



**Disaster Nursing Competencies Related to Earthquake Among  
Nurses in Nepal**

**Pritika Basnet**

**A Thesis Submitted in Partial Fulfillment of the Requirements for  
the Degree of Master of Nursing Science (International Program)**

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**Thesis Title** Disaster Nursing Competences Related to Earthquake Among Nurses in Nepal

**Author** Mrs. Pritika Basnet

**Major Program** Nursing Science (International Program)

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**Major Advisor**

.....  
 (Assoc. Prof. Dr. Praneed Songwathana)

**Examining Committee**

.....Chairperson  
 (Asst. Prof. Dr. Luppana Kitrungrrote)

.....Committee  
 (Assoc. Prof. Dr. Praneed Songwathana)

**Co-Advisor**

.....  
 (Asst. Prof. Dr. Wipa Sae-Sia)

.....Committee  
 (Asst. Prof. Dr. Wipa Sae-Sia)

.....Committee  
 (Dr. Marisa Suwanraj)

The Graduate School, Prince of Songkla University, has approved this thesis as partial fulfillment of the requirements for the Master of Nursing Science (International Program).

.....  
 (Assoc. Prof. Dr. Teerapol Srichana)

Dean of Graduate School

This is to certify that the work here submitted is the result of the candidate's own investigations. Due acknowledgement has been made for any assistance received.

.....Signature

(Assoc. Prof. Dr. Praneed Songwathana)

Major advisor

.....Signature

(Mrs. Pritika Basnet)

Candidate

I hereby certify that this work has not been accepted in substance for any degree, and is not being currently submitted in candidature for any degree.

.....Signature

(Mrs. Pritika Basnet)

Candidate

<b>Thesis title</b>	Disaster Nursing Competencies Related to Earthquake Among Nurses in Nepal
<b>Author</b>	Mrs. Pritika Basnet
<b>Major Program</b>	Nursing Science (International Program)
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### **Abstract**

The descriptive study was conducted to describe level of disaster nursing competencies in terms of knowledge, perceived skills and judgment ability regarding earthquake among nurses in Nepal. Data from three hundred nurses working in different level of hospitals in Nepal were used for the data analysis. Knowledge Questionnaire, Perceived Skills Questionnaire and Judgment Ability Questionnaire were used for data collection. The Kuder Richardson (KR-20) to determine the internal consistency reliability of knowledge and judgment ability questionnaire were .79 and .74 respectively and the Cronbach's alpha coefficient for perceived skills was .80. Data were analyzed using descriptive statistics.

The results revealed that knowledge regarding earthquake disaster was at a moderate level ( $M = 70.0$ ,  $SD = 10.0$ ), perceived skills regarding earthquake disaster were at a moderate level ( $M = 76.4$ ,  $SD = 13.5$ ), judgment ability regarding earthquake disaster at a very poor level ( $M = 56.8$ ,  $SD = 17.7$ ) and disaster nursing competencies at a poor level ( $M = 62.4$ ,  $SD = 14.3$ ). The lowest area of knowledge was related to triage assessment and management. The lowest area of perceived skills was related to using triage and the lowest area of judgment ability was related to

sorting the victims on the basis of color coding triage system. The overall level of disaster nursing competencies of Nepalese nurses related to earthquake disaster was at a poor level. The findings suggest that although nurses had moderate level of knowledge and perceived skills related to earthquake disaster, nurses were unable to integrate those knowledge and skills in order to make good decisions and judgment during disaster situation. So, further training programs on developing the decision making capabilities during disaster and emergency situation as well as triage assessment and management is necessary along with the integration of disaster nursing course in diploma nursing curriculum.

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## **Chapter 1**

### **Introduction**

This chapter presents background and significance of the problem, objectives, research questions, the conceptual framework, definition of the terms, scope, and significance of the study.

#### **Background and Significance of the Study**

Disaster is any destructive event that can cause death, injuries, illness and property damage which cannot be managed by routine procedures or resources in the community or nation. It can be broadly classified as natural and manmade. Natural disasters are those caused due to ecological disruption which includes earthquake, floods, hurricanes, tsunamis etc. On the other hand, manmade disasters are those caused due to human action. For example, humanitarian terrorism, fire, chemical spills, and explosions are manmade disaster (Veenema, 2012).

The incidence of natural disaster has been rapidly increasing. Asia has been often hit with the disaster which comprises 40.7% of all natural disaster and 90 % of total global disaster victims (Guha-Sapir, Hoyois, & Below, 2014). In addition, between 2004 and 2013, 41.2 % or 1,690 incidences occurred in the Asia-Pacific region out of world's reported natural disasters (United-Nation, 2014). Out of all natural disasters, seven percentage of the total victims were from the earthquake in 2013 (Guha-Sapir et al., 2014).

Since a decade, earthquake has occurred in large numbers throughout the world. Every year an average of 1-2 severe earthquakes of magnitude 8-9.9

Richter Scale have been recorded causing thousands of death and injuries (United States Geological Survey [USGS], 2015). Almost 90% of the highly earthquake affected area lies in Asia (USGS, 2015). Nepal is one of the Asian countries that have been attacked by earthquake and ranks in 11th position for earthquake in the world due to its location near the boundary of the Eurasian and Indian tectonic plates (Koirala, 2014). Recently, in April and May 2015 big earthquake of magnitude 7.9 and 7.2 struck Nepal (USGS, 2015). This event killed more than 8,673 people, 21,594 people injured and left hundreds of thousands of people making homeless with some of the village entirely flattened to the earth (United Nation High Commissioner for Refugees, 2015).

In Nepal, National Disaster Relief Act (NDRA) was introduced in 1982 in order to formulate a well-structured disaster management policy. There is a well-managed government structure in disaster management. This structure functions in a hierarchy from the central disaster relief committee to the local/district disaster relief committee (*Disaster management system in Nepal*, 2004). However, due to many years of political instability along with the economic difficulties, the national disaster act has been pending resulting in limited work by the higher authority on disaster preparedness and its risk reduction. In addition to this, poor infrastructure, unplanned settlements and low level of public awareness and preparedness have made the country more vulnerable to the effects of earthquake disaster (Nepal Red-Cross Society [NCRS], 2011).

Earthquake is considered as the unique event. According to Veenema (2012), an event to be defined as disaster depends upon the location in which it occurs, such as areas with dense population are highly affected. Every earthquake is not considered as disaster unless it produces extensive loss of lives and properties



which exceeds beyond local capacities. In addition, earthquake is usually followed by aftershocks which can last up-to months and years (USGS, 2012) and this leads to additional health impacts (Honma, Endo, Osada, Kim, & Kuriyama, 2012).

Health impacts after earthquake is wide and long-term. The common injuries found after earthquakes were soft tissue injuries (including lacerations and contusions), fractures and crush injuries. Extremities were the most likely areas of the body to be affected (Doocy, Daniels, Packer, Dick, & Kirsch, 2013; Lu-Ping et al., 2012). The major injuries after earthquake included cervical spine injuries with neurologic impairment, skull fractures with intracranial hemorrhage, damage to intra-abdominal, intra-thoracic and intra-pelvic organs with the liver lacerations, pneumothorax and ruptured spleen (Naghii, 2005). Cases on acute coronary syndrome, stroke and heart attacks increased significantly after the disaster events (Wilbert-Lampen & Steinbeck, 2012). In addition, diarrheal disease and acute respiratory tract infections were commonly seen after earthquake (Jafari, Shahsanai, Memarzadeh, & Loghmani, 2011).

Mental illness has been diagnosed among earthquake survivors (Ali, Farooq, Bhatti, & Kuroiwa, 2012; Livanou et al., 2005; Tachibana, Kitamura, Shindo, Honma, & Someya, 2014; Wang & Liu, 2012). The most common mental illness after earthquake disaster was psychological distress, depression, anxiety, cognitive disorder and post-traumatic stress disorder (PTSD). These problems resulted in less sleep hours, increased suicidal rates and decreased interpersonal relationships among family and society (Tachibana et al., 2014). These findings imply that there is a need to address these problems starting immediately after the disaster event and alert the role of nurses.

Nurses comprise the largest group of health care providers and have active role in the different phases of the disaster (Wee, 2011; Yang, Xiao, Cheng, Zhu, & Arbon, 2010). The phases of disaster have been classified as pre-incident phase (mitigation and preparedness), incident phase (response) and post-incident phase (recovery and rehabilitation). The mitigation activities help to prevent or minimize the risks related to disaster. Preparedness includes activities and measures taken prior to the disaster in order to ensure efficient response to the impacts caused by the disaster/hazards. Furthermore, response activities include immediate actions to provide both physical and psychological care to the victims. Finally, recovery and rehabilitation action includes assisting the community and the affected population recovers from the impact of the disaster (International Council for Nurses [ICN], 2009).

Nurses need to be competent in order to deal with disaster events. Competency refers to the integration of knowledge, skill and judgment in clinical practice (Evans & Donnelly, 2006). Disaster nursing competencies include effective utilization of knowledge, skills and judgment in disaster situation (ICN, 2009). It has been lucidly written in ICN disaster nursing report that all nurses must have essential competencies in order to respond disaster event effectively (ICN, 2009). Lack of response and recovery competencies creates mystifying environment where the nurses have to cope with limited resources. The response phase activities of the disaster are usually followed by recovery phase activities which continues 72 hours after the event (Baird, 2010; Veenema, 2007). Thus, the response and recovery phase of the disaster makes the highest demands on nurses working to minimize the impact of disaster on human health. Therefore, it is crucial for nurses to have adequate competencies to

respond effectively and quickly during response and recovery phase of the earthquake disaster.

Knowledge and skills on the disaster has been considered vital to treat victims properly, quickly, effectively and at a high medical standard (Yang et al., 2010). Nurses who are experienced to work in earthquake situation mentioned that being prepared in terms of knowledge and skills could have helped them to do lot more better nursing care in the disaster situation, where there is lack of resources (Li, Turale, Stone, & Petrini, 2015). Moreover, studies have found that nurses faced difficulties in performing certain clinical skills, such as mass casualty transportation, triage and emergency management, manual handling of the patients, controlling homeostasis, bandaging, fixation and psychological crisis interventions (Yin, He, Arbon, & Zhu, 2011). Thus, nurses must be prepared and well equipped with the knowledge and skills required during and after disasters which can be achieved only through the education and training.

