Nurses' Perceived Preparedness of Knowledge and Skills in Caring for Patients Attacked by Tsunami in Banda Aceh, Indonesia and Its Related Factors

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ABSTRACT

The tsunami disaster, which devastated Southeast Asia on December 26, 2004, resulted in a large number of deaths, caused injury to its thousands of victims physically, emotionally and psychologically, and created irreparable damage to homes and infrastructure. This descriptive correlational study aimed to describe the levels of nurses' perceived preparedness of knowledge and skills and to investigate the relationship between perceived severity and perceived risk, clinical experience, training and education, and attending hospital disaster drill and nurses' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami. Systematic random sampling was employed to recruit 97 staff nurses in a hospital in Banda Aceh, Indonesia. Data were obtained through self-reported questionnaires developed by the researcher and her colleague, which including five main parts: demographic data and working information, nurses' clinical experience, nurses' perceived preparedness of knowledge, tsunami care for measuring nurses' perceived preparedness of skills, and perceived severity and perceived risk. Pearson Product Moment correlation was used to investigate

the relationship between perceived severity and perceived risk, clinical experience, training and education, and nurses' perceived preparedness of knowledge and skills. Moreover, an independent *t*-test was used to compare mean differences of nurses' perceived preparedness of knowledge and skills between attending and none attending group nurses in attending hospital disaster drill.

Perceived severity and perceived risk, clinical experience, and training and education were low significantly positively correlated with nurses' perceived preparedness of knowledge ($r = .35$, $p < .01$), ($r = .42$, $p < .01$), ($r = .32$, $p < .01$) respectively, and with nurses' perceived preparedness of skills ($r = .22$, $p < .05$), ($r = .28$, $p < .01$), ($r = .33$, $p < .01$) respectively. Interestingly, there was no significant mean differences of nurses' perceived preparedness of knowledge and skills between attending and none attending group nurses in attending hospital disaster drill ($t = -1.55$, $p = .12$), ($t = .29$, $p = .76$) respectively. The findings provide evidence to be beneficial for the establishment of nurses' preparedness both in a clinical setting and nursing curricula.

Keywords: Nurse, preparedness, knowledge and skill, patients attacked by tsunami.

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CHAPTER 1

INTRODUCTION

Background and Significance of the Problem

On December 26, 2004, one of the largest recorded oceanic earthquake occurred in the Indian Ocean, 150 kilometers west of Aceh Province, Sumatra, Indonesia. This earthquake was registered at a magnitude of 9.0 on Richter scale. The earthquake has caused a gigantic tsunami which traveled 1,000 kilometers in two hours, destroying the coastal area throughout the Indian Ocean and hitting numerous countries including Indonesia, Srilanka, India, Thailand, Bangladesh, as well as other Asian and East African countries (Garfield & Hamid, 2006; Kurosaka et al., 2005).

Indonesia received the highest damage caused by the tsunami waves. The World Health Organization (WHO) reported the facts related with Southeast Asian tsunami in Indonesia which showed that 113,306 people died (counted for dead), 1,443 injured (hospitalized), 10,078 missing, and 605,849 reported as displaced by tsunami (WHO, 2005). The damage was considerably severe, which is known as one of the biggest humanitarian relief forces ever in the history of natural disaster, from around the world (Kurosaka et al., 2005; World Health Organization, 2005).

Banda Aceh province was severely impacted by the earthquake and tsunami reporting large numbers of deaths and injured, and badly damaged infrastructure such as extensive damage to the 5 hospitals and 77 health centres. Some of the hospitals were destroyed, some of the equipment were covered by mud, or all patients' information files were destroyed (Garfield & Hamid, 2006). Immediately aftermath of tsunami attacked victims faced various problems such as injuries,

fractures, and near drowning that develop pneumonia as a result of aspiration of seawater commonly called as tsunami lung (Maegele et al., 2005). The tsunami disaster resulted in people being homeless and inadequate sanitation thus having risk of disease such as water-borne diseases, respiratory diseases, or vector-borne diseases (Waring & Brown, 2005; World Health Organization, 2005). Tsunami disaster also caused the psychological problems for the victims. The victims of disaster also faced horrible experiences resulting psychological trauma to develop stress such as acute stress disorder (ASD) or post traumatic stress disorder (PTSD) (Deeny & McFetridge, 2005; Mitchell, Sakraida, & Zalice, 2005).

Preparations for, responding to, and recovering from disaster become a priority for health care providers, because disaster can occur anytime, anywhere, and in any form. Historically, nurses and physicians have played critical roles in disaster preparedness (Rogers & Lawhorn, 2007). Nurses have an obligation to treat as many victims as possible with a chance of survival during emergency phase of disaster. They are considered to be the first line of emergency defense with the goal to deliver acceptable quality care while saving as many lives as possible (Slepski, 2007). The participation of nurses in disaster is critical to ensure that nurses are aware and prepared to deal with mass casualty which not only required special knowledge but also need training to improve their skills (Williams, Nocera, & Casteel, in press). Nurses who are prepared and trained for disasters can play an important role and cope better with good performance in disaster (Suserud & Haljamie, 1997). Although not all nurses will directly contribute to disaster, it is imperative that each nurse acquires a knowledge based and minimum set of skills to enable for responding in disaster situation in an appropriate manner (Chapman & Arbon, 2008).

Many factors can contribute to nurses' preparedness in caring for patients attacked by tsunami. These include training and education (Chapman & Arbon, 2008; Wetta-Hall, Fredrickson, Ablah, Cook, & Molgaard, 2006), clinical experience (Suserud & Haljamie, 1997), perceived severity and perceived risk (O'Sullivan et al., 2008; Rebmann, 2006), and attending hospital disaster drill (Kaji & Lewis, 2008). The nurse considers practicing preparation for effective disaster preparedness. Preparation of nurses related to the received training and education as the most likely route of preparedness to provide knowledge and skill in disaster response (Chapman & Arbon, 2008; Wetta-Hall et al., 2006). The clinical experience will be related to readiness for actions in disaster response. The nurses who have previous experience will act more adequately and consistently than limited experience (Suserud & Haljamie). Perceived severity and perceived risk of nurses may affect them to prepare and will engage in preparedness activities (Rebmann). The nurse who involved in previous disaster will have a high perception in preparedness (O'Sullivan et al). Attending hospital disaster drill provide the real situation of disaster approach with the implementation of the relief activities in response phase of disaster and will be the way to assess the health care provider preparedness for future disaster (Kaji & Lewis).

Determining the nurses' preparedness for future disaster particularly tsunami is very crucial. Tsunami disaster occurs in a large scale and unpredictable effects. This disaster also needs specific treatment due to the characteristics of the victims. As the first line responder, the nurses should have enough preparedness on their knowledge and skills in caring for the tsunami victims. Continuously

preparedness is important in order to achieve the readiness for future disaster situations.

However, there are still gaps related to knowledge and skills with the poorly preparedness for disaster responding. The study from Slepski (2007) about emergency preparedness during hurricanes Katrina and Fung, Loke, and Lai (2008) study about disaster preparedness among Hong Kong nurses pointed out that the nurses perceived themselves have limited knowledge regarding disaster preparedness and well not trained. Moreover, Duong (2009) study about disaster education and training of emergency nurses in South Australia and Felice, Guillani, Alfonsi, Mosca, and Fabiani (2008) study about survey of nursing knowledge of bioterrorism revealed that there is no minimum standard for disaster education and training that lead to inadequate knowledge of nurses. The study from Arbon et al. (2006) about profiles of Australian nurses who volunteered and those who were deployed to Sumatra-Andaman earthquake of tsunami 2004 also described the role of nurses who have been deployed to a disaster event and report their work outside normal scope of practice which required knowledge and skills regarding disaster preparedness.

As the largest group of health care workforce, nurses are one of vital resources in dealing with unforeseeable disaster particularly their involvement in prompt responses in caring disaster victim. Therefore, this study focuses on nurse' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami disaster. This study may reveal benefits in capturing the real situation of nurses' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami and identifying factors related to the nurses' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami. Both of these results

will be a baseline data to improve the effort of nurses in regard to prepare them to be more knowledgeable and more skillful particularly in caring for patients attacked by tsunami.

Objectives of the Study

The objectives of this study were as follows:

1. To identify the levels of nurses' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami in Banda Aceh, Indonesia
2. To investigate the relationship between nurses' perceived preparedness of knowledge and its related factors in caring for patients attacked by tsunami in Banda Aceh, Indonesia
3. To investigate the relationship between nurses' perceived preparedness of skills and its related factors in caring for patients attacked by tsunami in Banda Aceh, Indonesia

Research Questions of the Study

This study aimed to answer the following research questions:

1. What are the levels of nurses' perceived preparedness of knowledge in caring for patients attacked by tsunami in Banda Aceh, Indonesia?
2. What are the levels of nurses' perceived preparedness of skills in caring for patients attacked by tsunami in Banda Aceh, Indonesia?
3. Are there any relationships between training and education, clinical experience, perceived severity and perceived risk, and attending hospital

disaster drill and nurses' perceived preparedness of knowledge in caring for patients attacked by tsunami in Banda Aceh, Indonesia?

4. Are there any relationships between training and education, clinical experience, perceived severity and perceived risk, and attending hospital disaster drill and nurses' perceived preparedness of skills in caring for patients attacked by tsunami in Banda Aceh, Indonesia?

Conceptual Framework of the Study

Conceptual framework for this study was developed based on three concepts: nurses' preparedness of knowledge, nurses' preparedness of skills, and factors relating to nurses' preparedness of knowledge and skills. The concepts of nurses' preparedness of knowledge consisted of the knowledge on impact of tsunami which was derived from Unahlekhaka and Mehta (2006), Laurendeau, Labarre, and Senecal (2007), and knowledge on tsunami disaster management included disaster management from the World Health organization [WHO] (2009) and Kim and Proctor (2002). The concept of knowledge on tsunami disaster management and nurses' preparedness of skills were developed from College of Registered Nurses of Nova Scotia [CRRNS] (2007) and the International Nursing Coalition for Mass Casualty Education [INCMCE] (2003). The researcher also used the concept of acute respiratory care from Maegele et al. (2006) and WHO (2009). Moreover, the concept of factors relating to nurses' preparedness of knowledge and skills are explored from literature reviews which included training and education (Chapman & Arbon, 2008; Wetta-Hall et al., 2006), clinical experience (Suserud & Haljamie, 1997), perceived

severity and perceived risk (O'Sullivan et al., 2008; Rebmann, 2006), and attending hospital disaster drill (Kaji & Lewis, 2008).

1. Nurses' preparedness of knowledge

The nurses' preparedness of knowledge consist of the knowledge on impacts of tsunami which covered physical impact such as enormous trauma of the survivors, psychological impact such as experienced with dreadful event yields suffering psychological problem including acute stress disorder (ASD) or post-traumatic disorder (PTSD). The psychosocial impact of tsunami survivor such as loss social network and property that leads them to bereavement feeling and disruption of living environment, and spiritual impact including experience of grieving, feeling guilty due to inability to rescue the family members, feeling loss of will to stay alive, and have feeling vulnerable, which interfere in performing religious activity. Moreover, the knowledge on tsunami disaster management including five phases of disaster management and seven domains of knowledge that needed by nurses to be prepared in caring for patients attacked by tsunami including triage, acute respiratory care, wound care, mental health care, psychosocial care, spiritual care, and patient referral. Triage knowledge is important in sorting the casualties when the health care provider cannot able to overwhelm of services in disaster situation. Acute respiratory care knowledge is needed for caring tsunami patients with respiratory problem due to submersion in tsunami wave which resulted in developing pneumonia. The nurses must be knowledgeable in caring specific tsunami wound due to the characteristic of the wound which needed specific treatment of recovery. The knowledge of mental health care covered the psychological problems that occur after trauma event and psychological support to prevent psychopathological problem of tsunami disaster. The

knowledge of spiritual care covered the knowledge of spiritual disruption and nursing activities regarding to spiritual support for the victims. Moreover, patient referral knowledge covered the knowledge of patients referring including preparation before transferring activity.

2. *Nurses' preparedness of skills*

The nurses' preparedness of skills consisted of seven domains of skills that nurses have to be prepared in caring for patients attacked by tsunami including triage, acute respiratory care, wound care, mental health care, psychosocial care, spiritual care, and patient referral. All the domains of nurses' preparedness of skills were divided into skills regarding to assessment, intervention, and evaluation. Triage assessment is process to prioritize the tsunami victims with the purpose to identify injured patient with good chance of live survival for receiving care. The triage intervention including START system triage by following respiratory, perfusion, and mental status (RPM) of victims to determine the appropriate care, and the evaluation of triage is ensuring the process of triage in the right place, and the right time to receive the appropriate care (Qureshi & Veenema, 2007). The assessment on acute respiratory care focuses on ability to breath, the symptom of breathing difficulties, persistent symptoms of weakness, dyspnea for tsunami victims with near drowning problem resulted for developing pneumonia and bronchitis from aspiration of seawater. The intervention of near drowning consists of maintaining circulation and re-warming intervention, promoting gas exchange, administering antibiotic and promoting hygiene standards to prevent nasocomial infection (Fan, 2006; Maegele et al., 2006). The evaluation is focused on continued reassessment of breathing effort, reduced patient's stress and anxiety, and preparing for transfer to intensive care unit if

the patient condition is being worsen (Maegele et al., 2006; World Health Organization, 2009).

Wounds of tsunami had been found to be contaminated with soil, seawater, or sewage which requires assessment of wound to determine degree of contamination for providing the accurate treatment. The interventions of wound care covered: wound cleansing to carry out the contaminate substance before wound is being closured, wound debridement to remove the necrotic tissue prior treatment, specific tsunami wound treatment by using the vacuum-assisted closure therapy (VAC) to promote wound healing, and the vaccination for prophylaxis treatment to prevent further wound infection (Maegele et al., 2006; Nelson & Dilloway, 2002; Prasartritha, Tungsiripat, & Warachit, 2008). The evaluation of healing process of tsunami wound is promoted by administering appropriate medication and regularly evaluation for wound infection will improve the healing process of wound (Lim, 2005; World Health Organization, 2009). The tsunami survivors have risk for encountering mental health problem because of their horrific experience in struggling with tsunami. The assessments of mental health problem include assessment of behavior of survivor such as fear, hopeless, anxiety or severely depression or having suicidal though appears (Mitchell et al., 2005). The intervention of mental health support composes of psychological triage and mental health referral, psychological first aid, crisis intervention, counseling, education. The evaluation of mental health support focuses on evaluation of patient's condition and ability to manage their feeling and solve their problems related to tsunami (Plum & Veenema, 2007).

The assessments of psychosocial care include assessment of social disruption of survivors such as loss family, friend, and business, assessment of coping

ability of survivors, and the others possibility social support resources around survivors. The interventions of psychosocial support focus on promoting social support involvement such as from relatives, neighborhoods, or making friendships among survivors. The evaluation of psychosocial care focuses on assessing ability of survivors to involve in friend or social network and evaluation of remaining sign and symptoms of such problem (Brake, Duckers, Vries, & Dun, 2009; Laurendeau et al., 2007). Furthermore, tsunami survivors commonly found the experience of grief, fear, despair, loss everything in their lives, or felt anger and guilty that led to questioning their spiritual belief (Gregor, 2005). The assessment of spiritual care focuses on evaluation of sign and symptoms of spiritual distress. The intervention related to spiritual care includes providing religious activity services and counseling related to spiritual distress. The evaluation of spiritual care focuses on evaluation of sign and symptom of spiritual distress and ability of survivors to involve in performing their religious activity (Wong & Yau, in press). Finally, the assessment of patient referral includes preparation prior transferring with intervention to offer the information to patient and family about transferring process, maintains patient condition, and communication with other agency where patient will be transferred. The evaluation of transferring process is the documentation about transferring activities (Timby, 2005).

3. Factors relating to nurses' preparedness of knowledge and skills

The factors relating to nurses' preparedness consisted of training and education, clinical experience, perceived severity and perceived risk, and attending hospital disaster drill. Training and education includes several kinds of training and education related to tsunami that the nurses have to undergo in order to prepare themselves for caring tsunami victim. Several various methods that the nurses apply

in order to improve their knowledge and skills including self study by reading books or other reading materials related to disaster, attending seminar or conference, and participation in training and education related to disaster preparedness (Chapman & Arbon, 2008). Clinical experience is the nurses' experience to perform some clinical skills such as triage, respiratory care, wound care, mental health care, psychosocial care, spiritual care, and patient referral in caring for patients attacked by tsunami. Previous experience in performing critical skills makes nurses able to perform some critical roles in response phase of disaster (Suserud & Haljamie, 1997).

The perceived severity and perceived risk of health care providers may affect their involvement in disaster preparedness. The severity of tsunami revealed the huge of injuries requires specific treatment and psychological problem that produce physical, psychological, social, and spiritual dysfunction (Maegele et al., 2006). The risk of next tsunami including risk due to people lives along coastal area where chances of earthquake-generated tidal wave are possible to strike them, or lack of knowledge and skill of nurses about life saving approaches that will lead to poor treatment for tsunami survivors (Noji, 1989). Lastly, attending hospital disaster drill allows nurses to become familiar with disaster management procedures during disaster response, and is the optimum way to assess disaster preparedness of nurses' for future disaster.

The conceptual framework of this study is presented in Figure 1:

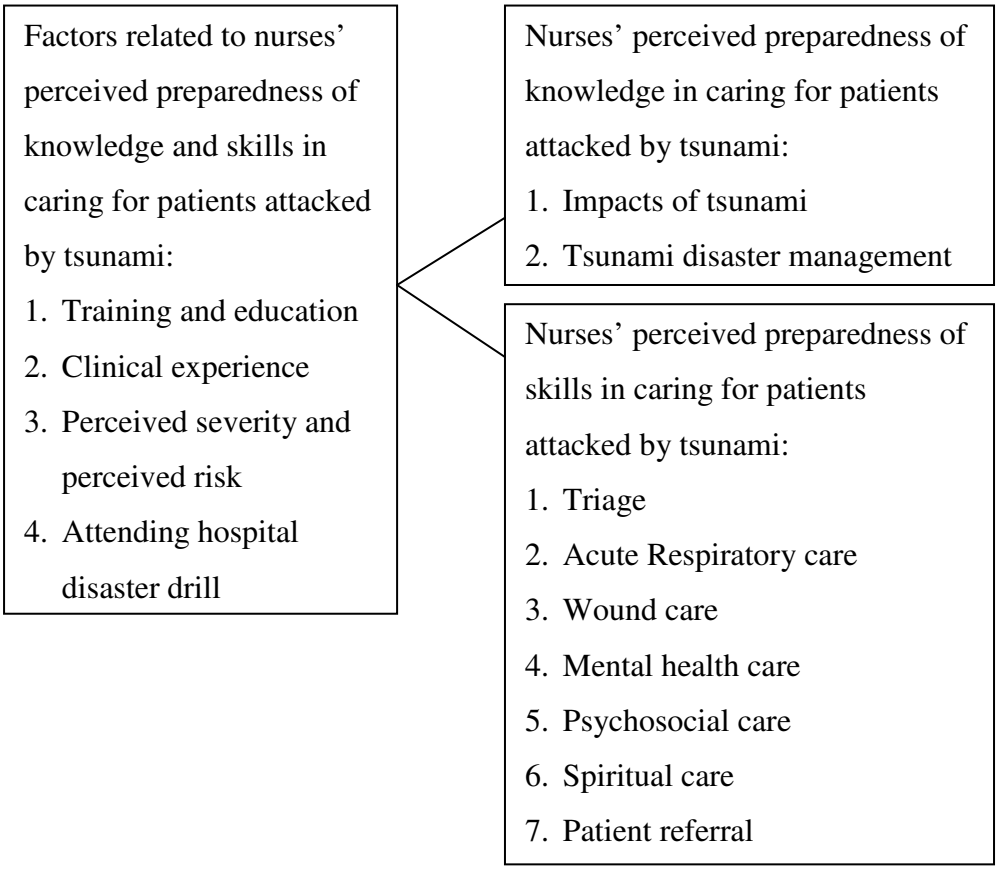

Figure 1 Conceptual framework of nurses' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami

Hypothesis

There are positive relationships between training and education, clinical experience, perceived severity and perceived risk, and attending hospital disaster drill and nurses' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami in Banda Aceh, Indonesia.

Definitions of Terms

1. Nurses' perceived preparedness of knowledge in caring for patients attacked by tsunami

Nurses' perceived preparedness of knowledge refers to the perception of nurses regarding the extent to which they have been prepared to have some knowledge in caring for patients attacked by tsunami consist of tsunami impacts and tsunami disaster management knowledge including triage, acute respiratory care, wound care, mental health care, psychosocial care, spiritual care and patient referral. The nurses' perceive preparedness of knowledge was measured by using the Nurses' Perceived Preparedness of Knowledge Questionnaire (NPPKQ) developed by the researcher in which the higher score reflects the higher perception of preparedness of knowledge in caring for patients attacked by tsunami (Appendix D).

2. Nurses' perceived preparedness of skills in caring for patients attacked by tsunami

Nurses' perceived preparedness of skills refers to the perception of nurses regarding the extent to which they have been prepared to have some skills in caring for patients attacked by tsunami including triage, respiratory care, wound care, mental health care, psychosocial care, spiritual care, and patient referral. The nurses' perceived preparedness skills was measured by using the Tsunami Care Questionnaire (TCQ) developed by the researcher and her colleague (Husna & Hermawati, 2009b), which the higher score reflects the higher perception of preparedness of skills in caring for patients attacked by tsunami (Appendix E).

3. Factors relating to nurses' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami

The factors relating to nurses' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami refers to training and education, clinical experience, perceived severity and perceived risk, and attending hospital disaster drill. The training and education refers to several kinds of emergency training and education related to disaster preparedness which were attended by nurses in regard to have prepared. Attending hospital disaster drill refers to the time of nurses to attend in hospital disaster drill which was conduct in their hospital. The training and education and attending hospital disaster drill were measured by using the Demographic Data and Working Information questionnaire (DDWIQ) (Appendix B). Clinical experience refers to previous nurses' experience to perform some clinical skills in caring for tsunami patients including experience in triage, acute respiratory care, wound care, mental health care, psychosocial care, spiritual care, and patient referral. The clinical experience was measured by using the Nurses' Clinical Experience (NCEQ) developed by the researcher and her colleague (Husna & Hermawati, 2009a) for this study (Appendix C).

Perceived severity and perceived risk refers to the nurses' perception for the severity and the risk of tsunami disaster including severity of tsunami impact and the risk for next tsunami because of the people living in vulnerable area and lack of knowledge and skill of nurses about life saving actions that leads to poorer treatment for tsunami survivors. The perceived severity and perceived risk was measured by using the perceived severity and perceived risk questionnaire (PSPRQ) developed by the researcher for this study (Appendix F).

