Perceived Clinical Skills for Tsunami Care and Its Related Factors

among Nurses in Banda Aceh, Indonesia

Cut Husna

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

Master of Nursing Science (International Program)

Prince of Songkla University

2010

Thesis Title   Perceived Clinical Skills for Tsunami Care and Its Related

Factors among Nurses in Banda Aceh, Indonesia

Author   Cut Husna

Major Program   Nursing Science in Adult Nursing (International Program)

_____

Major **Advisor:**   **Examining Committee:**

…………………………………...   …………………………….....Chairperson
(Asst. Prof. Dr. Urai Hatthakit)   (Asst. Prof. Dr. Wongchan Petpichetchian)

…………………………………………...
Co-advisor: (Asst. Prof. Dr. Urai Hatthakit)

…………………………………...   …………………………………………..
(Assoc. Prof. Dr. Aranya Chaowalit)   (Assoc. Prof. Dr. Aranya Chaowalit)

…………………………………….…
(Prof. Dr. Virasakdi Chongsuvivatwong)

……………………………………….…….
(Dr. Jaroonrat Rodniam)

The Graduate School, Prince of Songkla University, has approved this

thesis as partial fulfillment of the requirements for the Master of Nursing Science

(International Program)

…………………………………............
(Assoc. Prof. Dr. Krerkchai Thongnoo)
Dean of Graduate School

Thesis Title   Perceived Clinical Skills for Tsunami Care and Its Related Factors among Nurses in Banda Aceh, Indonesia

Author   Cut Husna

Major Program   Nursing Science (International Program)

Academic Year   2009

ABSTRACT

Nurses need to be equipped with appropriate nursing skills, knowledge and management strategies in order to respond to disaster events. The 2004 tsunami was a major disaster that tested the skills and response of nurses involved in the care of patients affected by the tsunami. This descriptive correlational study was conducted to describe the level of clinical skills for tsunami care, and to examine the relationship between knowledge, training and education, working experience, attending hospital disaster drills, and clinical skills for tsunami care perceived by nurses in Indonesia. This study utilized systematic random sampling involving 97 nurses in a provincial hospital in Banda Aceh, Indonesia. Data were collected by using the questionnaires, which consisted of four main parts, namely; Demographic Data Questionnaire (DDQ), Nurses' Clinical Experience Questionnaire (NCEQ), Nurses' Knowledge Tsunami Care Questionnaire (NKTCQ), and Tsunami Care Questionnaire (TCQ).

The descriptive statistics showed that the majority of the subjects were more than 30 years old (56.7%), were educated to diploma level (78.4%), female (71.1%), attending emergency training and education had six index scores (37.1%), working experience as a nurse for more than 5 years (53.6%), experience in caring

for tsunami patients (80.4%), and attended hospital disaster drill (42.3%). Overall, perceived clinical skills for tsunami care were at a moderate level with the total mean score of 3.52 (SD = 0.86). Pearson product moment correlation coefficients were used to investigate the relationship between perceived clinical skills for tsunami care and knowledge, clinical experience, and training and education. Independent t-test was used to compare mean differences of nurses' perceived clinical skills for tsunami care between none attended and attended groups on attending hospital disaster drill.

Knowledge, clinical experience, and training and education were low significantly positively correlated with perceived clinical skills for tsunami care (r = .24, p< .05); (r = .30, p< .01); and (r = .23, p< .05) respectively. There was no significant mean differences of perceived clinical skills for tsunami care between none attended and attended groups on hospital disaster drill (t = .55, p = 58), indicating that attending hospital disaster drill may not have influenced on perceived clinical skills for tsunami care among nurses. The study revealed that nurses in the hospital have to improve their knowledge and skills in order to prepare for future disaster.

Keywords: Nurse, Clinical skills, Perceived, Tsunami, Hospital

ACKNOWLEDGEMENTS

CONTENTS

CONTENTS (Continued)

CONTENTS (Continued)

LIST OF APPENDICES

LIST OF FIGURE

LIST OF TABLES

LIST OF TABLES (Continued)

CHAPTER 1

INTRODUCTION

Background and Significance of the Problem

The earthquake and tsunami on December 26, 2004 having a magnitude of 9.0 Richter scale was the second most powerful temblor in the recorded history. It struck the floor of the Indian Ocean about 15 miles off the Coast of Sumatra Island in Indonesia. The tsunami killed more than 270,000 people in the 11 countries, injured 500,000 people, and affected approximately 5 million people in the world. The hardest hit was observed in Aceh province, Indonesia that covered roughly 42,000 square miles on the north-west side of Sumatra Island. The tsunami killed approximately 128,000 people, which is about a quarter of the total population and many people were injured or lost their homes (World Health Organization, 2005a).

The 2004 tsunami also caused extensive damage to five hospitals in Banda Aceh, 122 hospitals and public health centers in few districts. Health providers and clinical networks beyond the hospitals were left in disarray. Communication and transportation system was disrupted and record of most of the nursing staff was lost. The lack of a medical disaster plan, supply of stockpiles and deployment of personnel were painfully evident in the immediate aftermath of the tsunami (Garfield & Hamid, 2006).

The tsunami has several impacts on physical trauma of the affected population such as lung injury, head injury, fracture, wounds, water borne diseases, and insect transmitted diseases. Maegele et al. (2006) stated that two-thirds of tsunami patients were reported to have combined injuries to the thorax or fractures.

Patients who survived from near drowning involved in the aspiration of immersion fluids, marine and soil debris into the respiratory tract and all patients displayed signs of pneumonitis and pneumonia, popularly known as tsunami lung disease. Hence, patients developed dyspnea and acute respiratory distress syndrome. Veenema (2007) mentioned the potential diseases caused by the tsunami including cholera, amebiasis, cryptosporidiosis, hepatitis A and B, and leptospirosis. Other endemic diseases caused by tsunami were parasite infections, rotavirus, shigellosis, and typhoid fever. Furthermore, animal or mosquitoes borne illness, plague, rabies, malaria, and dengue fever caused insect transmitted diseases were also reported.

Moreover, the tsunami resulted in huge property loss and the loss of life. Tsunami disaster affected the life of individuals, families, and communities. The tsunami has also long lasting impacts on psychological problems of the affected patients (Hatthakit & Thaniwathananon, 2007). Disruption due to tsunami caused anxiety, family dysfunction, post traumatic stress disorder (PTSD), conductive disorders, addictive behaviors, severe depression, panic, dissociation, grief reaction, increase stress level, sleep disruption, and even suicidal attempt (Veenema, 2007). Approximately 5-10% of affected population develops persistent problems such as depression, PTSD, or other anxiety disorders. The symptoms characterized by flashbacks, emotional detachment, sleep difficulties, other disruptions, and anxiety disorders (Maegele et al., 2006). The international post tsunami groups found that approximately 21% of the tsunami-affected patients had PTSD, 16% had severe depression, 30% had severe anxiety, and 22% had somatic symptoms. The tsunami patients also suffered from difficulties in their work, social life, and family life (Tull, 2008).

The tsunami created dramatic events and the ubiquitous threats of mass destruction. These events have heightened the recognition of the role of nurses in disaster management and response. Healthcare providers including nurses must respond to the tsunami affected patients. The nurses should be able to provide disaster response, communicate with disaster command, and evacuate patients as soon as possible. Unfortunately, most of the nurses are unprepared to respond to the disaster emergency. Many cases indicated inadequate nursing care, medical care, poor communication, chaotic management, and meager patient evacuation (Collander et al., 2007). For enhancing the capacity to respond to disaster and other public health emergencies, it will require a nursing work force, which is clinically rich in skills and experiences. In addition, nurses should have sufficient knowledge and skills to respond to tsunami disaster with confidence and authority (Veenema, 2006).

The nurses should have sufficient knowledge and skills in caring for tsunami patients. Several studies showed that ineffective medical response and lack of nurses' clinical skills were responsible for least care of the tsunami patients. Watcharong, Chuckpaiwong, and Mahaisavariya (2005) found that several problems arose in the care of trauma tsunami patients. The available medical personnel were inefficient in skills, equipment handling, and surgical facilities to deal with the huge number of patients effectively. The failure of the communication system, the ineffective rescue facilities in the hospitals also hindered in the care of traumatic tsunami patients. Almost all the patients having wound and open fracture were infected.

Lukthitikul and Hatthakit (2007) studied about wound care for the victims of nurses at hospitals of Phang-Nga province, Thailand. They found that the

nurses insufficient of knowledge and skills to provide care to the tsunami patients having wounds, particularly while cleaning and suturing the wounds. This results in wounds inflammation and infection due to the penetration of the debris, sand, and mud in the tissues. The nurses also lack knowledge and technical experiences for dressing the wounds in closed wound with "vacuum assisted closure" (VAC). Rebmann, Carrico and English (2008) found that nurses lacked skills in infection prevention and control in mass casualty incidents, public education, internal and external communication, and mental health care.

Moreover, for the tsunami occurrence in developing countries during December 2004, it was reported that there is a lack of knowledge and skills in the medical personnel including nurses about mental health care. The responsibility of nurses includes not only treatment but also focus on the tsunami patients about mental health care. The study also suggested to provide basic counseling and to engage nurses in informal education, provide important components of psychosocial rehabilitation such as normalizing, stabilizing, socializing, defusing of emotions and feelings, and to restore the sense of identification with others and safety and security, which will be helpful in normal healing process (Math et al., 2008).

The nurses have to furnish sufficient clinical skills in caring for tsunami patients. Nurses' clinical skills in handling tsunami disaster include triage, acute respiratory care, wound care, mental health care, psychosocial care, spiritual care, and patient referral (College of Register Nurses of Nova Scotia, 2006; International Nursing Coalition for Mass Casualty Education, 2003; Kaewlai et al., 2009). Chan (2009) found that age, higher educational level, and attitude might have influenced nurses' skills. The factors might have influenced the nurses' attitude were

work experience, senior ranking, and higher knowledge. Moreover, age, higher educational level, and senior ranking were factors that influence the nurses' skills.

Nurses' clinical skills are an essential in caring for tsunami patients. Clinical skills of nurses effectively help the nurses in handling the tsunami emergency response. Therefore, the present study assessed the clinical skills for tsunami care and its related factors, and helpful in improving clinical skills of nurses in caring for tsunami patients.

Objectives of the Study

The objectives of this study were as follows:

1. To identify the level of perceived clinical skills for tsunami care among nurses in Banda Aceh, Indonesia

2. To determine the relationship between perceived clinical skills for tsunami care and its related factors among nurses in Banda Aceh, Indonesia

Research Questions

1. What are the levels of perceived clinical skills for tsunami care among nurses in Banda Aceh, Indonesia?

2. Are there any relationships between knowledge, training and education, clinical experience, attending hospital disaster drill, and perceived clinical skills for tsunami care among nurses in Banda Aceh, Indonesia?

Conceptual Framework of the Study

    1. Clinical Skills for Tsunami Care

        The clinical skills for tsunami care focused on the response phase of disaster management. The response phase is the actual and direct implementation of nursing care for tsunami patients in hospital setting. Disaster management was adopted from Kim and Proctor (as cited in Qureshi & Gebby, 2007), consisting of five basic phases which include preparedness, mitigation, response, recovery, and evaluation. Preparedness related to an evaluation of facility's vulnerabilities or propensity for disasters. Mitigation is an effort to reduce the damaging effects of all kinds of disaster. Response is an actual implementation of nursing care or medical intervention on the disaster. Recovery related to a need of the organization and staff to recover, and evaluation related to what have been done and identification of the problems after disaster.

        The conceptual framework of perceived clinical skills for tsunami care in this study were adopted from the concepts of nurses' competencies on disaster management from International Nursing Coalition for Mass Casualty Education [INCMCE] (2003), the College of Register Nurses of Nova Scotia [CRNNS] (2006), and a study from Kaewlai et al. (2009). The INCMCE (2003) proposed nurses' competencies in responding to mass casualty incidents/disasters, the CRNNS (2006) which proposed competencies for registered nurses and nurse practitioners in an emergency/disaster, and Kaewlai et al. (2009) explained the main problems of patients suffering from tsunami trauma. Based on an intensive review of the two concepts and Kaewlai et al.'s study, the researcher concluded that the clinical skills which relevant for tsunami care comprise of (1) triage, (2) acute respiratory care, (3)

wound care, (4) mental health care, (5) psychosocial care, (6) spiritual care, and (7) patient referral.

Those of nurses' clinical skills for tsunami care involve assessment, intervention, and evaluation activities. Triage assessment refers to sorting and identifying by acuity the immediate medical treatment and nursing intervention in newly arrived patients (Zimmermann, Herr, & Scheetz, 2006). Intervention related to skills of nurses to implement triage principle that are specific to disaster management are Simple Triage and Rapid Treatment (START) system, that categorized the victims into 4 groups and assign each group a color (Veenema, 2007). Evaluation related to evaluate the triage principle effectively, in which START principle is used to get the right patient to the right place at the right time for the right treatment.

The nurses' clinical skills in acute respiratory care involve assessment (airway, breathing, and circulation), intervention (positioning, supplemental oxygenation, fluid management, and antibiotic), and evaluation effectively for airway, breathing, circulation, and disability (Chaya, 2005). Moreover, the nurses' clinical skills in wound care assessment consist of identification characteristic, location, and category of wound. Intervention refers to irrigation, debridement, cleansing, packing, and changing the dressing of wounds (Stotts et al., 2004). Evaluation related to evaluate wound' condition such as infection, granulation, and signs of wound healing. Furthermore, the nurses' clinical skills in mental health care consist of assessment of psychological problems in tsunami-affected patients. Intervention is focused on providing credible information, basic counseling, engage informal education, and important components of psychological rehabilitation (Math et al., 2008). Evaluation related to evaluate nursing intervention and outcomes by progressing assessment for

signs and symptoms of those problems. The nurses' clinical skills on psychosocial care consist of assessment of psychosocial distress in tsunami-affected patients, such as loss of families, friends, social networks, and financial incomes. Nursing intervention is focused on providing psychosocial support such as family, friends, and social network. Evaluation is focused on assessing of signs and symptoms of the psychosocial problems.

The nurses' clinical skills on spiritual care consist of assessment of grief and loss, hopelessness, loss of goal of life, anger, and guilty. Intervention is focused on providing counseling, prayer, and participating in religious activity. Evaluation is focused on assessing signs and symptoms of the problems. Lastly, the nurses' clinical skills in referring the patients depend upon the assessment and identifying the health service available in the hospital referred. Intervention is focused on informing the patients and caregiver about referral, complete a transfer summary, confirm with nurses on the transfer unit, and transport of patients' medication, nursing supplies and charts to other unit (Timby, 2003). Evaluation is related to collection of complete data regarding the patients and medical documents before the patient is referred to other hospital.

2. Related Factors of Perceived Clinical Skills for Tsunami Care

In this study, the researcher focuses only on the factors related to improve clinical skills in caring for tsunami patients. Those factors were adopted from several literature including knowledge (Considine, Botti, & Thomas, 2007; Sausa, 2006), training and education (Jensen et al., 2008), clinical experience (Bjork & Kirkevold, 1999; Chapman & Arbon, 2008; Considine et al., 2007; Jensen et al.,

2008), and attending hospital disaster drill (Green, Modi, Lunney, & Thomas, 2003; Kaji & Lewis, 2008; Sweeney, Jasper, & Gates, 2004; Vinson, 2007).

2.1 Knowledge

The nurses' knowledge in caring for tsunami patients were adopted from a study of Maegele et al. (2006) which focused on the physical impacts for tsunami patients, a study of Wickrama and Wickrama (2008) which proposed serious mental health problems among tsunami victims, and a study of Gregor (2005) which described spiritual problems in tsunami survivors. Moreover, Kim and Proctor (as cited in Qureshi & Gebby, 2007) described five basic phases disaster management including preparedness, mitigation, response, recovery, and evaluation. Based on the concept and previous studies, the nurses' knowledge that relevant for tsunami care patients consists of impacts of tsunami; physical, psychological, psychosocial, and spiritual, and disaster management.

2.2 Training and education

Training and education are related to types of emergency training and education for responding to tsunami disaster. Jensen et al. (2008) reported that the training program will be helpful to increasing knowledge and skills. Tippins (2005) found the nurses had more skills and ability to identify initial assessment at critical illness when responding to training.

2.3 Clinical experience

The gaining skills as criteria for experience supports in improving the clinical skills of the nurse and there was a complex relationship between skills and experience and skills were gained through experience (Chapman & Arbon, 2008).

Experiences in terms of exposure to events was also an important source of skills in nursing and in clinical decision-making (Considine et al., 2007).

2.4 Attending hospital disaster drill

Realistic drills and training for hospital personnel in hospital disaster drill will be increasing knowledge and skills to respond to disaster events. Successful medical response to a disaster depends on adequate resources, thoughtful planning, and a community-wide, multidisciplinary process of continuous education and training (Vinson, 2007). Those factors are essential parts related to nurses' clinical skills in caring for tsunami patients. Several studies showed that nurses' clinical skills have significant relationship with its related factors in emergency disaster response (Figure 1).
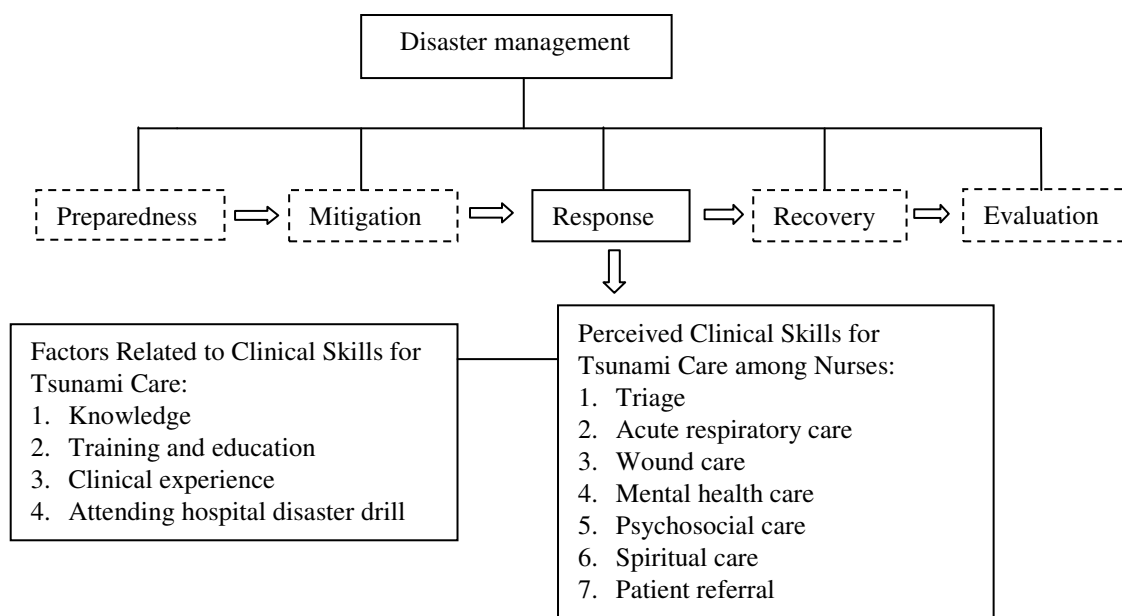
Figure 1: Conceptual framework of perceived clinical skills for tsunami care and its related factors among nurses

Hypotheses

There are positive relationships between knowledge, training and education, clinical experience, attending hospital disaster drill and perceived clinical skills for tsunami care among nurses in Banda Aceh, Indonesia.

Definition of Terms

Clinical skills for tsunami care refers to nurses' perceived ability to practice relevant skills including triage, acute respiratory care, wound care, mental health care, psychosocial care, spiritual care, and patient referral for tsunami patients. Perceived clinical skills for tsunami care were measured with the Tsunami Care Questionnaire (TCQ) developed by the researcher and colleagues (Husna & Hermawati, 2009b).

Related factors of perceived clinical skills refers to factors that are related to nurses' skills for tsunami care including knowledge, training and education, clinical experience, and attending hospital disaster drill. Knowledge refers to the nurses' understanding of impacts of the tsunami including physical, psychological, psychosocial, and spiritual impacts in response phase; and disaster management. Training and education refers to the number and time of nurses attended in emergency training and educational program. Clinical experience refers to perceived specific of nursing activities performed in caring for tsunami patients including triage, acute respiratory care, wound care, mental health care, psychosocial care, spiritual care, and patient referral. Lastly, attending hospital disaster drill refers to the number of nurses attended hospital disaster drill that provided in the hospital.

Related factors of perceived clinical skills for tsunami care were measured with Demographic Data Questionnaires (DDQ), Nurses' Knowledge Tsunami Care Questionnaires (NKTCQ) developed by the researcher, and Nurses' Clinical Experience Questionnaires (NCEQ) developed by the researcher and colleagues (Husna & Hermawati, 2009a).

Scope of the Study

This study was only focused on acute response phase of the tsunami because it was the most important roles of nurses' clinical skills in respond to the tsunami patients. The study was conducted with the nurses who had been working in acute settings; medical, surgical, and neurological wards, and emergency and critical care settings; emergency department [ED], intensive care units [ICU], and operating rooms [OR]) of a provincial hospital in Banda Aceh, Indonesia which was affected by tsunami on December 26, 2004.

