalomanu and Poutasi.

As of 9 October 2009, the official death toll stood at 138, with 310 injured. Around 20 000 to 25 000 people were displaced and/or affected by the tsunami. A total of 3500 people were moved to 12 evacuation centres. Some identified priority public health concerns were the need for adequate clean water supply, sanitation, medical care for injured persons, burial and storage of dead bodies and psychosocial support and mental health services.

Medical efforts focussed on preventing secondary infections of wounds caused by the waves or acquired during clean-up, and preventing outbreaks of communicable diseases. Prevention of tetanus was also a priority. Sanitation and vector control were addressed in the weeks after the tsunami. Psychosocial support was needed at the community level for a long time after the disaster.

DISASTER RESPONSE

Immediately after the tsunami, nurses reported to the main hospital in Apia and set up a special ward for those affected. Samoa’s Ministry of Health dispatched medical teams to remote villages to provide medical services for people who were injured and without transport. International organizations helped in the response efforts.

By the second day, emergency medical response teams had arrived from Australia and New Zealand. Volunteers had to show that they had competency to help where needed. Nursing personnel were rotated every two weeks from the time of the tsunami until months after.
The 112 nurses from New Zealand and Australia included some specialists. Many were orientated and trained on site, and the experience had allowed them to revisit their basics of nursing, particularly in the remote areas. The types of wounds caused by the tsunami were varied and treatment was difficult.

On the one-year anniversary of the tsunami, it was decided that a day of reflection should be held for all people involved in the tsunami response. On this day, participants concluded that it would have been better to reflect on and talk about individual experiences closer to the time of the disaster, not one year later. The need for psychosocial support for nurses was underestimated. Nurses themselves were victims: five of them had lost houses and family members.

CONCLUSION

Some nursing staff were not adequately prepared to cope in disaster situation (e.g. how to resuscitate victims on site). Cyclones, and consequently emergency situations, are becoming more frequent in the area; therefore, nurses’ competencies need to be continually credentialed.
SINGAPORE

HUMANITARIAN RESPONSE TO THE 2005 PAKISTAN QUAKE: A SINGAPORE HEALTH CARE WORKER'S ACCOUNT AND REFLECTIONS

Tan Shou Peng

Department of Acute Care and Emergency Medicine
Khoo Teck Puat Hospital, Alexandra Health Ltd.
INTRODUCTION

Pakistan-controlled Kashmir underwent a slow, pain-staking recovery with the help of foreign aid after a major earthquake struck the country in 2005. The healing process was hastened by the country's political and religious climate. The religion is primarily Islam.

Pakistan-controlled Kashmir is bordered by the Pakistani provinces of Punjab and Pakhtunkhwa to the west, the Wakhan Corridor of Afghanistan to the north-west, the Xinjiang Uyghur Autonomous Region of China to the north, and the Indian state of Jammu Kashmir to the east. India refers to this area as Pakistan-occupied Kashmir, while most aid agencies refer to it as Pakistan-administered Kashmir. Spilling from the 1947 war, the extremist jihad movement was waging militant war for their political agenda. Ironically, in this disaster, the jihadis played a critical role in getting aid to the displaced citizens of Kashmir.

Cradled by lofty mountains lies the capital of Pakistan-controlled Kashmir, Muzaffarabad. This city is located at the confluence of the Jhelum and Neelum Rivers, 138 km away from Rawalpindi and Islamabad. According to the 1998 census, the population was estimated to be 746 000, with over 86% of the population living in rural areas. This fragile city lies on the unstable seismic area of the collision of the Eurasian and Indian tectonic plates.

A major earthquake hit Pakistan-controlled Kashmir near Muzaffarabad on 8 October 2005, prompting the international community to send humanitarian aid to the city. An appeal for international aid came from United Nations Secretary-General Kofi Annan. The Ministry of Health of Singapore responded to the call and coordinated the various health care clusters in Singapore to mobilize their volunteer pool of nurses and doctors to form “Team Singapore” for deployment to Kashmir.

NATURE AND IMPACT OF DISASTER

On 8 October 2005, Pakistan-controlled Kashmir was rocked by a 7.6 magnitude earthquake, with its epicentre located near Muzaffarabad and 95 km north-northeast of the national capital, Islamabad.1 Reports of hundreds of aftershocks were registered after the initial quake.

There were mixed official reports of the confirmed death toll, but international aid agencies believed that the numbers were underestimated. It was estimated that 86 000 died and more than 69,000 were injured. The heaviest damage occurred in the Muzaffarabad area, where 89% of housing structures were totally destroyed.2
Other buildings were rendered unusable for considerable periods of time. Among the damaged buildings were major hospitals and schools that were close to the epicentre. Landslides were a prominent feature of the earthquake, leading to closures of vital highways. Several areas remained cut off via land routes due to bridge failures. Telecommunication, power and water supplies were down for varying lengths of time and restoration was slow. Without vital infrastructure and access to the mountainous regions, homeless residents had to face the harsh winter without permanent shelter.

**DISASTER RESPONSE**

*Local government response*

Pakistan President General Pervez Musharraf declared that the priority was to reach the quake survivors as soon as possible. Helicopters were deployed to remote villages to bring aid but were often grounded because of torrential rain and snow. Airdrops therefore were interrupted. Government soldiers were mobilized to clear essential roads affected by landslides to transport food aid and tents. However, it took days before the army could reach the stricken areas.

Ironically, the jihadis (i.e. Islamic militants who similarly suffered casualties in training camps established near the line of control) travelled to the epicentre with minivans and military vehicles, armed with picks and shovels, putting away their rifles to render aid to the quake victims before the long-awaited arrival of the army and international aid agencies. The jihadis shrouded the dead, unearthed the injured and rendered first aid to the quake victims. The jihadis’ efforts were applauded by the people of Pakistan and deepened the political fractures in the Pakistan Government as people looked to the jihad movement for help.