Scope of the Study

This study was conducted in Zainoel Abidin hospital in Banda Aceh province, Indonesia where nurses who work at this hospital and are at risk of confronting the tsunami in the future. The study was held during October – December 2009, approximately almost 5 years after the world largest tsunami on December 26, 2004.

Significance of the Study

1. For nursing practice, the results of this study provided the beneficial information and evidence regarding nurses' preparedness of knowledge and skills in caring for patients attacked by tsunami which can be guideline to developing intervention program on training and education related to disaster preparedness and preparation for hospital disaster drill setting in order to improve nurses' preparedness of their knowledge and skills.

2. For education, the findings of the present study can enhance the understanding of nurses' preparedness of knowledge and skills in caring for patients attacked by tsunami and its related factors that can be as the guidelines for establishing disaster nursing curricula.

3. The data from this study may be used as baseline data for further research related to nurses' knowledge and skills in disaster nursing particularly for tsunami preparedness.

CHAPTER 2

LITERATURE REVIEW

The literature review for this study was include overview of tsunami, nurses' preparedness of knowledge in caring for patients attacked by tsunami, nurses' preparedness of skills in caring for patients attacked by tsunami, and factors relating to nurses' preparedness of knowledge and skills in caring for patients attacked by tsunami in Indonesia. The literature review is as follow:

1. Overview of Tsunami
2. Nurses' Preparedness of Knowledge in Caring for Patients Attacked by Tsunami
   - 2.1 Impacts of Tsunami
     - 2.1.1 Physical Impact
     - 2.1.2 Psychological Impact
     - 2.1.3 Psychosocial Impact
     - 2.1.4 Spiritual Impact
   - 2.2 Disaster Management of Tsunami
     - 2.2.1 Disaster Management Phase
     - 2.2.2 Nurses' Knowledge on Tsunami Disaster Management in Caring for Patient Attacked by Tsunami
       - 2.2.2.1 Triage
       - 2.2.2.2 Acute Respiratory Care
       - 2.2.2.3 Wound Care
       - 2.2.2.4 Mental Health Care

2.2.2.5 Psychosocial Care

2.2.2.6 Spiritual Care

2.2.2.7 Patient Referral

3. Nurses' Preparedness of Skills in Caring for Patients Attacked by Tsunami

   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. Factors Relating to Nurses' Preparedness of Knowledge and Skills in Caring for of Patients Attacked by Tsunami

   4.1 Training and Education

   4.2 Clinical Experience

   4.3 Perceived Severity and Perceived Risk

   4.4 Attending Hospital Disaster Drill

Overview of Tsunami

Tsunami is a series of waves that are usually generated by massive earthquake at the ocean bed due to which a huge mass of water is rapidly displaced that attacked creates great destruction. Tsunami is not preventable and no predictable, but there are any following sign for events that may approach tsunami such a recent submarine earthquake or the water may recede a great distance from the coast (Landesman & Veenema, 2007).

Immediately, the occurrence of tsunami affected patients, families, or health care system in various problems. The affect of tsunami to patients are having premature death or illness due to drowning in the wave and forced them for having wide range of injuries (Landesman & Veenema, 2007). Drowning is defined as suffocation by submersion in the water which is a serious problem immediately after tsunami that attacked 90% of the victims with aspiration of liquid (World Health Organization, 2009). As a result, the tsunami's victims subsequently fell ill because of aspiration pneumonia that is commonly known as tsunami lung and developed contaminated wounds that produced more complications in wound healing phase. Almost the entire victim received injured multiple flap laceration with various sizes within both regions of body, which needs specific treatment (Garfield & Hamid, 2006; Maegele et al., 2005).

Moreover, tsunami disaster also causes psychological problems for the patients. The experience of being in death, or as witness of death, have dramatic sessions while trying to survive in flooding wave or awareness of people drowning were developed of stress. The victims reported that the stress response and suffering is mainly because of loss of at least one of family members, or being swept away from

parents or not able to keep hold of their children (Maegele et al., 2005). The stresses were emerged as acute stress disorder (ASD) or post-traumatic stress disorder (PTSD). Acute stress disorder occurs when the victim is involved emotionally with traumatic event. This phase emerges with the signs and symptoms such as anxiety that occurred minimum from two days until maximum four weeks after trauma. While post-traumatic stress disorder will occur after one month of acute stress disorder with the reaction of the victims such as fear, helplessness, or horror feeling. The other signs and symptoms that confounding in PTSD such as depression, loss of faith in social institutions, social isolation, demoralization, emotional distress, sleep disturbance, and difficulties in health achievement (Deeny & McFetridge, 2005; Mitchell, Sakraida, & Felice, 2005).

The tsunami affected families started with the environmental imbalance, which occurs when the tsunami disaster caused people being homeless and having risk of disease. A large number of people lost their homes, so that they must seek temporary shelters in crowded condition and having inadequate sanitations. Lack of waste management, clean water, enough of food, and weak immunity were playing a key role in compounding the devastation. These displaced population conditions results in the easiest communicable diseases in tsunami disaster. The communicable diseases included water-borne diseases (cholera, dysentery, typhoid, hepatitis A & E), diseases contaminated through drinking water, respiratory diseases (pneumonia), vector-borne diseases such as malaria, and dengue fever (Waring & Brown, 2005; World Health Organization, 2005).

The tsunami also affected the health care system by destroyed the local health care infrastructure, which was therefore unable to respond to the emergency of

tsunami. Disruptions of routine health care services with lack of medical supply, transportation system, organizational function, or deploy personnel are the evidence in the immediate aftermath of tsunami which may increase morbidity and mortality of the victim and survivor. Tsunami may cause shortage of food that causes severe nutritional deficiencies and cause large population movements (refugees) thus creating a burden on health care systems and communities (Garfield & Hamid, 2006; Veenema, 2007). Tsunami also affected the volunteer workers who are involved in such disaster. The disaster leaves large numbers of individual dead. The corpses need to be removed and disposed of properly. This increases the risk of infection include tuberculosis (from aerosolisation of aspirated fluid from the lungs), blood borne infections (contact with blood and body fluids with non intact skin and mucous membranes), injury from bone fragments and gastro-enteric infections (through contact with leaking faeces). Infection occurs through direct contact with infected bodies, soiled clothes, equipment and vehicles used in their transportation (Unahlekhaka & Mehta, 2006).

Nurses' Preparedness of Knowledge in Caring for *Patients Attacked by Tsunami*

There are several definitions of preparedness. According to Webster's New College Dictionary (as cited in Lusby, 2006) preparedness defines as "1. The state of being prepared, "where prepared is to make ready, usually for a specific purpose; make suitable; fit; adapt; train (p 1135). The dictionary defines readiness as "a ready quality or state" (p 1193).

The term of preparedness is synonymous with readiness. Preparedness or readiness was reported in literature review as accepts of responsibility or readiness

to learn. In a clinical setting, the preparedness or readiness generally means a state of preparedness for something about to happen (Reineck, 2004). Slepski (2005) proposed the definition of health provider preparedness particularly for the nurses is the comprehensive knowledge, skills, abilities, and actions to prepare for and respond to the threatened, actual, or suspected chemical, biological, radiological, nuclear, or explosive incidents, man-made incidents, natural disaster, or other related events.

Knowledge is defined recall or recognition of previously learned material, from fact or complete theory (Sousa, 2006). Knowledge comes through processing by human being from any combination of human and environmental interaction (Sweeney, 1994). Knowledge involves the understanding about facts and the procedures, which are obtained in several ways such as through education, training, experiences, and so forth (Kak, Burkhalter, & Cooper, 2001).

The nurses' preparedness of knowledge in caring for patients attacked by tsunami includes: 1) impact of tsunami, and 2) disaster management of tsunami. The knowledge about impact of tsunami consists of physical, psychological, psychosocial, and spiritual impact, while the knowledge about disaster management of tsunami including disaster management phase and nurses' knowledge in caring for patient attacked by tsunami including triage, acute respiratory care, wound care, mental health care, psychosocial care, spiritual care, and patient referral. The explanations of preparedness of knowledge in details are following:

1. *Impacts of Tsunami*

As natural phenomenon, tsunamis are giant sea waves caused by a submarine earthquake or slope collapse on the sea bed. The giant sea waves reach the coast after traveling thousands of miles at speeds of 300-600 mph and making way at

great force into the shoreline. Waves lash out at built structures, plants, trees and human habitations causing massive flooding and destruction (Unahlekhaka & Mehta, 2006). Immediately after occurrence of tsunami, it can affect for victims in various ways: physical, psychological, psychosocial, and spiritual impact.

1.1 Physical impact

According to Unahlekhaka and Mehta, the physical impact of tsunami for the patients includes: 1) trauma from tsunami, and 2) infection risk from the tsunami, which are as follows:

1.1.1 Trauma from tsunami

Trauma resulting from a tsunami includes near drowning, wound such as abrasion, superficial or deep laceration of wounds, open or closed fractures, blunt abdominal and chest injuries. The severity of trauma was at three levels, mild, moderate and severe with the causes of illness. Among hospitalized patients trauma found were lacerated wounds, near drowning complications with pneumonia, fractures of long bones, injury of head, abdomen or chest, and sprains. Wounds resulting from a tsunami are unique. The wound entry is affected by the explosive force of the water carrying with it debris such as mud, sand, stones, and twigs. Wounds are also bathed in high saline concentrations with high osmotic pressure. Wounds deteriorate rapidly despite outwardly appearing slight. Severely infected with multiple pathogens organisms such as *Proteus* spp., *Klebsiella* spp, *Pseudomonas* spp, *Staphylococcus aureus*, *Enterobacter* spp, *Escherichia coli*, and *Aeromonas hydrophila*. The aseptic techniques were used within the first few days post event, and broad-spectrum antibiotics were used to prevent wound infections.

1.1.2 Infection risk from tsunami

After tsunami, the infection risks for the victims increase which is considered as direct or indirect of cause of infection. The direct risks are due to the lashing of water with great force, along with sand and other debris, causing trauma and wounds. The wounds are unusual in that they are very prone to infection and healing is delayed, because of forced contact with contaminated saline water. Near drowning and ingestion or inhalation of contaminated water may result in ear, nose and throat infections and pneumonia. Skin infection and dermatitis resulted from wetting of the skin. Furthermore, indirect risks occur in the aftermath of tsunami and are due to disruption of water supply, lack of sanitary conditions, and lack of hygiene due to flooding. Water borne diseases such as typhoid, cholera, leptospirosis, and Hepatitis A virus infection are a major risk. Vector borne diseases occur when the water begins to recede, leaving standing pools of water which are a breeding ground for the vectors of malaria, dengue, and west nile fever.

1.2 Psychological impacts

Tsunami as a disaster can have significant impact on psychological of victims because they bring substantial loss for the victims: loss of the loved ones, of bodily integrity, loss of material goods, and loss of places they have made their own, loss of a sense of safety and security, and so on. Tsunami also creates different categories of the victims. First, there are the primary victims: those who are directly and personally affected. Then there are the witnesses of tsunami and their traumatic effects. Finally, there are all those who are exposed indirectly to the victims themselves, or the dreadful scenes of tsunami and the consequences of the disaster through the media (e.g., friends and family, the public) (Laurendeau et al., 2007).

Frankerberg et al. (2008) showed that the tsunami survivor experienced stresses that affect their mental health including fear of dying, exposure to the dead bodies, loss of the loved one, community disruption, and physical and economic hardship. Approximately 33% of tsunami survivors experienced the trauma of either hearing the tsunami wave or scream about it, 6% watched family or friend struggle or disappear, 3% of survivors sustained injuries, 3% lost their spouses, 5% lost parents or children, and nearly 25% lost family or friends. The effect of tsunami also damages home, household with 15% survivors suffered damaged of loss of land, livestock, or equipment. These all factors are associated with the post-traumatic severity risk that indicates poorer mental health care after tsunami struck.

Exposure to the traumatic events from tsunami will create the greater risk for developing ASD or PTSD. Approximately 9% of people who are exposed to disaster, whether directly or indirectly eventually suffer from PTSD that will develop maladaptive responses or psychiatric morbidities (Mitchell et al., 2005). Moreover, the study from Austin and Godleski (as cited in Plum, 2007) proved that individuals who are exposed to such disaster would develop psychiatric symptoms immediately after a disaster with the commonly reported disorders such as depression (41%), PTSD (22%-59%), generalized anxiety disorder (20%-29%), and substance abuse disorder (14%-22%).

1.3 Psychosocial impacts

Disaster is a very stressful event and a life threatening experience that cause psychological effect and social disruption of the victims. The significant impact of disaster on psychosocial dimension of survivors are because the disaster can lead to substantial loss due to loss of the loves ones, social network, their business,

and life goal that disrupts their future and meaning of life as result of the event (Hatthakit & Thaniwathananon, 2007). The range of this disruption can be range from mild anxiety until family dysfunction that lead to problem such as anxiety, PTSD, severe depression, or even suicide thoughts of survivors (Laurendeau et al., 2007).

Austin and Godleski (as cited in Plum, 2007) revealed that the psychosocial impact of disaster like tsunami could result in experience of horror, traumatic bereavement, and disruption of normal living environment. The experience of horror feeling happens when they life is threatened from tsunami that yield the psychological problem from anxiety until other psychopathological disorder occurs. The traumatic bereavement will occur when patients found that their family or friends were died during tsunami thus increase patient's psychological disturbance. This condition will be worse, if the patient feels their normal living with social support is being taken away from them after tsunami, this brings them into situation such as loss of the loved one, property, financial or even loss of social support from friends or neighborhoods.

1.4 Spiritual impacts

Spiritual impacts have strong relationship with psychosocial impacts of survivors. The tsunami survivors will be more devastating than the physical impact with the experience of grief, guilt, or fear due to tsunami. The survivors feels despair, they have loss everything, they see no future, and loss the will to stay alive (Gregor, 2005). Some tsunami survivors felt anger and guilty because they did not adequate serve their family due to unexpected death in their family member and failure to perform the religious activities for the dead family members

due to intentional constraint. Many of them also have fear and vulnerable feeling for disaster (Hatthakit & Thaniwathananon, 2007).

2. Tsunami Disaster Management

The purpose of disaster management in any health care facility is to maintain a safe environment and provide services to the patients or victims during times of disaster. Disaster management or emergency management maintains the continuity of patient care to be delivered effectively during disaster response. The disaster management of tsunami requires nurses to understand each phase of disaster management and apply knowledge that needed to care tsunami victims in response phase of tsunami (Qureshi & Gebbie, 2007).

2.1 Disaster management phase

Hospital will become the focal point of disaster management where as much as many disaster victims end up in emergency department that requires emergency medical services from hospital surrounding the disaster site. Therefore, the disaster preparation is necessary to provide effectiveness of disaster management in the event of a major disaster (Hardin, 2002).

There are some variations of terminology for different phases of disaster management with numerous typologies have been developed. They all describes a disaster-management cycle that consists of connected activities and phases, some of which occur simultaneously (World Health Organization, 2009). WHO states that there are four essential phases in the management of disasters: 1) preparedness or warning, 2) mitigation, 3) response or emergency, and 4) recovery. Moreover, Kim and Proctor (2002) added that the fifth essential phase on disaster management is 5) evaluation phase. The explanations for each phase as follows:

2.1.1 Preparedness or warning phase

Preparedness or warning phase refers to pro-active planning effort designed to structure the disaster response prior to its occurrence with the aim to make awareness of the nature of disaster and to be ready promptly to a specific type of disaster (Kim & Proctor, as cited in Qureshi & Gebbie, 2007). Health care facility particularly hospital must map out what type of disasters are most likely to be encountered, including human caused, technological, and natural events, and demonstrated the risk factors that are needed to prevent the effect of disaster. Campbell (2005) pointed out that the common activities in preparedness phase consist of: 1) education and training of health personnel with particular reference to resuscitation and life maintenance, 2) collaboration with other key response sector, 3) procurement of essential supplies and equipment, 4) preparation of inventory resources for disaster, and 5) simulation exercise or disaster drill.

2.1.2 Mitigation phase

Mitigation is a phase for lowering the severity and impact of the disaster through planning and practice. The hospital incident command system (HICS) needs to be established to determine the elements of hospital disaster management that comprises of: 1) staffing plan to maintaining services for pre-existing patients as well as the new arrivals, 2) command system to assign health personnel responsibility for caring the victims, 3) assuring the level of health personnel competencies by set up of the emergency preparedness competencies, 4) establishment of mutual aid agreement with other agencies for disaster simulation or drill. HICS is an emergency management system that comprises the main position in disaster response for health providers. Within hierarchical organizational chart, HICS

guides all health providers including the nurse to offer specific care for patients and ensuring the patients' safety with specific functional roles in emergency response, covers the area for triage and treatment areas, and describe the relationship with other organization that are involved in disaster (Qureshi & Gebbie, 2007).

2.1.3 Response or emergency phase

The response phase is the actual implementation phase in providing care for disaster survivors. In this phase, disaster responses or emergency management focuses primarily on emergency relief including triage, respiratory care, wound care, patients' referral to the advanced health services, and psychological support for the tsunami survivors offered by health personnel (Campbell, 2005; World Health Organization, 2005). Those nursing clinical skills require the appropriate knowledge and skills as an ability to perform their functional roles in caring the victims in emergency response of tsunami (Veenema, 2007).

2.1.4 Recovery phase

When the disaster event is over, the operation before disaster needs to recover. Recovery is the long-term phase focus on stabilizing and returning to normal situation. Recovery aims on returning to the state before disaster, and strengthen the ability to prevent future disaster. The activities can range from providing continuous care to victims, instituting mental health interventions such as rehabilitation and reconstruction activities to counter long-term effect of disaster, and rebuilding and repairing the infrastructure that damage from disaster.

2.1.5 Evaluation phase

Evaluation is the phase to evaluate the disaster plan. After disaster, it is essential that evaluation be conducted to determine what worked and

what not, and what specific problem, issue, and challenges were identified derived from previous disaster for further disaster planning. In every disaster, response phase is becoming the urgent phase in disaster management due to the need to response for magnitude of the disaster, immediate impact for the victims and health services, extent damage of other infrastructure, and the adequacy the resources to mounting relief operation. The nurses provide the important clinical skills with the aims to save the survivor lives reduce disability, minimize the impact of disaster both in physical or psychological aspect of survivors (Veenema, 2007).

2.2 Nurses' knowledge on tsunami disaster management in caring for patient attacked by tsunami

The applying of knowledge is relevant approach to disaster preparedness for professional nursing staff in order to be available in preparing for disaster event (Chapman & Arbon, 2008). In order to capable in caring tsunami patients, the nurses must be knowledgeable and skilful which requires preparedness of their knowledge and skill. As well as the skills, the nurses need knowledge for performing nursing clinical skill in caring for patients attacked by tsunami including knowledge on triage, acute respiratory care, wound care, mental health care, psychosocial care, spiritual care, and patient referral with the explanation as follows:

2.2.1 Triage

The word of triage is derived from the French word "Trier" which means "to sort or to choose." The definitions of triage is the process of prioritizing which patients are to be treated first which place is right for patient at the right time to receive the right level of care (Rice & Abel, as cited in Qureshi & Veenema, 2007). In mass casualty situation, the triage is essential for prioritizing the

casualties without regard to needs of the patients. The purpose of triage is to make the best possible use of the available medical, nursing personnel, and facilities to assist in determining which patient needs immediate care and which patient can wait (Dolan & Holt, 2008). According to Qureshi and Veenema (2007), there are five conceptual categories of triage composing of daily triage, incident triage, disaster triage, tactical military triage, and specific condition triage as follows:

2.2.1.1 The nurses perform daily triage as a routine duty in emergency department. The goal of this triage is to identify the sickness of patients in order to assess and provide treatment to them first. The highest intensity of care is to provide first line the most seriously ill patients, even if those patients have a low probability of survival.

2.2.1.2 The incident triage occurs when emergency department is stressed by large of number of patients. This triage requires additional (on-call staff) without disaster plan activated. Disaster triage is employed when local emergency services are overwhelmed to the point that the immediate care cannot be provided to everyone in need.

2.2.1.3 Tactical triage is similar to disaster triage, only military mission objectives drive the triage and transport decisions.

2.2.1.4 Specific condition triage is used when patients suffering from incident of weapons mass destruction such as radiation, biological, or chemical contaminant. These triage situations calls for personnel protective equipment from health care personnel and decontamination capability of facility.

There are some differentiation between hospital triage and disaster triage. Hospital triage commonly uses the categories of emergent, urgent, and

non-urgent with the main purpose to identify those patients who have the highest degree of compromise for providing rapid care to sickness patients first. While in disaster situation, disaster triage is employed when local emergency services are overwhelmed to the point that service cannot provide to everyone who needs it. The paradigm of triage shift of doing the rapid care to the most unstable or acutely ill patients with the goals to identify injured or ill patients, who have a good chance of survival with immediate care and does not require extra ordinary resources. In disaster situation, the common use of triage is START system triage which classified the adult victim by using respiration, perfusion, and mental status (RPM) condition and categorical the victim according to colors green, yellow, red, and black color. The categorical of color to determine the situation of patient such as green for patients who can walk (walking wounded), the yellow color for urgent condition with R<30, P<2 seconds, and obeys command. Red for critical situation with R >30, P >2 seconds, and does not obey command, and black for expectant of dead (Qureshi & Veenema, 2007).

2.2.2 Acute Respiratory care

Immediately aftermath of tsunami attacked victims with various problems, there are many forms of clinical cases injured from tsunami such as multiple injuries, sharp, blunt, and severely contaminated of wounds. Other cases are trauma or orthopedic injuries such as open injuries, and respiratory problems due to aspiration of seawater resulting in near drowning, aspiration pneumonia, and bronchitis (Maegele et al., 2006). The respiratory care of the victims covered near drowning care and respiratory disease care. Mostly the tsunami victims have been found with near drowning condition as a result of submersion and being caught in the

waves which leads to death. In tsunami disaster, near drowning occurs following the immersion in cold water, causing laryngospasm and vagal stimulation which leads to asphyxiation, hypoxia, metabolic acidosis, fluid and electrolyte abnormalities, cerebral edema, renal dysfunction, and cardiac arrest (Dolan & Holt, 2008).

Tsunami near drowning cases involves the aspiration of immersion fluids as well as marine and soil debris into respiratory tract, thus producing intra-pulmonary inoculation bacteria that lead to clinical signs pneumonia (Maegele et al., 2006). This disease is commonly known as tsunami lung with the symptoms of persistent cough, dyspnoe and scattered crackles in both lower lung fields, weakness, and chest x-ray showed a bilateral necrotizing pneumonia of the lung (Allworth, 2005). Approximately 32 percent of all tsunami survivors had complained of upper respiratory tract infection with mild cough, and sore throat. Some of them yield the symptoms of bronchitis and pneumonia with persistent cough, dyspnea, crackles sound, weakness, fever, and sputum production which required the treatment including frequently assessment of respiratory function, promote sufficiency of gas exchange, and providing specific antibiotic to prevent further infection (Maegele et al.).