Significance of the Study

1. For nursing practice, the research findings provided useful information and an evidence for clinical practitioners and hospital policy makers for importance to increase clinical skills for tsunami care and manage related factors in caring for tsunami patients, particular nurses' knowledge.

2. For nursing education, the research findings provided an evidence or guideline for nurse educator to prepare nursing students about nurses' knowledge and skills for tsunami care, provide disaster management, basic life support (BLS),

advanced cardiac life support (ACLS), and advanced trauma life support (ATLS) trainings on response phase in caring for tsunami patients in hospital setting.

3. For nursing administration, the results of this study provided information to increase nurses' clinical skills for tsunami care by providing training and education regarding emergency and disaster nursing, hospital disaster drill regularly, and hospital disaster plan related to tsunami management, and as a guideline to develop nurses' skills in respond to tsunami in the future.

CHAPTER 2

LITERATURE REVIEW

The literature review for this study includes overview of tsunami, overview of disaster nursing management, perceived clinical skills for tsunami care, related factors of perceived clinical skills for tsunami care, and the relationship between perceived clinical skills for tsunami care and its related factors among nurses in Banda Aceh, Indonesia, are as follows:

1. Overview of Tsunami

2. Overview of Disaster Nursing Management

3. Perceived Clinical Skills for Tsunami Care

   3.1 Triage

   3.2 Acute Respiratory Care

   3.3 Wound Care

   3.4 Mental Health Care

   3.5 Psychosocial Care

   3.6 Spiritual Care

   3.7 Patient Referral

4. Related Factors of Perceived Clinical Skills for Tsunami Care

   4.1 Knowledge

      4.1.1 Impacts of Tsunami

      4.1.2 Disaster Management

   4.2 Training and Education

   4.3 Clinical Experience

4.4 Hospital Disaster Drill

5. The Relationship between Perceived Clinical Skills for Tsunami Care and Its Related Factors among Nurses

Overview of Tsunami

Tsunami is a series of traveling ocean waves of extremely long length generated by disturbance associated primarily with earthquakes occurring below or near the ocean floor. The December 26, 2004 Indian Ocean tsunami reached the heights of 65 to 100 feet in Sumatra, Indonesia causing more than 200,000 deaths in Indonesia and registered on tide gauges throughout the world. Tsunami is triggered by earthquakes, volcanic eruptions, submarine landslides, and by onshore landslides in which large volumes of debris fall into the ocean. The tsunami caused disturbance occurring close to the coastline, and the resulting tsunami can reach coastal communities within minutes (United State Geological Survey, 2006).

Overview of Disaster Nursing Management

Disaster nursing management has purposes to maintain a safe environment and continue to provide essential services to the patients during disaster. Disaster nursing management includes preparedness/risk management, mitigation, response, recovery, and evaluation activities. The essential elements for successful disaster management are appropriate system capacities to support the delivery of services; competent staff or health care providers in their disaster response roles; clearly defined, executable, and practiced disaster plan; and strong partnership with collaborating organizations and agencies (Veenema, 2007). The tsunami December

26, 2004, the response phase activities was focused on providing support system to tsunami disaster including supply medical equipments, medical staff for patients' care, personnel to transfer medical information, support injured psychological needs, and evacuation patients (Lennquist & Hodgetts, 2008).

Particularly to respond to tsunami disaster in acute and emergency response phases, the nurses should have sufficient knowledge and skills for tsunami care with complicated problems such as injuries, traumas, and illnesses. The knowledge and skills might influence the capability and competency of the nurses in caring for tsunami patients. The response phase is the most important to respond to tsunami patients in hospital setting with implementation of nursing knowledge and skills such as assessment, intervention, and evaluation to caring of the tsunami patients.

Perceived Clinical Skills for Tsunami Care

Skills refer to the actions and reactions that an individual performs in a competent way in order to achieve a goal (Ericsson, as cited in Kak et al., 2001). Skills are gained through hand-on training using anatomic models or real patients, or through role-plays and the capacity to perform specific actions (Kak et al., 2001).

Clinical skills for tsunami care in this study were adopted from two concepts regarding nurses' competencies in responding to mass casualty incident/disaster and a study about the main problem patients suffering from tsunami trauma. Firstly, the CRNNS (2006) mentioned about core competencies of registered nurses and nurse practitioners in an emergency/disaster. Secondly, the INCMCE (2003) mentioned about nurses' competencies in responding to mass casualty

incidents/disaster. Lastly, Kaewlai et al. (2009) stated the main problem patients suffering from tsunami trauma. Based on those concepts and Kaewlai et al.'s study, the perceived nurses' clinical skills that relevant in caring for tsunami care have been outlined as follows:

1. *Triage*

Triage is a term commonly used in emergency department (ED) for initial assessment and sorting by acuity for the immediate need of medical treatment in newly arriving patients. In disaster nursing, triage is to maximize the number of survivor or the greatest benefit of triage is for the largest number of survivors. The purpose of ED is to get the right patient to the right place at the right time for the right treatment (Zimmermann et al., 2006).

During disaster, emergency medical service (EMS) and emergency health service (EHS) is provided to response to disaster using triage principles. Specific knowledge is needed to enhance nurses' ability to assist response to a disaster like tsunami (Stein, 2008; Veenema, 2007). Veenema (2007) described that the Nursing Emergency Preparedness Education Coalition (NEPEC) has identified core competency for nurses in triage and accepted triage principles specific to disaster such as the Simple Triage and Rapid Treatment (START) system. START divides the victims into 4 groups and assigns each group a color. GREEN refers to delay, injured or ill, but stable and not likely to deteriorate if treatment is delayed, YELLOW refers to urgent, acute problem and stable but may deteriorate, delayed intervention (up to one hour). Furthermore, RED is critical, unstable with acute problem, needs immediate intervention to save life or limb, and transport immediately. BLACK is

expectant, dead or no salvageable given the lowest of transport priority. There are three well-known disaster triage systems (Qureshi & Gebby, 2007):

   a) Simple Triage and Rapid Treatment (START) system (for triaging adults)

        The START is based on the person's ability to respond verbally and ambulate, and identify patient's respiration, perfusion, and mental status (RPM). The START triage technique involves assessment of respiration, perfusion, and mental status.

Table 1

Assessment of Respiration, Perfusion, and Mental Status for Adults

Categories (Color)	RPM Indicator
Critical (red)	R= respiratory rate > 30 P= capillary refill 2 seconds M= does not obey commands
Urgent (yellow)	R< 30 P< 2 seconds M=obey commands
Expectant: dead or dying (black)	R= not breathing

   b) JumpSTART system (for triaging pediatric patients)

        The JumpSTART system was created to meet the unique needs for assessing children less than 8 years of age. The objectives of JumpSTART: 1) to optimize the primary triage of injured children in the mass casualty incidents (MCI) settings, 2) to enhance the effectiveness of resource allocation for all MCI victims, and 3) to reduce the emotional burden on triage personnel, who may have to make rapid life or death decision about injured children in chaotic circumstances.

c) START/SAVE triage

The triage is a modified version of Simple Triage and Rapid Treatment (START) that substitute radial pulse for capillary refill, coupled with a system of secondary triage termed as Secondary Assessment of Victim Endpoint (SAVE). The SAVE assesses survivability of patients with various injuries and the basic of trauma statistics uses this information to describe the relationship between expected benefit and resources consumed.

Kahn, Schultz, Miller, and Anderson (2009) stated that START achieves at least 90% sensitivity and specificity for each triage level and ensures that the most critical patients are transported first to hospitals. START adequately identifies many patients with minor injuries. The START protocol has been proposed to identify salvageable victims from those with imminent mortality. Kennedy, Aghababian, Gans, and Lewis (1996) stated the nurses must keep their skills active and have appropriate training for concepts of triage and resources.

2. *Acute Respiratory Care*

Aspiration is common problems among tsunami patients due to near drowning. Aspiration pneumonia is related with near drowning, is an important cause of death among tsunami patients. Aspiration of seawater, mud, and marine debris into the respiratory tract provides pathogenic inoculums of pulmonary infection, inducing pneumonitis and pneumonia. Tsunami patients not only aspirate water, but also soil and particulate matters (Kaewlai et al., 2009).

Respiratory distress syndrome, cardiovascular distress, cardiac arrest, salted water aspiration developed complication associated with drowning. Near

drowning condition caused respiratory and cardiogenic shocks which were common problems encountered in tsunami affected patients (Prasartritha, Tungsiripat, & Warachit, 2008). Addressed respiratory tract infections and pneumonias were commonly found several days after the tsunami among the patients who survived from near drowning (Wacharong, Chukpaiwong, & Mahaisavariya, 2005). Tsunami patients involved the aspiration of immersion fluids as well as marine and soil debris into the respiratory tract, thus producing intra-pulmonary inoculation of bacteria. In accordance, all patients admitted to hospital displayed radiological and clinical signs of pneumonitis and pneumonia (Maegele et al., 2006). Tsunami lung or tsunami-related aspiration pneumonia is used to describe lung pathology in tsunami patients who have necrotizing, cavitary pneumonia that may create complication with empyema, pneumothorax, and hematogenous spread of infection (Kaewlai et al., 2009).

Tsunami lung occurs when people being swept by tsunami wave's inhale salt water contaminated with mud and bacteria. The resulting pneumonia like infections normally is treated with antibiotics. However, the 2004 tsunami wiped out the medical infrastructure, and antibiotics were not available to treat the infections in the early stages. Consequently, patients' lung infections festered, entered the bloodstream, and spread to the brain, producing abscesses and neurological problems such as paralysis. The diagnosis of tsunami lung requires a chest radiography and computed tomography scan of the brain to confirm abscesses (Potera, 2005). Patients showed high risk of polymicrobial infection of the lungs with various pathogens including *Aeromonas spp., Pseudomonas spp., Acinetobacter baumanii, Enterococcus faecium*, and *Klebsiella pneumonia*. The patients were usually affected with a higher

frequency of shock, respiratory failure, renal failure, and mortality (Kaewlai et al., 2009; Maegele et al., 2006).

Many patients after swallowing tsunami water developed aspiration pneumonia. A study by Chaya (2005) reported that the tsunami patients have developed aspiration pneumonia and showed febrile and shortness of breath. Intervention focused on intravenous fluids, antibiotics, acetaminophen, and supplemental oxygen. Patients with shortness of breath became unresponsive and stopped breathing, were provided with the advanced cardiac life support protocol (cardiopulmonary resuscitation/CPR), intravenous fluids, and several rounds of epinephrine and atropine.

Aspiration pneumonia, inhalation, and injury may develop acute respiratory distress syndrome (ARDS) that is most common respiratory problems for tsunami patients. ARDS is a critical and often fatal complication associated with sepsis, trauma, major surgery, and many serious illnesses. The mortality rate has been reported as high as 90%, but that appears to be decreasing with improvements in treatment techniques. Current treatment for ARDS relies on supportive measures to maintain adequate oxygenation until the lungs recover. Conventional therapy includes endotracheal intubation and volume cycled mechanical ventilation (Dirkes, 2002).

Aspiration caused salted water pneumonia, asphyxia, and ARDS. There were totally 2,311 patients attacked by tsunami, nearly 40% suffered from salted water aspiration, while 2% developed complication associated with near drowning. Mud, sand, and dirt were seen in the mouth and throat of the victims (Prasartritha et al., 2008). World Health Organization (2005b) found that patients with acute

respiratory infections (62%) for epidemic-prone disease surveillance and response after the tsunami in Aceh Province, Indonesia.

The nurses have to assess main signs of the tsunami affected patients which includes respiratory distress profound hypoxemia and diffuse bilateral alveolar infiltrate on chest X- ray (white lung), breathless, tachycardia, and increase effort of breathing, decreases $PaCO_2$, hypoxemia, hypotension, and decrease urine output (Harcombe, 2004). The nurses also have to assess for airway, breathing, circulation, and disability in maintaining adequate oxygenation for the patients. Airway is established a patent airway by positioning, suctioning, and oxygenation. Breathing related to assess breath sounds and respiratory effort, observe for chest wall trauma or other physical abnormality. Circulation involves monitoring vital signs, especially blood pressure and pulse rate. Disability refers to evaluating the client's level of consciousness (LOC) using ALERT (alert, responsive to voice, responsive to pain, unresponsive) and Glasgow Coma Scales (GCS), and re-evaluate frequently the client's LOC (Kozier, Erb, Berman, & Snyder, 2004).

To caring for tsunami patients with circulation problems due to acute respiratory distress, the nurses should have sufficient knowledge and skills to assess cardiovascular functions of patients to maintenance circulation, monitoring vital signs and identify signs of shock such as hypovolemic, cardiogenic, and septic shocks. Morrison (2007) described that shock is the manifestation of the rude unhinging of the machinery of life. Hypovolemic shock associated to cold, clammy skin, reduce peripheral perfusion, tachycardia, oliguria, tachypnea, metabolic acidosis, hypocapnia, and decrease cardiac output. Furthermore, cardiogenic shock associated to cardiovascular collapse because of cardiac disease, which is characteristics with

decrease cardiac output, increase heart rate, tachycardia, vasoconstriction, and increase after load. Septic shock is associated with stimulation of the host inflammatory response by an infecting organisms or one of its biological product, the signed with hypovolemic, dissociate, and cardiogenic shock.

Nursing intervention in patients with ARDS focused on fluid management involve fluid resuscitation to maintain cardiac output and tissue perfusion. Fluid balance should be considered due to contribution to worsening pulmonary edema. Patients are provided with ventilator support with positive end expiratory pressure (PEEP) to prevent alveolar atelectasis and improve oxygenation. Monitor pulmonary artery pressure (PAP) in range 25/10 mmHg and pulmonary artery wedge pressures (PAWP) in range 4-12 mmHg. To maintaining respiratory support, patients in prone position to improve oxygenation effectively in reduction of oxygen toxicity, risk barotraumas for alveolar, and optimization of postural drainage (Kozier et al., 2004).

Moreover, altering the patients' position to prone, improve oxygenation by reducing the ventilation perfusion mismatch and decrease the shunt. Tissue injury of patient can be prevented by changing patients from a supine to a prone position and thus prevents the use of high inspiratory and expiratory pressures (Harcombe, 2004). Anti-infective therapy are provided to patients with acute respiratory problems consisting of ampicillin/sulbactam, carbapenemes, fosfomycin, rifampisin, linezolid and glycopeptides (Maegele et al., 2006).

3. Wound Care

The tsunami patients were show several injuries, traumas, and wounds. The study of Watcharong, Chuckpaiwong, and Mahaisavariya (2005) showed that wound caused tsunami has specific characteristic; multiple in number, small to medium size, present on the head, face, and extremities, back, buttock and legs. Most of the wounds belong to lower (49%), and upper extremities (32%). Maegele et al. (2006) stated that wounds caused tsunami were significantly contaminated with foreign materials such as seawater, mud, sand, soil, vegetation, stick, and corals inside the cavity.

Prasartritha et al. (2008) mentioned that several traumas to the parts of the body and extremities were sustained when the wave hit and swept the affected patients. Patterns of injury can be ranged from minor abrasion to large lacerated wound. Fracture, dislocation, and tendon injury were also common problems found in tsunami patients. Debridement was needed in nearly 90% of the cases and causes of death were near drowning and blunt trauma.

Patients who survived the tsunami were severely injured, and the incidence of wound infections was high, being at risk of deadly fungal infections and infections caused by waterborne and highly resistant pathogens. The wound displayed the signs such as pus, foul smell, necrosis, gangrene or subcutaneous emphysema, cellulitis, erythema, swelling or infiltration of adjacent tissue, pain, and delayed healing. Many patient attacked by tsunami were injured by debris and polluted seawater, which contributed to wound contamination and further tissue damage. Patients mainly suffered from trauma such as wounds, fractures, head injuries, and many needed surgical treatment (Geertruid et al., 2006).

A mixture of sea and fresh water, sewage, sand, soil, foreign material causing polymicrobial infection and immediately contaminated wounds. The most common patients infected by gram-negative pathogen, namely *Escherichia coli*, *Klebsiella*, *Proteus species*, *Staphylococci*, and *Streptococci* and infected by bacteria, such as *Pseudomonas*, *Aeromonas*, and *Shewanella*, were probably washed into wounds. Wounds sustained in tsunami disaster are severely contaminated, therefore adequate debridement and delayed suture are recommended for all patients. Anti-infective therapy such as a potent quinolone combined with clindamycin, carbapenems and glycopeptides were used frequently to control infection (Maegele et al., 2006; Watcharong et al., 2005).

Tsunami injuries are categorized into two main groups, which are soft tissue injury and fracture or dislocation. Soft tissue injuries are classified into minor wounds and major wounds. The minor wound is defined as abrasion, scratch, or small-lacerated wound, which has no need for debridement. The major wounds refer to lacerated wounds with or without skin loss, multiple lacerated wounds, or infected wounds excluded necrotizing fasciitis and open fracture. Fracture and dislocation group included closed or open fracture, single or multiple fractures and dislocation (Prasartritha et al., 2008).

For tsunami patients with fractures, the nurses have to assess signs and symptoms of fracture such as local pain, local bleeding, local swelling, deformity or dislocation, numbness, and paralysis. Moreover, the nurses should be able to identify complications of fracture such as bleeding, hemorrhage, shock, and death (Ignatavius & Workman, 2006). The nurses should provide adequately treatment of fracture that involves reduction, immobilization, and rehabilitation of the fracture. Reduction

aimed to restore alignment and use of internal or external fixation devices to immobilize the fracture. Rehabilitation is particularly important and can prevent complications such as pressure ulcers, deep vein thrombosis, constipation, and urinary stasis. The nursing care for patients with fractures is complex and should include hemodynamic monitoring, pain assessment and management fracture (Scott, 2009).

Many tsunami patients suffered from trauma and injury in different pain levels. The nurses should have sufficient knowledge and skills to assess tsunami patients for pain levels. Johnson (2005) described the numeric pain scale (NPS), it is used to measure pain severity by using whole numbers. The line or bar is marked with whole numbers from 0 to10. Interpretation of pain based on score 0 = no pain, 1 to 3 = mild pain, 4 to 7 = moderate pain, and 8 to 10 = severe pain. In order to assess pain effectively, the nurses must be able to adequately assess pain severity in diverse condition of patients, understand how to monitor physiologic changes associated with pain and its treatment, be prepared to address the psychosocial experiences accompanying pain and know the consequences of inadequate analgesia (Dunwoody, Krenzischek, Pasero, Rathmell, & Polomano, 2008).

Wound care is an important part of the overall treatment for tsunami patients. Wound care consists of changing the dressing, packing wound, irrigation, debridement process of removing dead tissue, cleansing the wound, or providing a protective environment. Local care is an integral part of treatment of wounds and reduce bacterial burden, contain exudates, protect the wound from iatrogenic damage, and lead to wound closure. Care of wound healing by secondary and tertiary intention includes dressing change, packing, irrigation, and debridement (Stotts et al., 2004).

Types of wound care procedures involve dressing change and reapplication of a covering to the wound. Packing is insertion of material into a wound cavity and covering of the wound with a secondary dressing to prevent invasion of organisms. Irrigation refers to applying fluid under pressure to remove adherent materials and by products of wound metabolism from the surface of the wound. Debridement is removal of necrotic material and slough from the wound (Stotts et al., 2004).

Particularly, for management of wounds caused by tsunami focus should be on surgical removal of devitalized tissue and aggressive debridement. Injuries of that types require careful debridement including removal of devitalized and infected tissue while stabilizing remaining vital tissues, early operative care of critical structures to prevent later morbidity including amputation and frequent wound dressing changes. During the interim between initial wound surgery and secondary closure, wound were protected using vacuum-assisted closure systems. A major benefit vacuum-assisted closure system is the reduced need for dressing changes. Furthermore, vacuum-assisted closure therapy draws wounds closed by applying controlled negative pressure while smoothly removing infectious material and interstitial fluids, thus allowing tissue decompression. This system promotes cutaneous perfusion and formation of granulation tissue in the wound. Using this system, definitive wound closure could be achieved within the first week of occurrence of wound (Maegele et al., 2006).

Antibiotic and tetanus prophylaxis are pre-requisite to all patients who have sustained wounds. If the wound is tetanus prone, the patient should also receive tetanus immunoglobulin to prevent tolerance to antibiotics. A tetanus-prone wound is

one where the conditions for spore multiplication are favorable. These include deep penetrating and puncture wounds where the conditions are likely to be anaerobic, wounds with devitalized tissue, for example, burns, crush injuries, compound fractures, wounds contaminated with dirt or manure, wounds containing foreign bodies, and delayed wound cleaning (Sloan & Summers, 2006).