Judgment is another required ability for nurses to make quick decisions in emergency situation (ICN, 2009). The judgment and decision made in the critical situation decides the patients outcome (Noon, 2014). In addition, to make nurses competent in earthquake disaster nursing, developing judgment and decision making skills are equally important. Due to the chaos of mass casualty event in disaster, this situation may lead nurses to make inappropriate and poor judgment and decision. As a previous study shows that nurses working in emergency departments had low accuracy of triage judgment (Chen et al., 2010). However, a limited research has been done on the status of judgment abilities among nurses in disaster situation.

The education and trainings on disaster nursing are still underdeveloped in Asian countries. For instance in a survey of 89 university

representatives of Asian countries, still 30.3 % respondents in Asia and 42% in Japan did not know about ICN disaster nursing competencies (Sasaki, Ohara, Higashiura, Nishida, & Okamoto, 2014). In addition, the most common challenges in performing disaster nursing education and trainings were no equipment to simulate disaster, lack of qualified instructors, lack of domestic and international networks, lack of textbooks and insufficient curriculum time to teach disaster education (Sasaki et al., 2014). Furthermore, research regarding education and training aspect of disaster has been ranked on second priority among top ten research areas in disaster nursing (Ranse, Hutton, Jeeawody, & Wilson, 2014).

Nepal, similar to other developing countries has a lack of disaster nursing content in nursing curriculum. Most of the nurses in Nepal are working in hospital setting and they are educated up to three years diploma level (Regmi, K., Regmi, S., & Shahi, 2010). As Nepal is prone to the earthquake disaster, nurses in all departments are needed to be competent to respond future earthquake disaster to minimize the health impacts caused by the disaster. During earthquake in Nepal, nurses from all departments were called on duty for the emergency response because the nurses in the emergency department were not enough for management of mass casualty victim. A nurse who responded earthquake disaster felt that, there were very limited resources and every nurse had to cope with the mass casualty who had different health problems. She felt that effective disaster drills could helped them a lot to develop skills of every nurses to respond the mass casualty and disasters (Personal Communication, 8 December 2015). So, the initial step to plan the trainings and integrate disaster nursing content to the nursing curriculum is to assess the level of nursing competencies among the nurses in Nepal. In addition, limited research has been conducted addressing the disaster nursing aspect, especially focusing on

earthquake disaster in Nepal. This study was expected to develop an evidence in order to provide disaster trainings and education to the working nurses and integrate disaster nursing content in nursing curriculum in order to prepare nurses to respond future disasters.

This study is focused on nurses' competencies regarding earthquake disaster particularly in response and recovery phases. Several studies were conducted in developing countries after general disaster or specific to earthquake disaster which explored the disaster preparedness knowledge and essential clinical skills specific to one phase (Ibrahim, 2014; Wenji, Turale, Stone, & Petrini, 2015; Yan, Turale, Stone, & Petrini, 2015; Yin et al., 2011) and some of the qualitative studies explored the experiences of the nurses who responded to the earthquake disaster (Bahrami, Aliakbari, & Aein, 2014b; Nasrabadi, Naji, Mirzabeigi, & Dadbakhs, 2007; Yang et al., 2010). In addition, most of the nurses are working in hospital setting in Nepal. So, they are required to have adequate knowledge, skills and judgment ability in order to respond disaster and conduct recovery activities effectively because the health impacts will be more severe when nurses are not able to deal with the impacts of the disaster in response and recovery phase. This study provides implication for the education and actual training needs of nurses regarding earthquake disaster.

## **Objectives of the Study**

The main objective of this study was to identify the level of disaster nursing competencies related to earthquake among nurses in Nepal in terms of knowledge, skills and judgment ability in response and recovery phase as follows:

1. To describe the level of disaster nursing competencies on response and recovery phase of earthquake disaster among Nepalese nurses.
2. To describe the level of knowledge on response and recovery phase of earthquake disaster among Nepalese nurses.
3. To describe the level of perceived skills on response and recovery phase of earthquake disaster among Nepalese nurses.
4. To describe the level judgment ability on response and recovery phase of earthquake disaster among Nepalese nurses.

## **Research Questions**

The research questions of the study were:

1. What is the level of disaster nursing competencies on response and recovery phase of earthquake disaster among Nepalese nurses?
2. What is the level of knowledge on response and recovery phase of earthquake disaster among Nepalese nurses?
3. What is the level of perceived skills on response and recovery phase of earthquake disaster among Nepalese nurses?
4. What is the level of judgment ability on response and recovery phase of earthquake disaster among Nepalese nurses?

## **Conceptual Framework of the Study**

The main concept of disaster nursing competencies in terms of knowledge, perceived skills and judgment ability of nurses regarding earthquake disaster nursing were derived from ICN disaster nursing framework (ICN, 2009). According to ICN, (1997, as cited in ICN, 2009) competency has been defined as “a level of performance demonstrating the effective application of knowledge, skill and judgment” (p. 34). ICN disaster nursing framework has been widely used as a guideline of nurses’ competencies at an international level. ICN consists of four phases of disaster nursing competencies: Mitigation, preparedness, response, and recovery phases. These four areas include ten domains and 130 individual lists of core competencies for nurses. ICN disaster nursing framework is aimed to strengthen the essential capacities of nurses to deliver disaster and emergency services and to assure a global working workforce ready to respond in event of a disaster. However, the ICN framework provides the overall nurses’ knowledge, skills, and judgment required for all levels and types of disaster (ICN, 2009).

In this study, the main concept of the knowledge, skills and judgment abilities focusing on earthquake disaster nursing was derived from ICN disaster nursing framework proposed in 2009 and underlying sub-concepts were derived from literatures conducted on earthquake disaster.

Nurses are evident to play key role in disaster and crisis situations especially in response and recovery phase of earthquake disaster. Several studies have found that nurses have low to moderate knowledge and skills in disaster preparedness (Al Khalaileh, Bond, & Alasad, 2012; Al Thobaity, Plummer, Innes, & Copnell, 2015). Lack of nurses’ competencies in disaster response and recovery creates disorganized use of scarce resources (ICN, 2009). Understanding actual level of

knowledge, level of perceived skills and level of perceived judgment abilities on response and recovery phase helps in planning continuing education and training programs in order to prepare nurses for the future disaster management (Al Khalaileh et al., 2012). In addition, all nurses regardless of working settings are expected to have basic knowledge, skills and judgment abilities regarding disasters in order to respond disaster events effectively and quickly.

Based on ICN disaster nursing competencies framework, knowledge, perceived skills and judgment ability of nurses in response phase consists of (1) care of community, (2) care of individuals and families, (3) psychological care and (4) care of vulnerable populations. Knowledge, perceived skills and judgment ability of nurses on recovery phase consists of (5) long term individual, family and community recovery care. In addition, various literatures related to earthquake disaster (Ali et al., 2010; Aliakbari, Hammad, Bahrami, & Aein, 2015; Doocy et al., 2013; Li & Zheng, 2014; Lu-Ping et al., 2012; Tachibana et al., 2014) were analyzed to make the sub concept or specific content of nurses knowledge, skills and judgment ability in earthquake disaster.

The sub concept of nurses' knowledge and skills on (1) care of community consists of community response to earthquake disaster and collaboration with disaster teams, mortality and morbidities/injuries caused by earthquake disaster, resource management, communication skills and community based health education, (2) care of individuals and families consists of assessment and triage in earthquake disaster response, ethical and legal issues during earthquake disaster, patient referral and mass casualty transportation, trauma and wound care, patient transportation, spiritual care, culturally competent care and communication with patient and family. (3) Psychological care consists of the care and support to reduce the psychological



problems of the victims and be able to cope with the crisis and (4) care vulnerable populations include care for those dependent people such as people with disabilities, elderly, pregnant women, and children. Moreover, sub concept of (5) long-term individual, family and community recovery care consists of surveillance, disease outbreak after earthquake disaster and primary health care services after earthquake disaster.

Nurses' judgment and decision making abilities are crucial in disaster response and recovery where they have to make quick judgments and decisions (Good, 2008; Sandman & Nordmark, 2006). In this study, the sub concept of judgment ability of nurses on earthquake disaster consists of (1) care of community: mass casualty triage (2) care of individual and families: emergency patient care, (3) psychological care, (4) care of vulnerable population and (5) long term individual family and community recovery.

### **Definition of the Terms**

#### **Disaster nursing competencies regarding earthquake disaster.**

Disaster nursing competencies refer to the performance of nurses they perceived of demonstrating the sufficient utilization of knowledge, perceived skills and judgment ability during and after the earthquake disaster. In this study it was measured by combining the total scores of knowledge, perceived skills and judgment ability regarding earthquake disaster. Disaster Nursing competencies were classified in terms of knowledge, skills and judgment ability.

***Knowledge regarding earthquake disaster.*** Knowledge regarding earthquake disaster was defined as Nepalese nurses' understanding about the concept or content related to nursing care on earthquake disaster based on their roles in

response and recovery phase of earthquake disaster. This included knowledge on response phase in 5 domains. These are (1) care of community, (2) care of individuals and families (3) Psychological care and (4) care vulnerable populations. Knowledge on recovery phase included, (5) long-term individual, family and community recovery care. The knowledge was measured by Nurses' Knowledge regarding Earthquake Disaster Questionnaire (NK-EDQ) developed from ICN framework and literature review specific to earthquake disaster.

***Perceived skills regarding earthquake disaster.*** Perceived skills of nurses regarding earthquake disaster was defined as the Nepalese nurses' individual perceptions of their clinical skills or practice based on the roles of nurses in response and recovery phase of earthquake disaster. The skill in response phase included ( 1) care of community (2) care of individuals and families (3) Psychological care and (4) care vulnerable populations. The skill in recovery phase included, (5) long-term individual, family and community recovery care. The perceived skills was measured by Nurses' Perceived skills in Earthquake Disaster Questionnaire (NS-EDQ) developed by the researcher pararell to the knowledge.