2.2.3 Wound care

Definition of wound is the disruption of the integrity of the skin and its underlying tissue, which occurs from varied causes such as trauma, mechanical forces, burn, chemical, or are the result of underlying disease process (Branon, 2002). The varieties of tsunami wounds were enormous. The tsunami injuries can be divided into soft tissue injuries and fracture or dislocation. The soft injuries compose of minor wound such as abrasion, scratch, or small lacerate. The

major wounds were lacerated wounds with or without skin loss, multiple lacerated wounds and infected wounds which are varied in size, had extensively damage skin and underlying severe contamination because of sand, dirt, and mud. The fracture or dislocation group include open fracture, single or multiple fracture and dislocation (Prasartritha et al., 2008).

The initial treatment for tsunami wound covered identification of assessment of wound and specific management care of tsunami wound. Most of severely injured tsunami patients had open fractures either in upper or lower of limb the wound characterized multiple, small to medium size along the head, face, extremities that often in posterior aspect of head, back, buttocks, and leg which (Watcharong, Chuckpaiwong, & Mahaisavariya, 2005). The nurses must perform the musculoskeletal examination including examination of joint symmetry, bony deformities, and range of motion. Nurses need to assess the victim's musculoskeletal condition before determining the fracture treatments such as treatment for close fracture, debridement and stabilize treatment for open fracture, or other surgery treatment (Watcharong et al., 2005). Moreover, severely tsunami wound revealed the huge pain sensation as results from the degree of skin integration disruption. Pain is the unpleasant sensory and emotional experience that associated with actual and potential tissue damage or described in terms of such damage (Fast & Newton, 2008; Teanby, 2003). Usually, the nurses facing difficulties in measuring patients' pain sensation from patients and nurse. The reasons from patients such as patients may feel that their pain is very severity, and may using uncommon word to interpreting their pain. The reasons from nurse namely the nurse feel confuse about pain assessment tool, and lack of knowledge about pain and pain assessment. Therefore, the accurate

and appropriate of pain assessment skills are required to prevent improper or inadequate treatment of pain and also might increase the awareness of nurses about the importance of pain management in emergency response (Teanby, 2003).

Furthermore, the knowledge of tsunami wound treatment including of assessment of wound condition, cleansing and dressing wound, debridement of wound, wound closure, vaccination for prophylaxis, and evaluation of wound healing (Dolan & Holt, 2008; Nelson & Dilloway, 2002). The assessment of tsunami wounds is done by following the parameter namely location of wound, size of wound (length, width, and depth) which is usually documented in centimeters, tissue loss (partial thickness or full thickness), exudates, wound bed (granular, slough, eschar), and wound pain (Nelson & Dilloway, 2002; Stephen-Haynes & Downing, 2003).

The aim of wound cleansing is to prevent the further infection prior wound being closure. The wound cleansing has two important objectives that is the ways it is carried out and the solution to be used. Wound cleansing is essential for the prevention of infection and as responsibility to ensure that the wound is decontaminated prior to closure. Some technique can be apply such as following precautions guidelines, hand washing, and choose the appropriate irrigation solution to prevent the wound infection. Obviously, those common hygiene standards could not be preserved during initial care in emergency setting due to the magnitude of disaster. Therefore, the nurse should be concerned about this issue and try to maintain the standard in order to prevent the exposing of nasocomial pathogens for disaster victims (Maegele et al., 2005).

There are four kinds debridement of wound comprising of sharp, enzymatic/chemical, mechanical, and autolytic debridement. Prior to performing any type of debridement of a wound the patient must be assessed adequate for blood supply, and vascular condition (Nelson & Dilloway, 2002; Prasartritha et al., 2008). Debridement involves the principle of removing the necrotic tissue, identifying the infection or dead space of wounds, protection of the wounds and surrounding tissues that are useful to accelerate the wound healing (Nelson & Dilloway, 2002).

After tsunami struck, many victims arrival to emergency room with severe large scale soft tissue damage which were significantly contaminated with foreign materials such as seawater, mud, sand, vegetation, coral, etc (Maegele et al., 2006; Prasartritha et al., 2008). According to Maegele et al. (2006) pointed out that the initial tsunami wound management focuses on surgical removal of devitalized tissue and aggressive debridement. The characteristic of tsunami wound requires special treatment by using vacuum assisted closure therapy. Vacuum-assisted closure therapy (VAC) was designed to promote the formulation of granulation tissue. The negative pressure will promote wound healing by: 1) removing infectious material and excess interstitial fluids, thus allowing tissue compression, 2) increasing the vascularity of wound, thus improving cutaneous perfusion, 3) promoting granulation, and 4) creating beneficial mechanical forces that draw edges of the wound together. Moreover, it is important to provide tetanus prophylaxis vaccination for patient with injuries to prevent further infection. The nurses have to recognize the infection symptoms, which can be determined by following wound swab analysis and

biostatic culture sensitivity prior administering specific appropriate antibiotic for tsunami wound (Dolan & Holt, 2008; Lim, 2005).

2.2.4 Mental health care

Every nurse must have sufficient knowledge to respond effectively and contribute to the psychosocial recover of survivors in disaster event. The issue of psychological support during and after disaster is important for the people who are attacked by disaster and can experience severe distress that may need psychological support (Rooze et al., 2008). Actually, most of the tsunami victims who had experience or simply witnessed traumatic event can be attacked emotionally and develop a range of physical and emotional response, which in turn can produce psychological, social, and physiological dysfunction. The tsunami survivor comes with fear, helplessness, or horror feeling due to their bad experiences and witness or confront with tsunami wave that threatened the death. This condition is classified into acute stress disorder, occurring within 1 month after the tsunami and lasting for a minimum of 2 days and maximum of 4 weeks. If the symptoms persist, longer than 4 weeks of post-trauma, the diagnosis is post-traumatic stress disorder that may lead tsunami survivor's impairment in social, occupational, or other functioning (Mitchell et al., 2005; Ruzek, Young, Cordova, & Flynn, 2004).

The common symptoms and reaction of disaster for survivor are can be divided into affective, behavioral, cognitive, and physical reaction. The affective symptoms are depression, sadness, fear, anxiety, hopelessness, guilty feeling, or being blamed, and emotionally distant from people. The behavioral reaction namely difficulty in falling or staying a sleep, crying easily, avoiding remainder the trauma, hyper-activity or hypo-activity, increased arousal with high

alert or irritation, and increased conflict with others. The cognitive symptoms include confusion, recurrent dream or nightmares, difficulty in concentrating, and questioning spiritual belief, while as the physical reaction such as tiredness, fatigue, exhaustion, gastrointestinal distress, increased or decreased appetite, numerous somatic complaints, and exacerbation of prior health problems (Hughes, Dnurs, Fritsch, & Calder, 2007; Mitchell et al., 2005).

The nurses provide the psychological need for the disaster victims by providing several nursing intervention including psychological triage, crisis intervention, and psychological support for tsunami victims (Plum & Veenema, 2007). Psychological triage aims to identify which individual are most at risk for psychiatric complications and makes referral for further mental health evaluation and treatment when needed which the early stage of psychological triage will prevent the delayed of psychological symptoms and the worst situation of mental disorder prognosis. Crisis intervention is a technique used to assist person whose coping abilities have been overwhelmed by a stressful events which can be offered by tsunami victims by using active learning technique. Moreover, the psychological support intervention which van be offered by nurses including providing counseling, promote natural resolution environment, and psychological additional support from family, friends or social network of tsunami patients. The nurse also takes actions in advocacy, problem solving, and offering education to the victims. The nurse have to be alert of consequences of stress following the disaster that may result in potential of long-term stress characterized by re-experiencing the event, numbing behaviors, and increase physiologic arousal, and refers those survivors to other competent resources for further treatment (Cole, 2005).

2.2.5 Psychosocial care

Having experience with shocking events resulted disaster victims facing the psychological problem develops long-term psychological problem such as post traumatic stress disorder (PTSD) that might lead the impairment in social, occupational or other functioning of survivors' life including physical, or psychosocial. The psychosocial care covered the assessment of mental and psychosocial issues which aimed to understand the emergency situation, threat and capacities for mental and health and psychosocial well being. Social support and education support are the most intervention in helping disaster victim to strengthen their social relationship with family, friends, or nearby community. Social support may encourage the victims to talk as well as promote friendship to help survivors to understand that they are not alone. The education for survivors and family will help them to solve their problems related with psychological distress such as unable to sleep, signs of depression, further treatment for those sign or other related stressor such as housing issue after tsunami (Mitchell et al., 2005; Ruzek et al., 2004).

Early psychosocial intervention should be given in order to ensure the mental well being of those affected victim and to prevent of psychopathology. The interventions of psychosocial consisted of identification of psychosocial disruption, psychosocial intervention, and evaluation. The identification of psychosocial disruption aims to look systematically in patients' condition that used to identify the victims need of psychosocial dimension support. Psychosocial intervention covered the supporting activities including listening, offering factual information, and mobilize support from the victims surrounding, reunification with the people close with the affect of disaster, and reassure that those affected people

display the normal condition. Moreover, the evaluation of psychosocial support focuses on reassuring the victims' condition and maintains the ability to perform relationship with victim's social network including family, friends or community (Brake, Duckers, Vries, & Dun, 2009).

2.2.6 Spiritual care

Spirituality is primarily defined as the core essence of the self capable of experiencing inner peace and unifying interconnectedness with the higher power that provides meaning and purpose of life manifested through the interconnectedness with others and concern for natural environment (Wong, Lee, & Lee, 2008). Pincharoen and Congdon (as cited in Wong & Yau, in press) explained that the spiritual care is important to deliver for the patients due to beneficial outcomes from applying spiritual care. Spiritual care could provide comfort, peace, and harmony through health mind and valuable people in having relationship with family and friend and important in mental illness recovery.

The spiritual impact that may arise after traumatic event including tsunami caused disconnection with God, questioning God and theological belief, anger at God, spiritual emptiness, withdrawal from the faith community and feeling of guilt (Ellers, 2006). The nurses can play an important role through healing and introduction of hope which can help patient dealing with fear and uncertainty. The spiritual can be divided into assessment, intervention, and evaluation. The assessment focuses to spiritual disruption of the patients. The intervention covers providing peaceful environment, helping to accept the current situation, facilitating in religious activities, and strengthening the patients-family relationship in performing

religious activities. The evaluation focuses to evaluation of patients respond regarding their spiritual need (Wong & Yau, in press).

2.2.7 Patient referral

Patient requiring transferring are being move largely because their require resources not available at the institution where they are being managed. Patient transferring may take place when the disaster victims revealed the severely injuries from tsunami. The variety of severely tsunami wound which involved in many part of the body including single or multiple fracture and dislocation required to more treatment from other advanced health services (Prasartritha et al., 2008). Transferring critical ill patients including tsunami patients requires a comprehensive rapid and systematic assessment of patients' condition as well as preparation of nurses' knowledge regarding transferring process including preparation prior transferring, identification mode of transferring and maintaining communication during transferring process (Stephens, Beehan, & Hillman, 1995).

The preparation prior transferring consists of evaluation patient condition prior transferring, preparing documentation, and informing patients and family about transferring process. Prior transferring, the nurses have to evaluate patients' clinical parameter including level of consciousness, airways patency and respiratory rate, peripheral perfusion, and balance circulation. The preparation of patients including their belonging, medication, nursing supplies, and evaluate the process of transferring according patient's condition (Timby, 2005). The preparation of documentation is important due to clear documentation is vital tool in the assessment quality care during transferring which including completing transferring summary, biographical information, and nursing care note during the process (Neill &

Hughes, 2004; Stephens et al., 1995). While the information is important to delivered to the patient or family about referring in order to alleviate the anxiety which might encountered during the process (Johnson, 1999).

Furthermore, the nurses have to prepare their knowledge regarding to identification of transferring mode and communication of transferring. Several transferring mode can be identified such as road ambulance or helicopter that used according to referring destination and it is necessary for nurses to maintain communication with retrieval team for evaluation and receiving advice to improve the patients' condition during the transferring process (Stephens et al., 1995).

Nurses' Preparedness of Skills in Caring for Patients Attacked by Tsunami

Erickson (as cited in Kak et al., 2001) pointed out that skills refers to actions and reactions that individual performs in a competent way in order to achieve a goal. The casualty events require the skillful nurses to directly take care of the victims. The common skills that nurses prepare in caring for patients attacked by tsunami consist of: 1) triage, 2) acute respiratory care, 3) wound care, 4) mental health care, 5) psychosocial care, 6) spiritual care, and 7) patient referral. The explanations of skills in details are following:

1. *Triage*

Triage aims to sorting the patients which to be treated at the first time with receiving the high level of care. In disaster situation, the paradigm of triage shifted according to increases the number of casualty with diverse range of illness, varying degrees of severity, seriously ill, and the need of immediate emergency care highlights the need of skillful triage person in emergency response of disaster (Dolan

& Holt, 2008). The nurse who are involved in first line responder in disaster should have ability in performing triage that ensures all disaster victims receives treatment at the appropriate time by appropriate personnel. A poorly prepared triage nurse with insufficient knowledge and skills will be a liability of disaster nursing (McNally, 2001). In disaster situation, the nurses perform triage by following START system triage. This START system triage is commonly to use to sorting the patient according their respiration, perfusion, mental status (RPM) condition with category by using colors like green, yellow, red, and black for walking wounded patients, urgent condition patients, critical condition patients, and expectant of dead patient, respectively. The nurses have to collects some patients' information regarding to patients within a short space of time after sorting patient. The information gathered by nurses at the point of triage includes victim's information, physical assessment, and patients' acuity rating. The relevant information of tsunami victims are victim's name, age, and mechanism of injury. Physical assessment include vital signs, level of consciousness, musculoskeletal deformities, and skin assessment: color, moisture, laceration, and rashes (Qureshi & Veenema, 2007). Moreover, the nurses can apply five senses model as systematic assessment model of triage, which use the senses including listing the things that you can see, listen what the patient said, use smelling, take the vital signs and touch the hurt site, and using the assessment tools to aid triage decision (Dolan & Holt, 2008).

Previous study provides the evidence of the nurses' involvement in disaster triage. The study about surgical response of the Helsinki University Hospitals to a bomb disaster with 166 casualties from Torkki et al. (2006) described that the triage is was effective in significantly minimizing mortality among survivors. In this

study triage was performed by using four categories of triage with using four color, and determine injury severity score (ISS). Four categories are unstable condition, need hospital care, outpatient medical care, and death with applied four colors: green, yellow, red, and black to sort the victims respectively. Injury severity score (ISS) was established to classify the severity of injuries and the treatment for victims.

Moreover, a slightly different color in triage was used by senior nurse in assisting tsunami victim in hospital district in Thailand. Code blue was used to cover person who are already dead, code red cover person with severe injuries, code yellow referred to patient with non bleeding laceration, non-critical head injury, and crush or blunt trauma not associated with shock, and code green covered patient with minor injuries (Wattanawaitunechai, Peacock, & Jitpratoom, 2005). Therefore, it is important for nurses to be familiar with triage system in their hospital regards to be better prepared while assisting the disaster victims.

2. *Acute Respiratory Care*

After tsunami struck, many of casualties suffered from injuries or diseases due to the emersion in the water and being tossed and swirled around in the rapid gushing water that took the form of respiratory infection including aspiration. The near drowning condition involved the aspiration of immersion fluids, marine, and soil debris into respiratory tract thus producing intra-pulmonary inoculation of bacteria that displayed clinical sign of pneumonia (Maegele et al., 2006). In facing these tsunami types of injuries, the medical team particularly the nurses have to prepare and equip themselves to face this condition in emergency response of disaster (Fan, 2006).

2.1 Near drowning care

Near drowning condition is commonly found among tsunami patients as result from submersion in the waves which leads the death. Drowning is defined as suffocation by submersion in the seawater with approximately 90% of tsunami victims having aspirated the liquid. Near drowning occurs following the immersion in water causing laryngospasm and vagal stimulations which leads to asphyxiation, hypoxia, metabolic acidosis, fluid and electrolyte abnormalities, cerebral edema, renal dysfunction, and cardiac arrest. The aspiration causing inoculation bacteria leads to pneumonia (Allworth, 2005; Dolan & Holt, 2008).

The respiratory assessments for tsunami survivors with respiratory problems start with assessing the patient's ability to breath. The nurses recorded the respiratory assessment when taking the patient's vital signs, and further assessment about the rate, rhythm, depth, and effort of breathing. In performing respiratory assessment, the nurse uses technique including inspection, palpation, auscultation and percussion technique. Observe difficulty in breathing, impairment of respiratory movement of breathing, and the color of cyanosis that indicated insufficient oxygen perfusion. Palpate the chest that focuses on area of tenderness, abnormality of lying skin, and respiratory expansion. Listen the patient's breathing for crackles, or crepitating, and identifies the normal lung sound and the additional sound. The assessment should also be made by percussion technique on the chest wall and underlying tissue to identify whether the underlying tissue air filled, fulfill filled or in solid condition (Bickley & Szilagyi, 2007).

Commonly, drowning and near drowning occurs because of wet drowning. Occasionally near drowning victims present with mild dyspnoea, a death

like appearance with blue or grey color coding, apnoe or tacyhpnoe, hypertension, heart rate as slow as 4 to 5 beats per minute or pulselessness, cold skin, dilated pupil, hypothermia, and vomiting (Dolan & Holt, 2008). The nurses also can assess the victims' aspiration according to clinical history, oxygen saturation on pulse oximetry. The nursing interventions in caring tsunami victim with drowning consist of assessment, management, and monitoring in near drowning conditions. The assessment of near drowning victims include onset of symptom, airway assessment, and potential of head and neck trauma. The management of near drowning focuses on the immediate care that comprises of airway clear management, breathing by using oxygen inhalations, intubation and ventilation, broncho-dilator, and antibiotic administration. Maintaining circulation by using intravenous fluids for volume replacement, and maintains acid base balance. Re-warming is to prevent heat loss by wrapping victims in blanket or warm clothing, cardiac monitoring, continued reassessment, and psychological care for the patient and family due to their stress and anxiety (Dolan & Holt, 2008; World Health Organization, 2009). Patients with suspected aspiration underwent chest radiography with saturation oxygen less than 90% requires intubation and transfer to intensive care unit (Wattanawaitunechai et al., 2005).

2.2. Respiratory diseases care

Pneumonia is commonly respiratory disease among tsunami patient who had experience submersion in the wave. By X-ray examination, this condition significantly shows necrotizing or bilateral consolidation with scarring and early cavitations of the lungs (Fan, 2006). The nursing interventions for caring survivor with the clinical signs of pneumonia includes assessment of respiratory

function, immediate care to promote gas exchange with oxygen inhalation, ventilation, antibiotic administering, and provide hygiene standard in initial care to prevent exposure to nasocomial pathogen (Maegele et al., 2006).

3. Wound care

During Tsunami, many people were injured by debris, causing both sharp and blunt trauma. These injuries included deep lacerations caused by dislodged corrugated iron roofing, puncture wounds, and superficial abrasions. The wound becomes grossly contaminated with soil, seawater, or sewage which affects mostly in lower extremities followed by upper extremities and head (Lim, 2005; Maegele et al., 2006). The musculoskeletal assessment such as bone examination is important to perform for severely injured tsunami victim before determining the treatment such as treatment for close fracture, debridement and stabilize treatment for open fracture, or other surgery treatment (Watcharong et al., 2005). The examination focuses on deformities of bone, joint symmetry, and range of motion. Inspection of surrounding tissue and palpation crunching during movement of tendon or ligaments over the bone, and evaluation of the inflammation signs such as swelling which involve soft tissue structure, warm with comparing the involved tissue joint with unaffected tissue joint, tenderness of joint as result from trauma, and redness of overlying skin near the tissue (Bickley & Szilagyi, 2007). Moreover, the nurses also have to assess pain severity of tsunami victims with severely injuries. In disaster event, the survivors with various physical injuries come up with the severity of pain when attended in the emergency department. The nurses have more contacts with casualties than any other members of health care team and have to perform prime role in promoting comfort

and pain relief with the accuracy of pain assessment (Carrol & Browsher, as cited in Teanby, 2003; Sloman, Rosen, Rom & Shir, 2005).

The pain assessment can be included in primary assessment during emergency that include airways, breathing, circulation, and discomfort or pain severity. The most accurate pain assessment tool for assessing pain intensity level during emergency is numeric pain intensity scale. The numerical scale is the most effective tool for assessing pain intensity level in emergency response due to the accuracy of use in clinical situation and easy for patients to understand. Patients are asked which number best representative their level of pain. The scale of pain ranges from 0-10, 0 being no pain and 10 being unbearable pain. The nurse have to ask patients to describe not only presence, location, intensity or severity of pain but also any aggravating or relieving factors associated with the pain (Tanabe, 1995). In caring for tsunami wound, the nurses must have some skill regarding to wound care which include of assessment of wound, cleansing and dressing of wound, debridement of wound, wound closure, vaccination, and follow up the wound care with evaluation of wound healing process (Dolan & Holt, 2008; Nelson & Dilloway, 2002; Stephen-Haynes & Downing, 2003).

3.1 Assessment of wound

The assessment of tsunami wounds is done by following the parameter namely location of wound, size of wound (length, width, and depth) which is usually documented in centimeters, tissue loss (partial thickness or full thickness), exudates, wound bed (granular, slough, eschar), and wound pain. The treatment goals are determined based on the assessment that which definitive diagnosis process will precede the treatment (Nelson & Dilloway, 2002; Stephen-Haynes & Downing,

2003). Most of traumatic wounds occur in unsterile condition and therefore all carry a risk of infection. It is important to assess the degree of contamination carefully before management of wound is decided. The excessive bleeding should be controlled to allow the accurate assessment of wound including estimate of the blood loss, improve homeostasis with direct pressure, and observing the changes of vascular integrity such as skin color, skin temperature, distal pulses, and capillary refill (Dolan & Holt, 2008).

3.2 Cleansing and dressing of wound

The wound cleansing is essential for the prevention of infection and as responsibility to ensure that the wound is decontaminated prior to closure. The method of wound cleansing is done by using the pressure of irrigation with the normal saline solution. The irrigation should be done continuously until all obvious contaminations are removed and pressurized fluids should be delivered with enough force to remove all debris without damaging healthy tissue (Dolan & Holt, 2008; Lim, 2005; Nelson & Dilloway, 2002).

In some cases such as dirty abrasion and gritty wounds of varying depth, surgical scrubbing of the wound is indicated. The procedure should be carried out in a gentle manner so that further tissue damage is avoided, using small circular movement and anesthesia or analgesia will be required. Moreover, while irrigate the wound, the nurses have to check the dead space and manage the exudates for further treatment or for evaluation of wound healing progression and applying universal precautions including wash hands before treatment, use sterile gloves, dispose of soiled dressings and gloves after using, and use normal saline to clean and irrigate a wound (Dolan & Holt, 2008).