Purpose of wound dressing is to provide an environment that will enhance wound healing while offering from trauma. Wound dressings can also help in decreasing or eliminating the pain, reduce need for dressing changes and provide antibiotic debridement. Choosing the right dressing depend on wound bed characteristics such as wound draining, dry, need moisture, need debridement, and infection (Baranoski, 2008). There are some common categories of wound dressings consisting of absorptive dressings, alginate dressings, antimicrobial dressings, biological dressings, collagen dressings, composite dressings, contact layer, hydro gel dressings, impregnated dressings, silicone dressings, transparent film dressings, wound fillers, foam dressings, gauze, non-woven dressings, and hydrocolloid dressings (Mendez-Eastman, 2005).

In caring for tsunami patients with mild and severe injuries, wound dressings may protect the wound from any contaminating agent and microorganism. Walker (1996) stated that the gauze may inhibit bacterial penetration and may reduce infection in partial and full thickness of wounds. The gauze, which is easily available and relatively inexpensive, is used widely in wound care. A conservative treatment absorbs minimal exudates and should be placed into the wound in a moist state and removed while still moist. To maintain a moist wound bed, gauze should be moistened with normal saline or a wound gel, but not be so wet that the moisture

comes through the cover dressing. The gauze should remain moist while in the wound, so it usually needs to be changed every six hours. When used properly, gauze dressings are conservative and safe on stage II (the topmost layers of skin is severed), III (the fat layer and subcutaneous is severed), and IV (the bone and muscle is severed with death tissue and drainage). The enzymatic debridement is accomplished by coating the wound bed with topical enzymes that digest necrotic tissue.

According to Black (2005) nursing management of a client with acute inflammation includes minimizing complications of the edema with inflammation, reducing the inflammatory response, and monitoring systemic response.

a) Controlling the effect of edema

Rest, ice, compression, and elevation (RICE) system can be used to reduce the effect of edema. Ice is used to control the inflammatory response in extremities, particularly when edema and pain are present. Analgesic may be required for pain control.

b) Reduce inflammation

Reduce inflammatory agent may be prescribed to stabilize the mast cell and reduce edema in the affected area, for example non-steroid anti-inflammatory drugs (NSAID). Foreign bodies may be removed to reduce the cause of the inflammation.

c) Monitor system responses

Temperature is monitored and fever is treated with antipyretics. Client's temperature is monitored closely to prevent harm. The client with a fever may also experience malaise, nausea, anorexia, weight loss, tachypnea, and

tachycardia. The diet of the client suffering from inflammation should be high in vitamin C, protein, calories, and fluids.

The most of cleansing agents and dressings that were used for patients with trauma on wounds care were normal saline, providone iodine, hydrogen peroxide, and using contact layer gauze, telfa, and enzymatic debridement. Tsunamis injury causes severe acute pain (Stotts et al., 2004). In caring for patients with acute pain, the nurses should have sufficient knowledge and skills regarding pain management with pharmacological and non-pharmacological approaches. The pharmacological approach focused on analgesia therapy. For curing pain pharmacologic treatments were used such as opioids, sedatives, non steroidal anti inflammatory drugs (NSAIDs) and local treatment included lidocaine injection and topical eutectic mixture of local anesthetic (EMLA) cream (Stotts et al., 2004).

Furthermore, non-pharmacological treatment focused on physical and psychological approaches. Stevensen (1995) stated that the physical therapies and other complementary techniques such as massage, reflex zone therapy, acupuncture, shiatsu, therapeutic touch and transcutaneous electric nerve stimulation (TENS). Finally, the psychological therapy includes pre-operative information giving, cognitive methods, distraction, music, humor, hypnosis, relaxation training, guided imagery, and biofeedback. Stotts et al. (2004) studied pain management for non-pharmacotherapy showed that using humor (18.9%), distraction (15.5%), and deep breathing (12.1%) were effective in curing pain.

4. Mental Health Care

Psychological disorder is the most common problem aftermath of tsunami disaster. The nurses have to assess and identify psychological problems of tsunami patients. Foa, Stein, and McFarlane (2003) stated that psychological problem in acute phase included acute PTSD, traumatic grief, major depressive disorder, general anxiety disorder, panic disorder, and somatic symptoms. Acute stress disorder is most common problem followed by an exposure to traumatic event such as the tsunami.

According to Maegele et al. (2006) stated that during tsunami disaster among patients and relatives, showing clinical symptoms of post traumatic psychological stress response. The majority of patients complained of nightmares, emotional detachment, sleep difficulties, flashbacks, headaches, and intrusive thoughts based upon their experiences during the disaster, such as awareness of people drowning and dying, or guilt and anxiety over children and relatives that were carried away by the wave and were unable to save.

The nurses should have sufficient knowledge and skills to assess characteristics of psychological disorders such as anxiety, panic, dissociation, grief reaction, depression, increase stress level, sleep disruption, loss of psychosocial resource (coping skills and social support) and problem specific to childhood and adolescence include clinginess, tantrums, acts of disruption or delinquency (Hughes et al., 2007). The nurses also should be able to assess the psychosocial problems such as family dysfunction, addictive behaviors, and even suicidal efforts (Veenema, 2007).

Nurses play a contributing role in mental health recovery from emergencies of the patients. Nursing intervention on mental health care focused on

reducing the psychological impacts of tsunami. Stress is normal body natural reaction in response to a physical and emotional stress. Stress may be positive in activating a person's body, mind, and energy. However, if stress lasts too long, the body is resources will be exhausted and the person will develop harmful or negative forms of stress reactions (International Federation of Red Cross & Red Crescent Societies, as cited in Hughes et al., 2007).

In acute emergency response, mental health intervention consents to provide credible information to establish physical safety, relief efforts, and the location of relatives. Access to valid information is a basic right and essential parameter to reduce public anxiety and distress. Information should be uncomplicated, emphatic, showing understanding of the situation of the patients. The patients may encourage normal activities and active participation in the community such as re-establishing cultural and religious events. Health professional should be active for safe and effective implement of all these activities (Ommeren, Saxena, & Saraceno, 2005).

Mental health care response for Indian Ocean tsunami Aceh, Indonesia, 2004 focused on psychoeducation, crisis intervention, behavioral cognitive strategies, traditional healing, ritual, relaxation technique, pharmacotherapy, expressive methods, rehabilitation, and networking. Most of the mental health care activities were trainings, counseling, group work, and community development (Sundram et al., 2008).

The role of nurses in mental health care in disaster situation is related to assisting the affected people to resume daily life activities, facilitating them so that they can return to the normal life, family, and community. The patients need to

achieve grievance for their losses and help to reduce problematic tension, anxiety, or despondency to manageable levels. Psychological interventions can be provided to the patients including psychological assimilation and minimizing the negative impact of tsunami, help patients in returning to normal psychological and social functioning, restoring feeling confidence, competence, self sufficiency and control, and perform clear communication strategy by rigorous treatment of information (Lauredeau, Labarre, & Senecal, 2007).

The most essential part during tsunami response is the message must be clear, life saving, and allow health care teams to coordinate well in the face of event overwhelming without panic. Equipment and resources, training of hospital staff in disaster management and meaningful health care in mass casualty situation could measure the strength of trauma response. Education and preparedness should routinely be practiced for disaster response through scenario based training (Johnson & Travis, 2006).

5. Psychosocial Care

The psychosocial and emotional problems are particularly related with family dysfunction, addictive behaviors, and sometimes even suicidal (Veenema, 2007). Tsunami also caused emotional reaction to loss of livelihood, loss of loved ones, and displacement of homes (Tuicomepee & Romano, 2006).

Many child and adult who experience the tsunami disaster required mental health intervention by psychological support in the form of play therapy technique including drawing, doll play, storytelling, puppet shows, and grouping painting activities. Many of the children exhibited regressive behaviors such as

clinging and bedwetting, fearfulness and startle reactions, sleep disorders, anxiety, helplessness behavior, and somatic complain. Moreover, adult survivors showed guilt and anger, fear, depression, anxiety symptoms of hypervigilance, hyperarousal, sleeplessness, depersonalization, and panic attacks. Facilitating discussion and ventilation of emotion in groups are needed for expression and resolution of disaster experience (Becker, 2007).

The essential of psychosocial care for adults in the training program were ventilation, empathy, active listening, social support, externalization of interests and recreation to distract thought from the disaster, relaxation techniques, and spirituality as a part of the overall rebuilding process. Psychological care include normalization and ventilation of feelings, decreasing somatic and psychological symptom, using of culturally appropriate proverbs to facilitate the meaning of disaster, and providing practical assistance with accompanying emotional sensitivity and support (Becker, 2007).

Nursing intervention focused on providing psychosocial first aid, behavioral cognitive strategies, traditional healing, ritual, relaxation technique, pharmacotherapy, group and family work, expressive methods, rehabilitation, and networking. Raising psychosocial awareness and psychoeducation were communicated through pamphlets, media (popular media, interviews television, and radio), lectures, discussion, and dramas (Sundram et al., 2008).

Psychosocial care is a community-based program that provides basic mental health services in affected communities and aims to restore security, independence, and dignity to individuals, promote community resilience, and prevent psychiatric morbidity and further social disruption. Psychological care also include

essential mental care as integral part of relief, rehabilitation, and deconstruction (Becker, 2007).

6. *Spiritual Care*

Spirituality viewed as an ontologically impulse toward union or relationship with god or ultimate transcendent reality. Spiritual assessment as the process of gathering, analyzing, and synthesizing spiritual and religious information into a specific framework that provides the basis for, give direction to, subsequence practice decisions. Assessment should include an exploration of three parts: 1) denomination or faith tradition, 2) significant spiritual beliefs, and 3) important spiritual practices (Hodge, 2006).

A person' spiritual dimension include not only religious belief but also one's sense of purpose and meaning in life. Spiritual strength can promote healing of the physical body. The tsunami patients may develop spiritual distress or problems, which is characterized by questioning the meaning and purpose of life and suffering, and expression of grief as well as powerlessness and hopelessness. Expression of grief related to present losses (Julia & Joyce, 1996).

Spiritual assessments are used by discussion of fears and concern to the meaning and purpose of life. Appropriate teaching and counseling strategies were implemented when patients exhibited signs of spiritual distress or problems. Interventions are focused on using of prayer and participating in religious ritual. Grief counseling, cognitive reappraisal, reminiscence therapy, presence, and active listening are used to promote integration of body, mind, and spirit. Spiritual counseling is

accomplished by non-judgmental listening, provision of opportunity to practice religious rituals (Julia & Joyce, 1996).

Spiritual issue might important to adolescents who are facing unique social, emotional, intellectual, and professional stressor. Spiritual coping mechanism and treatment are common among young people with chronic illness and with psychological issues (Rubin, Dodd, Desai, Dollock, & Pole, 2009). The nurses exhibited a willingness to take account of spiritual and existential needs. The factors that influence the attitude to spiritual care include non-organized religiousness, belief in God, belief in life after death, and organized religiousness. The concept of religion and religiousness to describe spirituality are influenced by social, institutional, and cultural contexts. The religiosity as a coping resource that is influence by culture (Ekedahl & Wengstrom, 2009).

7. Patient Referral

During emergency response, referring the patients based on the patients' conditions in pre hospital evaluation and triage system. Reddy et al. (2008) stated that multidisciplinary activities involved in management of patients' referral to achieve medical services such emergency medical services (EMS) unit, police, communication center, other hospitals, nurses, physicians, volunteers, and social workers as soon as the case is referred. Referral will depend on both the availability of the medical facilities and nurses and skills levels of medical staff.

Referral is process of sending patients to other hospitals or agencies for special services. Generally, a transfer or referral has some advantages for the patients. It may facilitate specialized care in a life-threatening situation or reduce health care

cost for the patient. In transfer or referral system, the nurse is able to inform the patients and families about the transfer or referring, complete a transfer summary, speak with nurses on the transfer unit, and transport patients' medication, nursing supplies, and chart to other units (Timby, 2003).

According to Hughes et al. (2007) the development of referral pathways could include identifying the health services available in the referred hospital. Developing a team approach and spreading the expertise is important responsibility for of the hospital staff. Falcone, Herron, Werman, and Bonta (1998) stated that patients referred from hospital lacking the available medical equipment to another hospital is assumed to improve outcome by providing rapid response in minimizing time and patient definitive care.

Related Factors of Perceived Clinical Skills for Tsunami Care

1. Knowledge

Knowledge is the lowest level of cognition to remember factual material and development of intellectual skills. Knowledge includes recall or recognition of facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills. Knowledge is valuable mainly to think in more profound ways (Sausa, 2006). Intellectual skills is gained during a course of study which can be transferred to other situations, which may occur from learning situation (Lauder, Reynolds, & Angus, 1999).

Knowledge is described as factual, procedural, and conceptual. Factual knowledge is the knowledge of the set of facts. Procedural knowledge is related to the performance of activities or associated with action, such as decision rules and clinical

guideline. Conceptual knowledge is the assimilation of new information with prior knowledge and results in a deeper level of understanding. Knowledge is commonly used as a major influence in clinical care. Knowledge is acquired through formal and informal study in conjunction with experience in a specific domain of nursing practice (Considine et al., 2007).

The nurses should have knowledge in caring tsunami patients in all phases of disaster. In this study, nurses' knowledge on tsunami care was focused on conceptual knowledge of nurses in caring for tsunami patients in response phase. The knowledge regarding of tsunami care is a new issues who have to be well prepared and understood by the nurses. The knowledge of nurses leads to order in helping tsunami care patients in this phase. According from Kim and Proctor (as cited in Qureshi & Gebby, 2007), five basic phases to a disaster management include preparedness, mitigation, response, recovery, and evaluation. Maegele et al. (2006); Wickrama and Wickrama (2008), states the physical impacts for tsunami patients, and serious mental health problems among tsunami victims. By reconceptualized and reorganized those concepts and a study, the researcher concluded that the nurses' knowledge that is relevant in caring for tsunami patients are impacts of tsunami and disaster management, which are outlined as follows:

1.1 Impacts of Tsunami

The tsunami affects the communities and population in different ways. Death, injuries, wounds, fractures, and aspiration caused due to salt drowning are common problems. The tsunami caused impacts on physical, psychological, social, and spiritual well being.

1.1.1 Physical impacts

Tsunami caused several traumas and injuries in difference ways. Many tsunami patients were injured by the stone, trees branches, broken glass, and metal from building brought by tsunami waves. Most of the patients sustained lower-limb injuries because of being submerged in the water, and most of the survivors had minimal to moderate injuries to the body and extremities (Watcharong et al., 2005).

Severe skin injuries, wounds and multiple fractures are common problems for tsunami patients. Maegele et al. (2006) stated that the tsunami patients have multiple large flap laceration at various body sites. Lower extremities were mostly affected (88%), followed by upper extremities (29%), and head (18%). Two-thirds of patients had combined injuries to the thorax for instance, pneumo/hemopneumothorax, including intrapulmonary contusions and lesion, and fractures of the extremities, both open and closed.

On the other hand, the other physical effects of the tsunami and earthquake leads to the potential diseases such as ARDS, asphyxiation, coccidiodomycosis, crush syndrome, death, drowning, extremity injury, myocardial infarction, skin and soft tissue injuries, head trauma, chest trauma, lung injury, fracture, wound and long term of infectious, water or insect transmitted diseases, and tetanus (Jones, 2006). Tsunami may cause some of disease including cholera, amebiasis, cryptosporidiosis, hepatitis A and B, and leptospirosis. Other endemic diseases were parasite infections, rotavirus, shigellosis, and typhoid fever (Veenema, 2007). Tsunami may also affect physical symptoms like pain and sleep disturbance (Hatthakit & Thaniwathananon, 2007).

The nurses have to play an important role to assess physical impacts and problems that occurred during disaster response. Clinical skills and knowledge should be provided during assessment, developed nursing diagnosis, and nursing intervention. Nursing intervention should be provided to manage patients with severe injury and wound by immediate and accurate pharmacological and non-pharmacological approach to reduce patients' morbidity and mortality.

1.1.2 Psychological impacts

Most people exposed to disasters are resilient and recover from post-disaster psychiatric problem. Disaster also indicates that the serious mental health problems do prevail among a substantial portion of disaster victims and that prevalence rates may vary considerably (Wickrama & Wickrama, 2008). Veenema (2007) stated disaster might cause mild anxiety and family dysfunction, conduct disorder, addictive behaviors, depression, widespread panic, severe depression and even suicidal.

Hatthakit and Thaniwathananon (2007) stated tsunami also cause psychological symptoms such as anxiety, depression, PTSD for different length of time, fear, irritability, and decrease concentration. According to Foa et al. (2003) mentioned that the psychological problems for emergency or acute phase consist of PTSD, traumatic grief, major depressive disorder, generalized anxiety, disorder, panic disorder, and somatic symptoms.

One study by Wickrama and Wickrama (2008) showed that several factors related with tsunami caused mental health risk such as serious injuries, property destruction, death, family disorganization including conflict between family members and experience of family problem might lead to PTSD and

depression. Psychological problems are the common issue in the tsunami response. On February, 2005 WHO estimated that up to 50% of the five million people affected by the tsunami would experience moderate to severe psychological distress. Approximately 5-10% would develop persistent problems such as depression, PTSD or other anxiety disorders. The symptoms characterized by flashbacks, emotional detachment, sleep difficulties, other disruptions, and other anxiety disorders. Psychological counseling and intervention was initiated as early as possible and led to relief of symptoms (Maegele et al., 2006).

Moreover, the study by Lommen, Sanders, Buck, and Arntz (2009) showed that one-month post-tsunami, 72 participants (63.7%) met the criteria for PTSD. The number of people meeting the criteria for PTSD at the time of the study decreased to 59 (52.2%), including one person (0.9%) diagnosed as PTSD with delayed onset. The patients who are exposed to the disaster can have a risk of developing mental health problems. Other study showed that the most common psychological problems are depression (41%), PTSD (22-59%), generalized anxiety disorder (20-29%), and substance abuse disorders (14-22%) (Tuicomepee & Romano, 2006).

1.1.3 Psychosocial impacts

The tsunami caused also psychosocial problems such as loss of loved ones, finance, homes, loss of social network like families and relatives, loss of business because tsunami provided devastating effects, uncertainty regarding missing family, and vulnerability (Hatthakit & Thaniwathananon, 2007).

A study showed that many tsunami patients have lost their children, the children lost their parents, wives lost their husbands, and deaths in

every family are very common. They could not return to the sites to find the bodies of their loved ones. They also had been jobless and do not know what the future holds for them (Ekachai, 2005). Moreover, Dalgard, Bjork, and Tambs (as cited in Syarifah, 2009) found that there are several long lasting adversities of stressful event. Those problems are related to family, housing, work, economics, health, children, interpersonal relations, and other aspects of life.

1.1.4 Spiritual impacts

Tsunami caused spiritual symptoms for patients and family such as loss of goal in life, instant anger, and guilt (Hatthakit & Thaniwathananon, 2007). Moreover, the psychospiritual impacts of tsunami patients with experiencing a grief, guilt, and fear, in the things which they have lost and thus can see no future and they loss the will to live (Gregor, 2005).

1.2 Disaster Management

According to Kim and Proctor (as cited in Qureshi & Gebby, 2007), disaster management encompassed five phases, have been outlined as follows:

1.2.1 Preparedness

Preparedness is related to evaluation of the available facilities for vulnerabilities or propensity of disasters. Melsh, Weidemeyer, Ingram, and Schwartz (2002) described that disaster preparedness refers to proactive efforts undertaken by individuals, families, group or whole communities to place them in a better state of readiness to withstand or avoid the immediate impact of any kind of disaster. Tsunami is an unpredicted situation, thus, the nurses should be aware and prepared with the knowledge, skills, ability, authority, expected role, and equipment

that are required for providing care. Disaster training and education disaster plan and surge capacity of acute setting are an essential part of disaster preparedness. One study found that 92% voted for incorporation of disaster nursing in the nursing curriculum, 21% voted for prepare disaster event in the curriculum, 11% voted for disaster preparedness training in a community nursing course, and 4% voted for disaster preparedness education for nursing student (Chapman & Arbon, 2008).

Surging of capacities in acute setting, adequately trained staff to perform triage of patients and frequent of casualties in emergency department and hospital disaster plans should be standardized. Optimum way to prepare disaster preparedness system is by linking knowledge and education in disaster management to stimulated or "tabletop" exercises and "real time" drill with staff using "moulaged casualties" and smart simulation victims. Preparedness of disaster is essential means to build sufficient surge capacity into major trauma centers, intensive care, operating theater, medical imaging area and wards to accommodate victims and improve the hospital surge capacity (Chapman & Arbon, 2008).

1.2.2 Mitigation

These steps are taken to lessen the impact of disaster and considered as preventive measure. Melsh et al. (2002) states that disaster mitigation includes a wide range of activities at the household, community, state and national level that aimed to reduce the damaging effects of all kinds of disaster. Boe (2008) also described that mitigation is sustained action taken to reduce or eliminate long term risk to people and property from hazards and their effects. The application of mitigation practice can ensure that damage is reduced during disaster.

1.2.3 Response

The response phase is the actual implementation of the disaster. Response activity needs to be continually monitored and adjusted to the changing situation. Melsh et al. (2002) stated that the emergency response involve rescue operations, mass shelter, mass feeding and overall stabilization of the disaster-affected community.