While tens of thousands of Pakistanis were trapped under rubble, quake survivors were subjected to adverse weather conditions without essential aid. Vulnerable infants and the elderly contracted pneumonia when intermittent downpours soaked their bedding.

With the harsh cold winter on the way, doctors in Kashmir rushed to immunize 800 000 children with polio, measles, tetanus, whooping cough and diphtheria vaccines. Homeless children were vulnerable to these infectious diseases due to the squalid, cramped conditions of the refugee camps and malnutrition. Children in remote mountain villages who were isolated from the landslides were worse off and more prone to disease.
International response – Team Singapore

Team Singapore collaborated with aid agencies, such as Mercy Relief and the Singapore Red Cross, to deliver on-the-ground logistic support and coordination to the disaster site. A reconnaissance cum medical team from Team Singapore was initially sent with aid agencies’ assistance to assess the medical and nursing needs. A second response team, including the author, was sent on 18 October.

The coordination chaos started in Islamabad. Various international aid agencies made it to the airport, but without local handlers to facilitate the transport of cargo, the pallets of aid were held back, depriving the quake victims and affecting the operations of the aid agencies. Team Singapore avoided the latter problem by transporting the cargo together with the arriving team. By moving the medical supplies with the team, the security of the cargo was ensured. Singapore had to work on its own to clear customs and to source local transport to bring the team members and the medical cargo to the quake zone.

The route to the United Nations command base was treacherous. The roads were rocky, damaged by the quakes and blocked by landslides. The rough terrain caused some inexperienced staff to suffer from nausea and vomiting due to motion sickness. Essential bridge crossings were limited to one vehicle at a time and were often risky as some bridges suffered damage from the quake. Team members had to walk across essential bridges rather than be transported over by vehicles. The team arrived at the makeshift United Nations base, converted from an abandoned school field, next to the Neelum Stadium, which was converted into a helicopter base. International aid agencies set up tents at the base as the school buildings were rendered unsafe. Fuel for the base lighting and vehicles were rationed together with potable water. Non-potable water from desalination plant lorries filled the water well every morning for the purpose of bathing and general cleaning.

Under harsh conditions, away from the comfort of disaster-free Singapore homes, Singapore nurses had to adapt to the environment, begin to render care, and expand the makeshift field hospital established by the primary team and the Pakistan Islamic Medical Team (PIMA). The PIMA field hospital had been established on 12 October 2005 and became the WHO referral centre for tertiary care. Directly opposite the PIMA field hospital entrance, jihadis had set up relief camp tents to house the displaced quake victims. The tents were set up along the banks of the Neelum River, which was used by the quake survivors for washing, cooking and sanitation purposes. Corpses could be seen floating down the river while the distinctive smell of decomposition wafted in the air.
ROLE OF NURSES IN DISASTER RESPONSE

Nurses played an important role on the Singapore Team, providing perioperative and surgical nursing care, acute care and primary care. Nurses had to work alongside volunteers and allied health professionals, while being sensitive and respectful of the political and religious sentiments of the people in the region.

Perioperative and surgical nursing

Most injuries sustained in the quake were orthopaedic. Unstable fractures that required emergency operation were tended to in a makeshift operating theatre set up in a cargo container. Due to absence of general anaesthesia and post-anaesthesia monitoring facilities, ketamine was used. However, due to the short acting period of ketamine compared to general anaesthesia, surgeons and nurses had to fight against time to complete the operations before the patients woke up.

Post-operatively, the scrub nurse had to sterilize the operating equipment with a donated limited capacity sterilizer. Pre-operative nurses cleaned the modified operating theatre with methalyated spirit and educated the locals on the need for sterile conditions, but under the circumstances, sterile conditions were difficult to maintain and enforce.

The modified operating theatre garnered mixed feelings, but the international medical teams were keen to operate there. With a Singapore paediatrician on standby, the medical teams delivered three babies in the operating theatre via emergency caesarean section, a nearly impossible feat in disaster conditions.

Acute care

Triage counters and consultation rooms were established. Doctors had to scribble their treatment plans on pieces of paper. Dressing trolleys and injection trolleys were made from damaged school furniture, and a dressing basin was made from soup bowls. The nurses at the hospital’s makeshift treatment corner handled wound care, ranging from simple stitching to dressing.

Post-operative administration of antibiotics was a challenge. One issue that had to be resolved was the use of expired, donated antibiotics. Once seen as unethical, the intravenous administration of expired antibiotics was seen by PIMA as a “million-dollar deed” to prevent and treat wound infection.
Bed sourcing in the PIMA hospital was another challenge. One bed could hold a family of three. When the patients were fit for discharge, they either refused to go, as they did not want to be exposed to harsh weather conditions, or brought the beds with them to their refugee tents.

Volunteers from the jihad movement acted as escorts and interpreters for the medical teams entering the refugee camps. Without their assistance, the medical teams would not have been able to go into the refugee camps to conduct vaccinations. The able-bodied volunteers also assisted with the general movement of patients in the PIMA hospital. They removed medical waste from the makeshift buckets to the 5-metre deep pit behind the hospital. They also participated actively in pharmaceutical distribution and assisted in simple basic dressing.

These volunteers functioned not only as interpreters and health care assistants in the PIMA hospital, but also as lookouts for ambulance-like vehicles to move seriously ill patients to the tertiary hospital in Islamabad. According to ground reports, even though there was no medical equipment or trained medics to accompany the patient, these volunteer-operated minivans safely transported patients from the PIMA hospital to the tertiary hospital in Islamabad.