***Perceived judgment ability regarding earthquake disaster.*** Perceived judgment regarding earthquake disaster nursing was defined as the Nepalese nurses' individual perception of their ability to make their own judgment and decision while providing specific care on emergency earthquake disaster situation in response and recovery phase. Judgment ability of the nurses has been used interchangeably with decision making ability of nurses in this study. Judgment ability of nurses in response phase consisted of: (1) care of community: mass casualty triage (2) care of individual and families: emergency patient care, (3) psychological care, (4) care of vulnerable population including judgment in recovery phase: (5) long term individual family and

community recovery care: primary health care after disaster. The judgment ability of nurses was measured by Nurses' Judgment Ability Regarding Earthquake Disaster Questionnaire (NJ-EDQ) developed based on literature review by the researcher.

### **Scope of the Study**

The descriptive study was conducted on nurses' who worked in governmental and nongovernmental hospitals in both earthquake affected and non-affected areas in Nepal. The study was conducted during February 2016 to April 2016.

### **Significance of the Study**

The study findings can benefit to nursing practice in terms of enhancing the roles of nurse in earthquake disaster. For nursing education, it can be used for emphasizing the integration of disaster nursing course in nursing curriculum. In addition, this study can provide implication for the area of policy development for Nepalese nurses and development of different training policies as well as future nursing research in relation to earthquake disaster.

## **Chapter 2**

### **Literature Review**

The literature of this study includes overview of disaster and earthquake disaster, nursing education system in Nepal, concept of disaster nursing, nurses' roles in earthquake disaster and disaster nursing competencies regarding earthquake disaster. The literature review is thus divided into the following sessions.

1. Overview of disaster and earthquake disaster
  - 1.1. Definition of disaster
  - 1.2. Types of disaster
  - 1.3. Earthquake disaster
  - 1.4. Earthquake disaster in Nepal
  - 1.5. Disaster management system in Nepal
2. Nursing education system in Nepal
3. Concept of disaster nursing
4. Roles of nurses in earthquake disaster
  - 4.1. Prevention/mitigation phase
  - 4.2. Preparedness phase
  - 4.3. Response phase
  - 4.4. Recovery/rehabilitation phase
5. Disaster nursing competencies related to earthquake disaster
  - 5.1. Knowledge and skills of nurses related to earthquake disaster on response and recovery phase
    - 5.1.1. Care of communities

5.1.2.Care of individuals and families

5.1.3.Psychological care

5.1.4.Care of vulnerable population

5.1.5.Long-term individual, family and community  
recovery

5.2.Judgment ability of nurses related to earthquake disaster in  
response and recovery phase

5.2.1.Care of community

5.2.2.Care of individuals and families

5.2.3.Psychological care

5.2.4.Care of vulnerable populations

5.2.5.Long term individual, family and community  
recovery

6. Factors related to nurses' knowledge, skills and judgment ability  
related to earthquake

7. Summary of literature review

### **Overview of Disaster and Earthquake Disaster**

In recent years, the incidence of disasters has been increasing (Guha-Sapir, Below, & Hoyois, 2009; Guha-Sapir et al., 2014). Globally, every week number of natural and manmade disaster has been recorded. There were three times as many natural disasters from 2000 through 2009 as there were from 1980 through 1989 (Leaning & Guha-Sapir, 2013). Asia is a continent that has been hit frequently ever since 2003 with the 40.7 % of all natural disaster in 2013 and 90% of the total global disaster victims were from Asia (Guha-Sapir et al., 2014). In addition, of the world's

reported natural disasters between 2004 and 2013, 41.2 % or 1,690 incidences, occurred in the Asia-Pacific region. The number of recorded deaths from natural disasters went up from 205,388 between 1994 and 2003 to 713,956 between 2004 and 2013, with 1.5 billion people affected (United-Nation, 2014).

**Definition of disaster.** Various organizations define disaster in terms of infrastructure destructions, human sufferings, loss of lives and exceeding local resources. Disaster has been defined as follows:

According to World Health Organization [WHO], (2002) disaster is defined as “an occurrence disrupting the normal conditions of existence and causing a level of suffering that exceeds the capacity of adjustment of the affected community” (p. 3).

International Federation of Red Cross and Red Crescent Societies (IFRC) defines disaster as a sudden, calamitous event that disrupts the functioning of a community or society seriously and causes losses in terms of human, material, and economic or environment which exceed the community’s or society’s ability to cope using its own resources (International Federation of Red Cross and Red Crescent Societies [IFRC], n.d.).

Disaster is an unforeseen and sudden event or a situation which causes significant damage, destruction and human suffering, where local resources are overwhelmed by demands and requires a national or international level for external assistance (Below, Wirtz, & Guha-Sapir, 2009). In short, disaster can be defined as the emergency condition where its hazards such as death, injuries and property damage overwhelm the existing local resources.

**Types of disaster.** Disaster is an event that happens naturally or can be caused by humans. Natural disasters can be caused by environmental interferences

and include events such as earthquake, flood, hurricane or typhoon, tornado, fire, tsunami or storm surge, avalanche, volcanic eruption, extreme cold or blizzard, and heat wave. Manmade disaster is caused by activities of human which include nuclear accidents, bombings, and bioterrorism. In addition, the population density, community preparedness, education determines the severity of the both types of disasters (Landesman, 2011; Zibulewsky, 2001).

Each disaster is a unique event and they are classified on the basis of their onset, impact as well as duration. Earthquake disaster is a rapid onset event usually with short duration and sudden impact of community. In addition, due to its sudden and rapid onset, advanced warnings cannot be issued to enable planners to implement evacuation and early response plans so appropriate preparedness is essential for effective response as well as recovery of the community (Veenema, 2012).

**Earthquake disaster.** Globally, every year an average of 1-2 severe earthquake of magnitude 8-9.9, 14 moderate earthquake of magnitude 7-7.9 and thousands of mild to small earthquake has been recorded causing thousands of death and injuries (USGS, 2015). Since a decade, almost every year major earthquake has been occurred in different parts of the world and almost 90% of the highly affected area lies in Asia. Major earthquakes occurred in Sumatra (Indonesia) in 2004, Kashmir (Pakistan) in 2005, Sichuan (China) in 2008, Haiti in 2010, Honshu (Japan) in 2011 and Nepal in 2015 show evidences of devastating effects of earthquakes both on human health as well as nation (Gautschi, Cadosch, Rajan, & Zellweger, 2008; USGS, 2015). Asia, particularly in South East Asia being the highly dense populated area in the world, number of affected population due to the earthquake is also comparatively high in these areas causing approximately 500,000 people killed and

nearly a million injured with more than 50 million population displaced since 2000 (USGS, 2015). The highly affected countries in Asia are Indonesia, Japan, India, Pakistan, China, and Nepal.

**Earthquakes in Nepal.** Nepal, which is located in a highly active tectonic region of Himalayan belt and having a fragile geology, steep topology ranks in 11th position for earthquake in the world due to its location near the boundary of the Eurasian and Indian tectonic plates (Koirala, 2014). Earthquake happens very often in Nepal and evidences of earthquake have been recorded from 13 centuries in the history of Nepal (Koirala, 2014). In 1934, there was a great earthquake of 8.4 magnitude which took 11,000 lives and more than 10 thousands injured. After that, in 1988, 6.7 Richter scale magnitude of earthquake took more than 607 lives and left more than 6,500 injured. Similarly, in 2011 again magnitude of 6.9 Richter scale occurred which did not affect much in terms of human lives however some buildings were destroyed. Recently, in April and May 2015 big earthquake of magnitude 7.9 and 7.2 strike Nepal (USGS, 2015). Nepal continues to face many small and medium earthquake events in different parts throughout the year.

**Disaster management system in Nepal.** In 1982, disaster policy was formulated with the advent of Natural Disaster Relief Act (NDRA). This act is chaired by the Ministry of home affairs and works in three level levels disaster relief committee. Firstly, the central level committee works for the coordination, response, rescue and relief. Secondly, the regional natural disaster relief committee functions at the regional level and are responsible for regional resource mobilization and direction. Finally, the district natural disaster relief committee functions at district level which works for the program execution, rescue and relief and data collection at the times of disaster. In addition, there is a provision for local disaster response committees to



provide assistance at ground level. Moreover, the government of Nepal may publicly appeal to the international community in the case of a large disaster that is beyond national coping capacity. Currently, there is increasing involvement of the academicians, researchers, United Nation agencies, International non-governmental organizations, local bodies and civil Society in disaster response (*Disaster management system in Nepal*, 2004; Koirala, 2014).

Along with the Act, government of Nepal adopted National Strategy for Disaster Risk Management (NSDRM) in 2009 based on Hyogo Framework for Action. The strategy included in all phases of disaster such as prevention, mitigation, preparedness, response and recovery. However, National Disaster Relief Regulations (NDRR) has not been formulated for the effective application of the disaster relief act. NDRA, 1982 does not describe the duties and responsibilities of all disaster management related agencies other than the Ministry of Home Affairs guided by government of Nepal. Consequently different problem has been raised due to the lack of the disaster management regulation such as lack of job description, lack of coordination and cooperation and lack of responsibilities during disaster response response (*Disaster management system in Nepal*, 2004; Koirala, 2014).

Recently, the disaster risk reduction and climate change adaptation have become national priority and being institutionalized to support sustainable development in Nepal through the harmonization and mainstreaming process. The current thirteenth five Year Plan (2013/14-2015/16) has emphasized the disaster risk management issues as an inherited character of sustainable development and has accorded priority to pre-disaster preparedness to recovery process (Nepal Red-Cross Society [NCRS], 2011).

## **Nursing Education System in Nepal**

Currently, in Nepal there are different levels of nursing degree programs operated by different organizations and universities which are under the ministry of education. In 1989, along with the establishment of CTEVT (Center for Technical Education and Vocational Training), the number of nursing schools as well as nursing students started to grow rapidly. CTEVT is a council that is responsible for the production of technical and skillful human resources required to the nation. It is governed by the ministry of education in Nepal (Adhikari, 2015).