During response phase, a study in Krabi hospital Thailand during tsunami December 26, 2004 showed that the patients were triaged into two broad categories: trauma that required immediate surgical intervention with less severe surgical trauma and more manageable injuries. The emergency department is also divided into two areas: triage according to established advanced trauma and life support principles occurred using a colored tagging system for easy identification of case severity/urgency. Patients also received appropriate radiological and definitive treatment, medical response to shortages of blood, blood product, and medical supplies such as surgical device, antibiotics, and mental health care (Johnson & Travis, 2006). The nurses have to know about the triage principle in response phase of disaster is the greatest benefits and the largest number of patients. Nursing intervention for triage system during response phase of disaster is establishing advance trauma life support (ATLS) principle using a colored tagging system (Zimmermann et al., 2006).

Furthermore, on response phase in caring for tsunami patients, the nurses also should have sufficient knowledge regarding acute respiratory care wound care, mental health care, psychological care, spiritual care, and patients referring. In acute respiratory care, the nursing intervention focus on assessing for

airway, breathing, circulation, and disability in maintaining adequate oxygenation for the patients. Airway is established a patent airway by positioning, suctioning, and oxygenation. Breathing related to assess breath sounds and respiratory effort, observe for chest wall trauma or other physical abnormality. Circulation involves monitoring vital signs, especially blood pressure and pulse rate. Disability refers to evaluating the client's level of consciousness (LOC) using ALERT (alert, responsive to voice, responsive to pain, unresponsive) and the GCS, and re-evaluate frequently the client's LOC (Kozier et al., 2004).

Wound care is an important part of the overall treatment for tsunami patients. Wound care consists of changing the dressing, packing wound, irrigation, debridement process of removing dead tissue, cleansing the wound, or providing a protective environment (Stotts et al., 2004). Particularly, for management of wounds caused by tsunami focus should be on surgical removal of devitalized tissue and aggressive debridement. Injuries of that types require careful debridement including removal of devitalized and infected tissue while stabilizing remaining vital tissues, early operative care of critical structures to prevent later morbidity including amputation and frequent wound dressing changes (Maegele et al., 2006).

Moreover, for mental health care, communication skills are essential parts for counseling education in post-emergency and providing secondary consultation and support to others nurses. The nurses can support patients, help them through consultation and training about stress reaction, and stress management (Hughes et al., 2007). Psychological care of response phase focused on providing psychosocial first aid, behavioral cognitive strategies, traditional healing, ritual, relaxation technique, pharmacotherapy, group and family work, expressive

methods, rehabilitation, and networking. Psychosocial interventions are providing social, emotional, and informational supports (Sundram et al., 2008).

In spiritual care, appropriate teaching and counseling strategies were implemented when patients exhibited signs of spiritual distress or problems. Interventions are focused on using of prayer and participating in religious ritual (Julia & Joyce, 1996). Lastly, the nurses' knowledge of patients referring in caring for tsunami patients is to identify the health service available in the hospital referral. According to Hughes et al. (2007) the development of referral pathways could include identifying the health services available in the referred hospital. Developing a team approach and spreading the expertise is important responsibility for of the hospital staff.

During response phase, communication and information system, and role of nurses should be considered to perform nursing intervention. The nursing intervention not only focused on physical impacts but also to psychological, social, and spiritual problems of the patients. Communication system must be established to communicate among nurses and with collaborating partners such as police, fire, security, and local hospital (Veenema, 2007). The nurses should have sufficient knowledge and skills to communicate with patients, health care providers, offering information to communities, and should correctly use the web of communication during disaster. The web communication involves incident commander, which transfers information to emergency medical service (EMS), police, fire unit, and communication center. The 911 county communication centers provide information to other hospital and communication center to provide

administration and charge nurses, physicians, and residents to disaster response at once (Reddy et al., 2008).

Takahashi, Tanaka, and Miyaoka (2006) described that communication consists of general communication skill, mainly non verbal communication and interpersonal communication. The general communication includes eye contact, using gesture, show enthusiasm, good appearance, speaking loudly and choosing suitable sentence. Interpersonal communication skills consist of greeting, asking a question, active listening, explaining own situation, promising, getting permission for a delay, expressing need for help, and correcting misinterpretation. The INCMCE (2003) stated that during disaster response, nurses should have skills in emergency documentation assessment, intervention, nursing actions and outcomes as well.

Tsunami is chaotic events with huge suffered victims that needed medical response at the same time. Documentation systems should be considered to provide quality of care and avoid data errors. Patients most likely will enter the health care system through emergency departments, it is imperative for emergency nurses, medical provider, and trauma surgeons to prepare a way to deliver high-quality care with minimal errors. In fact, poor documentation may contribute to medical errors.

A study about disaster exercise regarding documentation systems showed that documentation and quality of care delivered during disaster exercise were deficient. There are a number of potential reasons, including unfamiliarity with the emergency department charts, patients' volume, patients' handoffs, and staff stress. The nurses' documentation should involve patients' history,

physical examination, assessment, orders, procedures, and diagnoses (Claudius et al., 2008).

A study by Shinchin (as cited in Smith, Morgans, Biggs, & Buchanan, 2007) proposed and suggested a model for medical records for disaster relief operations. The medical record format currently used during routine patient care is not adequate for use during a disaster. The medical record being too complicated, cumbersome, and difficult to use, and were considered to be too simple, with very limited space. The type of disaster medical record has a number of advantages, including simplicity, easy to use, and inexpensive to produce.

Moreover, Coupland, Parker and Gray (as cited in Smith et al., 2007) which mentioned that disaster medical records need to be large enough to enable adequate documentation of patient under the stress of an incident. A standard medical record and health information system procedures would be adequate during a disaster situation.

In disaster response, the nurses work within a system with independent roles and functions, and collaborate to attain the common goal of life. The nursing role effectiveness model developed by Irvine, Sidani, and Hall (1998) consist of structures, nurses' roles, and patients/health outcomes. The structures involve nurses, patients, and organizations. The nurses' roles involve independent, dependent, and interdependent roles. Nurses' independent roles comprise of assessment, diagnosis, intervention, and follow up care. Moreover, nurses' dependent roles consist of execution of medical order, and physician initiate treatment, and nurses' interdependent roles comprise of communication, case management, and coordination of care, continuity or monitoring and reporting.

Furthermore, the patient/health outcomes involve clinical symptoms, freedom from complication, functional status/self care, and knowledge of disease.

1.2.4 Recovery

Recovery is related to the need of the organization and staff to recover once the disaster had occurred. Recovery is easier, if some of the staff have been assigned the job to maintain essential services while other will be assigned to look after the disaster response. Melsh et al. (2002) stated that the disaster recovery relates to the collaborative efforts of individuals, communities, all levels of government, the private sector, the non-profit sector, and others to re-establish a sense of normalcy, development, and growth in a community affected by a disaster.

Tsunami related to trauma cases such as infected wound, unmanaged fracture, gangrenous wounds, and even amputation. Therefore, the nurses have to repeat the consult for wound dressing, removal of stitches, secondary infection care, and recovery of patients having wounds and impaired physical function. The nurses should have sufficient knowledge and skills in recovery phase including wound debridement, fracture care, wound cleaning, and dressing, and chest tube care. Other challenges include treating wound infections, preventing post-traumatic injuries, and meeting mental health needs (Lee, Low, Ng, & Teo, 2005). One study reported that after 2 weeks of tsunami in December 26, 2004 in Thailand 7,423 survivors had sought psychiatric help. Further mental health interventions will likely be needed to mitigate the post disaster effects on residents of coastal communities (Ministry of Public Health, World Health Organization representative to Thailand, & Thai Ministry of Health US CDC Collaboration, 2005).

1.2.5 Evaluation

Evaluation phase is essential part to determine what really needs to be worked out and what problems needs to be identified. The specific individual should be charged with the evaluation and follow-through activities. Evaluation should be performed in a formal way and should include staff and agency that the health facility interfaced during the response. Each unit or division should examine performance, and make the list of what went well and what proved problematic. A detailed list recommendation for changes to the emergency response plan should be compiled and forwarded for the organization's emergency response committee. This list should include specific points including who, what, when, and what resources are required to implement the changes (Qureshi & Gebby, 2007).

Many tsunami patients with severe trauma, injury, psychological problem such as PTSD, and physical and mental function deficits that need are evaluated. Lauredeau et al. (2007) described that evaluation is ideal period to determine effectiveness of outcomes of interventions implemented during the previous phases. The usefulness of continuing to evaluate the effects and outcomes of the interventions is aimed on improving the current nursing practices.

2. Training and Education

Training and education are essential parts of preparedness skills for nurses while handling disaster response. Skills of nurses are related to training and level of educational institution received by the nurses and well reflected while handling the disaster response. Education and training should be chosen to enable the

nurses to develop and apply knowledge and skills to meet demands of their current roles and functions needed for disaster response (Gould, Berridge, & Kelly, 2007).

Competency assessment may determine the efficacy of training interventions in imparting the knowledge and skills. Training may influence the nurses' skills levels. Low scores on competency assessments after training may indicate that the training was ineffective, poorly designed, poorly presented, or inappropriate (Smith & Merchant, as cited in Kak et al., 2001). Jensen et al. (2008) said that the training program will be increasing knowledge and skills, when contents, methods and strategies fit for characteristics of participants. Tippins (2005) found the nurses had more skills and ability to identify initial assessment at critical illness when responding to training.

Many kinds of training that are appropriate in responding to tsunami disaster such as basic life support (BLS), advanced cardiac life support (ACLS), advanced trauma life support (ATLS), hospital disaster life support (HDLS), mass triage, infection control procedure, and wound management.

According to Smith, Gilcreast, and Pierce (2008) stated that BLS and ACLS restores circulation in 40-60% of cases, provides oxygenation and restores spontaneous circulation and brain function. Nurses must be proficient in BLS and ACLS to disaster response. Goals of BLS training are to response correctly for cardiac arrest, respiratory arrest, and foreign-body airway obstruction. Classes include tests of knowledge and psychomotor skills. BLS skills can evaluate (1) recognition of need for resuscitation, (2) establishing unresponsiveness, (3) activating the emergency medical system, (4) opening the airway, (5) rescue breathing, (6) establishing lack of pulse, (7) cardiac compressions, (8) clearing airway obstruction, (9) barrier device,

and (10) automatic external defibrillator (AED). Furthermore, ACLS builds upon BLS knowledge and skills. ACLS skills can evaluate the following (1) airway management, (2) primary and secondary assessment, (3) electrical therapy, (4) intravenous techniques, (5) lethal dysrhythmias, (6) pharmacology, and (7) megacode leadership (Smith et al., 2008).

3. Clinical Experience

Experience should be defined in terms of how well it can transform or change nurses' knowledge and skill. The experience can gained sudden insights, acquired new views on the benefit of former learning, absorbed from others examples, and picked up from one's own mistakes and repeated action in similar situations by being attuned (Jensen et al., 2008).

Bjork and Kirkevold (1999) stated that most of the nurses who have worked for many years and come from an educational tradition, and long periods of practices have high expectations of efficiency and mastery while performing the nursing practice. Clinical experiences might influence nurses' understanding of the subject and perceived need for training and intention to learn, which might increase the nurses' skills. Jensen et al. (2008) showed that the increased knowledge and skills on clinical experience for nurses was found, who have worked for half year on resuscitation ALS training. Chapman and Arbon (2008) stated that skills of nurses are related to experience of nurses in a disaster response. Considine et al. (2007) mentioned that gaining skills as criteria for experience supports the fact that there is a complex relationship between skills and experience and skills is gained through

experience. Experience in terms of exposure to events is also an important source of skills in nursing and in clinical decision-making.

According to study by Arbon et al. (2006) stated that during tsunami December 26, 2004 in Banda Aceh, Indonesia many of Australian nurses undertook over 90 reconstructive surgery, infectious diseases treatment, traumatic injuries, salt water aspiration, and thus displayed good capability and clinical skills. The nurses were selected for experience or training in disaster management, and some of nurse had some previous experiences in disaster response. Watson (as cited in Considine et al., 2007) which identified that there were three criteria for experience: 1) the passage of time, 2) gaining skills or knowledge, and 3) exposure to an event. Passing of time is commonly used to define experiences in nursing, particularly in nursing research, where years of experience are used to categorize the nurses.

4. Attending Hospital Disaster Drill

Hospitals are a heaven of safety and provide care to large numbers of ill, injured, exposed, or concerned individuals during a disaster. One of the primary component of hospital disaster planning and preparedness has been used of drills to train health care providers and to test the hospital's disaster response capability (Kaji & Lewis, 2008).

Disaster simulations or drills are widely used throughout the world and are considered a fundamental tool for evaluation and improvement of disaster response capacity for health care providers (Green et al., 2003). Vinson (2007) stated that the realistic drills and training for hospital personnel in hospital disaster drill will be required and increasing knowledge and skills is necessary to respond to disaster

events. Successful medical response to a disaster depends on adequate resources, thoughtful planning, and a community-wide, multidisciplinary process of continuous education and training.

Nurses' lessons learned from the hospital disaster drill were classified into six categories: (1) time management, (2) venue, (3) victim expectations, (4) responder expectations, (5) realistic experience, and (6) record keeping /evaluations. The nurses that intend to learn from hospital disaster drills and can learn from the experiences and incorporate these lessons learned into the planning process by using knowledge and skills (Sweeney et al., 2004). Several types of hospital disaster drills are commonly used. Some hospitals use moulaged patients to operational disaster drill scenarios, and other perform tabletop drills involved in roundtable discussions without any simulated victims and practice the disaster response through computer simulations (Kaji & Lewis, 2008).

The Relationship Between Perceived Clinical Skills for Tsunami Care and Its Related Factors among Nurses

Related factors of clinical skills of nurses encompassed knowledge, clinical experience, training and education, and hospital disaster drill. These factors are essential part related to perceived clinical skills for tsunami care. Williams, Nocera, and Casteel (2008) reported that training interventions for health care providers were effective for improving knowledge and skills in disaster response.

There are several previous studies, which reported the knowledge and training might improve the nurses' skills. Chan (2009) found that adult age, higher education level, attitude might improve nurses' skills. The factors that improve

nurses' attitude are shown on work experience, senior ranking, and higher knowledge. Moreover, adult age, higher educational level, and senior ranking were factors that improve nurses' skills. Furthermore, Reid et al. (2005) which found that training had given greater knowledge of disaster mental health and provided many disaster mental health skills, and the skills had been valuable in professional and personal lives.

For clinical experience, a study by MacGeorge and Nelson (2003) found that most experienced the nurses in triage showed the sooner intervention of continuous positive airway pressure (CPAP) therapy in cardiogenic pulmonary edema (CPO). The experience of nurses in triage has relationship with nurses' skills in intervention CPAP. The experience of nurses in triage system has relationship with nurses' skills in intervention CPAP.

Lastly, Gillett et al. (2008) which found that high fidelity simulators and explored the experience of clinical staff during the drill exercise, prompting critical action in mass casualty drill and increased the perceived skills and reality of exercise. Schenker et al. (2006) also study disaster drill conducted in emergency medical system (EMS) which found that the accuracy rates of skills triage using the START triage system proved to be better than others.

In summary, based on intensive literature reviewed can be concluded that the factors related to perceived clinical skills for tsunami care are essential parts in caring for tsunami patients. The clinical skills refer to perceived ability of clinical skills that are relevant and specific in caring for tsunami patients. The perceived clinical skills for tsunami care consisted of triage, acute respiratory care, wound care, mental health care, psychosocial care, spiritual care, and patient referral. Moreover, the related factors of clinical skills for tsunami care refer to the factors that are related

to nurses' clinical skills in handling the tsunami. Those factors involve knowledge, clinical experience, training and education, and attending hospital disaster drill. The perceived clinical skills for tsunami care among nurses have a strong relationship between its related factors.

CHAPTER 3

RESEARCH METHODOLOGY

Research Design

This study was a descriptive correlational study. The aim of this study were to; (1) identify the levels of perceived clinical skills for tsunami care, and (2) examine the relationship between knowledge, clinical experience, training and education, attending hospital disaster drill, and perceived clinical skills for tsunami care among nurses in Banda Aceh, Indonesia.

Population and Setting

The target population of the study was the nurses who worked in acute care, and emergency and critical care setting from a provincial hospital in Banda Aceh, Indonesia. The acute care setting consisted of medical ward, surgical ward, and neurological ward. The emergency and critical care setting consisted of emergency department (ED), intensive care unit (ICU), and operating room (OR). Three of these settings were directly involved in response phase for tsunami care patients on December 26, 2004. The total number of the nurses was 195.

Dr. Zainoel Abidin, general hospital in Banda Aceh, Indonesia is an accredited educational and referral hospital in Nanggroe Aceh Darussalam province, Indonesia. There were 281 nurses in the hospital and had approximately 500 beds.

Sample and Sampling

    1. Sample Size

The number of subjects in this study was estimated by using power analysis. The sample size was determined at the level of significance (α) of .05, the power of test (1-β) of .80 and the effect size (ρ) of .30, which is categorized as medium effect size and is used commonly in nursing research. The sample size of 88 was needed (Polit & Hungler, 1999). To avoid low response rate of the sample in the study, the sample size was added by 10%, therefore, the total samples of 97 were recruited.

    2. Sampling Technique

The samples were recruited using systematic random sampling with odd number of each ward. They were randomly selected from each ward as shown in table 2. The reasons to perform this technique because it was identified in the sampling frame, the desired sample size, and the size of the population.

Table 2

Estimation of the Subject

Ward	Total nurses	Sample recruited
A. Acute setting:		
1. Medical ward	34	17
2. Surgical ward	37	18
3. Neurological ward	23	11
B. Emergency and critical care setting:		
1. ICU	20	10
2. ED	44	22
3. OR	37	19
Total	195	97

The nurses who met the following inclusion criteria were recruited:

1) Had been working as permanent and contracted employees of the hospital

2) Had working experience as a nurse at least a year

Instrumentation

> *Instruments*

The instruments used in this study were developed by the researcher and the researcher and colleagues. They have four main parts, 1) the Demographic Data Questionnaire [DDQ], 2) the Nurses' Clinical Experience Questionnaire [NCEQ], 3) the Nurses' Knowledge Tsunami Care Questionnaire [NKTCQ], and 4) the Tsunami Care Questionnaire [TCQ].

> *1. Demographic Data Questionnaire (DDQ*)

The DDQ was used to gather the following data: age, gender, marital status, religion, educational background, training and education, working experience as a nurse, and attending hospital disaster drill. The questionnaire was developed by the researcher (Appendix B).

> *1.1 Training and Education*

The variable training and education was measured by asking subjects to indicate type of trainings and number of times on the particular type of training (Appendix B). Type and number of times were multiplied then summed for all types, producing a training experience index. The higher index score reflects the higher attendance in emergency training and education program.

1.2 Attending Hospital Disaster Drill

Hospital disaster drill was measured by using dichotomous choice questionnaire (Appendix B). The higher score reflects the higher attendance in hospital disaster drill.

2. Nurses' Clinical Experience Questionnaire (NCEQ)

Clinical experience of nurses was measured by using Nurses' Clinical Experience Questionnaire (NCEQ) (Appendix C). The questionnaire consisted of 14 items which was measured by using a 4-point Likert-like scale, and was scored from 0 to 3, which 0 = never, 1 = sometimes, 2 = often, 3 = always. The higher score reflects the higher experience to perform nursing activities in caring for tsunami patients.

3. Nurses' Knowledge Tsunami Care Questionnaire (NKTCQ)

The Nurses' Knowledge Tsunami Care Questionnaire (NKTCQ) was used to measure the nurses' knowledge for tsunami care patients (Appendix D). It consisted of 13 multiple-choice questionnaires measuring two categories of knowledge: impacts of tsunami (1, 2, 3, 4), and disaster management (5, 6, 7, 8, 9, 10, 11, 12, 13). The item answered correctly was scored 1 and the item answered incorrectly was scored 0. The possible total score range from 0 to 13. The higher score reflects the higher nurses' knowledge for tsunami care patients.

4. Tsunami Care Questionnaire (TCQ)

The Tsunami Care Questionnaire was used to measure perceived clinical skills of nurses for tsunami care (Appendix E). The instrument is composed of 40 items with seven subscales: triage (1, 2, 3, 4, 5), acute respiratory care (6, 7, 8, 9, 10, 11, 12), wound care (13, 14, 15, 16, 17, 18, 19, 20), mental health care (21, 22, 23, 24, 25, 26), psychosocial care (27, 28, 29, 30, 31), spiritual care (32, 33, 34, 35), and patient referral (36, 37, 38, 39, 40).

The subjects were asked to rate each item using a 5-point Likert-like scale, ranging from 1 to 5 where 1 = very poor, 2 = poor, 3 = fair, 4 = good, and 5 = excellent. The total score and subscales score are the summed score of all items and items belong to those subscales. They were then averaged for comparable interpretations and categorized into three levels as follows:

Low   = 1.0 - 2.3

Moderate   = 2.4 - 3.7

High   = 3.8 - 5.0

The higher score reflects the higher clinical skills for tsunami care perceived by nurses.