**Primary care**

With infectious diseases creeping into the refugee camps, the nurses were racing against time to prevent an infectious disease outbreak. Vaccination became the top priority. Tetanus and measles vaccine stockpiles were shipped by the World Health Organization via the cold chain process to the quake zone. The nurses maintained the cold chain process during vaccination by keeping the vaccines in a mobile cooler bag and bringing only required quantities to the camp quarters.

During the vaccination process, the nurses worked closely with the jihad movement group, which served as escorts and interpreters in the refugee camps, obtaining permission from the parents of the children concerned. Very few medical histories were collected as most parents did not have vaccination information or did not have access to medical facilities.

To reach children in the mountainous region, nurses operated mobile clinics. Helicopters transported the mobile teams to the remote villages. Nurses were well prepared and always packed tents in case weather conditions prohibited helicopter takeoffs out of the villages.

During the quake crisis, Muslims around the world celebrated Ramadan, the ninth month of the Islamic lunar calendar, during which
time they abstain from food and drink during the daylight hours. Team Singapore's health care workers were sensitive to this important month. Non-Muslim doctors and nurses abstained from eating in the public area of the hospital. Instead, they ate and drank in tents out of sight of Muslim patients and other evacuees. Team Singapore was invited to and participated in the mass fast-breaking ceremony at the PIMA hospital. It was a learning experience for non-Muslim nurses.

Nurses had to be sensitive to the operating environment and respect the religious beliefs and practices of the region. They knew that the operating environment was a hostile environment as the country was at war. They rendered aid regardless of the patient’s religious affiliation in accordance with the humanitarian convention. In this case, the disaster site was primarily a jihad-occupied area, with frequent militant activities and limited access to government rescue efforts.

CONCLUSION

Key lessons can be drawn from the 2005 Pakistan quake in terms of humanitarian response. First, coordination, planning, development and implementation of any humanitarian response must be done with an aid agency. This is because aid agencies usually have more experience in operating in harsh conditions and have connections to the ground networking that is essential for mission success. Second, religious and political sensitivity must be emphasized in the pre-mission briefing to ensure humanitarian principles are strictly adhered to. Last but not least, nurses should attend disaster training, especially if they have never experienced a major natural disaster, so that they are mentally prepared for an event. Massive landslides were a particular feature of this event as well as inadequate water supply, and telecommunication services that were down for varying lengths of time.

REFERENCES


SINGAPORE

THE 2009 INFLUENZA A(H1N1) PANDEMIC: THE KKH EXPERIENCE

Delpine Tan and Lau Gek Muay

KK Women’s and Children’s Hospital
INTRODUCTION

Singapore is a little “red dot” on the world map, an urbanized island city-state in South-East Asia with a total land area of 710.3 km². Singapore’s population, estimated at 5.08 million as of the end of June 2010, is a multiracial mix of Chinese, Malay, Indian and other races. Singapore’s population density is 7022 per km², making it the third most densely populated country in the world. It is a well-developed country, enjoying a successful free-market economy. Its economy depends heavily on exports, particularly in consumer electronics, information technology products, pharmaceuticals, and a growing financial services sector.

Singapore is a popular travel destination and medical tourism hub. About 200 000 foreigners seek medical care in the country each year. Singapore medical services aim to serve one million foreign patients annually by 2012. More and more people are travelling in and out of the country, making it difficult to monitor and control. With this movement of people, it is inevitable that Singapore is more susceptible to the increasing viruses travelling to and from the island. Being a densely populated country also increases the risk of cross-infection among the general public. It is not the habit or culture of Singaporeans to wear a mask when unwell. However, it is their culture to enjoy communal dining, thus increasing the risk of cross-contamination.

As a small country with limited resources, it is important for the country to be well prepared for any form of disaster. Singapore’s Government is well known for its strategic contingency plans for various scenarios. However, when severe acute respiratory syndrome (SARS) struck Singapore in 2003, it took the health care profession by surprise and severely affected the economy of Singapore as a whole. It was the uncertainty and fear of the unknown that was most frightening. Some health care providers succumbed to the infection, which brought morale down significantly. Health care providers were fearful of cross-infecting their families and friends, and they were shunned by members of the public.

During SARS, Tan Tock Seng Hospital (TTSH) was designated as the nation’s main hospital for admitting affected patients, both adult and paediatric. The challenges faced by the hospital were tough. Furthermore, health care providers working there were segregated and stigmatized by members of the public. During that time, KK Women’s and Children’s Hospital (KKH) had to deploy a team of nurses and doctors to provide care and treatment to its paediatric and obstetric patients housed at TTSH.
NATURE AND IMPACT OF EMERGENCY

When the influenza A(H1N1) pandemic struck in April 2009, the apprehensive memories of SARS resurfaced. This time however, leadership was more prepared as many pandemic response systems had been established during and after SARS. KKH was thus able to play an important role in the national H1N1 medical emergency planning and management.

On a Sunday morning in April, all senior managers were called to the hospital to discuss the operational issues in response to management of H1N1 patients. A taskforce was established immediately, with the hospital’s Chairman of the Medical Board (CMB) heading the team. At the initial meeting, members knew that the hospital had to start its preparation to deal with the pandemic; however, very little information was on hand at that stage. The taskforce acted on the advisories issued by the Ministry of Health and the World Health Organization and closely followed H1N1 news around the world.