There are six levels of nursing degree programs available in Nepal. Firstly, ANM (Auxiliary Nurses Midwife) is an 18 month course where the nurses are trained about the importance of health and hygiene as well as the ways of reducing death ratio of mothers during the period of child birth. Secondly, most of the nurses in Nepal have PCL (Proficiency Certificate level) level of nursing education which is a 3 years course and aimed to produce Registered nurses in Nepal. Similarly, Bachelor of Nursing (BN) a two year under-graduate program in nursing and midwifery after the PCL nursing education. Another program is Bachelor of Science in Nursing (B.Sc. Nursing), a four year undergraduate program. In addition, masters of nursing (MN) is a 2 year nursing education after the completion of BN or B.Sc. Nursing education where nurses gets specializations in their area of interest. The PhD in Nursing is a three years program which runs under the Institute of Medicine (IOM) governed by ministry of education. All the nursing program is instructed in English language in Nepal (Dewan, 2014; Subedi, 2014).

Despite of the productions of more than 4000 nurses per year, there is a huge gap between the recruitment and production of nursing workforce in Nepal (Subedi, 2014). In addition, there is high staff turnover rate due to various reasons.

Firstly, lack of career development opportunities for the nurses is one of the reasons related to the turnover of nursing staffs. Secondly, high overload of the nurses in hospitals where the nurse patient ratio is 1:20 (the international standard is 1:6). In addition, poor working environment which is related to the inadequate physical facilities and scarce of equipment for quality service is another factor for the high turnover rate of nurses in hospitals of Nepal (Dewan, 2014).

Disaster nursing course content is limited in nursing curriculum in Nepal like other Asian developing countries (Shahi & Agrawal, 2013). The diploma level of nursing curriculum does not contain the disaster management course. The bachelor level of nursing (four year) curriculum contains eight hours disaster management content (which includes definition and types of disaster, triage function and roles and responsibilities of nurses in disasters) in a leadership and management course at the fourth year of nursing education. However, existing program in Nepal for enhancing emergency response (PEER) has been established by the United States Agency for International Development's, Office of U.S. Foreign Disaster Assistance (USAID/OFDA) in order to provide the regional training program and strengthen disaster response capacities in Asia. The program is currently running in ten countries: Cambodia, Bangladesh, Indonesia, India Nepal, Pakistan, Philippines, Thailand, Laos PDR and Vietnam. All coordination for PEER Nepal is under the auspices of the Nepal Government, the Ministry of Home Affairs (MOHA), and Disaster Relief Section. The main objective of the program is providing trainings in order to increase capacity of nation to manage and prepare for disasters. PEER for Hospital Preparedness for Emergencies (HOPE) and Community Action for Disaster Response (CADRE) has developed the training courses and curriculums in Nepal (Program for Enhancing Emergency Response [PEER], n.d.).

HOPE is providing training for the health care providers including nurses in order to develop skills in hospital disaster planning, mass casualty emergency care management and effective response (United States Agency for International Development [USAID], 2015). The course enables to develop plans for effective response, based on best-practice guidelines among health care staff to (PEER,n.d.)

### **Concept of Disaster Nursing**

Disaster nursing is adaptation of professional nursing knowledge, skills and attitude in recognizing and meeting nursing, health and emotional needs of disaster victims (Veenema, 2007). Disaster nursing is systematic use of specific knowledge and skills of disaster in collaboration with other disciplines in order to reduce life threatening damage and health related hazards caused by the disasters (Jennings-Sanders, Frisch, & Wing, 2005). According to Powers and Daily (2010), the main aim of disaster nursing is to “ensure that the highest achievable level of care is delivered through identifying, advocating, and caring for all impacted populations throughout all phases of a disaster event, including active participation in all levels of disaster planning and preparedness” (p.3).

Earthquake disaster nursing is an art of care to work under the conditions of limited resources by using knowledge, skills and judgment related to earthquake disaster and cooperate with other rescuers in order to help and reduce loss and harm to people and their livelihoods due to unpreventable elements. Rescuing and psychological comfort are two important aspects for nurses in earthquake disaster relief (Li et al., 2015). In order to respond earthquake disaster effectively, nurses must possess competencies related to earthquake disaster nursing.

For effective management of the disaster, different phases have been described. International council for Nurses described disaster management phases as pre-incident phase (mitigation and preparedness), incident phase (response) and post incident phase (recovery and rehabilitation) (ICN, 2009).

To begin with, mitigation is action that is taken to reduce risk to the people and property from the natural hazards or disasters before they occur. It includes restrictions or the regulations for the structural as well as the non-structural measures to prevent effects of the disasters. Secondly, preparedness phase comprises of variety of measures or actions to insure that an individual/community is ready to respond to any emergency or disasters. For instance, training health care personnel, preparing disaster kits in every homes, cars and offices are some of preparedness actions. Response phases include measures that are taken immediately during disaster which aims to reduce longer-term health impact of disaster and fulfill the immediate needs of the survivors. Finally, recovery and rehabilitation phases focuses on rebuilding and restoring vital services, meeting health needs of the population along with the infrastructure and housing and assisting victims to restore their lives (Hassmiller, 2012; ICN, 2009).

Nurses are the crucial resources during disasters and they can play vital role especially in response and recovery phase. Nurses are largest health related professionals in most of the nations who are at frontline to respond disasters (Harrington, Gorgone, & Jocelyn, 2012). Nurses with their knowledge and skills have proved their value in numerous disaster situations which support humanitarian efforts and contribute to a disaster response positively (ICN, 2009; Wee, 2011; Yang et al., 2010).

## **Roles of Nurses' in Earthquake Disaster**

The role of nurses during disaster situation differs greatly from daily routine works where nurses have to work with limited resources. It has been given emphasis that regardless of the setting that nurses work, every nurse must be aware about their roles, basic knowledge regarding disaster and disaster management planning of their respective countries to get prepared for the disasters because disaster can happen to any person, place or nation. Nurses play a great role from the mitigation phase until the recovery phase (ICN, 2009).

**Mitigation/prevention phase.** Nurses working in the mitigation phase have responsibility to prevent and minimize the risks of health hazards associated with the disaster. The nurse's role in prevention/mitigation phase begins with identifying risk of both individual and community level. The nurse can work in collaboration with other health professionals to reduce the identified risk. In addition, nurses help community to identify their need in order to determine the existing condition of disease, health facilities along with the identification of high risk populations, such as those with mental health problems, chronic disease, or disability. The nurse helps to plan for the evacuation of health facilities and relocation of patients as necessary by collaborating with community leaders and other health care providers (ICN, 2009).

**Preparedness phase.** Planning and preparedness activities performed prior to the disaster are included in this phase. Preparedness phase involves assessment and evaluation of potential vulnerability in order to design/prepare structure for the disaster response before it occurs (Veenema, 2012). The main role of nurses in the preparedness phase is to assess community for the vulnerability for the earthquake. For instance, nurses get information of vulnerable population (children,

pregnant women, elderly and disabled) in respective community in order to prepare and protect them from the disaster. In addition, nurses play a great role in planning the structure for the earthquake disaster response with the help of other disaster team members (ICN, 2009). Health educator is another role of nurses to help community people to prepare for the earthquake disaster. For example, nurse teaches and helps community people and their family to prepare family disaster plan which includes disaster kit and other essential equipment to respond disaster effectively. Moreover, a nurse can be a trainer to prepare community health volunteers in various disaster management topics such as triage, first aid, effective transportation of the victims (Brown, Hickling, & Frahm, 2010; Powers & Daily, 2010).

**Response phase.** In this phase, nurses and other health care members gives effort to minimize health hazards created by the earthquake disaster (Brown et al., 2010). In fact, it is actual implementation phase of disaster planning which focuses primarily on relief activities such as saving human life, triage, providing first aid, care and basic life supporting needs to the victims (Veenema, 2012). Nurses as a first responders (Harrington et al., 2012) are involved actively in health response in various earthquake disasters. During earthquake response phases, most nurses worked in local hospitals, evacuation centers, as well as nursing homes at the earthquake affected areas (Kako, Ranse, Yamamoto, & Arbon, 2014).

First and foremost, nurses act as clinician role in earthquake disaster site where nurses provide mass casualty triage, transportation, first aid, intravenous insertion, bandaging, homeostasis, cardio pulmonary resuscitation, and so forth as well as provide continuity of care to the vulnerable population (Yan et al., 2015; Yin et al., 2011). Nurses during earthquake response worked as a communicator with other health care professionals as well as their colleagues for the effective

transportation and management of the victims. Coordinator is another role of nurse on the earthquake response in which nurses coordinate patient care through careful handling and movement of the patients from one area/hospital to another disaster area or hospital. Some nurses who have responsibility to lead and coordinate health care team for effective and managed care to the patient, the leadership is an essential role. In addition, establishing effective communication routes, collection of complex information and coordinating with local hospital were roles for the leader nurse during the earthquake disaster. Moreover, nurses become psychological supporter whose role during the earthquake disaster is to provide psychological first aid to directly as well as indirectly affected victims (ICN, 2009; Kako et al., 2014).

Additional specialized nursing roles are essential to provide continuity of care to the patients during the earthquake. These roles included infection control, perioperative, neonatal, and oncology care (Kako et al., 2014).

**Recovery/rehabilitation phase.** After the disaster, individual, community as well as the nation needs to return to its normal state and recovery actions helps to do so. Rehabilitation efforts help to overcome long term effects caused by disaster to the individual, community as well as the nation (Veenema, 2012). Before attempting the recovery actions, nurses need to assess ongoing community needs and have accurate data about population in order to determine effective interventions for best possible outcomes (Hassmiller & Stanley, 2012). In addition, after an earthquake people face different physical, psychosocial, emotional impacts which may run long term and needs support of health care team. For instance, earthquake results in traumatic injuries such as brain injuries, spinal cord injuries, musculoskeletal fractures and crush injuries (Bartels & VanRooyen, 2012; Chan, Gao, & Griffiths, 2010) . Vulnerable groups such as women, children as well as older and



disabled are at greater risk than other people and needs long term continuity of care as well as rehabilitative care (ICN, 2009). So, nurses plays a major role in providing continue rehabilitative care to these patients.

Psychological supporter is also another role of nurses who helps earthquake victims who have the feelings of severe hopelessness, anxiety, depression, and grief in post-traumatic phase (Zhang, Wang, Shi, Wang, & Zhang, 2012).