Translation of the Instruments

The instruments were developed in the English version by the researcher. The instruments were examined for content validity by the three experts from the Faculty of Nursing Prince of Songkla University, Thailand. After validation, the instruments were translated into Indonesian language by three bilingual translators from Nursing Science Program of Syiah Kuala University, Banda Aceh, Indonesia.

The first bilingual translator translated the instruments from the English into the Indonesian version. The second bilingual translator translated back the instruments from the Indonesian version into the English version. The last bilingual translator clarified and identified the discrepancies in some items between two versions. Finally, the instruments were revised by following the suggestion from the translators.

Validity and Reliability of the Instruments

The Validity of the Instruments. The three experts from Faculty of Nursing, Prince of Songkla University were asked to validate content of the instruments. Each expert has expertise in disaster nursing, surgical nursing, and tool development. The instruments were modified and revised based on the suggestions of the experts.

The Reliability of the Instruments. Nurses' Clinical Experience Questionnaire (NCEQ) and Tsunami Care Questionnaire (TCQ) were tested for internal consistency by using Cronbach's alpha coefficients yielding the values of .93, and .98, respectively. Moreover, the Nurses' Knowledge Tsunami Care Questionnaire (NKTCQ) was tested for internal consistency by using Kuder Richardson (KR-20) with the coefficients of .71. Lastly, the training and education was tested for stability using test- retest with Spearman' Rho ($\rho = .98$, $p< .01$). The reliability tests were performed with 20 subjects who had similar criteria to the study subjects. Cronbach's alpha coefficients and KR-20 of the instruments were used with the expected value of at least .70, which were accepted for a new instrument (Polit & Hungler, 1999).

Data Collection Procedures

Preparation Phase

1. The researcher asked for a letter of permission from Dean of the Faculty of Nursing, Prince of Songkla University.

2. The researcher asked for permission from the Director of Dr. Zainoel Abidin general hospital Banda Aceh, Indonesia.

3. The researcher met the head nurse of each ward to explain the purpose of the study and asked for the name lists to identify sampling frame of the nurses who met the inclusion criteria in the identified wards.

4. The subjects were selected by using odd number of the name list to get the required number of samples for each ward.

Implementation Phase

1. The nurses who met the inclusion criteria were identified and asked for participation in this study.

2. The researcher explained to the subjects the purposes, benefits, and ethical considerations of this study.

3. The subjects who agreed to participate in this study completed these questionnaires spending approximately 40 to 50 minutes.

4. The questionnaires were returned 100 percent by the subjects because it was well facilitated by the head nurse of each ward during the conduct of the study.

Ethical Consideration

The research proposal was approved by the Institutional Review Board (IRB) of Faculty of Nursing, Prince of Songkla University, Thailand. The subjects who agreed to participate voluntarily in this study were informed about their right to withdraw in this study at any time for any reasons without negative consequences. The researcher explained the purposes of the study, expectations from the subjects' participation and potential harms in this study such as the feelings of the traumatic recall, sadness, depression, and despair in completing the questionnaires. In this study, no subjects experienced emotional or psychological problems during completing the questionnaires. The researcher explained them how to complete the questionnaires. The researcher maintained anonymity of the subjects by using code and all of the information was kept confidential (Appendix A).

Data Analysis

Data were analyzed by using descriptive and inferential statistics to answer the research questions:

1. Demographic data were analyzed by using frequency, percentage, mean, standard deviation, minimum, and maximum scores.

2. Nurses' clinical experience, nurses' knowledge, and perceived clinical skills for tsunami care among nurses were analyzed with descriptive statistics: mean and standard deviation.

3. Training and education was analyzed with descriptive statistics: mean and standard deviation to determine training experience index.

4. Attending hospital disaster drill was analyzed utilizing descriptive statistics: frequency and percentage.

5. Pearson product-moment correlation coefficients were used to analyze relationship between knowledge, clinical experience, training and education, and nurses' perceived clinical skills for tsunami care.

6. Independent *t*-test was used to compare mean differences of nurses' perceived clinical skills for tsunami care between none attended and attended groups on attending hospital disaster drill.

CHAPTER 4

RESULTS AND DISCUSSION

The findings of this study are presented as follows: 1) the demographic characteristics and experience, 2) level of perceived clinical skills for tsunami care, 3) related factors of perceived clinical skills for tsunami care, and 4) relationship between perceived clinical skills for tsunami care and its related factors.

Results

Demographic Characteristics and Experience

The subjects consisted of 97 nurses who worked in the hospital. Most of the subjects were more than 30 years old (56.7%) with a mean age of 31.9 (SD = 6.6).The majority of the subjects were female (71.1%), around three-fourth of them were married (75.3%), were educated to diploma level (78.4%), and all of them were Islam (100%). With regard to attending emergency training and education of the subjects had six index scores (37.1%) with the mean score of 4.3 (SD = 1.9). Regarding working experience as a nurse of the subjects, more half of them had experience more than 5 years (53.6%) with a mean score of 8.7 (SD = 7.5). Approximately 80.4 percent of the subjects had experience in caring for tsunami patients, and 40.2 percent had experience in caring for tsunami patients for 3-4 months with a mean score of 3.0 (SD = 1.9). Obviously, 42.3 percent of the subjects had attended hospital disaster drill with the mean score of 0.4 (SD = 0.5) (Table 3).

Table 3

Frequency and Percentage of Demographic Characteristics and Experience (N = 97)

No	Characteristics	Frequency	Percentage
1	Age (years) (M = 31.9, SD = 6.6)		
	(Min = 23, Max = 50)		
	23-30	42	43.3
	31-40	39	40.2
	>40	16	16.5
2	Gender		
	Female	69	71.1
	Male	28	28.9
3	Marital status		
	Single	24	24.7
	Married	73	75.3
4	Religion		
	Islam	97	100
5	Educational background		
	Diploma	76	78.4
	Bachelor	21	21.6
6	Working experience as a nurse (years)		
	(M = 8.7, SD = 7.5; Min = 2, Max = 27)		
	<5	45	46.4
	5-10	24	24.7
	>10	28	28.9
7	Experience in caring for tsunami patients		
	No	19	19.6
	Yes	78	80.4

Table 3 (Continued)

No	Characteristics	Frequency	Percentage
8	Number of months in caring for tsunami patients (M = 3.0, SD = 1.9; Min = 0, Max = 6)		
	None	19	19.6
	<3	23	23.7
	3-4	39	40.2
	5-6	16	16.5
9	Attending hospital disaster drill		
	Yes	41	42.3
	No	56	57.7
10	Attending emergency training and education (index) (M = 4.35, SD = 1.96; Min = 0, Max = 6)		
	None	11	11.3
	1-4	26	26.8
	5-6	60	61.9

Level of Perceived Clinical Skills for Tsunami Care

Overall, perceived clinical skills for tsunami care were at a moderate level with the total mean score of 3.52 (SD = 0.86). The highest mean score was on triage (M = 3.65, SD = 0.81), followed by acute respiratory care (M = 3.57, SD = 0.86), spiritual care (M = 3.51, SD = 0.93), mental health care (M = 3.51, SD = 0.99), wound care (M = 3.50, SD = 0.96), patient referral (M = 3.45, SD = 0.80), and psychosocial care (M = 3.41, SD = 0.84) respectively (Table 4).

Table 4

Means, Standard Deviations, and the Levels of Perceived Clinical Skills for Tsunami
Care (N = 97)

No	Perceived clinical skills	M	SD	Level
1.	Triage	3.65	0.81	Moderate
2.	Acute respiratory care	3.57	0.86	Moderate
3.	Spiritual care	3.51	0.93	Moderate
4.	Mental health care	3.51	0.99	Moderate
5.	Wound care	3.50	0.96	Moderate
6.	Patient referral	3.45	0.80	Moderate
7.	Psychosocial care	3.41	0.84	Moderate
	Total	3.52	0.86	Moderate

1. *Perceived Triage Skills*

There were two items of perceived triage skills, which had the mean scores at a high level and the other three items were at a moderate level. The top two items with the highest mean scores were "Classifying patients with critical, unstable, obvious bleeding, and circulation problem in red color" (M = 3.88, SD = 1.19), and "Evaluating patient's condition in triage process at the right time, place, and treatment" (M = 3.80, SD = 1.01). The lowest mean score was on the item "Determining care by using physical assessment and acuity rating of patients" (M = 3.47, SD = 0.72) (Table 5).

Table 5

Means, Standard Deviations, and the Levels of Perceived Triage Skills (N = 97)

No	Perceived triage skills	M	SD	Level
1	Classifying patients with critical, unstable, obvious bleeding, and circulation problem in red color	3.88	1.19	High
2	Evaluating patient's condition in triage process at the right time, place, and treatment	3.80	1.01	High
3	Classifying patients' condition by using categorical color (green, yellow, red, and black)	3.58	0.76	Moderate
4	Using simple triage and rapid treatment (START) system	3.57	0.70	Moderate
5	Determining care by using physical assessment and acuity rating of patients	3.47	0.72	Moderate

2. *Perceived Acute Respiratory Care Skills*

There was one item of perceived acute respiratory care skills, which had the mean scores at a high level, and the other six items were at a moderate level. The top one items with the highest mean scores was "Administering antibiotic therapy for acute respiratory problems" (M = 3.82, SD = 1.19). The two items with the lowest mean scores were "Assessing signs and symptoms of near drowning such as dyspnea, cyanosis, and hypothermia" (M = 3.33, SD = 0.74) and "Providing re-warming intervention by using warm blanket or clothing" (M = 3.32, SD = 0.96), which were at a moderate level (Table 6).

Table 6

Means, Standard Deviations, and the Levels of Perceived Acute Respiratory Care Skills (N = 97)

No	Perceived acute respiratory care skills	M	SD	Level
1	Administering antibiotic therapy for acute respiratory problems	3.82	1.19	High
2	Promoting adequate airway by positioning, suctioning, and oxygenation	3.75	1.26	Moderate
3	Assessing signs and symptoms of pneumonia	3.65	0.81	Moderate
4	Evaluating patient's condition such as vital signs, breathing, and circulation	3.59	0.91	Moderate
5	Removing foreign body from airway	3.53	0.76	Moderate
6	Assessing signs and symptoms of near drowning such as dyspnea, cyanosis, and hypothermia	3.33	0.74	Moderate
7	Providing re-warming intervention by using warm blanket or clothing	3.32	0.96	Moderate

3. Perceived Spiritual Care Skills

All items of perceived spiritual care skills had the mean scores at a moderate level. The item with the highest mean score was "Providing spiritual counseling" (M = 3.64, SD = 1.12). The item with the lowest mean score was "Providing spiritual interventions by participating in religious activities" (M = 3.46, SD = 0.94) (Table 7).

Table 7

Means, Standard Deviations, and the Levels of Perceived Spiritual Care Skills

(N = 97)

No	Perceived spiritual care skills	M	SD	Level
1	Providing spiritual counseling	3.64	1.12	Moderate
2	Evaluating spiritual distress	3.49	0.09	Moderate
3	Assessing signs and symptoms of spiritual distress such as grief and loss, hopelessness, loss of goal of life, anger, and guilty	3.47	1.06	Moderate
4	Providing spiritual interventions by participating in religious activities	3.46	0.94	Moderate

4. Perceived Mental Health Care Skills

All items of perceived mental health care skills had the mean scores at a moderate level. The item of "Assessing psychological symptoms such as sadness, crying, nightmare, and emotional detachment" (M = 3.76, SD = 1.11) had the highest mean score. The item with the lowest mean score was "Educating patients to solve their problems related to psychological distress" (M = 3.34, SD = 1.08) (Table 8).

Table 8

Means, Standard Deviations, and the Levels of Perceived Mental Health Care Skills
(N = 97)

No	Perceived mental health care skills	M	SD	Level
1	Assessing psychological symptoms such as sadness, crying, nightmare, and emotional detachment	3.76	1.11	Moderate
2	Providing consultation for patients	3.64	1.21	Moderate
3	Evaluating emotional healing	3.55	1.04	Moderate
4	Sorting patients with psychological problems	3.44	1.06	Moderate
5	Performing active listening and caring behavior	3.37	0.89	Moderate
6	Educating patients to solve their problems related to psychological distress	3.34	1.08	Moderate

5. Perceived Wound Care Skills

All items of perceived wound care skills had the mean scores at a moderate level. The one item with the highest mean score was "Cleansing tsunami wound by using normal saline" (M = 3.67, SD = 1.09). The two items which had an equal mean scores included "Assessing signs and symptoms of contaminated tsunami wound with sand, sewage, and mud" (M = 3.54, SD = 1.25), and "Administering antibiotic and tetanus prophylaxis" (M = 3.54, SD = 1.23). The item with the lowest mean score was "Assessing bone deformities and bleeding for patients with fractures" (M = 3.40, SD = 1.06) (Table 9).

Table 9

Means, Standard Deviations, and the Levels of Perceived Wound Care Skills (N = 97)

No	Perceived wound care skills	M	SD	Level
1	Cleansing tsunami wound by using normal saline	3.67	1.09	Moderate
2	Assessing signs and symptoms of contaminated tsunami wound with sand, sewage, and mud	3.54	1.25	Moderate
3	Administering antibiotic and tetanus prophylaxis	3.54	1.23	Moderate
4	Evaluating signs and symptoms of wound healing such as granulation growth	3.49	1.23	Moderate
5	Preparing patients for debridement	3.49	0.83	Moderate
6	Assessing pain intensity	3.48	0.84	Moderate
7	Assessing characteristics of tsunami injuries (soft tissue injuries and fractures)	3.41	1.04	Moderate
8	Assessing bone deformities and bleeding for patients with fractures	3.40	1.06	Moderate

6. Perceived Patient Referral Skills

All items of perceived patient referral skills had the mean scores at a moderate level. The one item with the highest mean scores was "Preparing patients' document, equipment, and medication before transferring" (M = 3.53, SD = 1.12). The two items which had an equal mean scores included "Documenting transferring activity" (M = 3.45, SD = 0.91), and "Evaluating effectiveness of patients referral" (M = 3.45, SD = 0.76) (Table 10).

Table 10

Means, Standard Deviations, and the Levels of Perceived Patient Referral Skills

(N = 97)

No	Perceived patient referral skills	M	SD	Level
1	Preparing patients' document, equipment, and medication before transferring	3.53	1.12	Moderate
2	Performing communication with other agencies where the patients will be transferred	3.48	0.84	Moderate
3	Documenting transferring activity	3.45	0.91	Moderate
4	Evaluating effectiveness of patients' referring	3.45	0.76	Moderate
5	Assessing patients' condition before referring	3.33	0.83	Moderate

7. *Perceived Psychosocial Care Skills*

All items of perceived psychosocial care skills had the mean scores at a moderate level. The top item with the highest mean score was "Assessing psychosocial disruption" (M = 3.56, SD = 0.84). The item with the lowest mean score was "Encouraging patients to establish friendship among survivors" (M = 3.34, SD = 0.76) (Table 11).

Table 11

Means, Standard Deviations, and the Levels of Perceived Psychosocial Care Skills

(N = 97)

No	Perceived psychosocial care skills	M	SD	Level
1	Assessing psychosocial disruption	3.56	0.84	Moderate
2	Encouraging family support to reduce psychosocial distress	3.45	1.15	Moderate
3	Assessing signs and symptoms of psychosocial distress such as loss of families, friends, social networks and financial incomes	3.37	0.99	Moderate
4	Evaluating psychosocial care	3.36	0.84	Moderate
5	Encouraging patients to establish friendship among survivors	3.34	0.76	Moderate

Related Factor of Perceived Clinical Skills for Tsunami Care

The related factors of nurses' clinical skills for tsunami care consisted of 1) knowledge, 2) clinical experience, 3) training and education, and 4) attending hospital disaster drill.

The findings of this study showed that nurses' knowledge on tsunami had a total mean score of 9.31 (SD = 1.89). The knowledge in tsunami disaster was divided into two main parts including impact of tsunami (M = 3.19, SD = 0.89) and disaster management (M = 6.12, SD = 1.54). The clinical experience had the total mean score of 2.09 (SD = 0.56). Moreover, attending training and education was computed by using training index with the mean score of 4.35 (SD = 1.96) (Table 12). The complete data of the mean score of each item the knowledge and clinical experience for tsunami care among nurses are available in table 16-18 (Appendix G).

Table 12

Means and Standard Deviations of Related Factors of Perceived Clinical Skills for Tsunami Care (N = 97)

No	Related factors	Possible range	M	SD
1.	Knowledge	0-13	9.31	1.89
	- Impacts of tsunami	0-4	3.19	0.87
	- Disaster management	0-9	6.12	1.54
2.	Clinical experience	0-3	2.09	0.56
3.	Training and education	-	4.35	1.96

Moreover, attending hospital disaster drill was nominal or categorical data with the percentage attended of 41 (42.3%) and none attended of 56 (57.7%) for the number of attendance hospital disaster drill (Table 3).

The Relationship Between Perceived Clinical Skills for Tsunami Care and Its Related Factors

The result of correlation showed that knowledge and clinical experience were statistically significant low positive correlated with perceived clinical skills for tsunami care ($r = .24$, $p < .05$), and ($r = .30$, $p < .01$) respectively. Training and education was statistically significant low positive correlated with perceived clinical skills for tsunami care ($r = .23$, $p < .05$) except for wound care (Table 13).

Table 13

Correlation Coefficients Between Perceived Clinical Skills for Tsunami Care and Its Related Factors (N = 97)

Relating factors	Clinical skills for tsunami care							
	1	2	3	4	5	6	7	Total
1. Knowledge	.24*	.20*	.23*	.26*	.24*	.23*	.26*	.24*
2. Working experience	.31**	.30**	.29**	.30**	.28**	.27**	.28**	.30**
3. Training and education	.21*	.23*	.21*	.21*	.20	.27**	.26*	.23*

*p<.05, **p<.01

Note: 1 = Triage, 2 = Acute respiratory care, 3 = Spiritual care, 4 = Mental health care,
      5 = Wound care, 6 = Patient referring, 7 = Psychosocial care

Attending hospital disaster drill was tested by using independent *t*-test to compare mean differences of perceived clinical skills for tsunami care between none attended and attended groups of hospital disaster drill. The finding of this study showed that there was no significant mean differences of perceived clinical skills for tsunami care among nurses between none attended and attended groups on attending hospital disaster drill (*t* = .55, *p* = .58) (Table 14).

Table 14

The Mean Differences of Perceived Clinical Skills for Tsunami Care Between None Attended and Attended Groups on Attending Hospital Disaster Drill (N = 97)

Variable	Attending hospital disaster drill				*t*	*p*
	None attended		Attended			
	M	SD	M	SD		
Perceived clinical skills for tsunami care	142.46	35.24	138.54	34.44	.55	.58

Discussion

There were 97 nurses working in Dr. Zainoel Abidin general hospital in Banda Aceh, Indonesia who participated in this study. The findings of the study are discussed in two main parts: 1) the levels of perceived clinical skills for tsunami care, and, 2) the relationship between perceived clinical skills for tsunami care and its related factors.

The Level of Perceived Clinical Skills for Tsunami Care

Overall, the findings of this study found that subjects' perceived clinical skills for tsunami care were at a moderate level (Table 4). There are several reasons might have contributed to the findings of perceived clinical skills for tsunami care in this study.

Educational level of the subjects may have played an important role in the results. Firstly, the majority of the subjects (78.4%) were educated to diploma level only which may have indicated a limited existing knowledge and skill for tsunami response, insufficiency in skill to seeking information, and limited capability to develop further advanced clinical skills. The subjects who only have formal education at the diploma level might not have enough mastery on their knowledge to prepare themselves on the appropriate skills for tsunami care in the response phase.

A recent study found that the nurses whose education was at diploma level showed lower levels of knowledge and skill than baccalaureate, master or doctoral students in clinical management (Chan, 2009). Moreover, the nurses who have diploma level showed lower level in theoretical and clinical components for collected evaluation data, written assignment skill testing, contribution to conference,

self-assessment, and other types of nursing program than baccalaureate and master levels of nurses (Oermann, Yarbrough, Saewert, Ard, & Charasika, 2009). Similarly, Alonzo (2009) reported that the nurses who have at the baccalaureate level has strong analytical and creative capacities and better skills in communication, assessment, cultural sensitivity, resourcefulness, the ability to apply knowledge, and scientific reasoning than the diploma level. In addition, the level of education of the nurses might have influenced the nurses' role in responding to an emergency disaster and the willingness to respond (Evers & Puzniak, 2005).

Secondly, the reason which may have influenced at a moderate level on their perceived clinical skills for tsunami care is knowledge regarding the tsunami. The finding of this study showed that the knowledge on the impacts of tsunami has the mean score of 3.19 (SD = 0.87) and disaster management of 6.12 (SD = 1.54) (Table 12). It can be interpreted that the nurses' knowledge about disaster management was insufficient. In this study, insufficient knowledge about disaster management for tsunami care may be related to inadequate knowledge in acute response phase of the tsunami in hospital setting. The tsunami was a new issue occurring more than five ago years but has resulted in complicated problems and illnesses in affected patients. In addition, the hospital may have provided inadequate reading resources, study materials, and literature reviews related to disaster management for nurses expected to respond to a tsunami disaster and limited nurses attending conferences regarding tsunami disasters.