3.3 Debridement of wound

The preparation of wound management includes the nurses to recognize the necessity of debridement of wound and prepare the victims for the procedure. The nurses will select the tsunami victims who will be treated with debridement. The tsunami victims who commonly have major wound such necrotizing fasciitis will receive surgical sharp debridement in operating room by the physician, while the nurse who has completed didactic and clinical instruction may perform the conservative debridement for minor wound (Nelson & Dilloway, 2002; Prasartritha et al., 2008).

The nurses have to identification the wound condition after debridement by using the classic sign which includes foul odor, pus, surrounding erythema, pain, induration, fever, and elevation of white blood cell count, as well as subtle changes such as increasing pain/tenderness, increasing exudate, friable wound tissue, and wound regression. After the debridement, the wound should be dressed with sterile dressing and scheduled for delayed primary closure (Nelson & Dilloway, 2002).

3.4 Wound closure

The characteristic of tsunami wound requires special treatment by using vacuum assisted closure therapy. Vacuum-assisted closure therapy (VAC) was designed to promote the formulation of granulation tissue in wound bed, either as an adjunct to surgical therapy or as an alternative to surgery. In detail, foam dressing with an attached evacuation tube is inserted into the wound and covered with an adhesive airtight seal drape. Controlled, localized negative pressure is applied and the effluents from wound are collected into nearby canister. During the interim between

initial wound surgery and secondary closure, tsunami wounds were protected by using vacuum-assisted closure. Renewal of vacuum-assisted wound dressings was performed in two to three day intervals under sterile conditions in the operating theatre and by following conditioning and then the wounds were closed either with or without skin grafting (Maegele et al., 2005). Depending on the size of the wound, progress should be seen within 72 to 96 hours by observation from physician or nurses (Nelson & Dilloway, 2002; Prasartritha et al., 2008).

3.5 Vaccination

All the tsunami victims with wounds even superficial or minor abrasion should receive tetanus prophylaxis for vaccination. This consists of tetanus booster (Td), unless the patient has received one within the past 5 years. The nurse preparing the tetanus prophylaxis should administer at the rate of 500 to 3000 International Unit (IU) tetanus immunoglobulin (TIG) as recommend for the victims, who never received the primary tetanus vaccine series after wound cleansing. Tetanus prophylaxis series should be applied in three doses with the time range of six weeks from the first dose to second dose, and 6 months between second doses to the third dose of immunization (World Health organization, 2005).

3.6 Evaluation of wound healing process

The faster wound healing will be promoted by using the appropriate antibiotics. Several signs of infection including redness, swelling, increased pain, purulent discharge, breakdown of the wound, odor, skin warm to touch, pyrexia, tachycardia, and tacyhpnoe can be use to determine the wound healing process (Dolan & Holt, 2008). Patients with a suspected wound infection should have a wound swab taken for microscopy, biostatic culture and sensitivity prior to

considering for antibiotic therapy or changing such therapy (Dolan & Holt; Lim, 2005).

4. Mental Health Care

The nurses who are well qualified in mental health with variety of skills in assessment and interventions are suited for disaster responding. Many terms are used in mental health status assessment including level of alertness, orientation, mood, attention, and memory. Level of consciousness is the state of patient's awareness of the environment. Orientation is the awareness of personal, place, and time that require both patient's memory and attention. Mood is a sustained emotion that may color a person's view, while attention is the ability to focus or concentrate overtime on one task or activity. Moreover, memory is the process of registering, recording, storage, and retention of information from the patient. When nurse assesses mental health status, they need to focus the assessment into appearance and behavior, speech and language, mood, thought, and perception or cognition of the patients. Appearance and behavior assessment include patient's level of consciousness, patient's posture, and motor behavior such as tense posture, restlessness, fidgeting anxiety, crying, depression, affect changes, and agitating as manic episode from the traumatic event. The speech and language characteristic includes intensity of talking, slow speech in depressed situation or relative silence. Mood examination can be observed from sadness, anger, anxiety, worry, or feel guilty from the patients feelings, the thought process can be evaluated by assessing the logic, organization, and coherent of patient's thought that revealed in words and speech throughout the interview process (Bickley & Szilagyi, 2007).

Moreover, the development of mental health problem such as acute stress disorder (ASD) or post-traumatic stress disorder (PTSD) after disaster have to be distinguished by nurse due to the symptoms which are often similar to those seen in anxiety, depressive, and other disorder. Accurate assessment of mental health status will assist with prompt identification of ASD or PTSD problem and lead to appropriate treatment from the multidisciplinary team in disaster responding (Mitchell et al., 2005). The activities of nurses in providing mental health care for disaster survivor comprises of psychological triage and mental health referrals, psychological first aid, crisis intervention, and psychological intervention for survivors (Plum & Veenema, 2007). The explanations are as follows:

4.1. Psychological triage and mental health referral

Factually, the disaster victim had experience or simply witnessed traumatic event can be attacked emotionally and develop psychological problem including acute stress distress (ASD) or post traumatic stress disorder (PTSD). In order to sorting the psychological problems among the victims, the nurses might perform the psychological triage refers the victim for advanced mental support. The psychological triage aims to identify which individual are most at risk for psychiatric complications and makes referral for further mental health evaluation and treatment when needed. The mental health referrals ought to be made when the survivor present symptoms such as disorientation or memory loss, depression with feeling of hopelessness and despair, anxiety, inability to maintain self-care, psychosis with feel about hearing or vision, pronounce pressure of speech, and suicidal thoughts or plans (Plum & Veenema, 2007).

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4.2. Psychological first aid

Once survivors' exposure with disaster, the appropriate effort have to directed toward the reduction of psychological harm. The nurses offer the psychological first aid, which includes prevention of retraumatization, new victimization, and pathological distress. Retraumatization can prevent by using avoidance in forcing the survivors to frequently telling their story about disaster. Prevention of new victimization by obtained exposing the survivors to disaster experience, and prevention of pathological distress by providing anticipatory guidance about emotional, cognitive, behavioral, and psychological response for survivors and helps them to gain their self confidence.

4.3. Crisis intervention

The nurses provide crisis intervention by using active listening and problem solving. Active listening allows the nurses to establish a sense of respect and trust with disaster survivor. The nurse used active listening when the survivors share their felling or emotional reaction about their traumatic event. The nurse also

enhances the awareness about the survivors with getting close with the victims, using non verbally method such as eye contact, head nodding or caring facial expression, and use paraphrase to repeat what the survivor said to convey interest, clarifies the meaning and check misunderstanding of information (Mitchell et al., 2005; Plum & Veenema, 2007).

4.4. Psychological support intervention

Psychological support composed counseling, promote natural resolution environment, and psychological additional support. The counseling assists survivor to find the solution for their problems. Counseling for problem solving consists of identifying the problem and alternative solutions through brainstorming, comparing the pros and cons of each solution, identifying the most suitable solution, and implementing the chosen solution (World Health Organization, as cited in Hughes et al., 2007; De Wolfe, as cited in Plum & Veenema, 2007). Promoting natural resolution namely reassurance of the survivors' reaction is normal and can be treated, encourage them to talk with others, assist them to concentrate on other things such as controlling their breathing technique, assist them by diverting their attention from pain and experienced life of threat, and providing useful information. This is important for disaster victims to receive the accurate, factual, and essential information regarding the disaster that was happened (Rooze et al., 2008).

Previous studies mentioning the psychological problem for disaster victims can be found from Galea, Ahern, and Resnick study (Galea, Ahern, & Resnick, as cited in Mitchell et al., 2005) and Austin and Godleski study (Austin & Godleski, as cited in Mitchell et al., 2005). Galea and colleagues assessed the psychological problems after the World Trade Center incidence in 2001. The study

reported that 9.7% of resident were consistent with depression and 7.5% reported consistent with PTSD, and the symptoms increased to 20% for those who were living close to the disaster site. Austin and Godleski reported that slightly more than half (up to 60%) of individual exposed to disaster would develop psychiatric symptoms immediately after the event. This number drops to 41% by 10 weeks and 22% by 1 year. When losing of life and physical injury following disaster is minimal, psychiatric sequel may be relative low. Conversely, when an event produces an immediate overwhelming number of deaths and high level of symptoms, then the presence of long-term psychiatric disorder may be quite high. Another study from Montazey and Baradan (Montazey & Baradan, as cited in Nasrabadi, Naji, Mirzabeigi, & Dadbakhs, 2007) reported that the surviving people after the earthquake supported the importance of continuing care for those who survived from tragedy. The findings showed than 58% of respondents suffered from mental health problem that was three times higher than the reported psychological distress among general population that needed comprehensive psychiatric nursing care. The study findings indicated that there is urgent need to deliver the mental health care or psychological support for disaster victim to reduce negative health impact of further psychopathology problem.

5. *Psychosocial Care*

Tsunami survivors found significant impact of their psychosocial such as social disruption because they have substantial loss of loves ones, friends, business, and life goal which this condition may leads the survivors to develop depression (Laurendeau et al., 2007). Austin and Godleski (Austin & Godleski, as cited in Plum, 2007) revealed that the psychosocial impact of disaster like tsunami resulting

experience of horror, traumatic bereavement, and disruption of normal living environment. The experience of horror feeling happens when they life is threatened from tsunami yields the psychological problem from anxiety until other psychopathological disorder occurs. Psychosocial care is provided to help survivors to solve problem related to social disruption. The psychosocial support can be delivering by nurses for disaster victim such as social support and educational support. Social support may encourage the victims to talk as well as promote friendship with others which help survivors to understand that they are not alone. The education for survivors and family will help them to solve their problems related with psychological distress such as unable to sleep, signs of depression, further treatment for those sign or other related stressor such as housing issue after tsunami (Mitchell et al., 2005; Ruzek et al., 2004).

6. Spiritual Care

Spiritual care is often derived as the experience of meaning and purpose and things in the world around us. This connected encompassed a relationship with God or a higher power which adherence to the belief and practices (Syed, 2003). Spiritual care of tsunami survivors is important due to the survivors are more devastating from tsunami impacts. Tsunami survivors usually come with experience of grief, fear, despair, loss everything in their lives, or felt anger and guilty that led to questioning their spiritual belief (Gregor, 2005). Spiritual assessment consists of assessment of spiritual distress and spiritual needs. The nursing intervention to relive spiritual distress included communicating with empathy, providing a quite peaceful environment, helping to accept the current situation, identifying the positive aspects of the current situation, facilitating religious coping,

instilling hope for future, assisting in finding meaning and purpose in life, strengthening patient-family relationship and referring to the religious leader and counseling related to spiritual distress. Moreover, the spiritual care evaluation focuses to assessing the patients' response after receiving spiritual intervention and ability of patients to perform their regular spiritual activities (Wong & Yau, in press).

7. Patient Referral

Secondary transport of patients involves the movements of patients already in hospital to another hospital with none appropriate facilities for patients' further management with the principle aims of referring is to stabilize the patient to a condition which allows transport at normal road speed with invasive monitoring, controlled ventilation and maintained resuscitation equipment (Stephens et al., 1995). In transferring process, the nurses is often most appropriate as team leader as competencies and knowledge of transferring procedure will be a part of their ongoing professional education. The nurses have to prepare their skill regarding to patient transferring including preparation of patient, equipment, documentation, communication and determine the mode of the transfer (Handy & Zwanenberg, 2007).

The preparation of patient before transferring is important to monitor and evaluate the patient condition prior transferring. The patient requires a secure airway, adequate respiratory support, and resuscitation of circulation. The specific procedures have to evaluate regarding to patients condition such as cervical spine for trauma patient, or intubated patient must have secured with endotracheal tubes (Stephens et al., 1995). Moreover, the nurses have to prepare their skill to be able in using the transferring equipment such as proficient to calculating and administering the drug, ambulance equipment including oxygen, defibrillator, or emergency kit for

emergency airway including ambu-bag with simple airways adjuncts, a laryngoscope, and endotracheal tube (Handy & Zwanenberg, 2007).

The documentation of transferring is important to assess the quality of transferring process. Prior the transferring, the nurses have to completing the transfer' summary with written review of patient's condition, medication preparation, nursing supplies, maintaining communication with the agency or unit where the patients will be transferred and documentation during the activities (Timby, 2005). Moreover, during the transferring, it is necessary to communicate with the retrieval team in order to evaluate patient's condition during the process. One individual should be a team leader on transferring process who should responsible for coordination the transfer either with written or verbal communication by using note making, referral letter, discussion with relative and liaising with other clinicians at receiving hospital. One the most frequent communication errors is failure to inform the receiving team about time for leave of transferring. Therefore the transfer form check list has to follow which provide documentation, preparation, handoff with receiving team, and as the legal record of transferring. Furthermore, the nurses have to determine the type or mode of transferring that could be selected according to distance availability, patient condition, or speed of the vehicles. The type or mode of patient transferring consists of horizontal or vertical transferring by using ambulance, car, helicopter, or other appropriate vehicles (Handy & Zwanenberg, 2007; Stephens et al., 1995).

Factors Relating to Nurses' Preparedness of Knowledge and Skills in Caring for Patients Attacked by Tsunami

1. *Training and Education*

As the largest subgroup of the health workforce which proves be the vital resources in dealing with in unforeseeable disaster and learning from the disaster make the nurses aware of the fact that they need to be prepared for disastrous events (Fung, Loke et al., 2008). It is critical for nursing profession to possess the need of knowledge, skills, and ability for response in disaster event and able to collaborate with variety of disciplines that involved in disaster responding. The current state of preparedness of nurses is becoming important for providing critical and appropriate care to the patients during the disaster (Wisniewski, Dennik-Champion, & Peltier, 2004). If the nurse knows what to do in disaster, chaos situation can be avoided and many lives can be saved. Therefore, the continuing education and training are necessary to educate nurses to make them prepared for playing their role that they have to undertake in disaster response (Davies, 2005). Continuous education and training are the most likely the route for preparedness effort that provide nurses to be knowledgeable and skillful as the first responder in disaster (Wetta-Hall et al., 2006). Chapman and Arbon (2008) suggested the training or education for disaster preparedness include basic first life support, triage, health assessment, counseling, and communication training, and decontamination training that are very important for hospital staff in caring casualty victims. Chapman and Arbon also pointed out that the nurse who receive such training or education related to disaster preparedness have positive outcomes such as improve confidence and more understanding about their role in disaster responding.

A variety of educational strategies can be used for training and education that are related to disaster preparedness. Several education strategies utilized for disaster education includes lecturer, seminar, distance/online education, field experience, independent study by reading books or journals, accessing computer databases or computer assisted learning, informal discussion (Doyle, 2006). The training methods include classroom instruction or lecturer based training, web-based courses, video conference, CD/DVD for computers, satellite broadcast, journals or publications, regular mails, drills, table top exercise, case study, workshop, tutorial seminar, group discussion, or joint regional multi agency exercise for disaster (Mosca, Sweeney, Hazy, & Brenner, 2005; Wetta-Hall et al., 2006; Wisniewski et al., 2004).

The study supports the importance of training and education for nurses' preparedness provided by Qureshi et al. (2004) or Wisniewski et al. (2004). Qureshi and colleagues (2004) found that the preparedness of public health nurse in New-York city with training program resulted in knowledge gain and shift of attitude. While, Wisniewski and colleagues (2004) pointed out that the nurse prefer education to increase their understanding of the appropriate response for large-scale emergencies. The survey from Mosca et al. (2005) about school nurses preparedness showed that the 60% respondents acknowledged that they have less confident in their abilities to implement skills that are required for bioterrorism and disaster competency, 56% indicated there is a high need additional training such as triage, first aid skill, incident command system, and communication strategies for preparedness.

The systematic review of the effectiveness of disaster training for health workers from William et al. (in press) found that the training has significant increase in preparedness of health workers regarding the disaster situation. In the

study from Baez et al. (Baez et al., as cited in Williams et al., in press) about triage showed that 96% participants correctly performed 4 of 5 triage scenario post intervention than before training. The study from Parish et al. (Parish et al., as cited in William et al. in press) about medical students who were receiving short medical course reported significantly increase post-test score about knowledge of disaster preparedness. The disaster training also had impact on adding personal knowledge to health care professional including nurses that contribute to personal change, work place change, and system change. As personal change, the nurses encourages themselves to prepare for disaster, the nurse can share the training material with individual in the work place to develop disaster plan in their unit and improvement in thinking abilities to anticipate the emergency response. The system change requires nurses to share the training information for their authority for further preparedness planning (Wetta-Hall et al., 2006).

In summary, the evidences are providing that training or education intervention in disaster preparedness improves knowledge and skills of health care professional including nurses for disaster response. The nurses can use several methods to enhance their capability of knowledge and skills regarding to preparedness in caring for disaster victims and preparation for future disaster.

2. *Clinical experience*

Suserud and Haljamie (1997) stated that the experience will be related to readiness for action in disaster response. The readiness of action by having a feeling of being prepared is commonly found with the nurses who have previous experiences rather than limited experienced nurses. The readiness described as knowing what should be done, able to cope up with situation, felt secure and

confidence in their nursing activity during disaster response. The importance of having qualified personnel including nurses in disaster site has been widely recognized. The nurses who had previous experience of accident and emergency nursing will act more adequately and consistently at the accident site than less experienced nurses.

Previous clinical experiences at accident and emergency department or experience performing some clinical skills at intensive care unit makes nurses able to perform some critical roles during disaster response such as triage, and emergency aid for caring disaster victim. Comparing with the inexperience nurses, commonly the nurses mentioned that they have negative feeling such as being insufficient of capabilities and mental strain during disaster response due to lack of preparedness (Suserud & Haljamie, 1997). Previous greater experiences may lead the nurses to increase their confident and mastery. The previous work experience in critical situation requires nurse to maintain their preparedness of specific knowledge and skills. When the nurses updates their knowledge and skills, they will work more effectively with more confident and fewer mistakes particularly in casualty events (Nasrabadi, Naji, Mirzabeigi, & Dadbhaks, 2007).

3. Perceived Severity and Perceived Risk

It is important that all the nurses in all specialties be prepared to take care for people affected by disaster. The perceived severity and perceived risk of health care providers about the disastrous event may affect them to be prepared. The nurses who accept risk perception and experience about disaster and effect on their community will be engaged in activity of preparedness (Rebmann, 2006). Understanding nurses' preparedness is critical to design more effective preparedness

strategies and training programs. According to O'Sullivan and colleagues study about the understanding of nurses perception of preparedness revealed that the nurse who had involved in previous disaster or all hazard have high perception in preparedness. The nurses who took direct care of patient in previous disaster reported that they are having high perception of preparedness. The perception of preparedness is consistently having positive correlation with being adequately equipped and trained for disaster with collaboration of all multidisciplinary health team care in having smooth running in disaster response (O'Sullivan et al., 2008).

All the events of disasters will transform a vulnerable human condition. According to Noji (1989), there are some severity and risk for having disaster. The severity of disaster yields some effects on human such as: 1) vulnerability resulting from poverty and social inequality, 2) environment degradation, and 3) rapid population growth especially among the poor society. While the risk of disaster includes: 1) peoples are least able to afford housing that can withstand for seismic activity, 2) people often lives along coast line where hurricanes, storms, earthquake-generated tidal wave can strike, 3) peoples are forced by economic circumstance to live in substandard housing, and 4) lack of knowledge for life saving actions when disaster occurs.

Tsunami as a kind of disaster also yields severity for the survivors. The severity of tsunami can be divided into physical and psychological problem. The severity of tsunami injuries revealed that the predominant pattern of injuries comprises of multiple large scale tissue wound at various sites of the body with various sizes likely caused by floating debris with severely contaminated, thoracic trauma with hemopneumothorax and respiratory distress, serial fractures such as

peripheral bone fracture, rib fracture, and dislocation. These injuries severity requires specific treatment that can be divided into the phases of treatment. The initial phase of treatment starts usually after seconds to minutes of disaster which is characterized by high mortality rate due to injuries incompatible with life. The second phase of treatment a starts from minute to hours after tsunami and focuses to control hemorrhage and hemopneumothorax. The third phase of treatment occurring in days to weeks of tsunami with the major efforts undertaken to prevent and treat complication such as sepsis, multiple organ failure, and psychological disorder (Maegele et al., 2005).

Furthermore, the severity of psychological problem for tsunami survivors yields clinical symptoms of post-traumatic stress. The stressor from flooding, drowning, or those not able to keep the family member in tsunami wave, the survivors were loaded on pickup trucks, were transferred to unknown site for further treatment and then they found themselves in crowd of other injured victims, not able to move, thinking they would die at the scene that lead to the stressful situation. In particular, persons suffering from chronic disease (e.g. asthma, diabetes, or coronary diseases) also had difficulties, as initial medical support did not cover the drug for such condition. The stress response of tsunami survivors with previous traumatic experiences includes heavy distress about injuries, dissociation, agitation, sleep disorder, guilt, grief, or manic behavior (Maegele et al., 2005).

4. Attending Hospital Disaster Drill

Hospital disaster drill is a primary component of hospital disaster planning that has been used to train employees and to test the hospital's disaster response capabilities for such disaster. Several types of disaster drill are commonly

used namely moulaged patients with disaster drill scenario, tabletop drills that consisting of roundtable discussion without any simulated victims, and practice disaster response through computer simulation (Kaji & Lewis, 2008).

The hospital disaster drill or tabletop exercises are effective in allowing hospital employee including nurses to become familiar with disaster procedure during disaster response. Regularly applying hospital disaster drill at least yearly or twice a year provides the realistic approach to disaster situation and the optimum way to test disaster preparedness among health provider staff, evaluate the logistic of disaster response, and hospital preparedness system (French, Sole, & Byers, 2002). The technologically based interventions namely computer simulation, teleconferences, or video demonstration can be added in hospital drills to increase knowledge and information retention for training participants. Computer simulation may represent an effective tool to educate through animation prior to a full scale of drill, while teleconferencing may educate the nurse over a geographic area. Video demonstration is convenient to educate large number of hospital staff about disaster procedure. These technological based interventions on disaster drill have advantages such as less costly and do not require large number of volunteers or other personnel (Hsu et al., 2004; Power, 2007). The effective disaster drill needs to be written and displayed in each hospital plan. The annually disaster drill should be in partnership with hospital emergency services (EMS), fire department, and local agencies. The cooperation among those agencies will facilitate drill and prepare responder for likely situation that would be helpful in preparing for actual disaster, which focuses to maximize the hospital space for triage, wounded victims area, dividing the level of treatment, and fulfill hospital chart supplies for emergency response (Linkous &

Carter, 2008). Believing that being adequately prepared for disaster make the nurses confident in disaster response, while inexperience staff may contribute to stress and fear for disaster response. The nurses can be pre-equipped and confident in their ability to respond to disaster events through having standardized, organized, and regularly evaluate the disaster planning by applying hospital disaster drill (Chapman & Arbon, 2008).