Moreover, additional role in recovery and rehabilitative phase includes public health surveillance, screening, Infection control and health promotion through health education (ICN, 2009).

### **Disaster Nursing Competencies Related to Earthquake Disaster**

Competencies have been defined from various perspectives in different literatures. For instance, Parry in 1998, defined competencies as the knowledge, skills and attitudes which can be measured against well accepted standards and are often related with the performance and environment of one's job (as cited in Amendola & Phoenix, 2008). This competency can be improved through education training, experiences as well as the personal development. In addition, competency is explained as the real performance of a person in a specific role, in a given situation (Daily, Padjen, & Birnbaum, 2010). It is not just only the knowledge that a person actually have but it is also the understanding of knowledge, clinical, technical, and communication skills, and the ability to problem solve through the use of clinical judgment (Schroeter, 2008).

Nurses must be competent to respond the disaster situation effectively and to successfully collaborate with disaster response teams (Bahrami et al., 2014b). Literatures have described the nurses' competencies in disaster nursing. However,

none of the literature described competencies of nurses specific to the earthquake disaster. International council for nurses (ICN) explored general disaster nursing competencies in all phases of disasters.

International Council for Nurses (ICN), (1997) defines competence as “a level of performance demonstrating the effective application of knowledge, skill and judgment” (ICN, 2009, p.34). The ICN disaster nursing competencies was launched as a framework of disaster nursing competencies in 2009 for general nurses. It consists of four competencies areas that correspond to the four phases in disaster management continuum: the prevention, preparedness, response, and recovery phases. These four areas include ten domains and 130 individual core competencies for nurses. ICN framework is aimed to strengthen the core capacities of nurses which are required to deliver disaster and emergency services as well as to encourage a global workforce qualified in order to respond future disaster events. In addition, the framework emphasize that nurses are required to have basic fundamental capacity or abilities to respond disaster event effectively and quickly and for the successful delivery of health care in disaster situations (ICN, 2009).

#### **Knowledge and skills of nurses regarding earthquake disaster.**

Knowledge is the recognition of previously learned fact or theory or situation (Sousa, 2011). Skill is an ability and capacity acquired through deliberate, systematic, and sustained effort to smoothly and adaptively carry out complex activities or functions which involves ideas (cognitive skills), things (technical skills), and/or people (interpersonal skills). The practices and skills that a nurse possess for the purpose of caring patients is underpinned by nursing knowledge that she gained through education, experiences, training as well as evidences (Hall, 2005). In a disaster situation, to function effectively and perform skills smoothly, knowledge regarding

proper management of the victim during the disaster situation is essential. Knowledge and skills on the assessment of the risks, vulnerabilities, and expected injury patterns will assist nurse responders to boost up more effective response during the immediate aftermath of a disaster (Veenema, 2012). Nurses going to rescue disaster victims and who do not have knowledge about the phases of disaster, what kind of patient they would deal with and what types of injuries are common for earthquake victims and skills to manage specific problems cannot function effectively during disaster situation. The knowledge and skills of nurses in earthquake disaster response and recovery phases includes knowledge on care of community, care of individuals and families, psychological care, care of vulnerable populations and long-term care of individual family and communities (ICN, 2009).

*Care of community.* Earthquake is one of the catastrophic natural disasters that can occur at any time, regardless of the location and person which has devastating effect on health. In order to respond and manage earthquake disaster effectively, nurses must have knowledge and skills on the community response to earthquake disaster and collaboration with disaster response team, mortality caused by earthquake disaster, morbidities or injuries caused by earthquake disaster, resource management, communication skills and community based health education.

*Community response to earthquake disaster and collaboration with disaster response team.* The main aim of the health care team and community during the disaster events is to minimize death and serious illness with limited resources and maximizing appropriate care for the largest number of patients. Immediately after the great East earthquake, Japan in 2011, nurses were assigned for the emergency relief activities such as providing care to evacuees at the evacuation centers who need medical and nursing care, assessing infectious diseases, communicating with other

health professionals and colleagues in various communities, maintaining and improving environmental sanitation and prevention of infection spread. The places where nurses worked included local hospitals, evacuation centers, and nursing homes at the earthquake affected areas (Kako et al., 2014).

In order to function effectively in the chaotic situations during disaster in the community, a nurse must have understanding about the how community respond to certain disaster and the resources available to respond the event. Every community consists of groups with variety of skills and abilities in addition to the personal and professional experiences that are essential to respond disaster events. So, effective community response is the mobilization of these resources to meet the health needs of the people in disaster situation for the maximum benefit of the victims. In addition, knowing how the community volunteers and other response teams can help before, during, and immediately following the aftermath of a disaster is crucial (Brennan, Cantrell, Spranger, & Kumaran, 2014).

*Mortality caused by earthquake disaster.* During the earthquake the primary cause of death is due to the building collapse. The high mortality is caused due to multiple traumas. Severity, place, time, and development level of the affected area are the main factors for the mortality during and after the earthquake disaster. Very young and very old age populations are at higher risk for mortality (Doocy et al., 2013). In addition, other factors such as poor socioeconomic status, people with physical disabilities, prior injury or illness, being indoors and being in a poorly constructed building during the time of the event are associated with the higher mortality in earthquake disaster. To be specific, individuals and households of lower socioeconomic status were at increased mortality and earthquake occurring at night had higher mortality rates than those which occurred at day times. Similarly, being

inside building and near the location of the epicenter were the stronger predictors for mortality during earthquake disaster (Doocy et al., 2013; Naghii, 2005).

*Morbidities or injuries caused by earthquake disaster.* The devastating effect of the earthquake disaster on infrastructures and housing buildings causes mass injuries leaving people to have long-term illness and disabilities. According to Doocy et al., (2013), 687 earthquake events occurred in between 1980 to 2009 in which estimated populations of 995,219 injuries were reported in 420 events. In 2010, Haiti earthquake event alone left 300,000 people injured (USGS, 2015).

During earthquake disaster, injuries are caused by the building collapse and falling objects from the buildings during ground shaking. The most common injuries were soft tissue injuries which include lacerations and contusions and fractures were the most common types of injury reported during three decades earthquake events (Ali et al., 2010; Doocy et al., 2013). In addition, the extremities were most likely areas of the body to be affected and crush injuries or crush syndrome were reported as the most common injury (Doocy et al., 2013; Kalantar Motamedi, Sagafinia, Ebrahimi, Shams, & Kalantar Motamedi, 2012).

Earthquake related trauma or injuries have been reported by World Health Organization (WHO) as well as the Center for Disease Control and Prevention (CDC) after devastating earthquake of Haiti in 2010. The most common injuries were minor cuts and bruises, simple fractures, dislocations as well as some victims suffered from serious multiple fractures or head, face, brain and other internal injuries and crush syndrome which required surgery, blood transfusion and other intensive treatment. In addition, significant number of cases was burn patients. Due to the limited resources, delayed presentation of acute injuries and inaccessible health facilities and minimum sterile standards at the time of the disaster treatment, risk of

wound infection and tetanus were high. Gangrene was found to be the complication of wound contamination (CDC, 2011; WHO, 2010a).

Several factors are related to morbidity during earthquake disaster. For instance Doocy et al., (2013) found that age, poor socioeconomic status and location of individuals at the time of the event has been linked with the higher risk for injuries at the time of earthquake event. In addition, there is an increased risk among young and working age adults and elderly with increasing age.

*Resource management.* Disaster is an event where there are always limited resources and improper management of those resources leads to the problems such as uncontrolled mobilization and over-response of resources. There is no denying fact that resource management is integral part of effective disaster management (Bahrami et al., 2014b).

The chaotic environment after disaster event often leads to improper management of the available resources. For example, during bam earthquake in Iran the crowd of volunteers who rushed to offer help caused a lot of chaos as well as misuse of the limited resources (Nekooei Moghaddam, Saeed, Khanjani, & Arab, 2014). Consequently, obstacles in the effective pre-hospital management of the victims were seen (Djalali, Khankeh, Ohlen, Castren, & Kurland, 2011). Nurses skills in assessment of the patients also determine the resource management during disasters. Accurate assessment and triage is essential for the correct estimation and application of the available resources. So, a nurse responding to the earthquake disaster must balance the available resources and accurate use of the resources to the needed victims (Bahrami et al., 2014b).

Several strategies can help nurses in effective management of resources during disaster events. For example, strong leadership, clear chain of

command, definitive role clarity as well as preparedness of sufficient equipment and facilities can help in proper resource management at the time of disasters (Nekooei Moghaddam et al., 2014). Moreover, preparing nurses' on safe and correct use of the equipment which is commonly used in performing the procedures such as, use of collar and board for spinal immobilization also helps in resources management during disaster situations (Gebbie & Qureshi, 2002).

*Communication skills.* Communication is one of the various aspects of disaster management. It is the process of conveying thoughts, ideas, warning, instructions, orders, commands, knowledge and information (Joshi, 2012). During emergency/chaotic situation following earthquake disaster, the partial or full destruction of communication system leads the rumors and confusions run unbridled. So, the flow of accurate and valid key information at the time of disaster is crucial. Moreover, communication skill is one of the important personal abilities for a nurse responding a disaster (Bahrami et al., 2014b).

The main purpose of communication during response phase of disaster is to convey the fact and clear information without creating any panic situation. Communication of nurses during disaster events includes communication with other health care providers and communication with patients and their relatives (Bahrami et al., 2014b). Firstly, communication with the other health care providers includes the team members who are responsible for caring and managing mass casualty. In addition, the communication between inter-hospitals as well as the field members is also vital. For instance, if the nurses working in disaster field do not communicate with the hospital where the patient is being transferred, the nurses would never know whether the hospital already exceeded its capacity resulting in the loss of time which can save patient's lives (Nekooei Moghaddam et al., 2014). Moreover, nurses' also

have the responsibility to clearly communicate accurate information to the patients as well as their families. So, the nurses are expected to have enough information about the problems and treatment actions and options in order to communicate accurately with the patients and family members (Bahrami et al., 2014b).

*Community based health education.* Health education is the communication of the information that is commonly undertaken to promote health of the community people. Immediately following the earthquake disasters, the health problems related with poor and unsafe water, sanitation, vector control and poor hygiene practice emerges which may lead secondary disasters (Jafari et al., 2011). Various measures can be taken to control the communicable diseases after the disasters.