Nurses' knowledge on tsunami may have influenced on the performance of their skills in caring for tsunami patients. The finding of this study was relevant with the previous study, which mentioned that the knowledge was

commonly used as a major influence in clinical care and is acquired through formal and informal study in conjunction with knowledge and experience in a specific domain of nursing practice (Considine et al., 2007). Insufficient knowledge could contribute to an inadequate nurses' response to disaster. Similarly, Collander et al. (2007) reported that most nurses had insufficient knowledge to disaster response due to limited opportunities to improve their knowledge related to disaster nursing care and chaotic management of disaster planning. It was indicated that nurses' disaster response skills may be insufficient as a result of knowledge deficits.

Knowledge may have influenced the development of nurses' clinical skills in disaster response. It was interpreted that sufficient knowledge leads to sufficient skills in performing nursing clinical skills in response to disaster. In other words, insufficient of knowledge on tsunami may have contributed to insufficient clinical skills of nurses in caring for tsunami patients.

In terms of knowledge related to tsunami disaster response, Lukthitikul and Hatthakit (2007) reported that nurses had insufficient knowledge to provide wound care to tsunami affected patients. They found that wound inflammation and infection was associated with inappropriate management of wounds contaminated with debris, sand, and mud. Moreover, Watcharong et al. (2005) also found that nurses' knowledge of caring for tsunami inflicted wounds was insufficient. As a result, almost all the patients who suffered wounds and open fractures suffered complications related to infection.

In addition, there have been a number of studies highlighting nurses' knowledge deficits in other disaster situations. Rebmann, English, and Carrico (2007) found that insufficiency of nurses' knowledge resulted to insufficiency of skills in

infection prevention and control in mass casualty incidents, public education, internal and external communication, and mental health care for disaster survivors. Moreover, it was reported that during December 2004 tsunami occurrence in the developing countries, there was an insufficiency of nurses' knowledge related to psychological problems on tsunami patients which caused insufficiency of skills in mental health care (Math et al., 2008).

Furthermore, despite the frequency of disasters around the world, the nurses' knowledge that contributes to the care of vulnerable patients in the response phase of the disaster was reported insufficient. Similarly, Almonte (2007) reported that nurses had insufficient knowledge in trauma care, mass casualty care, and intensive care nursing during a disaster response. A recent study of Hawaiian nurses' knowledge of bioterrorism also showed insufficient knowledge about general bioterrorism preparedness such as infection control and decontamination (Katz et al., as cited in Rebmann & Mohr, 2010).

The nurses should have prepared sufficient knowledge regarding disaster management in handling tsunami patients in response phase by regularly attending conferences related to tsunami care and intensively seeking appropriate reading materials on disaster management of the tsunami care in the response phase.

Thirdly, the reason that may have influenced the moderate level of perceived clinical skills for tsunami care is age. Almost half of the nurses in this study were aged less than 30 years (42.3%). It could be proposed older nurses have increased clinical skills capability as a result of accumulated experience and knowledge in clinical practice and that younger, less experienced nurses did not have yet enough accumulated clinical skills experience particularly for tsunami care with

complicated problems and serious illnesses. This could imply that the young adults may not have enough capability and competency to perform specific and advanced clinical skills needed in caring for tsunami patients in acute response phase. However, it is known that young adults have good memory capacity and more opportunity to learn and seek for adequate nursing care in caring for the tsunami patients, so further education may improve the nursing care of tsunami-inflicted wounds. These may have influenced the finding of this study.

Consistently, the previous studies by Marsiske and Willis (as cited in Kliegel & Martin, 2007) found that age may have influenced on clinical performance which explicitly emphasized experience and accumulated knowledge structure in maintaining adult's cognition. Young adults have higher memory capacity, speed of processing information and lower inhibition than older adults. In addition, Chan (2009) found that young adults (26-30 years) has lower knowledge and skill levels than middle adults (31-40 years) in clinical management systems.

Fourthly, the reason that may have influenced the moderate level of perceived clinical skills for tsunami care is working experience. The finding of this study showed that nearly half of the subjects had working experience as a nurse for less than 5 years (46.4%). Moreover, 80.4 percent of them had direct experience in caring for tsunami patients in acute response phase for three months in average, because at that time they were recruited and has started working as a nurse in the acute response phase of the tsunami in acute care, emergency and critical care setting (Table 3).

This indicates that most of the subjects had gained direct clinical skills by transforming experience to performing the nursing skills for tsunami patients.

However, they had limitation in the duration of direct clinical experienced in caring for tsunami patients in the acute and emergency response phases. In addition, many experienced nurses with greater than 5 years experience had used advanced clinical skills related to care to the tsunami patients in acute response phase. Those advanced skills involve tsunami wound care, and care of patients with tsunami lung or tsunami related aspiration pneumonia due to near drowning.

Similarly, a previous study supports that experience can help nurses gain sudden insights, acquire new views about the benefits of former learning, absorb information from others, and learn from mistakes and repeated action in similar situations. Experience is a determinant factor in transforming nurses' knowledge to skill (Jensen et al., 2008). The findings of this study are in accordance with a recent study that showed nurses who had less than 5 years experience showed lower levels of knowledge and skill than those who had experience for more than 10 years nursing experience (Chan, 2009).

Furthermore, the finding of this study was consistent with a previous study by Watson (as cited in Considine et al., 2007) identified three criteria for experience: 1) the passage of time, 2) gaining skills or knowledge, and 3) exposure to an event. Passing of time is commonly used to define experiences in nursing where years of experience are used to categorize the skill of nurses. In addition, Jensen et al. (2008) mentioned that the nurses who have worked for half year on resuscitation advanced life support (ALS) training were found to have increased knowledge and skills. Bjork and Kirkevold (1999) also found that most of the nurses who have worked for many years and long periods of practices have high expectations of efficiency and mastery while performing the nursing practice.

Fifthly, the reason that could explain the finding on the moderate level of perceived clinical skills for tsunami care is training and education. Attending emergency training for BLS, ACLS, BTLS, and disaster management are important to improve tsunami care skills of the nurses. The finding of this study showed that more than one-third (37.1%) of the subjects had attended only once on the six different topics related to tsunami care of BLS, ACLS, BTLS, disaster management, infection control and prevention, and mental health care for tsunami survivors training. Moreover, 11.3 percent of the subjects were never trained. This could be interpreted that training on emergency response and disaster management for tsunami care were insufficient and lack of continuity (Appendix F, Table 15).

Consistently, Gould, Berridge, and Kelly (2007) suggested that emergency training and education should be continued to enable the nurses to develop and apply knowledge and skills to meet demands of their current roles and functions needed for disaster response. Moreover, Evers and Puzniak (2005) mentioned that the nurses need more training and preparation for appropriate response to emergency and disaster. Training and education sessions should address the barriers and perceptions that an event is unlikely to occur and could increase skills of nurses to respond to disaster. Smith et al. (2008) suggested that emergency training of BLS and ACLS needs to improve by more frequency refresher trainings and allow more times for hand on skills practice. Kobayashi, Shapiro, Suner, and Williams (2003) mentioned that the disaster and emergency training provide specific and unique skills set, yet will need to be performed efficiently to respond to emergency or disaster. Lastly, training for emergency medical service (EMS) can result in significant quantifiable team and individual skill gains for a range professional (Scott et al., 2006).

Lastly, the reason that might have contributed to the moderate level on the finding of the study is attending hospital disaster drill. Nearly half of the subjects (42.3%) had attended hospital disaster drill provided by the hospital only once. This indicates that although the subjects have attended only once in their hospital drills, they have gained knowledge and skills to respond to disaster. Attending once on hospital disaster drill might not really influence the clinical skills for tsunami care of the nurses. Frequent and regular attendance on hospital disaster drills at least every one or two years could prepare the nurses with clinically rich knowledge and skills to respond to disaster events. Hospital drill is an essential part of hospital disaster preparedness to provide the sufficient nursing skills in response to disaster. The study by Green et al. (2003) figured out that hospital disaster drill was widely used throughout the world and considered a fundamental tool for evaluation and improvement of disaster response capacity for health care provider including nurses.

Several studies mentioned that disaster drill could provide sufficient knowledge and skills of nurses when responding to mass casualty incidents or disaster. Previous studies supported that disaster drill had equivalent results in prompting critical actions in mass casualty drills and increase the perceived reality to respond to disaster. To respond to mass casualty incidents or disaster, adequate training must be established, implemented, and maintained to ensure their safety and the optimal care of their patients (Gillett et al., 2008). Moreover, disaster drill also provide the basic tenets of disaster management and triage, decontamination, communication, incident command, and transport patients, and ability to rapidly form multidisciplinary work teams that communicate and function effectively to increase skills in disaster response (Kobayashi et al., 2003).

The Relationship Between Perceived Clinical Skills for Tsunami Care and Its Related Factors

Generally, the finding of this study demonstrated that knowledge, clinical experience, and attending training and education were significantly positive correlated with perceived clinical skills for tsunami care (Table 13). The finding of this study showed that knowledge was significantly low positive correlated with perceived clinical skills for tsunami care (r = .24, *p*< .05). The knowledge regarding tsunami care is an essential factor that could influence the subjects' perceived clinical skills in caring for tsunami patients. In this study, the nurses' knowledge regarding tsunami care was mostly measure on their conceptual knowledge rather than the factual and procedural knowledge of nurses regarding tsunami impacts and disaster management. Conceptual knowledge is a higher level of understanding of knowledge that needs intention to learn and updated of information by formal and non-formal educational programs. It was probably the influence on the low positive correlated of the results.

Consistently, Considine et al. (2007) mentioned that the conceptual knowledge is assimilation of new information with prior knowledge and resulted in a deeper level of understanding. Sausa (2006) stated that knowledge is the lowest level of cognition to remember factual material and development of intellectual skills. Knowledge includes recall or recognition of facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills.

The finding of this study are supported by Jennifer (2002) who showed that nurses' knowledge base of ACLS training might have correlated with the higher skills in triage system to respond to mass casualty incident or disaster. Evans and

Donnelly (2006) reported that sufficient knowledge of nurses might have correlated with their clinical skill. Smith and Poplett (2002) stated that knowledge is a basic aspect of acute care and might have correlated the initial assessment skill, treatment, and outcome of acutely ill ward patients.

Furthermore, clinical experience was significantly low positive correlated with perceived clinical skills for tsunami care (r = .30, *p*< .01). Clinical experience can transform nurses' knowledge and skills to disaster response. Clinical experience can be gained from former learning, absorbed from previous an event, and repeated action in similar activity such as emergency and disaster response. In this study, clinical experience had the total mean score of 2.09 (SD = 0.56) and the majority of the subjects answered of "often" for all items related to clinical experience in tsunami care.

The clinical experience of nurses on disaster might have contributed to the subjects' perceived clinical skills in caring for tsunami patients. However, in this study the subjects who were involved direct in caring for tsunami patients had the score of three months in average in acute response phase of the tsunami. Whereas, several studies mentioned that the nurses who involved approximately for six months exposure to an event or clinical practice showed high capability, expectation of efficiency and mastery of skills while performing nursing practice. The limited duration of direct care of the tsunami patients in this study may have influenced the low positive correlated of the results.

In the study setting, most of the subjects involved in caring for tsunami patients for 1-2 months after the tsunami struck, were also having serious psychological, psychosocial, and spiritual problems as a result of the tsunami affects.

In addition, the hospital was destroyed and collapsed presenting additional challenges to nurses providing care. Most of the tsunami patients were cared for by a collaboration of overseas and Indonesian nurses who came from non-affected tsunami areas and various temporary and field hospitals. The clinical experience of nurses for tsunami care in the acute response phase was correlated to their perceived clinical skills in caring for tsunami patients.

The finding of this study was supported by the study of Jensen et al. (2008) stated that experience should be defined in terms of how well it can transform or change nurses' knowledge and skill. Bjork and Kirkevold (1999) reported that clinical experience might influence nurses' perceived need for training and intention to learn which might increase the nurses' skills. For example, the most experienced triage nurses in triage intervened earlier when using continuous positive airway pressure (CPAP) therapy in cardiogenic pulmonary oedema (CPO). The clinical experience of triage nurses correlated with nurses' skills in intervention CPAP (MacGeorge & Nelson, 2003).

Moreover, a previous study found that the nurses who were selected for experience or training in disaster management and previous experienced in disaster response displayed good capability in clinical skills (Arbon et al., 2006). Chapman and Arbon (2008) mentioned that gaining skills as criteria for experience supports the fact that there was a complex relationship between skills and experience and those skills is gained through experience. Skills of nurses are related to experience of nurses in a disaster response.

Training and education was significantly low positive correlated with perceived clinical skills for tsunami care (r = .23, $p <$ .05) except for wound care (r =

.20, *p*> .05). Emergency training and education are essential parts to improve skills of nurses while handling disaster response. In this study, the nurses had attended emergency training and education consisted of disaster management, BLS, ACLS, BTLS, infection control and prevention, and mental health care for tsunami' survivors trainings. The finding of the study showed that the majority of the subjects (61.9%) had attended disaster and emergency training and education with the index mean score of 4.35 (SD = 1.96) (Table 3). Moreover, the subjects had attended once for disaster management training of 61.9 percent (Appendix F, Table 15). It could be interpreted that attending emergency training and education might have correlation to perceived clinical skills for tsunami care in this study. Similarity, a study supported that skills of nurses were related to training received by the nurses and well reflected while handling the disaster response (Gould et al., 2007).

The previous studies by Doyle, Gallagher, Bell, Rochford, and Roynane (2008) explained that training and education could evaluate knowledge and skills to perform the skill or competency. Skill in training could assess other ability in the nurses' skill. Jensen et al. (2008) mentioned that training program would be increasing knowledge and skills when contents, methods, and strategies fit the characteristics of participants. Moreover, the nurses who have worked on resuscitation advanced life support (ALS) training for a half year were correlated to have increased their knowledge and skills.

In addition, the existing studies by Williams, Nocera, and Casteel (2008) reported that training interventions for health care providers were correlated in improving knowledge and skills in disaster response. Reid et al. (2005) mentioned that disaster mental health intervention during, and following the disaster had

provided many disaster mental health skills and had been valuable in professional and personal lives. Moreover, Reynolds (2010) mentioned that practicing BLS training can develop confidence and skills, therefore mandatory training is important for all members of the team. Castle, Garton, and Kenward (2007) explained that nurses have improved their confidence and skills with regular BLS training compared with those who did not train.

One surprising finding of this study on perceived clinical skills for tsunami care particularly for wound care showed that training and education was non-significantly correlated with wound care (r = .20, *p*>.05) (Table 13). The finding could be explained based on the training index score showing that none of the subjects was trained for wound care in caring for tsunami patients (Appendix F, Table 15). This means that the hospital did not provide tsunami wound care training for the nurses. Moreover, the hospital might not be aware on the importance of tsunami wound care which is very different from other types of wounds. Maegele et al. (2006) figured out that tsunami wounds were significantly contaminated with foreign materials such as seawater, mud, sands, soil, vegetation, stick, and corals inside the cavity. Thus, debridement of wounds was needed in nearly 90 percent of the tsunami patients.

Tsunami wounds have specific and complicated problems and are very difficult to treat from general wounds. Hence, the nurses who attended and did not attend in emergency training and education program without specific context of tsunami wound care might be not really influence their clinical skills on tsunami wound care. Whereas, a study was supported by Lukthitikul and Hatthakit (2007)

mentioned that the nurses lack of knowledge and skills to provide care to tsunami patients having wounds, particularly while cleaning and suturing the wounds.

It was learned that Dr. Zainoel Abidin general hospital Banda Aceh had conducted short courses on emergency training and education programs for the nurses in local and other countries but showed lack of continuity of those trainings. The program was aimed to improve the nurses' knowledge and skills in responding to mass casualty events such as earthquake and tsunami disaster. Both the local government and NGOs had obtained donations for the programs during the first years after the tsunami. Even though almost half of the nurses had attended the emergency training and education, the continuity and duration of the emergency training and education should be increased to improve clinical skills for tsunami response. It is noted the previous study mentioned that intellectual skills is gained during a course of study which can be transferred to other situations, which may occur from learning situation (Smith & Merchant, as cited in Lauder et al., 1999).

There was no significant mean differences of perceived clinical skills for tsunami care among nurses between none attended and attended groups on hospital disaster drill ($t = .55$, $p = 58$). It was indicated that attendance to the drill had no influence on the nurses' perceived clinical skills for tsunami care. The hospital disaster drill is an essential part for improvement and evaluation of disaster response capacity for health care provider including nurses in the hospital. In fact, within five years after the tsunami struck, the hospital had conducted only one disaster response drill supported by local government and NGOs. The subjects who attended in the hospital disaster drill were 42.3 percent and none attended 57.7 percent. It was interpreted that the hospital discontinued conducting the hospital disaster drill. The

previous study mentioned that it is required to conduct the hospital drill at least once a year for drill involving enough victims to test the organization's performance under stress. As a standard, the hospital must provide for hospital disaster drill regularly to evaluate nurses' competency to respond to disaster (Kaji & Lewis, 2008).

On the other hand, the finding of this study indicated that the hospital also lack of validating drill tool assessment to conduct the drill, lack of hospital policy to respond to disaster, limited funding support to conduct disaster drill regularly, and the lack of hospital disaster plan could be an indication of the no correlation results. The study was supported by evidence from previous study, which mentioned that lack of validated assessment methods reflect the complex problem of hospital drill preparedness. The weakness in hospital disaster management include confusion over roles and responsibilities, poor communication, lack of planning, suboptimal training, and a lack of hospital integration into community disaster planning which are demonstrated in disaster management (Kaji et al., 2008).

Moreover, conducting disaster drills needs the total support of the hospital policy and the involvement of multidisciplinary groups including clinical staff, physicians, security, environment services, and infection control (Bartley, Fisher, & Stella, 2007). Successful medical response to a disaster depends on adequate resources, thoughtful disaster planning, and a community-wide, multidisciplinary process of continuous education and training. The realistic drills and training in hospital disaster drill could increase knowledge and skills in responding disaster events (Vinson, 2007). In addition, previous study suggests that teamwork is needed and that hospital policy should promote and publish evidence on the effectiveness of disaster drill for the hospital staff, therefore the drill could become an

effective method to improve clinical skills in response to disaster (Bartley et al., 2007). Moreover, drills can be difficult to organize and expensive because overtime pay is maybe necessary to compensate participants who are involved in the disaster drill (Kaji & Lewis, 2008).

To conduct successfully in hospital disaster drill, it needs well-prepared and organized hospital's teamwork, equipments of drill, and the community that involved in disaster drill. Similarity, a previous study supports that in providing a hospital disaster drill there should be a well-organized teamwork, communication, and disaster drill tool. The component of the drill should be clear among participants such as teamwork and communication, surge capacity, supplies, and equipment. Disaster drill should also identify zones and action during disaster such as command system, triage, treatment, and decontamination. Lack of training and unfamiliarity with disaster response might influence interpretation of drill tool (Kaji & Lewis, 2008).

On February 2009, this hospital has established a team for disaster response, and allocated the budget for hospital disaster plan. This team has established networking with the Tsunami Disaster Recovery and Mitigation Center (TDRMC) Nanggroe Aceh Darussalam and the Indonesian national disaster response as well. The team focused on providing emergency training and education, and competency to assess and validate disaster drill tool, promote support from hospital policy and stakeholders, and integrate the hospital into community disaster planning.

In summary, the subjects' perceived clinical skills for tsunami care in triage, acute respiratory care, spiritual care, mental health care, wound care, patient referral, and psychosocial care were at a moderate level. The finding of this study showed that the subjects' perceived clinical skills for tsunami care were statistically

significant low positive correlated with its related factors including knowledge, clinical experience, training and education, except for attending hospital disaster drill. Demographic data might have contributed to subjects' perceived clinical skills including diploma level, age, working experience as a nurse, and direct experience in caring for tsunami patients. These factors played an important role in order to improve subjects' perceived clinical skills in caring for tsunami patients.

CHAPTER 5

CONCLUSION AND RECOMENDATIONS

This study employed the descriptive correlational study to describe the level of perceived clinical skills for tsunami care, related factors of perceived clinical skills for tsunami care, and examine the relationship between perceived clinical skills for tsunami care and its related factors among nurses in Banda Aceh, Indonesia. This study was conducted in a provincial hospital in Banda Aceh, Indonesia. Ninety-seven nurses who worked in hospital of the tsunami-affected area were recruited using systematic random sampling. The subjects were required to complete a set of questionnaires, which consisted of four main parts: 1) the Demographic Data Questionnaire [DDQ], 2) the Nurses' Clinical Experience Questionnaire [NCEQ], 3) the Nurses' Knowledge Tsunami Care Questionnaire [NKTCQ], and 4) the Tsunami Care Questionnaire [TCQ]. The three experts from the Faculty of Nursing Prince of Songkla University, Thailand evaluated the instruments for its content validity.