In summary, based on all literature review, it can be concluded that nurses' preparedness of knowledge and skills in caring patients attacked by tsunami have played an important role in assisting tsunami patients. The preparedness of nurses for caring tsunami patients requires specific knowledge and skills to be able to provides the appropriate care based on patient's needs in the appropriate manner at appropriate time. There are several knowledge and skills for nurses to prepare in caring for casualties in disaster. According to Unalehkakha and Mehta (2006), Laurendeau, Labarre, and Senecal (2007), WHO (2009), and Kim and Proctor (2002), it can be concluded the nurses' preparedness of knowledge in caring for patients attacked by tsunami consist of knowledge about impact of tsunami and disaster management of tsunami. An impact of tsunami includes physical, psychological, psychosocial, and spiritual impact, and disaster management of tsunami includes disaster management phase and knowledge that the nurses needed to perform skills in caring tsunami patients including knowledge on triage, acute respiratory care, wound care, mental health care, psychosocial care, spiritual care, and patients referral which was derived from the same concept of preparedness skills. Based on the concept from the International Nursing Coalition for Mass Casualty Education [INCMCE] (2003), the College of Registered Nurses of Nova Scotia [CRRNS] (2007), Maegele et al.

(2006), and WHO (2009), the common nurses' preparedness of skills in caring for patients attacked by tsunami can be conclude including triage, respiratory care, wound care, mental health care, psychosocial care, spiritual care, and patient referral. Moreover, the ability of nurses to prepare themselves to be knowledgeable and skillful in caring for patients attacked by tsunami is influenced by many factors. Those factors are training and education related to disaster that the nurses received, clinical experienced in caring for patients attacked by tsunami with various clinical nursing skills, their perception of being risk for future tsunami with high severity of the impact, and their attending in hospital disaster drill.

CHAPTER 3

RESEARCH METHODOLOGY

Research Design

This descriptive correlational study aimed to: 1) describe the levels of nurses' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami, 2) examine the relationship between training and education, clinical experience, perceived severity and perceived risk, and attending hospital disaster drill and nurses' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami in Banda Aceh, Indonesia.

Population and Setting

The target population in this study was staff nurses of Zainoel Abidin Hospital in Banda Aceh Indonesia, which were approximately 281 nurses. Zainoel Abidin Hospital is the only one educational, government hospital and is the highest level of referral hospital in Banda Aceh province with the bed capacity of approximately 500 beds. After being struck by the tsunami, this hospital collapsed within 2 months with all facilities being covered by mud from the tsunami wave, and there were no health providers, including nurses who reported to work in the hospital in that critical time. Many staff nurses were reported to have died in the tsunami event. Therefore, approximately three months after the tsunami, some new nurses were recruited to be hospital staff nurses to maintain services in caring for a huge number of tsunami patients. Moreover, especially from 2006 until 2008, both domestic and overseas disaster trainings were offered for the staff in this hospital.

Several training sessions related to disaster consisted of disaster management training, basic life support (BLS), basic trauma life support (BTLS), advanced cardiology life support (ACLS), infection control, and mental health care, which were offered for representatives of health care staff from this hospital such as physicians, nurses, or technicians. The nurses from six wards who were responsible for caring for disaster patients, including Emergency Department (ED), Operating Room (OR), Intensive Care Unit (ICU), surgical ward, medical ward, and neurological ward were the potential subjects in this study with the total number of nurses in these wards being approximately 195 nurses.

Sample and sampling

1. *Sample Size*

The number of subjects was determined by using power analysis with level of significance (α) of 0.05, expected power (1-β) of 0.80, and effect size (ρ) 0.30 which is categorized as medium effect size and is used commonly in nursing research. The sample size needed was 88 nurses (Polit & Hungler, 1999). In this study, the researcher added 10% to the sample size to make 97 subjects in total, in order to prevent low response rate. Proportionately, the eligible nurses were selected: 22 from 44 Emergency Department nurses, 18 from 37 Operating Room nurses, 18 from 37 surgical ward nurses, 17 from 34 medical ward nurses, 12 from 23 neurological ward nurses, and 10 from 20 Intensive Care Unit nurses.

2. *Sampling Technique*

The systematic random sampling technique was used in this study to determine the potential subjects from six wards. The inclusion criteria for the participants were as follows:

2.1 Government or contract nurses

2.2 Had at least 1 year work experience as a nurse

2.3 Able to communicate in Indonesian language

Instrumentation

Instruments

In this study, five instruments were used: 1) The Demographic Data and Working Information Questionnaire, 2) The Nurses' Clinical Experience Questionnaire, 3) The Nurses' Perceived Preparedness of Knowledge Questionnaire, 4) The Tsunami Care Questionnaire, and 5) The Perceived Severity and Perceived Risk Questionnaire.

1. Demographic Data and Working Information Questionnaire (DDWIQ)

The researcher constructed the Demographic Data and Working Information Questionnaire (Appendix B). There were nine items including age, gender, marital status, religion, race, nursing educational background, training and education including methods of nurses' preparedness, attending hospital disaster drill, and working experience as nurses or in caring for patients attacked by tsunami.

1.1 Training and education

The training and education was measured by using training and education index formula with the number of training multiplied by the number of

times, with the higher scores reflecting the complete training and education received by nurses.

1.2 Nurses' preparedness methods

Nurses' preparedness methods consisted of two items measuring the preparedness method including reading a book or other related material about the disaster and searching from the Internet. Each item was scored from 0 to 3 in terms of 0 = never, 1= sometimes, 2= often, and 3= always with the higher score reflecting the more common method of nurses' preparedness.

1.3 Attending hospital disaster drill

Attending hospital disaster drill was measured with dichotomous choice of attending in hospital disaster drill with the higher score reflecting the sufficient of attending hospital disaster drill.

2. Nurses' Clinical Experience Questionnaire (NCEQ)

The Nurses' Clinical Experience Questionnaire (Appendix C) was developed by the researcher and colleague (Husna & Hermawati, 2009a) which consisted of 14 items of nurses' clinical experience in caring for tsunami patients including experience on triage, acute respiratory care, wound care, mental health care, psychosocial care, spiritual care, and patients referral. Each item was scored from 0 to 3 in terms of 0 = never, 1= sometimes, 2= often, and 3= always with the score ranging from 0-3. The higher scores reflected the more experienced of nurses in caring for tsunami patients.

3. Nurses' Perceived Preparedness of Knowledge Questionnaire (NPPKQ)

The Nurses' Perceived Preparedness of Knowledge Questionnaire (Appendix D) consisted of 50 items measuring nurses' perceived preparedness knowledge on the impact of tsunami (14 items), including physical, psychological, psychosocial, and spiritual impact; and knowledge on tsunami disaster management (36 items) including: triage (4 items), acute respiratory care (6 items), wound care (9 items), mental health care (5 items), psychosocial care (4 items), spiritual care (4 items) and patient referral (4 items). Each item was scored from 0 to 3 to indicate the extent of being prepared with 0= none, 1= low, 2= moderate, and 3= high preparedness. The level of nurses' perceived preparedness of knowledge was categorized into four levels: low: 0-0.75, moderate low: 0.76-1.50, moderate high: 1.51-2.25 and high: 2.26-3.00 with the higher scores reflecting the higher perception of nurses' perceived preparedness of knowledge

4. Tsunami Care Questionnaire (TCQ)

The Tsunami Care Questionnaire (Appendix E) consisted of nurses' perceived skill preparedness of triage, acute respiratory care, wound care, mental health care, psychosocial care, spiritual care, and patient referral which was developed by the researcher and colleague (Husna & Hermawati, 2009b). There were 40 items, including: triage (5 items), acute respiratory care (7 items), wound care (8 items), mental health care (6 items), psychosocial care (5 items), spiritual care (4 items), and patients referral (5 items). Each item was scored from 0 to 3 to indicate the extent of being prepared, where 0= none, 1= low, 2= moderate, and 3= high preparedness. The level of nurses' perceived preparedness of skills was categorized into four levels: low:

0-0.75, moderate low: 0.76-1.50, moderate high: 1.51-2.25 and high: 2.26-3.00 with the higher scores reflecting the higher perception of nurses' preparedness of skills.

5. *Perceived severity and perceived risk Questionnaire (PSPRQ)*

The Perceived Severity and Perceived Risk Questionnaire (Appendix F) consisted of 10 items measuring perceived severity of tsunami (7 items) and perceived risk of tsunami (3 items). Each item was scored from 1 to 3 where 1= low, 2= moderate, and 3= high, with the higher score reflecting higher perception of severity and risk of tsunami.

Translation of the Instruments

The original instruments of this study were developed in English. Three experts from the Faculty of Nursing, Prince of Songkla University, Thailand validated these instruments. After validation, two bilingual translators from the Nursing Science Program, Syiah Kuala University Banda Aceh, Indonesia, translated the instruments. One bilingual translator translated the instrument into the Indonesian language. Another translator translated back the instrument into English. The researcher had discussions with the two bilingual translators to check for discrepancies in the two English versions, and followed the suggestions of the translator.

Validity and Reliability of the Instruments

Validity of the Instruments. Three experts from the Faculty of Nursing, Prince of Songkla University, Thailand examined the instruments for their content validity. The first expert had expertise in surgical nursing, the second expert had expertise in disaster nursing, and the last expert had expertise in tool

development. The instruments were modified and revised based on the suggestions of the experts.

Reliability of the Instruments. The reliability of instruments was examined by using Cronbach's Alpha. The reliability of the NCEQ was.96, the NPPKQ and the TCQ had the same alpha of .98, and the PSPRQ was .94. In regard to test the stability of training index, test-retest reliability was used with Spearman Rho reliability coefficient ρ=.98 (p<.01).

Data Collection

1. *Preparation Phase*

1.1 The researcher asked for a letter from the Dean, Faculty of Nursing, Prince of Songkla University to submit to the authority of Zainoel Abidin Hospital in Banda Aceh, Indonesia for getting permission of the data collection.

1.2 After permission was obtained, the researcher explained to the head nurses about the objectives, benefits, confidentiality, and the method of data collection.

1.3 The researcher asked for a name list of the nurses from the selected wards and applied numbers to the name list of participants who met the inclusion criteria. The researcher used the systematic random sampling technique by selecting only the even number of the participants in the list according to the number of proportion of nurses from each ward.

2. *Implementation Phase*

2.1 The researcher distributed the questionnaires to the head nurses of selected wards according to the number of eligible participants from those wards, and asked them to distribute to the subjects, for confidentiality reasons.

2.2 Subjects who agreed to participate in this study completed the questionnaires. Ninety seven (100%) subjects returned the questionnaires to the researcher through the head nurses.

Ethical consideration

Data were collected after the Institutional Review Board (IRB), Faculty of Nursing, Prince of Songkla University, Thailand, approved the research proposal. The researcher obtained the permission from the director of Zainoel Abidin Hospital. After obtaining permission, the researcher contacted the head nurses of selected wards and approached the subjects who met the inclusion criteria. The researcher explained the purpose of the study, expectation from the subject's participation, and potential harm of the study.

It might be possible that subjects may feel flash backs of their previous experience in caring for tsunami patients and felt sad or insufficient in helping tsunami patients. However, during the actual data collection, none had developed it. The subjects were informed that they could refuse to participate or withdraw from this study for any reason without any fear or negative consequences. The identities of all subjects were hidden and coded and only used for this study purpose.

Data Analysis

In this study, data were analyzed by the following statistical techniques:

1. The Demographic Data and Working Information Questionnaire was analyzed by using descriptive statistics: frequencies, percentages, mean, standard deviation, and minimum and maximum score.
2. The Nurses' Clinical Experience Questionnaire (NCEQ) and Perceived Severity and Perceived Risk questionnaire (PSPRQ) were analyzed by descriptive statistics: mean and standard deviation.
3. The Nurses' Perceived Preparedness of Knowledge Questionnaire (NPPKQ) and Tsunami Care Questionnaire (TCQ) were analyzed using descriptive statistics: frequencies, percentages, mean, and standard deviation to determine the level of nurses' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami.
4. The Pearson product-moment correlation was used to analyze the relationships between training and education, clinical experience, perceived severity and perceived risk, and nurses' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami in Indonesia.
5. An independent *t*-test was used to compare the mean differences of nurses' perceived preparedness of knowledge and skills between attending and none attending group nurses in attending hospital disaster drill.
6. Additional analysis by using an independent *t*-test also was applied in this study to compare the mean differences of nurses' perceived preparedness of knowledge and skills between experience and none experience group nurses in caring for patient attacked by tsunami.

CHAPTER 4

RESULTS AND DISCUSSIONS

The findings of this study are presented as follows: 1) the demographic data and working information of the subjects, 2) the level of nurses' perceived preparedness of knowledge, 3) the level of nurses' perceived preparedness of skills, 4) the relationship between relating factors and nurses' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami.

Result

Demographic Data and Working Information

The subjects of this study consisted of 97 staff nurses of Zainoel Abidin Hospital in Banda Aceh, Indonesia. Nearly half of the subjects were less than 30 years old (48.5%) with a mean age of 31 years (SD = 5.9). The majority of the subjects were female (69.1%) and married (77.3 %). All of the subjects were Muslim and Acehnese. Three-fourths of them had nursing education at diploma level (73.2%) and had been working as staff nurses for at least 5 years (75.3%) with a mean of 9.1 years (SD = 6.4). Most of the subjects (86.6 %) had experience in caring for tsunami patients and nearly half of them (48.5%) had duration of involvement in caring for tsunami patients around 3-6 months. More than half had training and education index 1 to 4 (57.7%), and only one time attended hospital disaster drill (56.7 %). With regard to nurses' method of preparedness, the majority reported that they sometimes read books or other reading materials about disaster (71.1%) and nearly half (46.6%) sometimes searched from internet (Table 1).

Table 1

Frequency and Percentage of Demographic Data and Working Information (N=97)

Characteristic	Frequency	Percentage
Age (years) (Min =23, Max = 49, M = 31, SD = 5.9)		
< 30	47	48.5
30 - 40	40	41.2
> 40	10	10.3
Gender		
Male	30	30.9
Female	67	69.1
Marital status		
Single	22	22.7
Married	75	77.3
Educational background		
Diploma level	71	73.2
Bachelor level	26	26.8
Working period as a nurse (years)		
(Min = 2, Max = 29, M = 9.1, SD = 6.4)		
< 5	24	24.7
5-10	38	39.2
>10	35	36.1
Experience in caring for tsunami patients		
Yes	84	86.6
No	13	13.4
Attendance of hospital disaster drill		
Yes	55	56.7
No	42	43.3

Table 1 *(Continued)*

Characteristic	Frequency	Percentage
Duration of involvement in caring for tsunami patients in response phase (months) (Min = 0, Max =12, M = 3.4, SD = 2.8)	13	13.4
None	28	28.8
< 3	47	48.5
3-6	9	9.3
> 6		
Nurses' attending training and education (Index) (Min = 0, Max =7, M = 3.0, SD = 2.0)		
None	14	14.4
1-4	56	57.7
>4	27	27.8
Nurses' method of preparedness		
Reading books or other reading materials about disaster		
Never	8	8.2
Sometimes	69	71.1
Often	15	15.5
Always	5	5.2
Searching from internet		
Never	27	27.8
Sometimes	45	46.4
Often	20	20.6
Always	5	5.2

The level of nurses' perceived preparedness of knowledge

The total mean score of nurses' perceived preparedness of knowledge was at a moderate high level (M = 1.87, SD = 0.67). Two domains of nurses'

perceived preparedness of knowledge were also at a moderate high level. The highest score was preparedness knowledge on tsunami disaster management (M = 1.90, SD = 0.71), followed by tsunami impact (M = 1.84, SD = 0.67) (Table 2).

Table 2

Means, Standard Deviations, and the Levels of Nurses' Perceived Preparedness of Knowledge (N=97)

Preparedness of Knowledge	M	SD	Level
1. Tsunami disaster management	1.90	0.71	Moderate high
2. Tsunami impact	1.84	0.64	Moderate high
Total	1.87	0.67	Moderate high

1. Nurses' perceived preparedness of knowledge on tsunami disaster management

Mean scores of all domains of nurses' perceived preparedness of knowledge on tsunami disaster management were at a moderate high level (Table 3).

Table 3

Means, Standard Deviations, and the Levels of Nurses' Perceived Preparedness of Knowledge on Tsunami Disaster Management (N=97)

Preparedness of Knowledge on Tsunami Disaster Management	M	SD	Level
1. Wound care	2.01	0.67	Moderate high
2. Acute Respiratory Care	2.01	0.69	Moderate high
3. Triage	1.97	0.76	Moderate high
4. Spiritual care	1.88	0.70	Moderate high
5. Psychosocial Care	1.87	0.64	Moderate high
6. Patients Referral	1.84	0.77	Moderate high
7. Mental Health Care	1.77	0.75	Moderate high

1.1. Nurses' perceived preparedness of knowledge on wound care

Mean scores of all items of nurses' perceived preparedness of knowledge on wound care were at a moderate high level with the highest score item was "wound cleansing with normal saline irrigation" (M=2.16, SD=0.75) (Table 4).

Table 4

Means, Standard Deviations, and the Levels of Nurses' Perceived Preparedness of Knowledge on Wound Care (N=97)

Preparedness of Knowledge on Wound Care	M	SD	Level
1. Wound cleansing with normal saline irrigation.	2.16	0.75	Moderate high
2. Vaccination for tsunami wound with tetanus prophylaxis	2.08	0.67	Moderate high
3. Assessment of tsunami contaminated wound with soil, seawater, sewage, sand, dirt, and mud	2.05	0.75	Moderate high
4. Signs and symptoms of wound infection: redness, swelling, fever, pain, and delayed healing	2.04	0.80	Moderate high
5. Examination of bone deformities, joint symmetry, and bleeding for fracture	2.04	0.77	Moderate high
6. Examination of pain intensity	1.99	0.82	Moderate high
7. Characteristic of tsunami fractures such as open or multiple fracture and dislocation	1.95	0.76	Moderate high
8. Debridement for tsunami wound	1.90	0.78	Moderate high
9. Characteristics of soft tissue injuries such as abrasion, lacerated wound, and skin loss wound	1.88	0.83	Moderate high

1.2. Nurses' perceived preparedness of knowledge on acute respiratory care

Mean scores of all items of nurses' perceived preparedness of knowledge on acute respiratory care were at a moderate high level. Three items had an equal mean score including "immediate care maintaining circulation with fluid

replacement" (M=2.05, SD= 0.60), "immediate care of airway management with oxygenation support" (M= 2.05, SD= 0.68) and "signs and symptoms of near drowning: dyspnea, cyanosis, hypothermia" (M= 2.05, SD= 0.66) (Table 5).

Table 5

Means, Standard Deviations, and the Levels of Nurses' Perceived Preparedness of Knowledge on Acute Respiratory care (N=97)

Preparedness of Knowledge on Acute Respiratory Care	M	SD	Level
1. Immediate care of maintaining circulation with fluid replacement	2.05	0.60	Moderate high
2. Immediate care of airway management with oxygenation support	2.05	0.68	Moderate high
3. Signs and symptoms of near drowning: dyspnea, cyanosis, hypothermia	2.05	0.66	Moderate high
4. Signs and symptoms of pneumonia: persistent cough, dyspnea, weakness, fever	2.00	0.69	Moderate high
5. Immediate care of prevent heat loss with re-warming in warm blanket or clothing	1.99	0.74	Moderate high
6. Administration of appropriate antibiotic for infection	1.96	0.78	Moderate high

1.3. Nurses' perceived preparedness of knowledge on triage

Mean scores of all items of nurses' perceived preparedness knowledge on triage were at a moderate high level with the highest score item was "triage principle treatment in the right time, place, with high level care" (M=2.08, SD=0.65) (Table 6).

Table 6

Means, Standard Deviations, and the Levels of Nurses' Perceived Preparedness of Knowledge on Triage (N=97)

Preparedness of Knowledge on Triage	M	SD	Level
1. Triage principle treatment in the right time, place, with high level care	2.08	0.65	Moderate high
2. Physical assessment and patient acuity rating to determine immediate needs of the patients	2.01	0.77	Moderate high
3. Simple triage and rapid treatment (START) with respiratory, perfusion, and mental (RPM) status of the patients	1.93	0.86	Moderate high
4. Triage classification color: green yellow, red, and black	1.86	0.79	Moderate high

1.4. Nurses' perceived preparedness of knowledge on spiritual care

Mean scores of all items of nurses' preparedness of knowledge on spiritual care were at a moderate high level with the highest score item was "facilitating patient participation in performing religious activities" (M=1.95, SD=0.71) (Table 7).

Table 7

Means, Standard Deviations, and the Levels of Nurses' Perceived Preparedness of Knowledge on Spiritual Care (N=97)

Preparedness of Knowledge on Spiritual Care	M	SD	Level
1. Facilitating patient participation in performing religious activities	1.95	0.71	Moderate high
2. Providing spiritual counseling	1.87	0.70	Moderate high
3. Evaluation of spiritual distress	1.87	0.74	Moderate high
4. Assessment of spiritual distress such as despair, hopelessness, blamed, and anger to God	1.84	0.68	Moderate high

1.5. Nurses' perceived preparedness of knowledge on psychosocial care

Mean scores of all items of nurses' perceived preparedness of knowledge on psychosocial care were at a moderate high level with the highest item score was "evaluation of psychosocial care" (Table 8).

Table 8

Means, Standard Deviations, and the Levels of Nurses' Perceived Preparedness of Knowledge on Psychosocial care (N=97)

Preparedness of Knowledge on Psychosocial Care	M	SD	Level
1. Evaluation of psychosocial care	1.94	0.64	Moderate high
2. Encouragement of patients to establish friendship among tsunami survivors	1.91	0.69	Moderate high
3. Involvement of family in providing psychosocial support	1.89	0.64	Moderate high
4. Assessment of psychosocial disruption and signs and symptoms of psychological distress	1.77	0.64	Moderate high

1.6. Nurses' perceived preparedness of knowledge on patient referral

Mean scores of all items of nurses' perceived preparedness of knowledge on patient referral were at a moderate high level. The highest item score was "documentation and evaluation of the transferring activity" (M=1.92, SD= 0.81), and the lowest item was "establishment of communication with other agencies for referral activities" (M=1.71, SD= 0.79) (Table 9).

Table 9
Means, Standard Deviations, and the Levels of Nurses' Perceived Preparedness of Knowledge on Patients Referral (N=97)

Preparedness of Knowledge on Patient Referral	M	SD	Level
1. Documentation and evaluation of the transferring activity	1.92	0.81	Moderate high
2. Preparation of patient's document and medication for transferring	1.88	0.74	Moderate high
3. Assessment of patient's condition for referring	1.86	0.77	Moderate high
4. Establishment of communication with other agencies for referral activities	1.71	0.79	Moderate high

1.7. Nurses' perceived preparedness of knowledge on mental health care

Mean scores of all items of nurses' perceived preparedness of knowledge on mental health care were at a moderate high level (Table 10).