Health education is a key to control over the communicable disease that can spread after disasters. Firstly, ensuring safe drinking water and sanitation to the community population can control water bore diseases. For example, nurses provide mass education about various measures of purification of water before drinking and cooking. Educating people about hand washing with soap and its importance to protect against fecal-oral diseases is equally important. In addition, providing awareness about the food safety to the community mass is crucial for the disease prevention after disasters. For instance, WHO has provided five guideline to ensures safety food supplements which includes keeping food clean to prevent growth and spread of dangerous microorganisms, separating uncooked and cooked food to inhibit transmission of microorganisms, cooking thoroughly to kill dangerous microorganisms, keeping food at safe temperatures in order to inhibit growth of microorganisms and using safe water and raw materials to prevent contamination (Jafari et al., 2011; Veenema, 2012).



*Care of individual and families.* During the disaster response, nurses are assigned to perform individual health assessment, mass casualty triage, mass casualty transportation, patient referral, psychological care (Yan et al., 2015). To effectively carry out these activities nurses must have basic knowledge, skills and understanding about assessment and triage in earthquake disaster response, trauma and wound care, patient referral and transportation, spiritual care, culturally competent care, communication with patients and families and ethical and legal issues during earthquake disaster.

*Assessment and triage in earthquake disaster response.* Disaster triage is the prioritization of victims during a disaster based on illness/injury, severity, prognosis, and resource availability. During the disaster, patients with little or no chance of survival are not resuscitated due to the limited resources at the time of the disaster (Mace & Mayer, 2008). The main goal of the disaster triage is “do the greatest good for greatest number of casualties”

Various triage systems have been used throughout the world according to the type and severity of the disaster. During the disaster response, primary or quick sorting of the patient can be done by commonly used four color coding system (Hogan & Burstein, 2007; Romig, 2012). Firstly, emergent/immediate/red is tagged to the patients whose injury is critical but can be cured with minimal time and available resources and who have good prognosis after treatment. For example, patients with poorly controlled external bleeding that can be cured with simple operation, patients with moderate burns, or penetrating trauma, early shock, and respiratory distress, bleeding or neurovascular compromise. Secondly, urgent/delayed/yellow is tagged to the patients whose injury is significant but able to tolerate a delay in care without the risk for substantial morbidity. Example in this category includes physiologically

stable patients with possible spine or head injuries without acute neurological deficits, Thirdly, minor/ambulatory/green is tagged to the patients who are physiologically well compensated or whose injuries are minor enough to wait for the treatment. Example includes minor lacerations, simple fractures or sprains. Finally, deceased/expectant/black is tagged to the patients whose injuries are severe and have minimal chance of survival or who do not have detachable vital signs. The resources required to save these patients can save huge number of the other patients who have better chance of survival. Example includes massive head injuries or third degree burns.

The other types of pre-hospital triage tools that can be used in disaster situation are START (Simple Triage and Rapid Treatment) for adults, Jump START for the pediatric patients, and SAVE (Secondary Assessment of Victim Endpoint) are also commonly used triage system in disaster situation (Mace & Mayer, 2008; Romig, 2012).

START (Simple Triage and Rapid Treatment) is the common triage tool for adult mass casualty incident primary triage. In this system, five basic parameters are assessed in adult: the first one is the ability to walk followed by the presence or absence of spontaneous respirations, the respiratory rate, an assessment of perfusion and lastly the ability to obey command. These parameters are assessed in stepwise for each patient until identification of a critical threshold criterion. The main goal is to sort patient within 30 second time. In this system, RPM (Respirations, Perfusion and Mental status) criteria are used to categorize patient in four color category. If the patient have respiratory rate (R)  $>30$ , Capillary refill (P)  $>2$  sec or absent peripheral pulse and mental status (M) who doesn't obey commands than the patient is categorized as RED or emergent. If patient have  $R < 30$ ,  $P < 2$  sec and M

obeys commands than the patient is categorized as YELLOW or urgent. If patient is not breathing after a jaw thrust than categorized as BLACK or expectant. Lastly, if patient is able to walk than categorized as GREEN or minor (Romig, 2012).

Jump START is a pediatric Mass Casualty Incident Triage Tool which is used for the primary triage of children (Mace & Mayer, 2008; Romig, 2012). In this system firstly the children are assessed for the ambulation, if the patients are able to walk then they are categorized as GREEN or minor. Similarly, if the patients are not able to walk, they are assessed for the breathing. For an apneic child, jaw thrust is performed and if the child starts to breathe they are tagged as RED. If they do not start to breathe, pulse is assessed and for the children with palpable pulse, 5 rescue breaths are attempted. For the patient without pulse is categorized as BLACK. After rescue breath, if the child is breathing, they are categorized as RED otherwise BLACK. In addition, the respiratory thresholds for spontaneously breathing children are 15-45 breathe per minute. If the rate is greater than 45 or less than 15 are tagged as RED. Furthermore, while assessing the perfusion in the children who have respiration in given threshold, capillary refill greater than 2 or failure to detect pulse are categorized as red. Finally, for assessing mental status who have good perfusion status, children are assessed for their alertness, responsive to voice or localize a painful stimulus. If the patient is alert, responsive to voice and or localize painful stimulus than the patient is tagged as YELLOW otherwise RED.

SAVE (Secondary Assessment of Victim Endpoint) is the secondary triage followed by START in which assessment of survivability of the patient are done on the basis of injuries such as head injury burn injury, abdominal injury and crush injury. The areas of the assessment in SAVE method are vital signs, airway,

chest, abdomen, pelvis, spine, extremities, skin, neurologic status and mental status (Mace & Mayer, 2008; Romig, 2012)..

A triage nurse must know the accuracy of triage decision can affect patient outcome. There are two kinds of triage errors, Over-triage and under-triage (Beach, 2010). When the victims are classified as immediate when they should be classified as delayed, then the condition is called over-triage. Similarly, when the victims are classified as minor when they should be delayed or they are classified as delayed when they should be immediate, then the condition is called under-triage (Beach, 2010).

Several studies have found that nurses have limited triage skills during disaster response. For instance, a study conducted by Bahrami et al. (2014) in which triage skills was assessed among 40 Iranian nurses revealed that none of the nurses were able to perform triage accurately. Similarly, in a study done on 40 nurses on triage competencies using simulated patients encounters found that more than 80 % of nurses had moderate level of triage skill (Wolf, 2010).

*Trauma and wound care.* During the disasters, nurses are commonly assigned for trauma and wound care. The commonly used nursing procedures for the trauma and wound care during earthquake are debridement, dressing, homeostasis, bandaging, fixation and manual handling (Mulvey, Awan, Qadri, & Maqsood, 2008; Yin et al., 2011). During the 2005 earthquake, wound care was done by carefully and thoroughly washing all wounds with saline and cleaned with brushes and beta-dine. Wounds that were seen dirty were left open up to 4 days and closed later. All patients were given intravenous or oral antibiotics such as ceftriaxone or amoxicillin and all the patients were immunized with tetanus vaccine before discharge (Mulvey et al., 2008).

Various studies have been conducted in wound care during earthquake disasters. For instance, Yao et al. (2014) reported that during 2008 Wenchuan earthquake, management of the wound and injuries were done on five phases which included field first aid, emergency treatment within 3 hours of injury, early treatment within 6 hours after injury, special treatment within 12 hours after injury and later stage treatment performed within 12 hours. In addition, the first step of wound care is to assess the wound for the degree of contamination, presence of foreign bodies and integrity of underlying structures followed by wound cleaning, removal of foreign bodies and appropriate debridement. The same study also emphasized delayed primary closure of wound. Wound closure is done on 48 hours or longer after wound dressing, debridement and repeat debridement if necessary. Adequate systemic antibiotics and tetanus prophylaxis is needed for every wound in the disaster situation (Wuthisuthimethawee et al., 2015).

Another common trauma related to earthquake disaster is fracture and dislocation. Nurses must have knowledge and skills to identify and manage fractures in the disaster situations. The fractures can be of two types: open and closed. The signs and symptoms of the fracture include swelling, redness, pain, bruising in the injured area and local bleeding may occur in open fracture. In addition the complications of the fractures must be identified by the nurse such as bleeding, hemorrhage, shock as well as death in some cases (Giorgi, 2013). The management of the fracture includes cast for the simple fracture and for the compound and open fracture bleeding control, reduction, immobilization, dressing and debridement. Special precaution care is needed to prevent complications such as pressure ulcer, deep vein thrombosis and internal bleeding (Giorgi, 2013).

Pain management is another major nursing concern during the disaster situation. Nurse must be able to assess and manage pain of the affected victims. Pain is the fifth vital signs that must be assessed with the other vital signs during the disaster (Guetti, Angeletti, Paladini, Varrassi, & Marinangeli, 2013). Pain must be assessed in terms of severity, location, quality and time. In addition, numeric rating scale (NRS) can be used in which pain is verbalized from 0-10 where 0 means no pain, 1 to 3 means mild pain, 4-7 means moderate pain, and 8-10 means severe pain (Hjermstad et al., 2011). Nurses must understand the physiologic changes associated with pain and its management. In addition, analgesics must be administered before every procedures (Campiglia, Consales, & De Gaudio, 2010).

Crush injury is one of the common problems after earthquake disaster. Early management of the crush injuries leads to proper prognosis of the patient. The initial treatment of the crush injury begins with the intravenous hydration which is aimed to restore end organ perfusion and prevent renal failure by volume expansion. Intravenous line must be opened with rapid infusion of sodium chloride solution or lactate ringers solutions in order to initiate the fluid therapy as soon as possible at the disaster site. These patients must be transported to the hospital for the further management which may be the blood transfusion and or hemodialysis or other further management (Sahjian & Frakes, 2007).

Spinal injury during disaster is surgical emergency that requires specialized care including initial immobilization and careful transportation of the patients. The patients with spinal injury need careful short term as well as long-term and rehabilitative care. Immediately after the spinal injury, movement of the spinal column must be restricted to avoid complications which include neurologic injuries and paralysis. Nurse must understand the concept of log rolling and correct

immobilization techniques for transporting the injured victims who are suspected or have actual spinal injury. In addition, the nursing concern includes early transportation early spinal fixation, management to optimize bowel and bladder care, and provision of appropriate skin care (Rathore et al., 2008).