A pilot study was conducted and the desired alpha coefficient of .93 for the Nurses' Clinical Experience Questionnaire and .98 for the Tsunami Care Questionnaire were found. Moreover, the Nurses' Knowledge Tsunami Care Questionnaire was tested for internal consistency using Kuder Richardson-20 with the coefficients of .71. Lastly, the training and education questionnaire was tested for stability using test- retest with Spearman' Rho ($\rho = .98$, $p< .01$). The data were analyzed by using descriptive and inferential statistics.

Summary of the Study Findings

The sample consisted of 97 nurses with the mean age of 31.9 (SD = 6.6). Majority of them were more than 30 years old (56.7%), and around three fourth of them were married (75.3%). The majority of the subjects were female (71.1%), were educated to diploma level (78.4%), and all of them were Islam (100%). Attending emergency training and education had six index score (37.1%) with the mean score of 4.3 (SD = 1.9). Working experience as a nurse of the subjects was more than 5 years (53.6%) with the mean score of 8.7 (SD = 7.5). The majority of the subjects had experience in caring for tsunami patients (80.4%), and 40.2 percent of them had experience in caring for tsunami patients for 3-4 months with the mean score of 3.0 (SD = 1.9). Approximately 42.3 percent of the subjects had attended hospital disaster drill.

The perceived clinical skills for tsunami care of the subjects showed that the highest mean score were triage (M = 3.65, SD = 0.81), followed by acute respiratory care (M = 3.57, SD = 0.86), spiritual care (M = 3.51, SD = 0.93), mental health care (M = 3.51, SD = 0.99), wound care (M = 3.50, SD = 0.96), patient referral (M = 3.45, SD = 0.80), and psychosocial care (M = 3.41, SD = 0.84). Furthermore, the related factors of perceived clinical skills for tsunami care showed that knowledge had the mean score of 9.31(SD = 1.89), and clinical experience of 2.09 (SD = 0.56). Moreover, training and education had the index mean score of 4.3 (SD = 1.9), and the subjects had attended hospital disaster drill of 42.3 percent and none attended of 57.7 percent of the number of attendance.

The correlation between perceived clinical skills for tsunami care and its related factors showed knowledge has a statistically low positive significant

correlation with perceived clinical skills for tsunami care (r = .24, *p*< .05). Clinical experience has a statistically low positive significant correlation with perceived clinical skills for tsunami care (r = .30, *p*< .01). Training and education has a statistically low positive significant correlation with perceived clinical skills for tsunami care (r = .23, *p*< .05) except for wound care. Lastly, there was no significant mean differences of perceived clinical skills for tsunami care between none attended and attended groups on attending hospital disaster drill (*t* = .55, *p* = 58).

Limitation of the Study

The findings of this study cannot be generalized on the actual clinical skills for tsunami care, because this study was conducted only for perceived clinical skills for tsunami care among nurses who worked in the tsunami-affected area in a provincial hospital in Banda Aceh, Indonesia.

Recommendations

Nursing Practice

The finding of this study recommends that the clinical practitioners and hospital policy makers should be aware of the importance on the preparation of hospital disaster drill in response to the tsunami. The nurses' clinical skills for tsunami care needs improvement on knowledge and skills by attending trainings and educational programs and hospital disaster drills. Furthermore, clinical practitioners should encourage nurses to increase their knowledge in caring for tsunami patients, attending emergency training and education, and attending hospital disaster drill regularly to meet a standard level on preparations in response to disaster.

Nursing Education

The findings of this study could serve as evidence or guideline for nurse educators to better prepare nursing students about for nurses' knowledge and skills for tsunami care by providing disaster and emergency trainings. Those training consist of disaster management, BLS, ACLS, ATLS, mental health care, and infection control and prevention in response to tsunami disaster in the hospital setting.

Nursing Research

These findings present valuable information about perceived clinical skills for tsunami care and its related factors among nurses. Particularly, the emergency training and research center should consider developing and continuing the training program and hospital disaster drill. The hospital and emergency training and research center should also allocate budget for hospital disaster plan to improve nurses' knowledge and skills in response to disaster. Further study is needed to develop practical guidelines of clinical skills for tsunami care in acute response phase in the hospital.

References

Almonte, A. (2007). *Navy nurses' experiences during operation unified assistance aboard the USNS MERCY: A grounded theory study.* Unpublished Ph.D., University of San Diego, United States, California.

Alonzo, A. (2009). *Motivational factors in registered nurses completing a baccalaureate completion program.* Unpublished Ph.D., University of Kansas, United States, Kansas.

Arbon, P., Bobrowski, C., Zeitz, K., Hooper, C., Williams, J., & Thitchener, J. (2006). Australian nurses volunteering for the Sumatra-Andaman earthquake and tsunami of 2004: A review of experience and analysis of data collected by the Tsunami Volunteer Hotline. *Australasian Emergency Nursing Journal, 9*(4), 171-178.

Baranoski, S. (2008). Choosing a wound dressing, part 1. *Nursing, 38*(1), 60-61.

Bartley, B., Fisher, J., & Stella, J. (2007). Video of a disaster drill is effective in educating registrars on the hospital disaster plan. *Emergency Medicine Australasia, 19*(1), 39-44.

Becker, S. M. (2007). Psychosocial care for adult and child survivors of the tsunami disaster in India. *Journal of Child & Adolescent Psychiatric Nursing, 20*(3), 148-155.

Bjork, I. T., & Kirkevold, M. (1999). Issues in nurses' practical skill development in the clinical setting. *Journal of Nursing Care Quality, 14*(1), 72-84.

Black, J. M. (2005). *Medical surgical nursing clinical management for outcomes* (7 th ed. Vol. 1). St. Louis: Elsevier Senders.

Boe, G. P. (2008). Reducing laboratory losses through disaster mitigation. *AMT Events, 25*(1), 8.

Castille, K. (1996). Clinical supervision: from rhetoric to accident and emergency practice. *Accident and Emergency Nursing, 4*(1), 2-4.

Castle, N., Garton, H., & Kenward, G. (2007). Confidence vs competence: Basic life support skills of health professionals. *British Journal of Nursing (BJN), 16*(11), 664-666.

Chan, M. F. (2009). Factors affecting knowledge, attitudes, and skills levels for nursing staff toward the clinical management system in Hong Kong. *Computers Informatics Nursing 27*(1), 57-65.

Chapman, K., & Arbon, P. (2008). Are nurses ready? Disaster preparedness in the acute setting. *Australasian Emergency Nursing Journal, 11*(3), 135-144.

Chaya, M. (2005). Relieving suffering after the tsunami. *Nursing, 35*(8), 48-49.

Claudius, I., Behar, S., Ballow, S., Wood, R., Stevenson, K., Blake, N., et al. (2008). Disaster drill exercise documentation and management: Are we drilling to standard? *Journal of Emergency Nursing, 34*(6), 504-508.

Collander, B., Green, B., Millo, Y., Shamloo, C., Donnellan, J., & DeAtley, C. (2007). Development of an "All-Hazards" hospital disaster preparedness training course utilizing multi-modality teaching. *Prehospital and Disaster Medicine*, 63-68.

College of Register Nurses of Nova Scotia (2006). *Position statement core competencies for registered nurses and nurse practitioners in an emergency/disaster*. Halifax, NS: College of Register Nurses of Nova Scotia.

Considine, J., Botti, M., & Thomas, S. (2007). Do knowledge and experience have specific roles in triage decision-making. *Academic emergency Medicine, 14*, 722-726.

Cummins, A. (2008). Clinical supervision: The way forward? A review of the literature. *Nurse Education in Practice, In Press, Corrected Proof*.

Dirkes, S. (2002). Help for ARDS patients. *RN, 65*(8), 52-58.

Doyle, S., Gallagher, J., Bell, M., Rochford, C., & Roynane, S. (2008). Establishing a ' train the trainer' education model for clinical skills development. *Nursing Oder people, 20*(5), 34-37.

Dunwoody, C. J., Krenzischek, D. A., Pasero, C., Rathmell, J. P., & Polomano, R. C. (2008). Assessment, physiological monitoring, and consequences of inadequately treated acute pain. *Journal of PeriAnesthesia Nursing, 23*(1, Supplement 1), S15-S27.

Ekachai, S. (2005). Tsunami aftermath: Help or hurt? an uncertain future Retrieved August 9, 2009, from

http://www.angkor.com/2bangkok/2bangkok/forum/showthread.php?p=4376

Ekedahl, M. A., & Wengstrom, Y. (2009). Caritas, spirituality and religiosity in nurses' coping. *European Journal of Cancer Care* 1-8.

Evans, R. J., & Donnelly, G. W. (2006). A model to describe the relationship between knowledge, skill, and judgment in nursing practice. *Nursing Forum, 41*(4), 150-157.

Evers, S., & Puzniak, L. (2005). Bioterrorism knowledge and emergency preparedness among school nurses. *The Journal of School Health, 75*(6), 232.

Falcone, R. E., Herron, H., Werman, H., & Bonta, M. (1998). Air medical transport of the injured patient: Scene versus referring hospital *Air Medical Journal, 17*(4), 161-165.

Foa, E. B., Stein, D. J., & Mcfarlance, A. C. (2003). Symptomatology and psychopathology of mental health problems after disaster. *Journal Psychiatric, 67*(2).

Garfield, R., & Hamid, A. Y. (2006). Tsunami response: A year later. *American Journal of Nursing, 106*(1), 76-79.

Geertruid, M. H., Marres, M., W., D., de Lange, M., P.H., L., Leenen, M., et al. (2006). Wound infections in repatriated survivors of the tsunami disaster. *18*(4), 1-5.

Gillett, B., Peckler, B., Sinert, R., Onkst, C., Nabors, S., Issley, S., et al. (2008). Simulation in a disaster drill: Comparison of high-fidelity simulators versus trained actors. *Academic Emergency Medicine, 15*, 1144-1151.

Gould, D., Berridge, E.-J., & Kelly, D. (2007). The national health service knowledge and skills framework and its implications for continuing professional development in nursing. *Nurse Education Today, 27*(1), 26-34.

Green, G. B., Modi, S., Lunney, K., & Thomas, T. L. (2003). Generic evaluation methods for disaster drills in developing countries. *Annals of Emergency Medicine, 41*(5), 689-699.

Gregor, S. (2005). Resilience after a disaster Retrieved August 1, 2009, from http: www..psychology.org.au/publications/inpsych/disaster/

Harcombe, C. (2004). Nursing patients with ARDS in the prone position. *Nursing Standard, 18*(19), 33-39.

Hatthakit, U., & Thaniwathananon, P. (2007). The suffering experiences of Buddhist tsunami survivors. *International Journal for Human Caring, 11*(2), 59-66.

Hodge, D. R. (2006). A template for spiritual assessment: A review of the JCAHO requirements and guidelines for implementation. *Social Work, 51*(4), 317-326.

Hsu, E. B., Thomas, T. L., Bass, E. B., Whyne, D., Kelen, G. D., & Green, G. B. (2006). Health care worker competencies for disaster training. *BMC Medical Education, 6*(19).

Hughes, F., Dnurs, M. G., Fritsch, K., & Calder, S. (2007). Psychosocial response in emergency situations the nurses' role. *International Nursing Review 54*, 19-27.

Husna, C., & Hermawati, D. (2009a). Nurses' Clinical Experience Questionnaire (NCEQ). Unpublished questionnaire. Prince of Songkla University, Thailand.

Husna, C., & Hermawati, D. (2009b). Tsunami Care Questionnaire (TCQ). Unpublished questionnaire. Prince of Songkla University, Thailand.

Ignatavius, D. D., & Workman, M. L. (2006). *Medical surgical nursing critical thinking for collaborative care* (5 th ed.). St. Loius. Missouri: Elsevier Saunders.

International Nursing Coalition for Mass Casualty Education (2003). *Educational competencies for registered nurses responding to mass casualty incidents*. New York: International Nursing Coalition for Mass Casualty Education.

Irvine, D., Sidani, S., & Hall, L. M. G. (1998). Linking outcomes to nurses' role in health care. *Nursing Economic, 16*(2).

Jennifer, L. R. (2002). Army nurses' knowledge base for determining triage categories in a mass casualty. *Military Medicine, 167*(10), 812.

Jensen, M. L., Lippert, F., Hesselfeldt, R., Rasmussen, M. B., Mogensen, S. S., Jensen, M. K., et al. (2008). The significance of clinical experience on learning outcome from resuscitation training: A randomized controlled study. *Resuscitation, 80*, 238-243.

Johnson (2005). Measuring pain Visual Analog Scale versus Numeric Pain Scale: What is the difference? *Journal of Chiropractic Medicine, 4*(1), 43-44.

Johnson, & Travis (2006). Trauma response to the Asian tsunami: Krabi Hospital, Southern Thailand. *Emergency Medicine Australasia, 18*(2), 196-198.

Jones (2006). Mother natural's disaster and their health effects: A literature review. *Nursing Forum, 42*(2), 78-87.

Julia, G., & Joyce, D. (1996). Managing spiritual distress in patients with advanced cancer pain. *Cancer Nursing 19*(5), 376-383.

Kaewlai, R., Meennuch, W., Srisuwan, T., Prasitvoranant, W., Yenarkarn, P., & Chuapetcharasopon, C. (2009). Imaging in tsunami trauma. *Journal of Medical Ultrasound, 17*(1), 1-8.

Kahn, C. A., Schultz, C. H., Miller, K. T., & Anderson, C. L. (2009). Does START triage work? An outcomes assessment after a disaster. *Annals of Emergency Medicine, In press, corrected proof*.

Kaji, A. H., Langford, V., & Lewis, R. J. (2008). Assessing hospital disaster preparedness: A comparison of an on-site survey, directly observed drill performance, and video analysis of teamwork. *Annals of Emergency Medicine, 52*(3), 195-201.e112.

Kaji, A. H., & Lewis, R. J. (2008). Assessment of the reliability of the Johns Hopkins/agency for healthcare research and quality hospital disaster drill evaluation tool. *Annals of Emergency Medicine, 52*(3), 204-210.e208.

Kak, N., Burkhalter, B., & Cooper, M.-A. (2001). Measuring the competence of healthcare providers. *QA Operations Research Issue Paper, 2*(1), 1-28.

Kennedy, K., Aghababian, R. V., Gans, L., & Lewis, C. P. (1996). Triage: Techniques and applications in decision making. *Annals of Emergency Medicine, 28*(2), 136-144.

Kliegel, M., & Martin, M. (2007). Adult age differences in errant planning: The role task familiarity and cognitive resources. *Experimental Aging Research*(33), 145-161.

Kobayashi, L., Shapiro, M. J., Suner, S., & Williams, K. A. (2003). Disaster medicine: The potential role of high fidelity medical simulation for mass casualty incident training. *Medicine and Health Rhode Island, 86*(7), 196.

Kozier, B., Erb, G., Berman, A., & Snyder, S. (Eds.). (2004). *Fundamentals of nursing: Concepts, process, and practice* (7 th ed.). New Jersey.

Lauder, W., Reynolds, W., & Angus, N. (1999). Transfer of knowledge and skills: some implications for nursing and nurse education. *Nurse Education Today, 19*(6), 480-487.

Lauredeau, M. C., Labarre, L., & Senecal, G. (2007). The psychological dimension of heath and social service interventions in emergency situation. *Open Medicine, 1*(2), E 102-106.

Lee, V. J., Low, E., Ng, Y. Y., & Teo, C. (2005). Disaster relief and initial response to the earthquake and tsunami in Meulaboh, Indonesia. *Annals Academy Medical Singapore, 34*(9), 586-590.

Lennquist, S., & Hodgetts, T. (2008). Evaluation of the response of the Swedish healthcare system to the tsunami disaster in South East Asia. *European Journal of Trauma and Emergency Surgery, 34*(5), 465.

Lommen, M. J. J., Sanders, A. J. M. L., Buck, N., & Arntz, A. (2009). Psychosocial predictors of chronic post-traumatic stress disorder in Sri Lankan tsunami survivors. *Behaviour Research and Therapy 47*, 60-65.

Lukthitikul, S., & Hatthakit, U. (2007). Wound care for tsunami victims of nurses at hospitals of Phang-Nga province. *Songklanagarind Medical Journal, 25*(5), 391- 400.

MacGeorge, J. M., & Nelson, K. M. (2003). The experience of the nurse at triage influences the timing of CPAP intervention. *Accident and Emergency Nursing, 11*(4), 234-238.

Maegele, M., Gregor, S., Yuecel, N., Simanski, C., Paffrath, T., Rixen, D., et al. (2006). One year ago not business as usual: Wound management, infection and psychoemotional control during tertiary medical care following the 2004 tsunami disaster in southeast Asia. *Critical Care 1*(2), 1-9.

Math, S. B., Tandon, S., Girimaj, S. C., Benegal, V., Kumar, U., Hamza, A., et al. (2008). Psychological impact of the tsunami on children and adolescents from the Andaman and Nicobar islands. *Journal of Clinical Psychiatry, 10*(1).

Melsh, M., Weidemeyer, T., Ingram, S., & Schwartz, J. (2002). Preventing a disaster within disaster: The effective use and management of unaffiliated volunteers, from www.pointsoflight.org/disaster/disaster.cfm

Mendez-Eastman, S. (2005). Wound dressing categories. *Plastic Surgical Nursing* Retrieved 2, 25, from http://www.dressings.org/Dressings/telfa.htm

Ministry of Public Health, World Health Organization representative to Thailand, & Thai Ministry of Health US CDC Collaboration (2005). Rapid health response, assessment, and surveillance after a tsunami Thailand, 2004-2005. *Safer Healthier People, 54*(3), 61-64.

Morrison, G. (2007). Understanding shock. *3*(3), 121-125.

Obura, D. (2006). Impacts of the 26 December 2004 tsunami in Eastern Africa. *Ocean & Coastal Management, 49*(11), 873-888.

Oermann, M., Yarbrough, S., Saewert, K., Ard, N., & Charasika, M. (2009). Clinical evaluation and grading practices in schools of nursing: National survey findings part II. *Nursing Education Perspectives, 30*(6), 352.

Ommeren, M. v., Saxena, S., & Saraceno, B. (2005). Mental and social health during and after acute emergencies: Emerging consensus? *Bulletin of the World Health Organization, 83*, 71-76.

Polit, D. F., & Hungler, B. P. (1999). *Nursing research: Principles and methods* (6 th ed.). Philadelphia: Lippincott.

Potera, C. (2005). In disaster's wake: Tsunami lung. *Environmental Health Perspectives, 113*(11), A734-A734.

Prasartritha, T., Tungsiripat, R., & Warachit, P. (2008). The revisit of 2004 tsunami in Thailand: Characteristics of wounds. *International Wound Journal 5*(1), 8-19.

Proehl, J. A. (2002). Assessing emergency nursing competence. *Nursing Clinics of North America, 37*(1), 97-109.

Qureshi, K., & Gebby, K. M. (2007). Disaster management. In T. G. Veenema (Ed.), *Disaster nursing and emergency preparedness for chemical, biological, and radiological terrorism and other hazards* (2 nd ed., pp. 137-176). New York: Springer Publishing Company.

Rebmann, T., Carrico, R., & English, J. F. (2008). Lessons public health professionals learned from past disasters. *Public Health Nursing, 25*(4), 344-352.

Rebmann, T., English, J. F., & Carrico, R. (2007). Disaster preparedness lessons learned and future directions for education: Results from focus groups conducted at the 2006 APIC Conference. *American Journal of Infection Control, 35*(6), 374-381.

Rebmann, T., & Mohr, L. (2010). Bioterrorism Knowledge and Educational Participation of Nurses in Missouri. *The Journal of Continuing Education in Nursing, 41*(2), 67.

Reddy, M. C., Paul, S. A., Abraham, J., Neese, M. M., DeFlitch, C., & Yen, J. (2008). Challenges to effective crisis management: Using information and communication technologies to coordinate emergency medical services and emergency department teams. *International Journal of Medical Informations* 1-11.

Reid, W. M., Ruzycki, S., Haney, M. L., Brown, L. M., Baggerly, J., Mescia, N., et al. (2005). Disaster mental health training in Florida and the response to the 2004 hurricanes. *Journal of Public Health Management & Practice, 11(6)*(Supplement), S57-S62.

Reynolds, E. (2010). Basic life support... this practice profile is based on NS494 Denton A, Giddins P (2009) A collaborative and progressive approach to basic life support. Nursing Standard. 23, 38, 49-55. *Nursing Standard, 24*(18), 59-59.

Rubin, D., Dodd, M., Desai, N., Dollock, B., & Pole, J. G. (2009). Spirituality in well and ill adolescents and their parents: The use of two assessment scales. *Pediatric Nursing, 31*(1).

Sausa, D. A. (2006). *How the brain learns* (3 rd ed.). California: Carwin Press.

Schenker, J. D., Goldstein, S., Braun, J., Werner, A., Buccellato, F., Asaeda, G., et al. (2006). Triage accuracy at a multiple casualty incident disaster drill: The emergency medical service, fire department of New York city experience. *Journal of Burn Care & Research 27*(5), 570-575.

Scott, J. A., Miller, G. T., Barry Issenberg, S., Brotons, A. A., Gordon, D. L., Gordon, M. S., et al. (2006). Skill improvement during emergency response to terrorism training. *Prehospital Emergency Care, 10*, 507-514.