E-mails on “Need for Conversion of Isolation Ward” were circulated on 30 April 2009 and changes were made speedily. Within a span of two hours, patients in an identified ward, Ward 46, were either discharged or transferred out. The Nurse Manager and her team of nurses sprung into action, getting ready to admit suspected H1N1 patients. The nurses were apprehensive about facing the challenges of uncertainties and changes. There were many unanswered questions, such as: How will the virus spread? Will health care providers be infected? What is the best way to protect individuals, family and the community? Even with all these questions in their minds, the nurses went ahead with their work as quickly, professionally and enthusiastically as ever, doing whatever was needed. As soon as the last patient was transferred out, Ward 46 admitted its first two H1N1 suspect patients. Fortunately, these patients tested negative for the H1N1 virus and were discharged with symptomatic treatment.

EMERGENCY RESPONSE

The hospital’s infection control team jumped into action quickly, giving the staff moral support, providing education and reiterating the proper use of personal protective equipment (PPE). When supplies such as gloves, N95 masks and gowns ran low, the Material Management Department was activated immediately to deploy more stocks to the ward. It was very clear that all staff working with H1N1 patients had to have adequate supply of PPE.
Every staff member within the hospital took instructions gracefully, carried out duties to the best of their abilities and supported the decisions made. The team spirit and effort were enormous and the strength garnered from each other throughout this tough period was commendable.

Backroom staff were assigned to screen all patients and visitors entering the hospital in order to control the spread of the virus. They played an important role during this period, acting as gatekeepers and ensuring that no one was missed. They had a tough job. They were at risk not only of becoming infected (they wore N95 masks while on duty), but also of being abused or scolded by visitors who turned aggressive when they were denied entry into the wards. People’s attitudes changed, however, when posters produced by the Ministry of Health on the need for screening and restriction of visitors were placed prominently in front of all screening stations. In addition, screening criteria were established and clearly stated for the public’s information.

The new virus strain spread quickly around the world and infected large portions of populations in a short period of time. By June 2009, the World Health Organization (WHO) declared influenza A(H1N1) a global pandemic. Simultaneously, Singapore moved from a state of “Green Alert” to “Yellow Alert”, and within two days, “Orange Alert” was declared. As the alerts were raised, hospital staff (Children’s Emergency and wards) and screeners were informed to be in full PPE at all times.

On 2 June 2009, KKH received notice that Tan Tock Seng Hospital would be transferring a paediatric patient. When the patient arrived at the ward, nurses were dressed in full PPE to receive him. The patient was a 15-year-old Indian boy who had just returned from the United States of America and had tested positive for H1N1.

The patient was admitted because he met at least one of the warded criteria:

- history of travel to Japan, New Zealand, Australia, Asia, Mexico, the United States of America or Chile;
- cough and fever;
- contact with live poultry; and
- contact with anyone with influenza-like illness.

At that point, taking the patient’s specimen for nasopharyngeal aspirate was a great challenge. Specimens had to be taken in the patient’s room by one nurse and given to another nurse outside the patient’s room to be placed in a specimen bag. The nurses had to be mindful not to cross-contaminate each other or the surroundings.
The boy had to be totally isolated from all visitors, including his parents, during his stay. The only consolation for his boredom was that his room had a television and telephone for him to communicate with his family. Eventually, with permission from the infection control team, he was allowed to bring in his laptop as a form of diversion therapy. Nurses were also there, showering him with care as his fever fluctuated.

As this was the first positive case at KKH, news spread quickly. For the protection of staff, the hospital came up with the following guidelines for them to follow:

- check temperature twice a day;
- seek medical attention when unwell or with fever or flu-like symptoms;
- take flu vaccination;
- submit to re-fitting of mask size and PPE training;
- refrain from travelling to an affected country;
- stay in designated department and do not congregate during break time, unless necessary;
- use a powered air purifying respirator, if necessary; and
- cancel leave to ensure adequate coverage.

The experience taught senior management that communication is the key in allaying anxiety and uncertainty among staff. The transparency of information and constant communication by management helped support the staff. Although stress levels were high, the staff felt supported and their voices heard.

After the initial positive case, more cases were admitted and thus more isolation rooms were required. As Ward 46 was a 12-bed ward, it was difficult to accommodate everyone when there was a sudden influx of probable H1N1 cases. There was an urgent need to convert more wards into isolation wards. Within 6 hours, one more ward was opened for the obstetric patients, and another paediatric ward was opened within the next 12 hours. The Outpatient Clinic was rapidly converted into an isolation ward by an expert team from Facilities Management who worked tirelessly to meet deadlines so that more wards would be available to accommodate the growing number of patients.

With the need to open two more wards, the housekeeping department was called in to set up Wards 51 and 61. Nurses and other support services staff helped to prepare the wards to receive cases. With the opening of these extra wards and more patients confirmed with H1N1, cluster isolation was advocated to relieve some constraints. Porters, too, worked very hard during this period as they were activated to bring the patients to the
ROLE OF NURSES

With the increase in isolation wards, nurses had to be recruited from all over the hospital, including the Intensive Care Unit and wards from the Women's Tower and Children's Tower. Everyone needed to come together, exchange knowledge, adapt to a new location, meet new colleagues and work with a new team to provide care.

Nurses in Ward 46 played a key role during this period as they had to adapt to multiple changes instantaneously, like the conversion to a full isolation ward. These nurses guided and taught others in the newly converted isolation wards on the management, processes and workflow of taking care of suspected or confirmed H1N1 patients. And when there were no patients in Ward 46, they were prepared to be deployed to other wards and to stand by to receive patients when called upon.

Nurses worked 8- to 12-hour shifts in full PPE, being isolated in the ward without any contact, except with patients. Thus, meals were sent to health care professionals in the wards to minimize contact with the public and/or other health care professionals.