*Patient referral and transportation.* After primary field triage of the victims, they are provided with the first aid care and management followed by transportation to the appropriate health facilities for further management. The referral and transportation of the patients depend upon the severity of the cases. For example, some patients are directly transferred to referral centers without treatment from the health camps based on the degree of severity (Biswas, Rahman, Mashreky, Humaira, & Dalal, 2015). Nurses must understand the referral systems and channels of the respective disaster sites for timely transport victims during and after disasters.

The process of patient transfer during earthquake and tsunami in Ache, Indonesia included triage, rapid treatment and patient transfer. After triage of the patient using START method, critically injured patients were given rapid and early emergency treatments, for example cardiac monitoring, oxygen uptake, establishment of infusion channels, and cardiopulmonary resuscitation. Highest priority was given to the patient with life threatening condition who could be saved by immediate transfer and treatment (Li & Zheng, 2014).

Secondary triage is performed before transporting patient to definitive health care unit in order to assess the injury, decide upon the referral centers and transportation priority, and perform some necessary precautions such as spinal immobilization for the patients with suspected spinal cord injury (Li & Zheng, 2014). At the evacuation site, the patient who received immediate high priority treatment may receive a low priority for transportation. Patients with time-critical injuries must

be transported to the appropriate hospital which has facilities to provide the patient with definitive care without delay as well as by most appropriate means of transportation (Dolan & Holt, 2013).

Safe and efficient patient transportation along with the coordination of the health care providers are paramount for the successful relief during the disasters (Li & Zheng, 2014). Early transportation can save life and minimize secondary damage to already affected areas of the victims by timely and specific medical treatment (Lodhi et al., 2011). During the earthquake, unique challenges of the transportation due to harsh damage of roads and infrastructures makes the transportation process more complicated (Djalali et al., 2011).

In earthquake disaster, significant number of the victims are suffered from injuries such as spinal cord injury (SCI), head injuries and fractures which is primarily due to falling debris (Gautschi et al., 2008). Among these injuries, SCI is the injury that needs proper pre-hospital management and transportation without immobilizing patients (Lodhi et al., 2011). For instance, during Pakistan earthquake approximately 600 of all victims were affected from the SCI (Tauqir, Mirza, Gul, Ghaffar, & Zafar, 2007). In 2008 Sichuan earthquake 13–15.2% of all patients admitted in tertiary hospitals was the cases of SCI (Li et al., 2012).

Improper pre-hospital management and reckless movement of spine during rescue and transportation results in further neurological deterioration. In a study of 83 SCI victims of Pakistan earthquake, only 9.6 % of patients were immobilized and only 12% of victims were transported by well-equipped ambulance (Lodhi et al., 2011). This result indicates the lack of basic knowledge of the rescue teams and health care providers about the trauma management and transportation.



Patients with the suspected or potential SCI requires careful and immense pre-hospital care to minimize secondary SCI and potential morbidity related to spinal immobilization. The main purpose of immobilization is to prevent the damage of neurologic function that may result from the pathologic motion of the injured vertebrae (Theodore et al., 2013). Ahn et al. (2011) made recommendation on pre-hospital care and management of suspected spinal cord injured patients. Firstly, the patients with suspected SCI must be immobilized with cervical collar, head immobilization, and a spinal board. In addition, the transport must be made to the definitive hospital center for care within 24 hour of the injury. Longer the duration of the time to transport patient higher is the chance of secondary damage and complications (Ahn et al., 2011; Tahmasebi et al., 2005).

*Spiritual Care.* Prayer, faith and spiritual practices are the most widely reported methods for coping with traumatic life events (Massey, 2006). The spiritual distress symptoms during the earthquake disaster may are asking questions like “why god do this?”, questioning justice and meaning, feeling far from previously held beliefs, feeling need to be cleansed, closing oneself off from loved ones, feeling despair and hopelessness, feeling guilty, wondering about life and death, feeling shame and so on (Massey, 2006) . A nurse must understand these symptoms of spiritual distress in order to provide spiritual care to the victims of the disaster.

Nursing intervention such as listening carefully, hearing victim’s story, saying “I am very sorry” or “my prayers are with you at this time”, providing peaceful environment, facilitating religious coping, providing hope for the future, assisting in finding meaning and purpose in life at the time of the disaster, connecting them to the family members can provide victims to feel comfortable spiritually during the disaster situation (Aten & Boan, 2013; Massey, 2006).

*Culturally competent care.* The culture of the nurse who is responding to the disaster may or may not be similar to the respective cultures of the communities. Culture is one of the barrier that influence health disparities among population and communities in order to access health care (Danna, Pierce, Schaubhut, Billingsley, & Bennett, 2015). In order to decrease this health disparity, especially during emergency situation, nurses must understand the specific needs, culture and norms of the specific population or community. In addition, disaster continues to occur across the world, so preparing nurses in terms of cultural aspect is equally important.

Danna & Bennett (2013) laid out the strategies for nurses in order to provide culturally competent care during disaster situation. Firstly, careful assessment of the vulnerable population is needed. Vulnerable population includes physically or mentally disabled, older and younger persons, sexual and gender minorities, immigrants, homeless individuals and rural residents. To provide culturally competent care to the vulnerable population, nurses must learn the basic structure of the emergency response system in their local and regional areas. Appropriate intervention of for the vulnerable populations in the community to be responding must be identified. In addition, nurses must know how to participate local people for mobilizing resources in spite of language barriers using the alternatives such as providing audio and video tools for those who do not understand the language.

*Communication with patients and families.* Nurses' communication with the patient and family members is equally important during emergency situation. So, a nurse must have proper communication skills and strategies to communicate effectively with the patient and their families in crisis situation.

Communication skills of nurses include various measures (Bramhall, 2014). Firstly, empathizing patients and showing how the other person seems to be feeling. For example, saying like “everything happened so fast, no wonder you are finding it difficult to take in”. Secondly, psychological focus deals with recognizing and responding to the emotions, feelings and concerns and providing psychological interventions. In addition, active listening on what the patient is trying to say and responding appropriately. Another strategy is using pauses and silence which gives patient time to think what they want to express by providing a slower pace and helping the person to engage in the conversation.

Communication needs differs with individual. For example, some patients just want nurses to listen their problems whereas others want specific explanations on what had happened to them or their family (Kourkouta & Papathanasiou, 2014). These different needs of the patients should be treated accordingly by the nurses.

*Ethical and legal issues during earthquake disaster.* In nursing, ethics is a branch of philosophy which is concerned with determining right and wrong in relation to people's decisions and actions (Chaloner, 2007). Being one of the challenging fields itself, disaster nursing care is unique and complex due to its ethical and legal conflict and challenges. Nurses must have reasoning skills and understand the concept of and principle of ethics as well as ethical analysis in various conditions in the workplace. In addition, regardless of the setting or context, nurses' must follow the code of ethics such as the right to life and choice, respect for human rights, along with cultural rights, dignity and to be treated with respect (ICN, 2012).

Nurses responding the disaster situation have challenges to follow code of ethics which is different than daily practice. For instance, in disaster situation

allocation of limited resources to the huge number of victims, lack of privacy, appropriate triage and treatment priorities, obtaining informed consent and working autonomously are some of the situations which challenges nurses to act with in the code of ethics (Aliakbari et al., 2015; Larkin & Fowler, 2002).

Aliakbari et al. (2015) discussed the nurses experiences related to ethical and legal aspects who worked during the disaster response and recovery. Firstly, despite of challenging situation during disaster, nurses' must focus on the the importance of acting ethically and professional responsibility. Professional responsibility includes being committed and responsible to the work and this includes being committed to work, unprejudiced care provision, accepting responsibility, respecting human life, dedication and selflessness, justice, and performing procedures correctly. In addition, nurses act ethically by respecting the patient right during the difficult situation. Nurses must follow the code of ethics and act ethically in disaster situation by preserving privacy, complying with principles of appropriate care, observing and respecting the rights and dignity of those affected by disaster, respecting colleagues, avoiding violation of ethics for personal gain or loss, maintaining continuous records, making decisions based on ethical obligations and respecting others' cultural beliefs along with the ethical responsibilities to the victims who suffer from diminished consciousness or unconscious.

Nurses working in the disaster situation must have knowledge and familiar with legal requirements. They should know to which act can cause legal problems and to which extent nurses are free to act. For example, in disaster situation the condition may arise that nurses may be bounded to do invasive procedures that they are not allowed to do and this may have legal troubles and charges. In order to avoid such problems, every nurses must be familiar with protocols and guidelines of

their institutions and or nations regarding the legal responsibilities and boundaries of nurses (Aliakbari et al., 2015; Bahrami et al., 2014b).

Various ethical and legal issues can arise during responding the disaster. Firstly, during triage, the patients who exceed the available resources are classified as “beyond emergency care”. In this situation, the ethical principle in disaster situation suggests that the health care providers must show patients compassion and respect for their dignity by separating them from others and helping them to administer appropriate pain relief and sedatives. In addition, another legal issue during disaster response is informed consent. It might be difficult to take informed consent from the patient and their legal representatives due to lack of time in chaotic situation. In this situation, if the patient is unconscious and cannot make decision on their own, their legal representative must be approached for informed consent. Further, if legal representative is not available and the patient need immediate treatment, consent of the patient may be presumed. Moreover, the nurses must make every effort to start and sustain available treatments according to priority (Ozge Karadag & Kerim Hakan, 2012).

***Psychological care.*** Mental health disorders are one of the most common problems during and after every disaster. Every people facing the disaster directly or indirectly are affected psychologically especially in earthquake disaster where aftershocks persists for longer period of time (days up to years) (Honma et al., 2012). Nurses have the responsibility to assess, identify and manage those psychological problems. Cases such as post-traumatic stress disorder (PTSD), depression, cognitive disorder, personality disorders, and so on during and after earthquake disaster (Wang & Liu, 2012). In addition, the long-term psychological

condition after months to years of earthquake disaster includes PTSD, depression, psychological distress and anxiety disorders (Ali et al., 2012; Livanou et al., 2005).