Table 10
Means, Standard Deviations, and the Levels of Nurses' Perceived Preparedness of Knowledge on Mental Health Care (N=97)

Preparedness of Knowledge on Mental Health Care	M	SD	Level
1. Crisis intervention with providing active listening for the patients	1.86	0.72	Moderate high
2. Signs and symptoms of psychological problems such as sadness, crying, nightmares, and emotional detachment	1.85	0.76	Moderate high
3. Counseling and education for patients to solve problem related to psychological distress	1.75	0.79	Moderate high
4. Signs and symptoms of severe mental problems such as disorientation, depression, or psychosis	1.74	0.75	Moderate high
5. Evaluation of emotional healing for tsunami patients	1.65	0.76	Moderate high

2. Nurses' perceived preparedness of knowledge on tsunami impact

Mean score of all items of nurses' perceived preparedness of knowledge on tsunami impact were at a moderate high level with the highest score item was "severely contaminated wound" (M = 2.11, SD = 0.67) (Table 11).

Table 11

Means, Standard Deviations, and the Levels of Nurses' Perceived Preparedness of Knowledge on Tsunami Impact (N=97)

Preparedness of Knowledge on Tsunami Impact		M	SD	Level
1.	Severely contaminated wound	2.11	0.67	Moderate high
2.	Respiratory problems	1.98	0.61	Moderate high
3.	Loss of family	1.95	0.65	Moderate high
4.	Grief and loss	1.93	0.63	Moderate high
5.	Pain severity	1.91	0.67	Moderate high
6.	Acute stress disorder	1.86	0.67	Moderate high
7.	Loss of social network	1.81	0.63	Moderate high
8.	Loss of financial income	1.79	0.59	Moderate high
9.	Fear	1.78	0.54	Moderate high
10.	Fractures such as open or multiple fracture, and dislocation	1.77	0.88	Moderate high
11.	Despair	1.76	0.64	Moderate high
12.	Depression	1.74	0.54	Moderate high
13.	Feeling guilty for unable to help family member	1.74	0.60	Moderate high
14.	Hopelessness	1.71	0.66	Moderate high

The level of nurses' perceived preparedness of skills

The total mean score of nurses' perceived preparedness of skills was at a moderate high level (M = 2.11, SD = 0.66). The highest domain score was wound

care (M = 2.33, SD = 0.66) and the lowest domain was spiritual care (M = 2.03, SD = 0.63) (Table 12).

Table 12

Means, Standard Deviations, and the Levels of Nurses' Perceived Preparedness of Skills (N=97)

Preparedness of Skills	M	SD	Level
1. Wound care	2.33	0.66	High
2. Acute respiratory care	2.15	0.66	Moderate high
3. Triage	2.15	0.73	Moderate high
4. Mental health care	2.07	0.67	Moderate high
5. Psychosocial care	2.05	0.64	Moderate high
6. Patients referral	2.04	0.64	Moderate high
7. Spiritual care	2.03	0.63	Moderate high
Total	2.11	0.66	Moderate high

1. Nurses' perceived preparedness of skill on wound care

All items of skill preparedness on wound care were at a high level. The highest item score was "cleansing tsunami wound by using normal saline (M = 2.42, SD = 0.59) and the lowest item was "assess pain intensity" (M = 2.28, SD = 0.70) (Table 13).

Table 13

Means, Standard Deviations, and the Levels of Nurses' Perceived Preparedness of Skill on Wound Care (N=97)

Preparedness of Skill on Wound Care	M	SD	Level
1. Cleansing tsunami wound by using normal saline	2.42	0.59	High
2. Assessing characteristics of tsunami injuries (soft tissue injuries and fractures)	2.36	0.71	High
3. Preparing patients for debridement	2.35	0.66	High

Table 13 *(Continued)*

Preparedness of Skill on Wound Care		M	SD	Level
4.	Assessing bone deformities and bleeding for patients with fractures	2.34	0.67	High
5.	Administering of antibiotic and tetanus prophylaxis	2.34.	0.66	High
6.	Evaluating signs and symptoms of wound healing such as granulation growth	2.32	0.65	High
7.	Assessing signs and symptoms of contaminated tsunami wound with sand, sewage, and mud	2.29	0.67	High
8.	Assessing pain intensity	2.28	0.70	High

2. Nurses' perceived preparedness of skill on acute respiratory care

Mean scores of all items of skill preparedness on acute respiratory care were at a moderate high level except one, "evaluating patient condition such as vital sign, breathing, and circulation" was at a high level (M =2.30, SD = 0.66) (Table 14).

Table 14

Means, Standard Deviations, and the Levels of Nurses' Perceived Preparedness of Skill on Acute Respiratory Care (N=97)

Preparedness Skill on Acute Respiratory Care		M	SD	Level
1.	Evaluating patient's conditions such as vital signs, breathing, and circulation.	2.30	0.66	High
2.	Assessing signs and symptoms of near drowning such as dyspnea, cyanosis, hypothermia	2.19	0.68	Moderate high
3.	Promoting adequate airway by positioning, suctioning, and oxygenation	2.18	0.61	Moderate high
4.	Administering antibiotic therapy for acute respiratory problems	2.16	0.62	Moderate high

Table 14 *(Continued)*

Preparedness Skill on Acute Respiratory Care	M	SD	Level
5. Providing re-warming intervention by using warm blanket or clothing	2.15	0.66	Moderate high
6. Removing of foreign body from airway	2.14	0.67	Moderate high
7. Assessing signs and symptoms of pneumonia	2.09	0.70	Moderate high

3. Nurses' perceived preparedness of skill on triage

Mean scores of two items of nurses' perceived preparedness of skill on triage "determining care by using physical assessment and acuity rating of patients" (M=2.34, SD=0.67) and "classifying patient's with critical, unstable, obvious bleeding, and circulation problem in red color" (M=2.29, SD =0.70) were at a high level, while three other items had mean score at a moderate high level (Table 15).

Table 15

Means, Standard Deviations, and the Levels of Nurses' Perceived Preparedness of Skill on Triage (N=97)

Preparedness of Skill on Triage	M	SD	Level
1. Determining care by using physical assessment and acuity rating of patients	2.34	0.67	High
2. Classifying patient's with critical, unstable, obvious bleeding, and circulation problem in red color	2.29	0.70	High
3. Evaluating patient's condition in triage process at the right time, place, and treatment	2.16	0.65	Moderate high
4. Classifying patient's condition by using categorical color (green, yellow, red, and black).	2.05	0.83	Moderate high
5. Using simple triage and rapid treatment (START) system	1.95	0.82	Moderate high

4. Nurses' perceived preparedness of skill on mental health care

Mean scores of all items of nurses' perceived preparedness of skill on mental health care were at a moderate high level. The highest score item was "assess psychological symptoms such as sadness, crying, nightmares, and emotional detachment" (M = 2.20, SD = 0.64), and the lowest item was "educating patients to solve their problems related to psychological distress" (M = 1.98, SD = 0.72) (Table 16).

Table 16

Means, Standard Deviations, and the Level of Nurses' Perceived Preparedness of Skill on Mental Health Care (N=97)

Preparedness of Skill on Mental Health Care	M	SD	Level
1. Assessing psychological symptoms such as sadness, crying, nightmares, and emotional detachment	2.20	0.64	Moderate high
2. Sorting patients with psychological problems	2.13	0.67	Moderate high
3. Providing consultation for patients	2.08	0.68	Moderate high
4. Performing active listening and caring behavior	2.06	0.70	Moderate high
5. Evaluating emotional healing.	2.02	0.61	Moderate high
6. Educating patients to solve their problems related to psychological distress	1.98	0.72	Moderate high

5. Nurses' perceived preparedness of skill on psychosocial care

Mean scores of all items of skill preparedness on psychosocial care were at a moderate high level. The highest item score was "encouraging patients to establish friendship among survivors" (M = 2.13, SD = 0.60), and the lowest item score was" assess psychosocial disruption (M= 1.98, SD= 0.69) (Table 17).

Table 17

Means, Standard Deviations, and the Level of Nurses' Perceived Preparedness of Skill on Psychosocial Care (N=97)

Preparedness of Skill on Psychosocial Care	M	SD	Level
1. Encouraging patients to establish friendship among survivors	2.13	0.60	Moderate high
2. Encouraging family support to reduce psychosocial distress	2.09	0.69	Moderate high
3. Evaluating psychosocial care	2.05	0.58	Moderate high
4. Assessing signs and symptoms of psychosocial distress such as loss families, friends, social networks, and financial incomes	2.02	0.66	Moderate high
5. Assessing psychosocial disruption	1.98	0.69	Moderate high

6. Nurses' perceived preparedness of skill on patient referral

Mean scores of all items of nurses' perceived preparedness of skill on patients referral was at a moderate high level with the highest item score was "assess patient condition before transferring" (M=2.14, SD=0.62) (Table 18).

Table 18

Means, Standard Deviations, and the Level of Nurses' Perceived Preparedness of Skill on Patients Referral (N=97)

Preparedness of Skill on Patients Referral	M	SD	Level
1. Assessing patient's condition before referring	2.14	0.62	Moderate high
2. Preparing patient's document, equipment, and medication before transferring	2.06	0.62	Moderate high
3. Documenting transferring activity	2.05	0.63	Moderate high
4. Performing communication with other agencies where patient will be transferred	2.00	0.62	Moderate high
5. Evaluating effectiveness of patient's referring	1.96	0.69	Moderate high

7. Nurses' perceived preparedness of skill on spiritual care

Mean score of all items of nurses' perceived preparedness of skill on spiritual care were at a moderate high level with the highest item score was "providing spiritual intervention by participating in religious activity" (M=2.11, SD=0.64) (Table 19).

Table 19

Means, Standard Deviations, and the Level of Nurses' Perceived Preparedness of Skill on Spiritual Care (N=97)

Preparedness Skill on Spiritual Care	M	SD	Level
1. Providing spiritual interventions by participating in religious activities	2.11	0.64	Moderate high
2. Providing spiritual counseling	2.02	0.66	Moderate high
3. Assessing signs and symptoms of spiritual distress such as grief and loss, hopelessness, loss of goal of life, anger and guilty	2.01	0.66	Moderate high
4. Evaluating spiritual distress	1.99	0.63	Moderate high

Relating Factors to Nurses' Perceived Preparedness of Knowledge and Skills

The relating factors to nurses' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami including training and education, clinical experience, perceived severity and perceived risk, and attending hospital disaster drill were analyzed for means and standard deviations (Table 20).

Table 20

Means and Standard Deviations of Relating Factors to Nurses' Perceived Preparedness of Knowledge and Skills (N=97)

Relating Factors		M	SD
1.	Training and education	3.00	2.00
2.	Clinical experience	2.03	0.88
3.	Perceived severity and perceived risk	2.44	0.64

Overall, training and education was calculated by using index which multiplying the type of training with the times of attending. More than half of the subjects had training index 1 to 4 (57.7%) with one-fourth of them (23%) attended one of each disaster management and infection control training (training index =2), where 4.1% attended one of seven types of training including BLS, BTLS, BCLS, ACLS, Disaster Management, Infection Control, and Mental Health Care training (training index = 7) (Appendix H, Table 1). Clinical experience consisted of fourteen items of nurses' clinical experience in caring for tsunami patients with the highest score of experience was "providing specific wound care for tsunami patients" (M = 2.39, SD = 0.87) and the lowest score was "involving in patients referring activities (M = 1.65, SD = 0.94) (Appendix H, Table 2). The highest score of perceived severity and perceived risk was perceived severity of "loss of people's lives (M= 2.63, 0.58), and perceived risk "mortality rate caused by unprepared tsunami disaster management" (M = 2.43, SD = 0.62) (Appendix H, Table 3).

Moreover, there was only one time of Zainoel Abidin Hospital conducted hospital disaster drill since five years after tsunami following the government drill in testing public mitigation plan for using rescue building for

disaster preparedness with only 55 nurses (56.7%) have attended in only once time of hospital disaster drill, while 42 nurses (43.3%) did not attended in such drill.

The relationship between relating factors and nurses' perceived preparedness of knowledge and skills

1. The relationship between relating factors and nurses' perceived preparedness of Knowledge

Perceived severity and perceived risk was statistically significant low positive correlation with total mean score of nurses' perceived preparedness of knowledge ($r = .35$, $p < .01$) as well as with the domains of preparedness knowledge of tsunami disaster management ($r = .33$, $p < .01$) and preparedness knowledge of tsunami impact ($r = .26$, $p < .05$). Clinical experience was statistically significant low positive correlation with the total mean scores nurses' perceived preparedness of knowledge ($r = .42$, $p < .01$) as well as with sub domains of preparedness knowledge of tsunami disaster management ($r = .48$, $p < .01$) and preparedness knowledge of tsunami impact ($r = .34$, $p < .01$). Training and education was statistically significant low positive correlation with the total mean score of nurses' perceived preparedness of knowledge ($r = .32$, $p < .01$) as well as with sub domains of preparedness knowledge of tsunami disaster management of ($r = .28$, $p < .01$) and preparedness knowledge of tsunami impact ($r = .32$, $p < .01$), meaning that the hypothesis were accepted (Table 21).

Table 21

Correlation Coefficients Between Relating Factors and Nurses' Perceived Preparedness of Knowledge in Caring for Patients Attacked by Tsunami in Indonesia (N=97)

Related Factor	Nurses' Perceived Preparedness of Knowledge		
	1	2	Total
1. Perceived severity and perceived risk	.33**	.26*	.35**
2. Clinical experience	.48**	.34**	.42**
3. Training and education	.28**	.32**	.32**

Note: *p<.05, **p<.01, 1= Disaster management of tsunami, 2= Impact of tsunami

2. The relationship between relating factors and nurses' perceived preparedness of skills

Perceived severity and perceived risk was statistically significant low positive correlation with the total mean score of nurses' perceived preparedness of skills (r = .22, p<.05) as well as with the skills on wound care (r = .22, p<.05), acute respiratory care (r = .20, p<.05), mental health care (r = .20, p<.05). Clinical experience was statistically significant low positive correlation with the total mean score of nurses' perceived preparedness of skills (r= .28, p<.01) as well as with the skills on wound care (r = .33, p< .01), acute respiratory care (r = .22, p< .05), triage (r = .24, p<.05), psychosocial care (r = .20, p<.05), and patients referral (r = .29, p<.01). Training and education was statistically significant low positive correlation with the total mean score of nurses' perceived preparedness of skills (r = .33, p<.01) as well as every domains of skills on wound care (r = .28, p<.01), acute respiratory care (r =27, p<.01), triage (r = .27, p<.01), mental health care (r = .25, p<.05), patients referral (r

=.37, p<.01), and with spiritual care (r = .29, p<.01), meaning that that the hypothesis were accepted (Table 22).

Table 22

Correlation Coefficients Between Relating Factors and Nurses' Perceived Preparedness of Skills in Caring for Patients Attacked by Tsunami in Indonesia (N=97)

Related Factor	Nurses' Perceived Preparedness of Skills							
	1	2	3	4	5	6	7	Total
1. Perceived severity and perceived risk	.22*	.20*	.17	20*	.15	.09	19	.22*
2. Clinical experience	.33**	.22*	.24*	.14	.20*	.29**	.17	.28**
3. Training and education	.28**	.27**	.27**	.25*	.14	.37**	.29**	.33**

Note: *p<.05, **p<.01, 1=Wound care, 2= Acute respiratory care, 3=Triage, 4=Mental health care 5= Psychosocial care, 6= Patients referral, 7= Spiritual care

Moreover, an independent *t*-test was used to compare mean differences of nurses' perceived preparedness of knowledge and skills between attending and none attending group nurses in attending hospital disaster drill. The results showed that there was no significant mean differences of nurses' perceived preparedness of knowledge and skills between attending and none attending group nurses in attending hospital disaster drill (*t* = -.1.55, p= .12), (*t* = .29, p= .76) respectively, meaning that the hypothesis was rejected (Table 23).

Table 23

The Mean Differences of Nurses' Perceived Preparedness of Knowledge and Skills Between Attending and None Attending Group Nurses in Attending Hospital Disaster Drill (N= 97)

Variables	Attending hospital disaster drill					
	Attending group (N= 55)		None attending group (N=42)		*t* value	p value
	M	SD	M	SD		
1. Preparedness of knowledge	98.05	20.66	91.38	21.25	-1.55	.12
2. Preparedness of skills	85.33	18.31	86.45	18.65	.29	.76

Furthermore, additional analysis was applied by using an independent *t*-test to compare mean differences of nurses' perceived preparedness of knowledge and skills between experience and none experience group nurses in caring for patients attacked by tsunami. The results showed that there was a significant mean differences of nurses' perceived preparedness of knowledge on tsunami impact (*t*= - 2.79, p=.01), and nurses' perceived preparedness of skills on triage (*t*= - 2.32, p=.02), patient referral (*t*= - 3.54, p=.00) and spiritual care (*t*= - 2.37, p=.02) between experience and none experience group nurses in caring for patients attacked by tsunami (Table 24).

Table 24

The Mean Differences of Nurses' Perceived Preparedness of Knowledge and Skills Between Experience and None Experience Group Nurses in Caring for Patients Attacked by Tsunami (N= 97)

Variables	Experience in caring for tsunami patient					
	Experience group (N=84)		None experience group (N=13)		*t* value	p value
	M	SD	M	SD		
Preparedness of knowledge	97.19	20.47	82.08	20.45	- 2.46	.01*
1. Tsunami disaster management	70.56	17.87	61.23	14.93	1.78	.07
2. Tsunami impact	26.63	5.11	20.85	7.17	- 2.79	01*
Preparedness of skill	87.61	16.12	74.23	27.09	- 2.50	.01*
1. Wound care	19.10	3.70	16.15	5.80	- 1.77	.09
2. Acute respiratory care	15.44	3.55	13.77	5.31	- 1.10	.29
3. Triage	11.08	3.00	8.92	3.79	- 2.32	.02*
4. Mental health care	12.62	3.26	11.54	4.89	- .77	.45
5. Psychosocial care	10.43	2.59	9.31	4.28	- .91	.37
6. Patient referral	8.35	2.18	6.77	2.48	- 3.54	.00**
7. Spiritual care	10.60	2.67	7.77	2.65	- 2.37	.02*

Note: *p<.05, **p<.01

Discussion

This study aimed to identify the level of nurses' perceived preparedness of knowledge and skills and to investigate the relationship between related factors and nurses' perceived preparedness of knowledge and skills in caring for patients attacked by tsunami in Banda Aceh, Indonesia. The subjects were 97 staff

nurses of Zainoel Abidin Hospital in Banda Aceh, Indonesia. One hundred percent response rate of the subjects was found in this study. This was probably due to the researcher distributing the questionnaires to the subjects through their head nurses of each selected ward for confidentiality reasons. All the filled questionnaires were returned to the researcher through their head nurse, which could be a reason for the high response rate of this study. The findings of this study are discussed as follows: the level of nurses' perceived preparedness of knowledge, the level of nurses' perceived preparedness of skills, and the relationship between the relating factors namely: perceived severity and perceived risk, clinical experience, training and education, attending hospital disaster drill and nurses' perceived preparedness of knowledge and skills.

The level of nurses' perceived preparedness of knowledge

The findings showed that the nurses' perceived preparedness of knowledge in caring for patients attacked by tsunami was at a moderate high level (M= 1.87, SD = 0.67). The nurses' perceived preparedness of knowledge consisted of two domains which were at a moderate high level, including preparedness of knowledge on tsunami disaster management and preparedness of knowledge on tsunami impact (Table 2). The findings indicated that the nurses' perceived preparedness of knowledge in caring for patients attacked by tsunami was insufficient, which can be explained by several reasons that might have contributed to the findings of this study. The moderate high level of nurses' perceived preparedness of knowledge can be explained with the educational background of the subjects which showed that two-thirds (73.2%) of the subjects had an educational background at the

diploma level and 26.8 percent were bachelor level. The diploma level is the lower level in the nursing educational system with limited knowledge and skills competency compared to other levels (Carllisle, Luker, Davies, Stiwell, & Wilson, 1999). Currently in Indonesia, the content of disaster nursing is not yet integrated in the nursing curricula either in the diploma or bachelor level (Muharso, 2006). As a result, diploma nurse graduates may have limited knowledge and skills regarding disaster nursing, which may have contributed to their ability to improve such knowledge and skill needed. Similarly, disaster nursing content is relatively new in the nursing curricula in the western country (Duong, 2009; Jennings-Sanders, Frisch, & Wing, 2005). Disaster awareness has been raised in the diploma through bachelor level. Some competencies related to mass casualties have been developed but it is not well documented on how and to what extent nursing faculties are teaching this content in the nursing curricula, resulting in minor competencies of nursing graduates related to disaster preparedness.

The nurses' experience in working as a nurse and their clinical experience in caring for tsunami patients might have contributed to the moderate high level of nurses' perceived preparedness of knowledge. The finding showed that the great majority of the nurses (86.6%) were involved in caring for tsunami patients, with the duration of involvement for three to six months after the tsunami struck, which can be stated as the late emergency phase of involvement. The nurses might have limited experience in caring for tsunami victims and seem to be not enough for nurses to improve their knowledge related to caring for the victims. This is consistent with Chan's (2006) study who figured out that there are significant differences of knowledge, skill and attitudes between the more working experienced nurses and the

less working experienced nurses which might contribute to the nurses' perceived preparedness of knowledge and skill.

The workload situation of the nurses in daily practice might have also contributed to knowledge preparedness. This study was conducted in a main hospital in Banda Aceh, Indonesia. This hospital has approximately 500 beds with 285 nurses taking care of either the hospitalized or out patients. The ratio between nurses and patients is 1: 6 with the bed occupancy rate (BOR) over 100 percent, meaning that the nurses have over workload. With these conditions, the nurses tend to have limited time to improve the specific knowledge in caring for disaster victims. Relevantly, a survey from the Indonesian Nurses Association (INA) has pointed out that approximately 50.9 percent of nurses reported they had over workload (Rachmawati, 2000). The study of Rofiyah (2006) found that some problems the nurses encountered were related to over workload including feeling bored and lazy (20%), and tiredness (35%). Thus, the nurses might have been stressed with the workload situation that contributed to their lesser effort to prepare some competencies regarding specific purposes, such as preparedness of knowledge in caring for tsunami patients. The study from Lee (2003) supported this idea. This study revealed that the over workload situation of nurses makes the nurses have to be as organized as possible to perform the important duty of nursing routine practice rather than put much attention for other kinds of supported activities such as preparedness of their competencies for disaster preparedness of this study.