To ensure timely reporting on the bed census, staff used their mobile phones to text message bed statements three to four times a day, so as to better manage the bed situation. There were times when staff morale was low, as a result of constant changes in the situation and environment due to deployment. They also faced many challenging and demanding customers and had to answer to their endless enquiries. The keys to success lay in strong communication, support for each other, teamwork, and supportive management. Staff were constantly updated about the flu alert level and informed of the latest changes. Management staff also made frequent visits to the ward to ensure the well-being of the staff and to provide a supportive ear.

As more cases were being admitted, the demand for supplies, equipment and staff mounted. More nasopharyngeal aspirate swab sticks were needed to test for sub-typing if a patient tested positive for influenza A. The laboratory had to operate around the clock and therefore had to increase the number of staff on duty to get the results out quickly. The testing machine was overworked and broke down, increasing turnaround time. Nurses were faced with many challenging patients who were anxious about their results. Most of the patients and their caregivers were foreigners and some were either on transit or on holiday, waiting to be discharged or to catch a flight home. Eventually, the hospital outsourced testing to another institution to meet the huge demand. That eased the demand on the laboratory and gave nurses a break from the challenging patients faced every day on top of their daily workload.
CONCLUSION

It is hoped that the lessons learnt from this experience will help hospitals to become better equipped and more prepared. It is strongly believed that teamwork is crucial and that every member of the hospital has a major role to play to contain the spread of infection. Open communication from senior management can help tremendously in alleviating fear and providing support to the staff. This support will motivate them to carry on despite the difficulties faced. The use of the media to broadcast and educate the public can help to alleviate the fear and anxiety of the public. It was fortunate that H1N1 turned out to be less serious than SARS. Standardized protocols and workflow among hospitals will help to reduce confusion among the public as visitors tend to compare and demand to know the reason for different practices among hospitals.

Lastly, in order for an emergency to be well contained, nurses and midwives and the health care system need to be adaptable to changes. Information is the key to ensuring success—transparency and keeping the staff updated are paramount. In order to gain the staff's cooperation, they need to be kept informed of the situation and the rationale for decisions made. With staff's buy-in and cooperation, they will be more willing to work towards a common organization goal.
VIET NAM

THE ROLE OF NURSES IN THE CARE OF PETROL FIRE VICTIMS IN QUANG NINH PROVINCE, VIET NAM

Nguyễn Bích Lưu¹, Nguyễn Đăng Doanh², Trần Quang Huy³

¹Chief of Nursing Office, ²Chief Doctor of Viet Nam-Sweden Uongbi Hospital, ³Former Chief Nurse of Viet Nam-Sweden Uongbi Hospital
INTRODUCTION

Viet Nam is located in the Indochinese Peninsula of South-East Asia with a long coast (3444 km) facing the Gulf of Tonkin, the South China Sea and the Gulf of Thailand. Viet Nam has 58 provinces and five cities under the direct governance of the central Government.

Quang Ninh Province is a coastal province in north-east Viet Nam. It is home to Halong Bay, a world heritage site. The province plays an important role in the economic development planning of the country because of its tourism potential.

Disasters such as floods and fire occur in Viet Nam each year. Most often, the first responders are police officers, soldiers, taxi drivers, motorbike drivers, community members and Red Cross volunteers. Normally, nurses and doctors work in health care facilities where patients or victims are taken after an event. This case study, however, describes the care given by doctors and nurses of the Viet Nam-Sweden Uongbi General Hospital to casualties of a petrol fire that occurred near the hospital. The event took place on 6 February 1990 in the Minh Thanh commune, Yen Hung District, Quang Ninh Province.

The Viet Nam-Sweden Uongbi General Hospital is a regional hospital operated by the Ministry of Health. The hospital is located in Uongbi town, Quang Ninh Province, about 120 km north-east of Hanoi. The hospital is in charge of providing care to local residents, predominately workers in coal mines, power plants and construction. The hospital frequently admits casualties from work-related accidents.

NATURE AND IMPACT OF DISASTER

Around 19:00 on 6 February 1990, the Director of the Viet Nam-Sweden Uongbi General Hospital received a telephone call, informing him that the hospital’s casualty department was teeming with severely burnt patients who were being transferred by motorbikes. These patients were victims of a petrol fire explosion that occurred about 15 km from the hospital. The director gave an order to all hospital staff to take care of casualties.

In the casualty department, fire victims were lying in beds and on stretchers, their bodies covered in mud and emitting a strong burnt smell. Some of them were crying. Nurses stepped into action and started administering infusions. In most cases, nurses had difficulty finding veins as most casualties were suffering from full body burns. The nurses worked in a chain: one hospital nurse disinfected the infusion site, another helped to insert a needle into the vein, and another connected the infusion line and regulated the speed of infusion before moving on to another casualty.
The root of the disaster was a leaking petrol pipe running through a swamp about 500 metres from the main road (numbered 18). People living near the leaking pipe rushed to it with containers to collect petrol. They dug trenches, some one metre deep and two metres wide to direct the flow. As people worked hastily, their clothes became drenched with petrol and they became "high" on the gas. When it became dark, someone lit a lighter, igniting the petrol. Very soon, a sea of flames engulfed the area and each person became a live torch. The fire lasted for almost five hours (started at 17:00 and ended at 22:00). Because the affected area was isolated from the main road by a large canal, fire trucks and ambulances could not gain access. All of their efforts to rescue casualties failed.