Scott, L. (2009). Fracture management. *Nursing Standard, 23*(27), 59-59.

Sloan, K., & Summers, A. (2006). Tetanus vaccination: The issue of 'just in case' vaccinations in emergency departments. *Australasian Emergency Nursing Journal, 9*(1), 35-38.

Smith, E., Morgans, A., Biggs, J., & Buchanan, R. (2007). Managing health information during disasters: A survey of current specialized health information systems in Victorian hospitals. *Health Information Management Journal, 36*(1), 23-29.

Smith, G. B., & Poplett, N. (2002). Knowledge of aspects of acute care in trainee doctors. *Post Graduate Medicine Journal, 78*, 335-338.

Smith, K. K., Gilcreast, D., & Pierce, K. (2008). Evaluation of staff's retention of ACLS and BLS skills. *Resuscitation, 78*(1), 59-65.

Stein, L. (2008). Mass casualty triage. *The Oklahoma Nurse* 19-21.

Stevensen, C. (1995). Nonpharmacological aspects of acute pain management. *Complementary Therapies in Nursing and Midwifery, 1*(3), 77-84.

Stotts, N. A., Puntillo, K., Morris, A. B., Stanik-Hutt, J., Thompson, C., White, C., et al. (2004). Wound care pain in hospitalized adult patients. *Heart and Lung, 33*(5).

Sundram, S., Karim, M. E., Ladrido-Ignacio, L., Maramis, A., Mufti, K. A., Nagaraja, D., et al. (2008). Psychosocial responses to disaster: An Asian perspective. *Asian Journal of Psychiatry, 1*(1), 7-14.

Sweeney, B., Jasper, E., & Gates, E. (2004). Large-scale urban disaster drill involving an explosion: lessons learned by an academic medical center. *Disaster Management & Response, 2*(3), 87-90.

Syarifah, R. J. (2009). *Family support and psychosocial problems among the tsunami survivors in Aceh Besar district, Indonesia.* Prince of Songkla University, Hatyai.

Takahashi, M., Tanaka, K., & Miyaoka, H. (2006). Reliability and validity of communication skills questionnaire (CSQ). *Psychiatry and Clinical Neurosciences 60*, 211-218.

Timby, B. K. (2003). *Fundamental skills and concepts in patient care* (7 th ed.). Philadelphia, Baltimore, New York: Lippincott William & Wilkins.

Tippins, E. (2005). How emergency nurses identify and respond to critical illness. *Australasian Emergency Nursing Journal 8*, 85-120.

Tuicomepee, A., & Romano, J. L. (2006). Children and adolescents in natural disasters: Psychological implication for Thai youth affected by the 2004 tsunami. *Journal of Mental Health of Thailand*.

Tull, M. (2008). The psychological impact of the 2004 tsunami Retrieved August 8, 2009, from

http://www.google.co.th/search?hl=th&q=psychological+impact+of+tsunami-+Tull+2008

United State Geological Survey (2006). Tsunami hazard a national treat Retrieved February 28, 2008, from http://www.usgs.gov/

Veenema, T. G. (2006). Expanding educational opportunities in disaster response and emergency preparedness for nurses. *Nursing Education Perspectives, 27*(2), 93-99.

Veenema, T. G. (2007). *Disaster nursing and emergency preparedness for chemical, biological, and radiological terrorism and other hazards* (2 nd ed.). New York: Springer Publishing Company.

Vinson, E. (2007). Managing bioterrorism mass casualties in an emergency department: Lessons learned from a rural community hospital disaster drill. *Disaster Management & Response, 5*(1), 18-21.

Wacharong, C., Chukpaiwong, B., & Mahaisavariya, B. (2005). After the tsunamis. *The Lancet, 365*(9455), 203-203.

Walker, D. (1996). Back to basics: Choosing the correct wound dressing. *American Journal of Nursing, 96*(9), 35-39.

Watcharong, C., Chuckpaiwong, B., & Mahaisavariya, B. (2005). Editorial: Orthophaedic trauma following tsunami: Experience from Phang Nga, Thailand. *Journal of Orthopaedic Surgery, 13*(1), 1-2.

Wickrama, K. A. S., & Wickrama, K. A. T. (2008). Family context of mental health risk in tsunami affected mothers: Findings from a pilot study in Sri Lanka. *Social Science & Medicine, 66*(4), 994-1007.

Williams, J., Nocera, M., & Casteel, C. (2008). The effectiveness of disaster training for health care workers: A systematic review. *Annals of Emergency Medicine, 52*(3), 211-222.

World Health Organization (2005a). *The emergency and its aftermath in moving beyond the tsunami*. New Delhi- India: World Health Organization Office for South-East Asia.

World Health Organization (2005b). Epidemic-prone disease surveillance and response after the tsunami in Aceh Province, Indonesia. *Weekly Epidemiological Record, 80*(18), 160-164.

Zimmermann, P. G., Herr, R. D., & Scheetz, L. (2006). *Triage nursing secrets*. Illinois, Washington, New Jersey: Mosby Elsevier.

APPENDICES

Appendix A

Informed Consent

Dear participant,

My name is Cut Husna. I am a lecturer of Nursing Science Program of Syiah Kuala University Banda Aceh, Indonesia. Now, I am pursuing my masters at Faculty of Nursing Prince of Songkla University, Thailand. I am conducting a research entitled **"Perceived Clinical Skills for Tsunami Care and Its Related Factors among Nurses in Banda Aceh, Indonesia."** Information from this study will be valuable for the development of nursing profession. If you agree to participate in this study, you will be asked to complete the questionnaires, which takes 40-50 minutes. Your personal identity and all answers will be kept confidential and all information will only be used for the purpose of this research project. This study may have risk for your emotional distress for example you may feel flash back, sad, depressed, and get despair during completing questionnaire. If you feel uncomfortable while completing the questionnaire, you can stop until you feel better or you may withdraw from this study any time for any reasons without negative consequences.

Signature

Cut Husna

Date

……………………

If you still do not understand anything while completing the questionnaires or need more information, please do not hesitate to contact me or my thesis advisor (Asst. Prof. Dr. Urai Hatthakit) at the following address:

Nursing Science Program

Faculty of Medicine,

University of Syiah Kuala, Banda Aceh

Phone: (0651) 7461155

Mobile: 085277114575

Email: husna_psik_usk@yahoo.com

or

Asst. Prof. Dr. Urai Hatthakit

Faculty of Nursing, Prince of Songkla University,

Songkhla, Thailand, 90112

Phone: 074-286401

Email: urai.h@psu.ac.th

APPENDIX B
Instruments

Demographic Data Questionnaire (DDQ)

Please answer by putting mark (√) in the space available that is appropriate for you.

Demographic Data

1. Age ……years

2. Gender: 1 ( ) Female   2 ( ) Male

3. Marital status: 1 ( ) Single   2 ( ) Married

      3 ( ) Widowed   4 ( ) Divorced

4. Religion: 1 ( ) Islam   2 ( ) Christian

      2 ( ) Hindu   4 ( ) Buddha

5. Educational background:

   1 ( ) Diploma

   2 ( ) Bachelor

   3 ( ) Postgraduate, identify:…………………….

6. Training and education:

   6.1. Attending in emergency training and education program within past 5 years:

   1 (   ) None

   2 (   ) Basic life support (BLS)   :…......time(s)

   3 (   ) Advanced cardiac life support (ACLS)   :……..time(s)

   4 (   ) Basic trauma life support (BTLS)   :……..time(s)

   5 (   ) Advanced trauma life support (ATLS)   :……..time(s)

   6 (   ) Disaster management   :……..time(s)

   7 (   ) Infection control and prevention   :……..time(s)

   8 (   ) Mental health care for tsunami survivors   :……..time(s)

7. Working experience:

   7.1 Working experience as a nurse:……years.

   7.2 Experience in caring for patients attacked by tsunami:

      1 (   ) No   2 (   ) Yes

   7.3 If yes, the number of months/days in caring for patients attacked by

      tsunami: ……..months/days

   7.4 Experience of performing the following clinical nursing skills in caring

      for patients attacked by tsunami:

APPENDIX C

Nurses' Clinical Experience Questionnaire (NCEQ)

Please answer by putting mark (√) in the appropriate column.

No	Your Experiences in the Following Items	Never (0)	Sometimes (1)	Often (2)	Always (3)
	Triage				
1	Sorting patients based on triage system				
2	Providing nursing intervention based on categorical color in triage system				
	Acute respiratory care				
3	Assessing chest trauma for tsunami patients with near drowning				
4	Providing oxygenation support for patients with respiratory problems				
	Wound care				
5	Assessing characteristic of tsunami wound				
6	Providing specific wound care for tsunami patients				

No	Your experiences in the following Items	Never (0)	Sometimes (1)	Often (2)	Always (3)
	Mental health care				
7	Assessing psychological problems of tsunami patients				
8	Providing emotional support for tsunami patients				
	Psychosocial care				
9	Identifying core problems of psychosocial disruption such as loss families and financial incomes				
10	Promoting social support from families, friends, and society				
	Spiritual care				
11	Identifying spiritual distress for tsunami patients such as despair and hopelessness				
12	Providing spiritual practice for tsunami patients such as prayer and reciting Al-Qur'an				
	Patients referral				
13	Identifying patient referring requirement				
14	Involving in patient referring activities				

8. Attending hospital disaster drill:

   8.1 Within the last 5 years, my hospital has conducted hospital disaster drill……. time(s)

   8.2 Experience in attending hospital disaster drill (in item 8.1)

   1 (   ) No   2 (   ) Yes,………. time(s)

APPENDIX D

Nurses' Knowledge Tsunami Care Questionnaire (NKTCQ)

This questionnaire will provide some questions regarding nurses' knowledge on tsunami. Please choose the correct answer by putting mark (√) on the available options a, b, c, or d.

Impacts of Tsunami

1. What are the most common physical impacts on patients attacked by tsunami?
   a. Tetanus, hepatitis, and diarrhea
   b. Cardiac arrest, injury, and wound
   c. *Wound, fractures, and near drowning*
   d. Skin diseases, hepatitis, and cardiac arrest

2. What are the most common psychological symptoms on patients attacked by tsunami?
   a. Anxiety, decrease concentration, and depression
   b. Sleep disturbance, emotional disorders, and depression
   c. *Anxiety, depression, and post traumatic stress disorders (PTSD)*
   d. Decrease concentration, sleep disturbance, and emotional disorders

3. What are the common causes of psychosocial problems for patients attacked by tsunami?
   a. Fear and guilty
   b. Hopelessness and anger
   c. Loss of the meaning of life
   d. *Loss of loved ones and financial incomes*

4. What are the signs and symptoms of spiritual distress of patients attacked by tsunami?
   a. PTSD and guilty
   b. Anxiety and depression
   c. Anger, fear, despair, and depression
   d. *Grief and loss, hopelessness, despair, anger, and guilty*

Disaster Management

5. What is the triage principle in response phase of disaster?

    a. Making first priority for illness patients

    b. To get the right patients at the same time

    c. Maintaining life of survival of the patients

    d. *The greatest benefit and the largest numbers of patients*

6. What is nursing intervention for triage system during response phase?

    a. Offering information to communities

    b. Establishing communication and information

    c. *Establishing ATLS principles using a colored tagging system*

    d. Receiving appropriate radiological and definitive treatment and medical response

7. What are nursing interventions for tsunami patients with acute respiratory problems?

    a. Providing radiological intervention

    b. Referring to other hospitals to available medical equipment

    c. *Assessing for airway, breathing, circulation, and patients' disability*

    d. Conventional therapy including intubation and mechanical ventilator

8. What are the wound care procedures for patients attacked by tsunami?

    a. Dressing change of wound

    b. Protect the wound from iatrogenic damage

    c. Providing a protective wound from foreign body

    d. *Irrigation, debridement, cleansing, packing wound, and changing the dressing*

9. What are focuses of management wound care for patients attacked by tsunami?

    a. Frequent wound dressing changes

    b. Early operative care to prevent later morbidity

    c. Stabilizing remaining vital tissue and critical structures

    d. *Surgical removal of devitalized tissue and aggressive debridement*

10. What are the mental health interventions in tsunami response?
    a. Emphatic with patients condition
    b. Facilitating for medicine treatment
    c. Suggesting to visit psychiatrics and psychological ward
    d. *Providing consultation and training related to stress reaction, and stress management*

11. What are psychosocial interventions during response phase in caring for patients attacked by tsunami?
    a. Providing medical response
    b. Facilitating to find medical service
    c. *Providing social, emotional, and informational supports*
    d. Integrating medical intervention in volunteers and social workers

12. What are nursing interventions for spiritual distress in caring for patients attacked by tsunami?
    a. Providing of social support
    b. Providing of patient referring
    c. Identifying of the main signs and symptoms
    d. *Providing of counseling and participating in religious activities*

13. What are nursing assessments for referral pathway before patient referring to hospital referred?
    a. Providing nursing report
    b. Identifying patients condition and treatment
    c. Transporting patient's medication to other hospital
    d. *Identifying the health services available in the hospital referred*

APPENDIX E

Tsunami Care Questionnaire (TCQ)

Please answer all of the questions that apply for you based on your perceived skills in caring for tsunami patients by putting mark (√) in the appropriate column. There are five options available: **1 = very poor, 2 = poor, 3 = fair, 4 = good, and 5 = excellent.**

No	Your Skills in the Following Items	Very poor (1)	Poor (2)	Fair (3)	Good (4)	Excellent (5)
	Triage					
1	Using simple triage and rapid treatment (START) system					
2	Classifying patients' condition by using categorical color (green, yellow, red, and black)					
3	Determining care by using physical assessment and acuity rating of patients					
4	Classifying patients with critical, unstable, obvious bleeding, and circulation problem in red color					
5	Evaluating patient's condition in triage process at the right time, place, and treatment					
	Acute respiratory care					
6	Assessing signs and symptoms of near drowning such as dyspnea, cyanosis, and hypothermia					
7	Assessing signs and symptoms of pneumonia					

No	Your Skills in the Following Items	Very poor (1)	Poor (2)	Fair (3)	Good (4)	Excellent (5)
8	Removing foreign body from airway					
9	Promoting adequate airway by positioning, suctioning, and oxygenation					
10	Providing re-warming intervention by using warm blanket or clothing					
11	Administering antibiotic therapy for acute respiratory problems					
12	Evaluating patient's condition such as vital signs, breathing, and circulation					
	Wound care					
13	Assessing signs and symptoms of contaminated tsunami wound with sand, sewage, and mud					
14	Assessing characteristics of tsunami injuries (soft tissue injuries and fractures)					
15	Assessing bone deformities and bleeding for patients with fractures					
16	Assessing pain intensity					
17	Cleansing tsunami wound by using normal saline					
18	Preparing patients for debridement					
19	Administering antibiotic and tetanus prophylaxis					
20	Evaluating signs and symptoms of wound healing such as granulation growth					

No	Your Skills in the Following Items	Very poor (1)	Poor (2)	Fair (3)	Good (4)	Excellent (5)
	Mental health care					
21	Assessing psychological symptoms such as sadness, crying, nightmare, and emotional detachment					
22	Sorting patients with psychological problems					
23	Performing active listening and caring behavior					
24	Providing consultation for patients					
25	Educating patients to solve their problems related to psychological distress					
26	Evaluating emotional healing					
	Psychosocial care					
27	Assessing psychosocial disruption					
28	Assessing signs and symptoms of psychosocial distress such as loss of families, friends, social networks and financial incomes					
29	Encouraging family support to reduce psychosocial distress					
30	Encouraging patients to establish friendship among survivors					
31	Evaluating psychosocial care					
	Spiritual care					
32	Assessing signs and symptoms of spiritual distress such as grief and loss, hopelessness, loss of goal of life, anger, and guilty					

No	Your Skills in the Following Items	Very poor (1)	Poor (2)	Fair (3)	Good (4)	Excellent (5)
33	Providing spiritual interventions by participating in religious activities					
34	Providing spiritual counseling					
35	Evaluating spiritual distress					
	Patient referral					
36	Assessing patients' condition before referring					
37	Preparing patients' document, equipment, and medication before transferring					
38	Performing communication with other agencies where the patients will be transferred					
39	Documenting transferring activity					
40	Evaluating effectiveness of patients' referring					

Thanks You for Your Participation

APPENDIX F

Table 15

Training Index, Frequency, and Percentage of Training and Education (N = 97)

Training index	Types of training	Frequency	Percentage
0	None	11	11.3
1	ATLS[1]	2	2.1
2	ATLS[1], BTLS[1]	4	4.1
3	BLS[2], ACLS[1]	4	4.1
4	BLS[1], DM[2], IC[1]	16	16.5
5	BLS[1], DM[1], IC[2], MC[1]	24	24.8
6	BLS[1], ACLS[1], BTLS[1], DM[1], IC[1], MC[1]	36	37.1
	Total	97	100

ATLS[1]: Advanced trauma life support (1 time), BTLS[1]: Basic trauma life support (1 time), BLS[1]: Basic life support (1 time), BLS[2]: Basic life support (2 times), ACLS[1]: Advanced cardio life support (1 time), DM[1]: Disaster management (1 time), DM[2]: Disaster management (2 times), IC[1]: Infection control and prevention (1 time), IC[2]: Infection control and prevention (2 times), MC[1]: Mental health care for tsunami survivors (1 time)

APPENDIX G

Table 16

Means and Standard Deviations of Knowledge on Impact of Tsunami (N = 97)

No	Knowledge on impact of tsunami	M	SD
1	What are the most common physical impacts on patients attacked by tsunami?	0.85	0.36
2	What are the common causes of psychosocial problems of patients attacked by tsunami?	0.81	0.39
3	What are the most common psychological symptoms on patients attacked by tsunami?	0.80	0.39
4	What are the signs and symptoms of spiritual distress of patients attacked by tsunami?	0.72	0.45
	Total	3.19	0.87

Table 17

Means and Standard Deviations of Knowledge on Disaster Management (N = 97)

No	Knowledge on disaster management	M	SD
1	What are nursing interventions for tsunami patients with acute respiratory problems?	0.87	0.34
2	What are the wound care procedures for patients attacked by tsunami?	0.87	0.34
3	What are the mental health interventions in tsunami response?	0.87	0.34
4	What are nursing interventions for spiritual distress in caring for patients attacked by tsunami?	0.79	0.40
5	What is nursing intervention for triage system during response phase?	0.70	0.46
6	What are psychosocial interventions during response phase in caring for patients attacked by tsunami?	0.63	0.48
7	What is the triage principle in response phase of disaster?	0.57	0.49
8	What are nursing assessments for referral pathway before patient referral to hospital referred?	0.42	0.49
9	What are focuses of management wound care for patients attacked by tsunami?	0.41	0.49
	Total	6.12	1.54

Table 18

Means and Standard Deviations of Clinical Experience (N = 97)

No	Clinical experience	M	SD
1	Promoting social support from families, friends, and society	2.55	0.73
2	Providing spiritual practice for tsunami patients such as prayer and reciting Al-Qur'an	2.54	0.64
3	Identifying core problem of psychosocial disruption such as loss families and financial incomes	2.53	0.80
4	Identifying spiritual distress for tsunami patients such as despair and hopelessness	2.45	0.75
5	Assessing psychological problems of tsunami patients	2.43	0.81
6	Providing emotional support for tsunami patients	2.41	0.74
7	Providing specific wound care for tsunami patients	2.40	0.73
8	Providing oxygenation support for patients with respiratory problem	2.07	0.58
9	Assessing characteristic of tsunami wound	1.95	0.69
10	Providing nursing intervention based on categorical color in triage system	1.88	0.38
11	Identifying patient referring requirement	1.80	0.65
12	Assessing chest trauma for tsunami patients with near drowning	1.61	0.65
13	Involving in patient referring activities	1.43	0.51
14	Sorting patients based on triage system	1.40	0.49
	Total	2.09	0.56

APPENDIX H

List of Experts

Three experts validated the content validity of Demographic Data Questionnaire (DDQ), Nurses' Clinical Experience Questionnaire (NCEQ), Nurses' Knowledge Tsunami Care Questionnaire (NKTCQ), and Tsunami Care Questionnaire (TCQ), they were:

1. Asst. Prof. Dr. Sang-arun Isaramalai, RN

   Nursing lecturer, Faculty of Nursing Prince of Songkla University, Hatyai, Thailand

2. Asst. Prof. Dr. Wipa Sae Sia, RN

   Nursing lecturer, Faculty of Nursing Prince of Songkla University, Hatyai, Thailand

3. Dr. Hathairat Sangchan, RN.

   Nursing lecturer, Faculty of Nursing Prince of Songkla University, Hatyai, Thailand

VITAE

Name   Cut Husna

Student ID   5110420044

Educational attainment

Degree	Name of Institution	Year of Graduation
Bachelor of nursing science	Nursing Science Program, Syiah Kuala University Banda Aceh	2003

Scholarship Awards during Enrollment

Rocky Feller Foundation from the United Kingdom (UK)

Work-Position and Address

Nurse educator of nursing program of

Syiah Kuala University Banda Aceh, Indonesia

Phone +62-651-7555249