The hospital policy regarding disaster preparedness might have influenced the nurses' perceived preparedness of knowledge. It is important for every hospital to set up a disaster preparedness policy which covers the written plan of

disaster preparedness, committees, staff capabilities and allocating the financial support for preparedness activities (Jagim, 2007). Currently, the Zainoel Abidin hospital is the provincial hospital with governmental support. In relation to the establishment of the disaster preparedness, the nurses committee of this hospital tried to set up the hospital disaster committee consisting of the committee's structure with job description, planning, and budgeting resources for disaster preparedness activities. However this plan has not been approved yet by the hospital authority and the provincial government due to prioritization of financial allocations, limitation of hospital human resources in this area, and insufficiency of a planning approach, resulting in a lack of ability of nurses' committee to take into consideration the disaster preparedness effort and evaluate their nurses' preparedness (Hartati, hospital head nurses, personal communication, October 12, 2009). This is supported by the finding of this study in which most (57.7%) of the nurses attended one to four types of trainings related to disaster, particularly in the first year after the tsunami struck, implying that the nurses might have considered disaster preparedness. However, an undeveloped disaster policy in this hospital might have contributed to the limited evaluation of nurses' preparedness, resulting in a moderate high level of both their knowledge and skills in caring for tsunami victims.

Relevantly, the study from Considine and Mitchell (2008) revealed that it is important for hospitals set up the policy of preparedness which would provide instruction and training in effective use and recommended regular refreshment of training in order to prepare nurses' knowledge and skills. Moreover, the author of this study also pointed out that some barriers for nurses concerning preparedness includes: workload, lack of dedication for education time, and having to obtain other priority of

hospital regulation. Hospital planning for disaster preparedness includes the educational preparation for staff to have training for improving the knowledge and skills related to disaster preparedness (Jagim, 2007).

The highest score of knowledge preparedness of tsunami disaster management was knowledge on wound care (M=2.01, SD= 0.67) and acute respiratory care (M= 2.01, SD= 0.69) (Table 3). It might be because the nurses have regularly performed wound care in their daily practice including assessment, cleansing, and dressing of wound, which might lead the nurses to be more knowledgeable on wound care. It can be seen that all items of preparedness on wound care were at a moderate high level of preparedness. Moreover, fifty percent of the nurses attended Basic Life Support training that taught them to be able to maintain adequate ventilation with oxygenation support and fluid replacement for shock prevention (Dean, 2005). The nurses who had experience in attending this kind of training were able to perform qualified respiratory care in daily nursing practice, resulting in high scores of perceived preparedness of knowledge on respiratory care.

The lowest score of knowledge preparedness of tsunami disaster management was patient referral (M=1.84, SD= 0.77) and mental health care (M=1.77, SD= 0.75). It might be because the nurses have limitations in transferring activities due to this is a main referral hospital system which received many patients from others regency hospitals in Aceh province, and only a few nurses from the intensive care unit or emergency department have commonly been selected for patients transferring to other referral hospitals in other provinces or islands in Indonesia. The study from Johnson (1999) pointed that the nurses who have experience in inter-hospital transferring gained more recognition of the transferring

management process, while the study from Johnson, Kjellberg, and Lagestrom (2006) found that the nurses had learned a better technique of transferring that reflected into there was a correlation between experience nurses in handling patients with transferring technique performance. The low score of mental health care could be explained because the nurses have limitations to perform some competencies related to mental care such as assessing patients, enhancing the nurse-patient relationship, and using themselves as the healing environment in providing such care for the patients (Yang & Mao, 2007).

The level of nurses' preparedness of skills

The total mean score of nurses' preparedness of skills in caring for patients attacked by tsunami was 2.11 (SD = 0.66) categorized as a moderate high level. It can be concluded that the nurses' perceived preparedness of skills in caring for patients attacked by tsunami was still insufficient in facing the possibility of the next disaster in the future. Similarly, with knowledge, the diploma nurses with limited competency regarding disaster might have limited improvement and preparedness of skills, which is needed in caring for disaster victims (Clark et al., as cited in Carllisle et al., 1999). This is consistent with Charters et al. (2005) study about nurses' educational background relevant to the competencies. The higher degree of nurses is active in education and development of their nursing services for patient care as well as the preparation of the competencies. In addition, the current situation of nurses in Indonesia revealed that the majority of nurses have limited education and preparation of the role, and there is no central registration of nurses, which means that it is

impossible to regulate either the profession or the standards of care (Hennessy, Hicks, Hilan, & Kawonal, 2006).

The clinical experience of nurses in caring for patients attacked by tsunami might have also contributed to the moderate high level of nurses' skill preparedness. The tsunami caused extensive damage to the hospital and left the surviving medical personnel and clinical network in disarray. The short duration of nurses' involvement after the tsunami can be explained since only a few nurses returned to work immediately after the tsunami struck, and many of them who were not injured tended to their immediate family for fear of further loss and injury of family members (Garfield & Hamid, 2006). It can be concluded that the nurses have limited experience in direct contribution in caring for tsunami patients due to their delayed return to their work. Moreover, many new staff were recruited after the tsunami in order to maintain hospital services, which can be seen in the 24.7 percent of nurses who have been working for less than 5 years, who also might have insufficient experience in caring for tsunami patients. The study from Aari, Castren, Leino-Kilpi, and Souminen (2004) figured out that the new staff nurses were found to be stressed in their work place, particularly in critical situations, and showed difficulties in performing some specific skills as well the preparation of such skills.

Insufficiency in continuously attending training and education related to disaster might contribute to the moderate high of nurses' perceived preparedness of skills. As a main hospital in Banda Aceh province, a lot of trainings and seminars related to disaster were offered for hospital staff by many non government organizations (NGO), especially during the first year after being hit by the tsunami. After the tsunami struck, fifteen donors pooled their grant assistance into a US $ 525

million fund for Aceh by the European Commission, The World Bank, The Asian Development Bank, and the Aceh Bureau of Rehabilitation and Reconstruction (ABRR) that offered assistance in all levels of services, including hospital services (ABRR, 2005). The training and education were provided mainly in the first year after the tsunami in one single time in order to improve baseline knowledge and skills of hospital staff, particularly nurses without continuity of training and education attendance. In addition, only 7.2 percent of nurses who worked in acute settings including ICU, OR, and the Emergency department attended two times of BLS and one time of ACLS training, compared with 4.1 percent of nurses attending one time of such training, considering the nurses have deteriorated their skills related to emergency competency, which might have contributed to their feeling of the limitation of skills, resulting in a moderate high level of skill preparedness. It is consistent with the study of Smith, Gilcreast, and Pierce (2008) and Castle, Garton, and Kenward (2007) study who mentioned that the nurses should receive certification for BLS and ACLS training every two years to prevent a deterioration of skills in responding to cardiac arrest problems and being successful in resuscitation for emergency situations.

The perception of nurses relating to the tsunami severity and risk might have influenced the nurses' perceived preparedness of skills. In this study, the nurses have high perception of tsunami severity and tsunami risk. The mean score of perceived severity and perceived risk was 2.44 (SD= 0.64), considered high perception of severity and risk of tsunami. It might be because the nurses' realized that a tsunami is a kind of disaster which reveals a huge effect for the victims, and they are also aware that Indonesia is an archipelago country which is high risk and

prone to natural disaster. It seems that the nurses' perceived severity and risk did not motivate them to be more prepared. The diploma level of nurses with insufficient knowledge and skill related to disaster preparedness, and the limitation of previous experience in caring for tsunami patients in early emergency response might have contributed to their ability to be more prepared for a tsunami response. The perception of severity and risk of disaster will lead the nurses to seek out the relevant information and they will participate in preparedness activity (Barnett et al., 2005). However, a study of O' Sullivan et al. (2008) found that a higher level of nurses' knowledge typically is associated with a lower level of perceived risk and severity due to their feeling of being adequately equipped and trained related to disaster preparedness. In the present study the diploma level of nurses with insufficient knowledge and the limited previous experience in caring for tsunami patients might contribute to a high perception of severity and risk. However, it could not stimulate them to be more prepared, probably due to a limitation of information of searching ability. There were only a small numbers of nurses (15-20%) that sometimes read books and searched information from the Internet related to disaster for preparedness.

Finally, attending a hospital disaster drill might have contributed to the moderate high level of nurses' perceived preparedness of skills. The study showed that since five years after the tsunami struck, only one hospital drill was conducted with 56.7 percent of the nurses being involved. The hospital conducted the drill following the governmental drill in testing the public mitigation plan by using an escape tower that had been built for preparedness. It seems that the hospital conducted the drill without enough preparation due to a lack of planning prior to the drill. As a result, the nurses might have found a limitation in evaluating their capabilities related

to disaster response, which might have contributed to the ability to maintain the preparedness resulting in a moderate high level of preparedness. Hospital disaster drill is a primary component that has been used to train staff capabilities, including nurses for disaster response which requires preparation prior to the drill, including having a written disaster plan, adequate supplies, equipment, volunteers, space arrangements for triage, decontamination, treatment zone with supplies of stockpiles, as well as the appropriate medical and non medical staff (Charters et al., 2005; French et al., 2002; Kaji & Lewis, 2008; Linkous & Carter, 2008). The hospital should conduct the drill two times per year within the table discussion drill and simulation drill for assuring skill preparation of the hospital staff, including nurses (Powers, 2007).

This is relevant with study of Cyganik (2003) who reported that the lesson learned from the Arlington Center Hospital, Virginia disaster drill indicated that a review of the hospital drill plan is important to improve staff knowledge and skill for disaster response. The plan covered several aspects, including a disaster plan with established roles and responsibilities for hospital staff, creating a disaster chart such as a color tag triage, an emergency department chart for emergency nurses who received casualties for the first time, and identifying staging zones of assessment, triage, decontamination and treatment. Moreover, Kirchebaum, Keene, O'Neil, and Westfal (2005) study reported that the hospital of St. Vincent Hospital, Manhattan has performed a drill annually since the September 11, 2001 attack to enhance disaster preparedness. Based on the drill experience, it was illustrated that prior to the drill, an implementation of the incident command system was important, consisting of several positions, including command officer, information, logistic, data, and medical supply. Furthermore, the sufficiency and standardization of drill planning contributed to the

ability of preparing the staff's knowledge and skills related to preparedness (Claudius et al., 2008).

The highest score of nurses' perceived preparedness of skill was for wound care (M= 2.33, SD=0.66). It might be because the nurses have direct experience in caring for tsunami wounds which is considered a complicated wound, and that needed to be more prepared in daily routine practice such as assessment of wound, and wound cleansing prior to wound closure. It can be seen that the highest score of nurses' perceived preparedness of skill on wound care was "cleansing wound with normal saline" (M= 2.42, SD= 0.59). The tsunami disaster affected patients with a wide range of injuries such as fractures, and multiple flap lacerations of various sizes and regions over the body (Landesman & Venema, 2007; Garfield & Hamid, 2006; Maegele et al., 2005). The varieties of wounds were enormous, which were classified as wound with skin loss or multiple lacerated wound that became severely contaminated and needed time for recovery (Prasaritha, Tungsiripat, &Warachit, 2008). The wound problem was the highest rate of cases during the tsunami as well as fractures, which were difficult to treat due to the old fractures and severely contaminated wounds and needing specific treatment (Fan, 2006; Redwood-Campbell & Riddez, 2006). Moreover, in the tsunami situation, the nurses carried out a variety of tasks in caring for tsunami patients, and they reported working well outside of their normal scope, working in a challenging situation with caring patients that were rarely seen in daily practice (Arbon et al., 2006). It can be concluded that the direct experience in caring for tsunami wounds might have influenced the nurses to maintain their skills in providing wound care in daily practice resulting in a high level of their perceived preparedness.

The lowest score of nurses' perceived preparedness of skills was for spiritual care (M= 2.11, SD=0.66). It was probably due to all the participants being Muslim who believed that faith in Islam consisting of prayer, Zikr to remember God, and recitation of Al-Qur'an were needed to perform in daily life, as well as the patients did when they were hospitalized (Syed, 2003). The nurses might neglect the religious practice as supported by Taylor (as cited in Yang & Mao, 2007) that the religious beliefs are usually neglected by academic in relation to the provision of treatment. The study of Yang and Mao (2007) also supported that spiritual care is the field of nursing which is still in its infancy and requires the nurses to more fully understand their spirituality and awareness of their own beliefs and values which might contribute to a limitation about spiritual aspects. Therefore, the nurses found a limitation to provide spiritual care due to the nurses did not always know their patients well, and about patients' and families' spiritual needs (Kociszewski, 2004). Moreover, the additional analysis found that there was a mean difference of nurses' preparedness of skills on spiritual care between experience nurses and none experience nurses in caring for tsunami patients (t= - 2.37, p=.02). This could be explained that the experience nurses could be more prepared in spiritual care due to their realization that the spiritual care is important to offer for tsunami victims in helping the victims stay with their beliefs and faith, and practice their religious activities to promote harmony through health of mind, which is important in mental recovery after being attacked by a disaster.

The relationship between relating factors and nurses' perceived preparedness of knowledge and skills

The findings showed that there were statistically significant low positive correlations between perceived severity and perceived risk, and both nurses' perceived preparedness of knowledge ($r = .35$, $p<.01$) and nurses' perceived preparedness of skills ($r = .22$, $p<.05$). Knowledge is defined as a recall of recognition of learned material which comes through processing a combination of understanding the facts and obtaining several ways of understanding, such as education, experience and so forth. The knowledge influences the skill as the combination of action and reaction that the individual performs according their previous understanding of the facts and as the function of both knowledge and strategies to apply such knowledge. Therefore, the knowledge and skills come together and intersect each aspect which could be explained as one combination of competency (Kak et al., 2001).

According to the results of the study, the positive relationship between perceived severity and perceived risk and nurses' perceived preparedness of knowledge can be explained due to the nurses might have a high perception of tsunami severity, including loss of lives, or facing victims with huge physical or psychological problems, and the risk perception of a high mortality rate from the tsunami due to unprepared knowledge and skills. The nurses who accepted the perception of severity and risk of disaster may motivate them to be more prepared and encourage them to engage in such preparedness activity (Rebmann, 2006). Previous study found that severity and risk perception was correlated with preparedness effort either in knowledge or skills. The perception of severity and risk has significant implications to motivate the nurses to have a sense of initiative of preparedness, while

valuing them to seek more information regarding preparedness effort (Barnett et al., 2005). It seems that the nurses tend to be more active in improving their knowledge because tsunami severity and risk perception might motivate them to be prepared and start to find the information about tsunamis which can be seen from nurses' preparedness methods such as sometimes reading books or other material related to disaster (71.1%) or search from the Internet (46.6%).

Similarly, with the knowledge, the perception influences the nurses to look for more relevant training and education related to disaster preparedness, in order to improve their skill ability in caring for disaster victims (Shadel et al., 2004). The study found that since five years after the tsunami struck, more than half of the nurses (57.7%) attended one to four kinds of emergency training which might be motivation from their perception of high tsunami risk. The study from Balicer, Omer, Barnett and Everly-Jr (2006) illustrated that the risk perception of public health nurses about the influenza pandemic led them to attend the additional training activities, resulting in increased nurses' confidence in personal safety that was related to their existing knowledge and skills, and made them willing to report for duty on future disaster outbreaks. Moreover, Hsu, Chen, Chang and Chang (2006) study of the nurses' experience in managing the home influenza pandemic quarantine measures revealed that the risk perception of nurses has relevance with prompt update of skills which allowed them to be more confident to be involved in such a disaster response.

The clinical experience was significant low positive correlations with nurses' perceived preparedness of knowledge ($r = .42$, $p<.01$) and with nurses' perceived preparedness of skills ($r =.28$, $p<.01$). In this study, a great majority (86.6%) of nurses had experience in caring for tsunami patients, with the involvement

of nurses in caring for patients attacked by tsunami around three to six months after tsunami struck (48.5%). One of the main problems of tsunami victims was tsunami wound care that required time for recovery (Prasartritha et al., 2008). It can be seen that the highest score of clinical experience related to caring for tsunami victims was for wound care (2.39, SD= 0.87). Wound care is a common role of nurses in performing nursing routine practices which might increase the knowledge of nurses regarding this competency. The experiences nurses of such competency have leads them to be more knowledgeable on such experiences which reflects the readiness of preparedness (Suserud & Haljamie, 1997). The study from Vaughan (as cited in Tippet, 2004) found that the experience is a way of learning by nurses. The previous experiences correlate with knowledge improvement due to the more repeated experiences, and the more nurses have an understanding of such knowledge.

The previous clinical experience related to caring for tsunami patients might lead the nurses to be more prepared in their skills. In this study, two-thirds (73.2%) of the nurses have worked for at least ten years. The mean score of nurses' clinical experience related to caring for tsunami patients was (M= 2.03, SD= 0.88), considered often performed experience. Moreover, according to the proportion samples of the study, revealed that 51.5% of the study's subjects worked in an acute setting including the emergency department, operating room, and intensive care unit areas that commonly performed the specific skills related to critical situations. Previous study illustrated that the clinical experience of nurses correlated with their preparedness of skills. The study from Barnes (2006) about the nurses had prepared them with skills to be part of the mobile medical team nurses due to their experience in caring for the patients from mass casualties. The nurses of this study stated that

they were able to perform such skills in caring for casualties although only 50 percent of them had completed Advance Life Support training, which was needed for ambulance nurses. The study from Fero et al. (2008) also figured out that the nurses who had more experience in working tended to have high performance of skill. This study also pointed out that the years of working experience had a correlation with the expectation of performance. The less experienced nurses had a high rate of not meeting the performance expectation than the most experienced nurses.

Moreover, the study from Nasrabadi, Naji, Mirzabeigi, and Dadbhaks (2007) found that the previous experience stimulated nurses to maintain their specific knowledge and skills. The nurses who prepared well were found to work effectively in disaster responses in the future. Thus, experienced nurses who are adequately prepared for a disaster will gain more confidence and knowledge, while inexperienced nurses may exhibit stress and fear for disaster response, and further inhibit their preparedness for future disaster (Chapman & Arbon, 2008). Furthermore, the additional analysis of this study which investigate a significant mean differences of nurses' perceived preparedness of skills between experience and none experience group nurses in caring for patients attacked by tsunami found that there were significant mean differences among these two groups of nurses. The nurses who had experience significantly perceived preparedness on triage (t= - 2.32, p=.02), patient referral (t= - 3.54, p=.00), and spiritual care (t= - 2.37, p=.02), which the nurses considered to be more prepared due to their limitation of the experience in performing such skills in early phase of a tsunami response.

Training and education was significant low positive correlations with nurses' perceived preparedness of knowledge (r = .32, p<.01) and with nurses'

perceived preparedness of skills ($r = .33$, $p<.01$). Nurses' preparedness related to disaster or casualty events is the state of being prepared for the nurses including knowledge and skills to prepare for, and respond to a disaster response in the future (Reineck, 2004). In this study, more than half (57.7%) of nurses attended one to four types of trainings related to disaster and only 4.1% of nurses had attended all types of trainings provided by hospitals particularly in the first year after the tsunami without continuity of the programs (Table 1). In the five years after the tsunami struck, it seems that there were no variations in types of trainings that were provided by the hospital in order to improve their staff competencies. Training and education is the appropriate way to educate nurses to be more knowledgeable and skillful (Wetta-hall, 2006). Previous study mentioned the relationship between training and education with nurses' preparedness of knowledge. The study from Hammond, Saba, Simes, and Cross (2000) showed retention of knowledge and skill after continuing the training on Advanced Life Support (ALS) for nurses who had 18 months previous ALS training. The author of this study concluded that the performance of knowledge and skill will deteriorate with elapsed time; hence, continuous training is significantly important to produce good retesting scores of knowledge and skill. The study from Gerdtz and Bucknall (as cited in McBrien, 2009) figured out the importance of specific knowledge in performing such skills. In this study, the author stated that specific competencies such as triage require the understanding of the triage process and nurses should be well equipped with this kind of knowledge. Rashotte and Thomas study (as cited in Robinson, Flynn, Canavan, Cerreta, & Krivak, 2006) pointed out that an ongoing education program is essential for the promotion and expansion of nurses' knowledge and the transition from novice to expert nurses.

Moreover, the findings of the study also showed that the training index was 3.0 meaning that the nurses attended an average of three types of training related to disaster. According to specific emergency training including BLS, BTLS, BCLS, and ACLS, it was revealed that the nurses attended such training for 40%, 11.3%, 23.6%, and 11.3% respectively. It can be concluded that even though the nurses mostly attended specific emergency training, it seems that the nurses have limitation in continuously to attend in training, resulting in correlation with nurses' perceived preparedness of skills was to be found. Attending training and education is important for refreshment of the specific skills for caring for disaster victims, with continuity of the program being important to update nurses' knowledge and skills, particularly for disaster preparedness (Wang et al., 2008).

Previous study mentioned the importance of training for skill preparedness. Scott et al. (2006) study about skill improvement during the terrorism training in disaster response for 220 hospital staff, which was comprised of emergency medical technicians, physicians, nurses and paramedics, revealed that there was a significantly increased mean score of skill between two different rotations of assessment, either in team skill or individual skill. By taking training and education, the nurses maintain the preparedness effort which results in nurses' mastery of specific skill. Duong's study (2009) also figured out that the limited opportunities of nurses in attending training and education diminished the nurses' confidence of their skill, which might have influenced them to be more prepared. Fung, Lai, and Loke (2008) study illustrated that nursing support during disasters expanded a nurses' role from primary care to the ability to react to a disaster in terms of preparedness in preparing nurses adequately through training and education as the

essential in developing disaster nursing. Furthermore, several kinds of basic and advanced training related to a disaster being suggested for disaster preparedness including triage, basic and advanced life support, basic and advanced trauma support, and mental health care required the nurses to fully attend and to have more understanding about their roles in such situations (Chapman & Arbon, 2008; Fung, Loke, & Lai, 2008). The study from Frost, Brueggen and Mangan (1997) added that the lack of nurses' skills preparation had relevance with insufficiency in taking training and education. The author of that study also concludes that the nurses have to maintain attending relevant training in order to expend their skills.

Interesting findings of this study found that there was no significant difference of nurses' perceived preparedness of knowledge and nurses' perceived preparedness of skills between attending and none attending group nurses with the scores were (t = -.1.55, p= .12) and (t = .29, p= .76) respectively. Hospital disaster drill is the appropriate way to train employees and to test hospital disaster response capabilities for such disasters (Kaji & Lewis, 2008). However, this study illustrated that the hospital conducted only one disaster drill without enough preparation, such as a written disaster plan, hospital incident command system, and space arrangements for caring for the victims, which might have influenced to no relationship with nurses' perceived preparedness of either the knowledge or with the skills. French, Sole, & Byers (2002) stated that regularly applying hospital disaster drills at least yearly or twice a year provides the realistic approach to a disaster situation and the optimum way to test preparedness among hospital staff. The study from Doung (2009) figured out 56 percent of South Australian nurses attended the drill exercise every two years or less, with the form of drill such as desktop exercise or real time exercise for

improving their preparedness of knowledge and skill. The study from Hsu et al. (2004) mentioned that hospital disaster drills were effective in illustrating a better understanding of proper knowledge and skill, needed by hospital staff, including nurses in disaster preparedness. Moreover, insufficient preparation prior to the drill had contributed to a health providers' ability to maintain their knowledge and skill regarding a disaster response (Claudius et al., 2008).