The affected area was far from residential areas and about 15 km from the hospital. As such, telephone communication was limited. The hospital was unaware of the disaster until casualties started arriving, transferred by all means of transport, especially by motorbikes. The casualties did not receive any first aid prior to transport. The distance between the disaster site and the hospital also explains why the first casualties did not arrive at the hospital until two hours after the fire started, at about 19:00. Initially, there was confusion at the hospital because relatives were frantically looking for injured family members. Many of them did not know how many relatives were injured. The sounds of crying, calling, footsteps, motorbikes and severely burnt victims screaming created a terrible, uncontrolled condition that initially overwhelmed health staff for several minutes before getting the situation under control.

**DISASTER RESPONSE**

*Organization of admission and provision of emergency care to casualties*

After mobilizing all health staff in the hospital to provide emergency care to casualties, the hospital director ordered all patients to be moved to three wards in order to make space for more casualties. After receiving a casualty, the health staff wrote the name, age and body surface area of burn on a piece of paper and then placed it with the identified patient. After admission, the casualty was transferred to the ward. A doctor and two nurses were responsible for taking care of casualties in each room.

The hospital director gave an order to set up an emergency committee consisting of:

- the director, as general commander to direct and coordinate necessary activities, and as the person in charge of communications and external relations to ensure effective support;
- the vice-director, in charge of logistics;
• the hospital’s head doctor, responsible for professional activities in general;
• the hospital’s chief nurse, in charge of coordinating nursing care provided to casualties; and
• the chief of the pharmacy, responsible for providing infusions, medicines as well as other treatment requirements in the clinical wards.

After 30 minutes, every casualty was assigned a bed, was kept warm and received an infusion as well as morphine.

After 60 minutes, all casualties were assessed. Casualties who were in shock were treated in the intensive care unit or in the surgical ward for further treatment. Health staff observed their vital signs, urine volume and infusion intake hourly. Casualties who were not in shock were given milk. Fluid and electrolyte balances were maintained to facilitate good prognosis.

After 120 minutes, a group of doctors reassessed all patients and adjusted their treatments as needed. Other health staff were allocated to work in three shifts. Besides allocating health staff, the hospital arranged for guardians, namely local residents, to help deal with relatives who were swarming the hospital, making the hospital very crowded and noisy.

Profiling casualties

Of the 69 casualties, 8 died on the spot. The remaining casualties, 53 males and 8 females, were admitted to the hospital. The oldest casualty was 51 years old, while the youngest was only 12. In the end, 48 casualties were discharged without any complication and 13 died. Of these, 10 died within the first 48 hours due to shock, 2 died after 12 days because of infection and intoxication, and 1 died 21 days later because of infection and deteriorated situation. See Table 1 for classification of injuries.

Table 1. Classification of injuries

<table>
<thead>
<tr>
<th>Burnt surface</th>
<th>Casualties</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Rate (%)</td>
</tr>
<tr>
<td>&gt; 90%</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>&gt; 80%-90%</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>&gt; 70%-80%</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>&gt; 60%-70%</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>&gt; 50%-60%</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>&gt; 40%-50%</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>&gt; 30%-40%</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Burnt surface</td>
<td>Casualties</td>
<td>Deaths</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------</td>
<td>--------</td>
</tr>
<tr>
<td></td>
<td>Number</td>
<td>Rate (%)</td>
</tr>
<tr>
<td>&gt; 15%–30%</td>
<td>13</td>
<td>21</td>
</tr>
<tr>
<td>≤ 15%</td>
<td>22</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Dr. Nguyễn Đăng Doanh, former head doctor of the ICU, Viet Nam-Sweden Uongbi Hospital

Thirty-nine casualties, accounting for 64% of total admissions, were burnt on more than 15% of the body surface. Many of them went into shock (Table 2).

Most casualties suffered from third-degree burns on less than 30% of their body surface. One casualty had burns that covered 53% of his body surface and were deeper than third degree. Both his legs and one of his arms were burnt to the bone and were almost detached when he died 21 days later.

Table 2. Symptoms observed in 39 casualties with burns covering more than 15% of the body skin surface (risk of shock)

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Number and rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number (n=39)</td>
</tr>
<tr>
<td>Full signs and symptoms of shock</td>
<td>22</td>
</tr>
<tr>
<td>Dyspnoea</td>
<td>15</td>
</tr>
<tr>
<td>Abdominal pain, vomiting and abdominal distension</td>
<td>17</td>
</tr>
<tr>
<td>Severe haematemesis</td>
<td>5</td>
</tr>
<tr>
<td>Shivering</td>
<td>25</td>
</tr>
<tr>
<td>Haemoconcentration</td>
<td>34</td>
</tr>
</tbody>
</table>

Source: Dr. Nguyễn Đăng Doanh, former head doctor of the ICU, Viet Nam-Sweden Uongbi Hospital

All burn patients had a fever that lasted from 10 days to 125 days. Besides receiving an infusion, they were given a blood transfusion, plasma and natri hydrocarbonat (sodium hydrogen carbonate). However, the haemoconcentration lasted long. Haematocrit values returned to the normal range after one week in nine patients (accounted for 26%), after two weeks in seven patients (accounted for 20%), and after three weeks in five patients (accounted for 14%).
Medical treatment and care

Treatment of shock

The amount of infusion given within the first eight hours was calculated by the formula: four mL x body weight in kilograms per percentage of body surface area burnt. Multiples of 9 were used to calculate the percentage of body surface area burnt. Careful observation and regular clinical assessments were made to adjust treatment accordingly. Assessments were based on the patient’s urine production, heamatoerit, haemoglobin, pulse, respiration rate, blood pressure and mental status.

The total amount of infusion in the first 8 hours, the next 12 hours and the next 24 hours were calculated by using the same formula mentioned above. However, for the 16- and 24-hour infusions, it was important to factor in the person’s urine volume, amount of vomit and invisible loss. On average, in the first 24 hours, each casualty was given 20 litres of fluids; the maximum was 23.8 litres. The basic infusion solution was natri clorua (sodium chloride) 0.9%. Plasma was calculated using the formula: 0.5 ml x body weight x % of body burnt. Blood transfusions were calculated using the formula: 1% of blood volume per 1% of body burnt. A 1.4% natri hydrocarbonat solution was used for 27 casualties with acidosis. A glucose solution was given to patients as the primary source of energy. The patients who could not eat on their own were tube fed.

Because natri clorua 0.9% (isotonic solution) was used, haemoconcentration remained. Based on the urine volume produced within the first eight hours, infusions were continuously given because it was assumed that the casualties’ kidney functions were normal (i.e. the volume of urine increased with the amount of infusion and urine gravity was normal), increasing renal filtration to exclude toxicities as consequences of shock and burnt tissues. Such treatments were provided with the hope that patients would pass the intoxicated period.

Table 3. Volume of urine in the first 24 hours of treatment

<table>
<thead>
<tr>
<th>Volume of urine within 24 hours</th>
<th>Number of cases</th>
<th>Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.3 litres (died within 24-36 hours)</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>&gt; 3-4 litres</td>
<td>44</td>
<td>72</td>
</tr>
<tr>
<td>&gt; 4-5 litres</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>&gt; 5 litres</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>&gt; 8 litres</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Dr. Nguyên Dang Doanh, former head doctor of the ICU, Viet Nam-Sweden Uongbi Hospital
As shown in Table 3, the urine volume of the eight cases who died in the shock stage was less than 0.5 ml/kg of body weight; the urine volume did not increase regardless of increased infusion solution. They all died within the first 24–36 hours as was predicted.

In this period, nurses played an important role in the observation of the patient’s general status, especially signs and symptoms of shock, fluid intake and output. Those data were important for further intervention.

Infection

Ten cases died before bacteria culture was performed. The results of bacteria culture in other patients showed that 40 patients had developed infection. Out of these, 9 patients were infected by *Pseudomonas*, 16 patients (40%) had *Staphylococcus aureus*, and 3 patients were infected by both *Staphylococcus* and *Pseudomonas*. The rest (12 patients accounting for 30%) were infected by *E. coli* and *Enterobacter*.

At that time, the antibiotics most often prescribed were penicillin in combination with gentamicin. Luckily, with support from Swedish advisers, Lexinor (norfloxacain) was given and had positive effects, as both *Pseudomonas* and *Staphylococcus* were sensitive to this antibiotic.

Nursing care was very important to prevent infection during treatment. Nurses were instrumental in reducing contamination caused by bacteria in the environment and through caring activities.

Burn care and skin graft

Nurses cleaned and debrided burnt areas by removing dead tissue, cleansing the wound with soap and antiseptic solution, and then bandaging the wound with gauze soaked in 0.9% sterile saline solution. Dressings were changed three to four times a day. Patients who were severely burnt (third degree) underwent highly successful skin graft surgeries.

Nutrition

All severe cases were fed by gastric tube until they were well enough to eat by mouth. Food was provided by the hospital and by the patients’ families. Nutrition was ensured with diets that provided about 2000 calories a day.
Prevention of complications and sequelae

Parallel with treatment, doctors and nurses helped patients to prevent sequelae by providing instruction and putting affected arms and legs in the correct position. Daily, physiotherapists helped to train patients either passively or actively. Several patients had to train in water. It was difficult for some patients to train because of the pain. Nurses and physiotherapists did a very good job of reassuring patients and encouraging them persistently to train early to ensure good rehabilitation. As a result, none of them had any sequelae.

CONCLUSION

Emergency care was given to 61 casualties affected by the fire disaster. Of those casualties, 13 died of severe burns (large and deep). Doctors and nurses in the Vietnam-Sweden Uongbi General Hospital saved the lives of 48 casualties (survival rate was 79%) and all of them recovered completely without any sequelae. Twenty-six out of the 48 casualties (54%) were discharged within three weeks.

The great success would not have been possible without important contributions from the nurses of the Vietnam-Sweden Uongbi General Hospital. Their contributions made them famous and they were awarded the title Hero of Labour in 2000 by the Government. To date, they are unique in receiving such a title that demonstrated high recognition and compliments of the Government, of the people, and of the health authorities.

The Vietnam-Sweden Uongbi General Hospital was able to respond effectively to the disaster by:

- setting up an emergency committee early;
- establishing clear task assignments for each member of the committee for emergency care and treatment, logistics, communication and external relations, and including everything in a master plan with clearly stated aims and objectives; and
- having competent health staff working with a high sense of responsibility and enthusiasm.

Leaders were effective because they had experience in dealing with catastrophes such as war and labour disasters.

The Vietnam-Sweden Uongbi General Hospital was able to mobilize support from and collaborate with the local government and the Ministry of Health in order to obtain adequate supplies of medicine, money and donated blood as well as other logistics.
Efficient support from Swedish advisers resulted in the hospital obtaining time-specific antibiotics for treatment of *Pseudomonas* and *Staphylococcus aureus*.

Disasters can occur at any time and at any location. As such, health facilities should be ready to deal with any situation. So, health care facilities have the responsibility to train and mobilize the community to participate in emergency and disaster preparedness. All formal training curricula for health care workers include first-aid training, but lack formal emergency and disaster training. Therefore, it is necessary to adapt the emergency and disaster training curricula of the World Health Organization in the Western Pacific Region in Viet Nam.