In summary, this study's findings showed that various factors, including perceived severity and perceived risk, clinical experience, and training and education were found to have correlation with both of nurses' perceived preparedness of knowledge and skills. However, there were no significant mean differences of nurses' perceived preparedness of knowledge and nurses' perceived preparedness of skills between attending and none attending group nurses in attending hospital disaster drill.

CHAPTER 5

CONCLUSSIONS AND RECOMMENDATIONS

This descriptive correlational study was proposed to identify the level of nurses' perceived preparedness of knowledge and skill, related factors to nurses' perceived preparedness of knowledge and skills, and to investigate the relationship between nurses' perceived preparedness of knowledge and skills and its related factors in caring for patients attacked by tsunami in Indonesia. This study was conducted in the Zainoel Abidin Hospital as the main referral center and educational hospital in Banda Aceh, Indonesia. Ninety seven staff nurses were recruited to participate in this study. The subjects were requested to complete a set questionnaire which consisted of five main parts, namely: 1) Demographic Data and Working Information Questionnaire (DDWQ), 2) Nurses' Clinical Experience Questionnaire (NCEQ), 3) Nurses' Perceived Preparedness of Knowledge Questionnaire (NPPKQ), 4) Tsunami Care Questionnaire (TCQ), and 5) Perceived Severity and Perceived Risk Questionnaire (PSPRQ). Two instruments were developed by the researcher and her colleagues for NCEQ (Husna & Hermawati, 2009a) and TCQ (Husna & Hermawati, 2009b), while the rest of the questionnaires were developed by the researcher for this study. These instruments were evaluated for their content validity by three experts from the Faculty of Nursing, Prince of Songkla University, Thailand. The statistical test of Cronbach's Alpha was used to analyze the stability of the instruments Nurses' Clinical Experience Questionnaire (NECQ), Nurses' Perceived Preparedness of Knowledge Questionnaire (NPPKQ), Tsunami Care Questionnaire (TCQ), and Perceived Severity and Perceived Risk Questionnaire (PSPRQ), and the result was .96

for NECQ, .98 for NPPKQ and TCQ, and .94 for PSPRQ. With regard to testing the stability of training index, test-retest reliability was obtained by using Spearman Rho where the score was ρ=.98 ($p<.01$).

Summary of the study findings

In this study, ninety seven hospital staff nurses were recruited as the eligible subjects. The mean age of the subjects was 31 years old and nearly half of them (48.5%) were less than 30 years old. The majority of the subjects were female (69.1%), all of the subjects were Muslim and Acehnese with the great majority of them (77.3%) married. The level of education was at the diploma level for three-fourths of them (73.2%). Nearly one-third of the subjects (24.7 %) were working less than five years as staff nurses. With regards to the nurses' experience in caring for tsunami patients, the great majority of the subjects (86.6 %) had experience in caring for tsunami patients, with nearly half of them (48.5%) having duration of involvement in caring for tsunami patients for around 3-6 months after the tsunami struck. By the training and education index, 57.7 % had index 1 to 4. More than half of the subjects (56.7 %) had attended a hospital disaster drill. With regards to nurses' method of preparedness, 71.1% of the subjects reported that they sometimes read books or other reading materials about disasters, and 46.6% said they sometimes search the Internet.

The total mean score of nurses' perceived preparedness of knowledge was at a moderate high level (M=1.87, SD=0.67). Both dimensions of the nurses' perceived preparedness of knowledge on disaster management of tsunami (M= 1.90, SD = 0.71) and tsunami impact (M = 1.84, SD = 0.64) were classified as a moderate high level. The total mean score of nurses' perceived preparedness of skills was at a

moderate high level (M= 2.11, SD = 0.66). One domain of nurses' perceived preparedness of skill which had a high level of preparedness was wound care (M = 2.33, SD = 0.66), while six other domains including acute respiratory care (M = 2.15, SD = 0.66), triage (M = 2.15, SD = 0.6), mental health care (M = 2.07, SD = 0.67), psychosocial care (M = 2.05, SD = 0.64), patients referral (M = 2.04, SD = 0.64), and spiritual care (M = 2.03, SD = 0.63) were at a moderate high level of preparedness.

The relationship between relating factors namely: perceived severity and perceived risk, clinical experience, and training and education were low significantly positively correlated with nurses' perceived preparedness of knowledge (r = .35, p<.01), (r = .42, p< .01), (r = .42, p< .01) respectively. However, there were no significant mean differences of nurses' perceived preparedness of knowledge between attending and none attending group nurses in attending hospital disaster drill (t = -1.55, p= .12). The relationship between relating factors namely: perceived severity and perceived risk, clinical experience, and training and education were low significantly positively correlated with nurses' perceived preparedness of skills(r = .22, p<.05), (r = .28, p<.01), (r = .33, p<.01) respectively. Moreover, there were no significant mean differences of nurses' perceived preparedness of skills between attending and none attending group nurses in attending hospital disaster drill (t = .29, p= .76).

Limitations of the study

The study was conducted among the nurses with only measured nurses' perception of preparedness of knowledge and skills regarding caring for patients attacked by tsunami without measuring their real preparedness effort related to such

purpose, which cannot be generalized to other hospital staff nurses related to their preparedness in caring for patients attacked by tsunami.

Recommendation

Nursing Practice

The finding of this study that the nurses had moderate high level of knowledge and skills perceived preparedness is probably due to the fact that the nurses had less continuity in attending training and education related to disaster, and limited evaluation of nurses' competencies related to disaster preparedness by hospital nurses' authority. Providing regular training and education programs is important for refreshing nurses' knowledge and ensuring nurses' skill for preparedness. The establishment of a hospital nurses' disaster committee needs to be considered for evaluating nurses' competencies related to disaster preparedness and designing future plan strategies for preparedness. It is also crucial for the hospital to set up policy regarding disaster preparedness, which covers a disaster preparedness plan, committee personnel, and budgeting for preparedness activities, including training and education refreshment and conducting regular hospital disaster drills as the testing way for hospital staff for disaster response.

Nursing education

The finding of the study could be a stimulating point to start the integration of disaster preparedness in nursing curricula in order to increase the awareness of disaster preparedness among nurses' educators and students related to disaster preparedness.

Nursing research

Further study is still needed related to nurses' preparedness of knowledge and skills, including the development of practical guidelines related to disaster preparedness. Further research which investigates the real situation of nurses' preparedness of this hospital has to be considered in order to assess this hospital's nurses' readiness for future disaster.

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APPENDICES

APPENDIX A

Informed Consent

Dear Colleagues,

My name is Dewi Hermawati. I am a lecturer at 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 research regarding "Nurses' Perceived Preparedness of Knowledge and Skills in Caring for Patients Attacked by tsunami in Banda Aceh Indonesia and Its Related Factors." Information from this study will be valuable for development of nursing profession particularly in area of disaster nursing. If you agree to participate voluntarily, you would be asked to complete the questionnaires, which takes around 55 minutes. Your personal identity and all answers will be kept confidentially and all information will only be used for purpose of this research project. Your participation is voluntary. You may withdraw from this study any time without negative consequences.

Signature of researcher

……

Dewi Hermawati

Date

……

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

Nursing Science Program

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Signature of researcher

……

Dewi Hermawati

APPENDIX B

Demographic Data and Working Information Questionnaire (DDWIQ)

Code:……

Date:…….

Please answer by marking (v) in the space available or filling in the blank space that is appropriate for you.

A. Demographic Data

1. Age …….. years
2. Gender : 1 ( ) Male 2 ( ) Female
3. Marital Status : 1 ( ) Single 2 ( ) Married
   3 ( ) Widowed 4 ( ) Divorced
4. Religion: 1 ( ) Islam 2 ( ) others, identify……..
5. Race: 1 ( ) Acehnese 2 ( ) others, identify…….

B. Working Information

6. Nursing educational background :

   1 ( ) Diploma level

   2 ( ) Bachelor level

   3 ( ) Master level

7. Training and education:

   7.1 Number of trainings and times of attending training and education related to disaster within past 5 years after tsunami:

   1 ( ) None
   2 ( ) Basic Life Support (BLS) ____ times
   3 ( ) Basic Trauma Life Support (BTLS) ____ times
   4 ( ) Basic Cardiac Life Support (BCLS) ____ times
   5 ( ) Advanced Cardiac Life Support (ACLS) ____ times

6 ( ) Disaster management ____ times

7 ( ) Infection control ____ times

8 ( ) Mental health care ____ times

7.2 Methods of nurses' preparedness:

7.2.1 Reading books or other related reading materials about disaster

0 ( ) Never 1( ) Sometimes 2 ( ) Often 3( ) Always

7.2.2 Searching from internet

0 ( ) Never 1( ) Sometimes 2 ( ) Often 3 ( ) Always

8. Attending hospital disaster drill:

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

8.2 Experience in attending hospital disaster drill

1 ( ) No 2 ( ) Yes, ……..time (s)

9. Working experience:

9.1 Working experience as a nurse: …… years/months

9.2 Have experience in caring for patients attacked by tsunami

1( ) No 2 ( ) Yes

9.3 If yes, duration of involvement in caring for patients attacked by tsunami: …….. months/days.

APPENDIX C

Nurses' Clinical Experience Questionnaire (NCEQ)

This questionnaire is developed to measure nurses' experience in performing clinical nursing skills related to caring for patients attacked by tsunami. Please answer by putting mark (v) in the appropriate column. There are 4 (four) possible option that indicate the experience of nurses in performing clinical nursing skills to caring for tsunami victims: 0 = Never have experience, 1 = Sometimes have experience, 3 = Often have experience, and 4 = Always have experience.

No	Items	Never (0)	Sometimes (1)	Often (2)	Always (3)
	Your experiences in the following items:				
1	**Triage:** Sorting patients based on triage system				
2	Providing nursing interventions based on categorical color in triage system				
3	**Acute respiratory care:** Assessing chest trauma for tsunami patients with near drowning				
4	Providing oxygenation support for patients with respiratory problems				
5	**Wound care:** Assessing characteristic of tsunami wound				
6	Providing specific wound care for tsunami patients				
7	**Mental health care:** Assessing psychological problems for tsunami patients				
8	Providing emotional support for tsunami patients				

No	Items	Never (0)	Sometimes (1)	Often (2)	Always (3)
	Your experiences in the following items:				
9	**Psychosocial care:** Identifying of core problem of psychosocial disruption such as loss families and financial income				
10	Promoting of social support from families, friends, and society				
11	**Spiritual care:** Identifying of spiritual distress of tsunami patients such as despair and hopelessness				
12	Providing of spiritual care for tsunami patients such as prayer and reciting Qur'an				
13	**Patients referral:** Identifying of referring requirement				
14	Involving in patients referring activities				

APPENDIX D

Nurses' Perceived Preparedness of Knowledge Questionnaire (NPPKQ)

This questionnaire is to measure nurses' perceived preparedness of knowledge in caring for patients attacked by tsunami. Please answer all questions by putting mark (v) in the right column that is appropriate to you. There are 4 (four) possible options that indicate your perception how much you have prepared yourself to have knowledge in caring for patients attacked by tsunami:

0= None

1= Low preparedness

2= Moderate preparedness

3= High preparedness

No	Aspects	Extent of being prepared			
		None (0)	**Low (1)**	**Moderate (2)**	**High (3)**
1	**The extent you have prepared yourself to be knowledgeable in the following aspects:** **Impact of tsunami** Physical impact: 1.1 Fractures such as open or multiple fracture, and dislocation 1.2 Pain severity 1.3 Respiratory problems 1.4 Severely contaminated wound				
2	Psychological impact: 2.1 Acute stress disorder 2.2 Grief and loss 2.3 Fear 2.4 Depression				

No	Aspects	Extent of being prepared			
		None (0)	**Low (1)**	**Moderate (2)**	**High (3)**
3	Psychosocial impact: 3.1 Loss of family 3.2 Loss of social network 3.3 Loss of financial income				
4	Spiritual impact: 4.1 Despair 4.2 Feeling guilty for unable to help family member 4.3 Hopelessness				
5	**Tsunami disaster management** **Knowledge in triage system** 5.1 Simple triage and rapid treatment (START) with respiratory, perfusion, and mental (RPM) status of the patients 5.2 Triage classification color: green yellow, red, and black 5.3 Physical assessment and patient acuity rating to determine immediate needs of the patients 5.4 Triage principle treatment in the right time, place, with high level care				
6	**Knowledge in acute respiratory care** 6.1 Signs and symptoms of near drowning: dyspnea, cyanosis, hypothermia 6.2 Signs and symptoms of pneumonia: persistent cough, dyspnea, weakness, fever				

No	Aspects	Extent of being prepared			
		None (0)	**Low (1)**	**Moderate (2)**	**High (3)**
	6.3 Immediate care of airway management with oxygenation support 6.4 Immediate care of maintaining circulation with fluid replacement 6.5 Immediate care of prevent heat loss with re-warming in warm blanket or clothing 6.6 Administration of appropriate antibiotic for infection				
7	**Knowledge in wound care** 7.1 Assessment of tsunami contaminated wound with soil, seawater, sewage, sand, dirt, and mud 7.2 Characteristics of soft tissue injuries such as abrasion, lacerated wound, and skin loss wound 7.3 Characteristic of tsunami fractures such as open or multiple fracture and dislocation 7.4 Examination of bone deformities, joint symmetry, and bleeding for fracture 7.5 Examination of pain intensity 7.6 Wound cleansing with normal saline irrigation 7.7 Debridement for tsunami wound 7.8 Vaccination for tsunami wound with tetanus prophylaxis				

No	Aspects	Extent of being prepared			
		None (0)	Low (1)	Moderate (2)	High (3)
	7.9 Signs and symptoms of wound infection: redness, swelling, fever, pain, and delayed healing				
8	**Knowledge in mental health care** 8.1 Signs and symptoms of psychological problems such as sadness, crying, nightmares, and emotional detachment 8.2 Signs and symptoms of severe mental problems such as disorientation, depression, or psychosis sign 8.3 Crisis intervention with providing active listening for the patients 8.4 Counseling and education for patient to solve problem related to psychological distress 8.5 Evaluation of emotional healing for tsunami patients				
9	**Knowledge in psychosocial care** 9.1 Assessment of psychosocial disruption and signs and symptoms of psychological distress 9.2 Involvement of family in providing psychosocial support 9.3 Encouragement of patients to establish friendship among tsunami survivors 9.4 Evaluation of psychosocial care				

No	Aspects	Extent of being prepared			
		None (0)	**Low (1)**	**Moderate (2)**	**High (3)**
10	**Knowledge in spiritual care** 10.1 Assessment of spiritual distress such as despair, hopelessness, blamed, and anger to God 10.2 Facilitating patient participation in performing religious activities 10.3 Providing spiritual counseling 10.4 Evaluation of spiritual distress				
11	**Knowledge in patient referral** 11.1 Assessment of patient's condition for referring 11.2 Preparation of patient's document and medication for transferring 11.3 Establishment of communication with other agencies for referral activities 11.4 Documentation and evaluation of the transferring activity				

APPENDIX E

Tsunami Care Questionnaire (TCQ)

This questionnaire is to measure nurses' perceived preparedness of skills in caring for patients attacked by tsunami. Please answer all questions by putting mark (v) in the right column that is appropriate to you. There are 4 (four) possible options that indicate your perception how much you have prepare yourself to have skills in caring for patients attacked by tsunami:

0= None

1= Low preparedness

2= Moderate preparedness

3= High preparedness

No	Practices	Extent of being prepared			
		None (0)	Low (1)	Moderate (2)	High (3)
1	**The extent you prepare yourself to be skillful in following practices:** **Triage** Using simple triage and rapid treatment (START) system				
2	Classifying patient's condition by using categorical color (green, yellow, red, and black)				
3	Determining care by using physical assessment and acuity rating of patients				
4	Classifying patient's with critical, unstable, obvious bleeding, and circulation problem in red color				

No	Practices	Extent of being prepared			
		None (0)	Low (1)	Moderate (2)	High (3)
5	Evaluating patient's condition in triage process at the right time, place, and treatment				
6	**Acute Respiratory care** Assessing signs and symptoms of near drowning such as dyspnea, cyanosis, hypothermia				
7	Assessing signs and symptoms of pneumonia				
8	Removing of 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 conditions such as vital signs, breathing, and circulation				
13	**Wound Care** Assessing signs and symptoms of contaminated tsunami wound with sand, sewage, and mud				
14	Assessing characteristics of tsunami injuries (soft tissue injuries and fractures)				

No	Practices	Extent of being prepared			
		None (0)	Low (1)	Moderate (2)	High (3)
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 of antibiotic and tetanus prophylaxis				
20	Evaluating signs and symptoms of wound healing such as granulation growth				
21	**Mental health care** Assessing psychological symptoms such as sadness, crying, nightmares, 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				

No	Practices	Extent of being prepared			
		None (0)	**Low (1)**	**Moderate (2)**	**High (3)**
27	**Psychosocial Care** Assessing psychosocial disruption				
28	Assessing signs and symptoms of psychosocial distress such as loss 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				
32	**Spiritual Care** Assessing signs and symptoms of spiritual distress such as grief and loss, hopelessness, loss of goal of life, anger and guilty				
33	Providing spiritual interventions by participating in religious activities				
34	Providing spiritual counseling				
35	Evaluating spiritual distress				

No	Practices	Extent of being prepared			
		None (0)	**Low (1)**	**Moderate (2)**	**High (3)**
36	**Patient referral** Assessing patient's condition before referring				
37	Preparing patient's document, equipment, and medication before transferring				
38	Performing communication with other agencies where patient will be transferred				
39	Documenting transferring activity				
40	Evaluating effectiveness of patient's referring				

APPENDIX F

Perceived Severity and Perceived Risk Questionnaire (PSPRQ)

This questionnaire will provide some questions regarding the perceived severity and perceived risk of tsunami by nurses that may influence their preparedness of knowledge and skills in caring for patients attacked by tsunami. Please answer all questions that apply for you by marking (v). There are 3 options available: 1 = Low, 2= Moderate and 3= High.

No	Items	Low (1)	Moderate (2)	High (3)
1	**Perceived Severity** Degree of severity caused by tsunami : Loss of people's lives			
2	Loss of houses			
3	Loss of health care facilities			
4	Physical injuries such as fractures, wound, and respiratory problems			
5	Psychological problems such as sadness, fear, anxiety and depression			
6	Psychosocial distress such as loss family, friend, social network, and financial income			
7	Spiritual distress such as despair, angry, guilty, blamed, and venerable feeling			
8	**Perceived Risk** Occurrence of tsunami disaster in Indonesia			
9	Occurrence of tsunami in your area			
10	Mortality rate caused by unprepared tsunami disaster management			

"Thank you very much for completing these questionnaires "

APPENDIX G

List of Experts

Three experts validated the content validity of the instruments: Nurses' Clinical Experience Questionnaire (NCEQ), Nurses' Perceived Preparedness of Knowledge Questionnaire (NPPKQ), Tsunami Care Questionnaire (TCQ) and Perceived Severity and Perceived Risk Questionnaire (PSPRQ), they were:

1. Assist. Prof. Dr. Sang-arun Isaramalai

   Nursing Lecturer, Faculty of Nursing, Prince of Songkla University, Thailand

2. Assist. Prof. Dr. Wipa-sea

   Nursing Lecturer, Faculty of Nursing, Prince of Songkla University, Thailand

3. Dr. Hattairat Sanchan

   Nursing Lecturer, Faculty of Nursing, Prince of Songkla University, Thailand

APPENDIX H

Table 1

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

Training index	Type of training	F	%
0	None	14	14.4
1	BTLS	11	11.3
2	DM (1), IC (1)	22	23
3	DM (2), MHC (1)	11	11.3
4	BLS (1), BCLS (1), IC (2)	12	12.3
5	BLS (1), DM (1), IC (1), MHC (2)	16	16.4
6	BLS (2), BTLS (1), BCLS (1), ACLS (1), DM(1)	7	7.2
7	BLS (1), BTLS (1), BCLS (1), ACLS (1) DM (1), IC (1), MHC (1)	4	4.1

Note: BLS = Basic life Support, BTLS = Basic Trauma life Support, BCLS = Basic Cardiology Life Support, ACLS = Advanced Cardiology Life Support, DM = Disaster Management, IC = Infection Control, MHC = Mental Health care

(1) = 1 times attending such training, (2) = 2 times attending such training

Table 2

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

Experience		M	SD
1.	Providing specific wound care for tsunami patients	2.39	0.87
2	Assessing characteristic of tsunami wound	2.31	0.85
3.	Providing emotional support for tsunami patients	2.22	0.84
4.	Providing of spiritual care for tsunami patients such as prayer and reciting Qur'an	2.19	0.75
5.	Assessing psychological problems tsunami patients	2.15	0.88
6.	Providing oxygenation support for patients with respiratory problems	2.13	0.89
7.	Promoting social support from families, friends, and societies	2.11	0.88
8.	Identifying core problem of psychosocial disruption	2.10	0.88
9.	Identifying of spiritual distress of tsunami patients such as despair and hopelessness	2.01	0.88
10.	Assessing tsunami patients with near drowning	1.87	0.88
11.	Providing nursing interventions based on categorical in triage	1.84	0.92
12.	Identifying of referring requirement	1.76	0.86
13.	Sorting patients based on triage	1.75	1.00
14.	Involving in patients referring activities	1.65	0.94

Table 3

Means and Standard Deviations of Perceived Severity and Perceived Risk of Tsunami Disaster (N=97)

Perceived Severity of Tsunami Disaster	M	SD
Perceived severity		
1. Loss of people's lives	2.63	0.58
2. Loss of houses	2.55	0.64
3. Physical injuries such as fractures, wound and respiratory problems	2.57	0.57
4. Psychological problems such as sadness, fear, anxiety and depression	2.47	0.64
5. Loss of health care facilities	2.45	0.66
6. Psychosocial distress such as loss family, friend, social network, and financial income	2.42	0.64
7. Spiritual distress such as despair, angry, guilty, blamed, and venerable feeling	2.34	0.66
Perceived Risk		
8. Mortality rate caused by unprepared tsunami disaster management	2.43	0.62
9. Occurrence of tsunami in your area	2.34	0.67
10. Occurrence of tsunami disaster in Indonesia	2.23	0.77

VITAE

Name Dewi Hermawati

Student ID 5110420045

Educational Attainment

Degree	Name of Institution	Year of Graduation
Bachelor of Nursing Science	Nursing Science Program Faculty of Medicine University of Syiah Kuala	2003

Scholarship Awards during Enrolment

Rocky Feller Foundation from the United Kingdom (UK)

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