Nurses are on the front line of health care facilities when treating emergency patients. As such, every health care institution should maximize their nurses’ organizations in preparing for and responding to emergencies and disasters, including policy and training, and validate competencies of nurses on emergency and disaster preparedness. Implementation of policy to integrate disaster preparedness in pre-service education is a necessary component of policy in emergency and disaster response.
SUMMARY OF LESSONS LEARNT

Case study contributors were asked to identify lessons learnt and offer recommendations for improvements in nursing, midwifery and overall health system emergency and disaster management. Consistent themes in the case studies appear to reflect APEDNN's ecological conceptual framework, which recognizes the situational and environmental context of disasters, placing emphasis on the need for participation, inclusiveness and collaboration to achieve outcomes that mitigate the impact of disasters, through enhanced capacities and responses, community empowerment and resilience.

A comprehensive approach to disasters, across the continuum of care and encompassing all ages, was clearly identified as being important in terms of addressing immediate as well as longer-term recovery needs for persons of all ages, particularly those most vulnerable. A holistic approach to disaster management was considered to be essential in ensuring that physiologic, psychologic, family and environmental perspectives were taken into account. Mutual cooperation and support, social interaction and the sharing of feelings and experiences were also deemed important.

A coordinated, broad-based humanitarian response within and across sectors was recognized as a necessity—one that requires the full engagement and support of existing local structures, systems and communities. Central to disaster preparedness and response are robust health and mental health systems, as well as strong national, institutional, community, school and school district disaster management plans, protocols and operational committees, all with shared goals, established and understood by all before disasters occur. Workflow and human resource surge capacity plans were recognized as important components of overall disaster plans.

Successes were seen to be built on a number of common values and processes, such as responsiveness to, engagement of and partnership with local leaders, communities and schools; flexibility; diversity; communication, collaboration, coordination; and partnerships and teamwork. Better communication and improved communication alerts and information messages were highlighted as being vitally important to individual, family and community preparedness and risk reduction plans.

Nursing and midwifery characteristics and abilities that were recognized as being essential in disaster management were adaptability, creativity and innovation, critical thinking and collaborative learning skills, as well as public health and infection control skills. Such skills are essential in enabling responders to effectively intervene in the face of unexpected situations and extremely limited resources.
Pre-service disaster and preparedness training were seen to be cornerstones of effective disaster management by all nurses and midwives, health professionals and volunteers. Such training should support and assure interoperability between responders, central and local governments, countries and jurisdictions. The training needs identified encompass incident command systems and different types of disasters; promotion of psychosocial health and recovery; immediate response as well as longer-term recovery needs; standardized and clear guidelines, roles and functional responsibilities; logistical and reporting systems and advance understanding of unique cultural, religious and political aspects of disaster situations.

Case study recommendations highlighted the need for action or operational research as well as ongoing evaluation of the effectiveness of interventions.

Nursing and midwifery readiness and rapid assumption of essential responder and leadership roles were highlighted in all the case studies, reflective of their roles as essential providers of health services. Recommendations reinforced the need for nurses and midwives to be full participants in health cluster coordination and response and in the development and implementation of disaster preparedness, response and recovery plans.

Further work is planned to continue strengthening nursing and midwifery capacities and leadership in humanitarian response and their abilities to reduce the impact of disasters, with an emphasis on empowerment, professional development, partnerships and teamwork, and building community resilience. More contextualized research is required to measure and evaluate of the outcomes and impact of various interventions on nursing, midwifery capacities, humanitarian response policies and practices, health system responsiveness and community resilience. The establishment of a formal APEDNN research action framework is seen as a foundational step in building the evidence base for disaster nursing and community resilience.
ANNEX

Case Study Guidelines: The Role of Nurses and Midwives in Emergencies and Disasters

Instructions to Contributors:

The following questions serve as a guide for contributors to provide important information relevant to the case studies and to have a common framework for the case studies for comparative analysis and recommendations. Please write considering both personal and professional perspectives on the themes and issues raised. Feel free to add other information that may not have been specified in the guide questions.

A. Brief SNAPSHOT of affected community/country
   • Describe the geographical area and demographic and socio economic characteristics of the population.
   • Identify the major underlying vulnerabilities of the population exposed to the emergency, disaster or hazard.
   • Describe any emergency preparedness plans of the community and roles of nurses and midwives.

B. NATURE and IMPACT of the emergency or disaster
   • Describe the emergency or disaster event.
   • Describe the direct impact of the emergency or disaster: health threats and health system threats (e.g. deaths, injuries, illnesses, psychosocial concerns, health facilities damage; disruption in health services; disruption in provision of medications; access to drugs/medicines).
   • What were the indirect impacts that affected health of the people (e.g. loss of properties, roads, communication facilities, buildings including hospitals and health facilities; water and sanitation facilities; shelter)?
   • What health and nursing and other resources were available?

C. Health sector RESPONSE and COORDINATION
   • What ACTIONS were taken and what were their OUTCOMES, IMPACT?
   • How were RESOURCES coordinated and used (both good/bad)?
   • What factors limited or hindered an effective response, outcomes?
   • What factors provided opportunities or facilitated effective response, outcomes?
   • What were the contributions of nurses and midwives in responding to the emergency or disaster? Specify their roles and functions in emergency preparedness and response as they relate to primary health
care [all inclusive—from preventive to curative services, including psychosocial care], community empowerment and partnerships.

• What were the mechanisms for teamwork and partnerships to coordinate efforts in emergency preparedness, response and early recovery?

D. SUMMARY AND RECOMMENDATIONS

• What are the lessons learnt to lessen vulnerabilities of communities and improve capacities to prepare and respond to emergencies and disasters?

• What are the lessons learnt on coordination, planning, development and implementation of emergency preparedness and response?

• What do nurses and midwives (and health systems) need to do to improve their roles and functions in health emergency management?