Nurses must be able to assess mental status of the population in the disaster and also assess the risk factors in order to determine available support systems. The symptoms of the PTSD after the earthquake disaster includes re-experiencing symptoms such as flash back, bad dreams and frightening thoughts, avoidance symptoms such as staying away from place, events or objects and hyper arousal symptoms such as feeling tensed, having difficulty in sleeping. Showing odd behavior, respond inappropriately to social cues and hold peculiar beliefs are the symptoms of Schizotypal personality disorder. Symptoms such as helplessness, hopelessness and a sense of being overwhelmed are symptoms of depression. Moreover, poor problem solving behaviors, low self-esteem and hopelessness are some symptoms of personality disorders associated with earthquake (Powers & Daily, 2010; Wang & Liu, 2012). Nurses must be aware of these symptoms in order to provide specific care to the affected victims.

The most common mental health and psychosocial intervention during the disasters were counseling, providing and facilitating community-based social supports, structured social activities such as social drama, music and art, provision of information, psycho-education, and raising awareness. Giving valid information during emergency situation is helpful to reduce anxiety and distress and the information must be clear, empathetic and uncomplicated which can be understandable for cognitive level of local 12 years old. In addition, encouraging survivors to do normal activities and active participation in the community for example social networking of the people and cultural and religious events such as

funeral ceremonies and grieving rituals is crucial in the emergency phase of the disaster (Tol et al., 2011; Van Ommeren, Saxena, & Saraceno, 2005).

Te Brake et al. (2009) laid out the guideline in order to provide early psychological intervention after disaster. The mental health and psychological interventions after the disasters are early screening, early preventive and curative psychosocial interventions, supportive environment, and the organization of care. At first screening must be done to identify the victims who are especially needed for the direct psychological care and help. Similarly, supportive environment consists of being open to immediate practical needs of affected population, listening to the victims, clear fact and up to date information about the situation, reunification with the people nearest to those affected and allowing the family members to stay together and reassurance for the victims who shows normal stress reaction.

Early preventive interventions consist of offering general information, psychological triage, and psychological first aid (Powers & Daily, 2010; Te Brake et al., 2009). General information consists of advice on how to continue with the daily routine based on the level of understanding of the victim, reassuring explanation about normal reactions and provision of the indications for when to seek help. Psychological triage includes the identification of the victims with mental problems which may serious clinical symptoms and require diagnosis/treatment. Psychological first aid is initial intervention to the survivors which involves approaching support and reassurance, offering safety, comfort and communication.

***Care of vulnerable populations.*** Vulnerable populations are those populations who are at greater risk for poor health status and health care access (Shi & Stevens, 2005). Vulnerable population in disasters includes those who are incapable or unable to access and use the resources that are made available in disaster

preparedness and planning, response and recovery (Wingate, Perry, Campbell, David, & Weist, 2007). Those populations are defined vulnerable on the basis of age, gender, race/ethnicity, socio-economic status, and people with chronic sensory, mobility or cognitive impairments, people who depends upon assistive devices or complex medical regimens in order to survive.

According to WHO, during the acute phase of the disaster, the priority response includes identifying persons with disabilities, responding with the special health care needs, implementing curative and therapeutic intervention such as prevention of bedsores (WHO, 2005). In addition, people with mental disabilities may be left behind during disaster response due to their inability to understand instructions during rescue and relief. During the earthquake, loss of key support networks made disabled people feel more vulnerable when repeated after shock occurred (Phibbs, Woodbury, Williamson, & Good, 2012).

Elderly populations who are 65 or older are at high risk during emergency situations. During 2011 Japan earthquake and tsunami, 56.7% of total deaths were 65 years or older (Nakahara & Ichikawa, 2013). These populations are vulnerable to the disasters due to their impaired mobility, diminished sensory awareness, chronic health conditions and social and economic limitations (Fernandez, Byard, Lin, Benson, & Barbera, 2002; Powers & Daily, 2010). Elderly individuals need particular attention and support during and after the disasters.

Due to the special physical and psychological needs, pregnant women are also vulnerable population during emergency situations. During the disasters, interruptions of clean water supply for drinking and bathing, inadequate access to safe food, exposure to environmental toxins, crowded conditions in shelters and interruption of health care and infrastructures leads pregnant women to be vulnerable



and needs special care (Callaghan et al., 2007). After the Taiwan and China earthquake, higher rate of maternal psychiatric distress, low birth rates, preterm birth and birth defects were seen (Harville, Xiong, & Buekens, 2010).

Children under the age of five are particularly vulnerable to disaster. Due to poor judgment and decision making skills, inability to advocate for themselves, dependent on others for livelihood and emotional support as well as susceptible to injuries at the times of disasters and emergencies makes children more vulnerable to disasters (Hoffman, 2008; Powers & Daily, 2010). In addition, children are more susceptible to the infectious disease due to their immature and underdeveloped immunity and additionally are likely to develop dehydration, malnutrition, and exhaustion more quickly than adults (WHO, 2011).

Several nurses' skills are required to care for the vulnerable population (Van Zandt, Sloand, & Wilkins, 2008). Firstly, excellent interpersonal skills are required to establish trusting and effective relationship with the victims. Trusting relationship is important to provide continuity of care and achieve treatment goal. Similarly, health promotion and patient education skills are important for nurses to promote and continue self-care of the vulnerable populations during the disasters. In addition, needs of the voiceless vulnerable populations are often underserved. So, strong patient advocacy skills are needed to provide the continuity of care during disasters and emergencies with limited resources. Finally, cultural sensitive care which includes appreciation of the economic, social and cultural influences on the health care helps in successful individualized care.

During the disasters, addressing the barriers to the basic needs such as transportation, shelter, access to information of the vulnerable population is another major concern (Powers & Daily, 2010). Many emergency vehicles used for the

transportation of the disaster victims are not well equipped with the lifts that are necessary for the people using wheel chairs and peoples with mobility impairments. In this case, transportation options for the disable populations must be provided. The shelter sites for the disaster victims may not be able to accommodate individuals with disabilities, hearing, vision, mobility and cognitive impairments, age, specific needs and chronic medical conditions. Careful arrangement of the shelter for these populations is necessary. In addition, the shelters for the vulnerable people need to be staffed by health care professionals with access to the necessary resources such as medical equipment, medicines.

Vulnerable populations such as people with the cognitive or sensory limitations, limited language skills or literacy limitations may not access to the important information related to the evacuation orders, shelter locations and transportation options. For example, people with hearing impairment cannot rely on the radio or emergency sirens or other audible type of information. In this case, information must be disseminated on television, as sign language, videos and internets. The vulnerable populations must be encouraged to have reliable network of family, friends and neighbors to receive, interpret and disseminate vital information (Powers & Daily, 2010).

*Long-term individual, family and community recovery.* After the active response phase individual, family and communities are supposed to return to the previous state of living. In order to work effectively in recovery phase, nurses are intended to have knowledge on environmental impact after earthquake disaster and disease outbreak after earthquake disasters.

*Surveillance.* Surveillance is the systematic collection, analysis, and interpretation of deaths, injuries, and illnesses which enables public health to track

and identify any adverse health effects in the community. During the disaster, surveillance is important to determine the extent and scope of the health effects on the affected populations. In addition, it helps in detection of potential outbreaks and track disease and injury so that available resources can be effectively and early deployed to the affected populations (CDC, 2012). Nurses can play vital role in surveillance and investigations because they can have valuable information from the beginning of the response as they assess, triage patient, provide preventive and curative care, provide health education as well as psychological support to the victims (Veenema, 2012).

The role of nurses in surveillance begins immediately after earthquake disaster. Immediately after the disaster, the surveillance process includes collection, analysis, and dissemination of data on hazards, exposures, and health outcomes (Nsubuga et al., 2006). After the Haiti earthquake, the surveillance included detecting and responding to outbreaks of epidemic-prone diseases based on observations from health facilities and monitoring mortality and nutritional status at the community.

*Disease outbreak after earthquake disaster.* Outbreak of communicable diseases and infectious disease after any natural disaster is the major concern of public health which can lead to secondary disaster. Lin, Ashkenazi, Dorn, and Savoia (2014) reported that the interruption of access to the safe water and sanitation, population displacement, overcrowding, increased exposure to disease carrying vectors and poor access to health services during the disaster situation were the main risk factors that creates the environment to the increase the chance for communicable disease.

After earthquake, outbreak of infectious diseases can be due to substantial population displacement into overcrowded shelters where there is limited access of food and safe drinking water. In addition, the disease outbreak may be due

to the degradation of sanitary conditions and destruction of water and sanitation systems caused by the earthquake disaster (Kouadio, Aljunid, Kamigaki, Hammad, & Oshitani, 2012). The communicable disease associated with the disaster includes water borne diseases such as diarrhea, cholera, vector borne diseases such as malaria, dengue, crowding associated disease such as respiratory diseases, measles and other diseases such as tetanus (WHO, 2006).

After the great east Japan earthquake in 2011, the most frequent communicable disease were respiratory infections and gastrointestinal infections with some cases of jaundice (Iwata et al., 2013). In addition, the incidences of respiratory and gastrointestinal illness were highest seen infectious disease after the great east japan earthquake. The diarrheal infection is the most common infectious disease after earthquake event followed by viral hepatitis A and E. Cholera caused significant number of death after Haiti earthquake. In addition, respiratory infection was seen after almost all of the earthquakes that occurred in between 2000-2011. In developing countries like Pakistan, cases of measles and meningitis which were supposed to be transmitted due to poor hygiene, limited access to medical and nursing care, crowded camps and living in close quarters with infected persons (Kouadio et al., 2012). After earthquake disaster, wound infections, gas gangrene, and tetanus are also common infections associated with trauma after disasters (CDC, 2011; WHO, 2010a).

Vaccination is the major intervention after earthquake disaster to control communicable diseases. The main aim of vaccination after earthquake disaster is to minimize the occurrence of vaccine-preventable diseases such as tetanus, measles and so forth. After the Haiti earthquake, vaccinations such as TT vaccine, vaccinations against diphtheria, measles, rubella, vitamin A supplements and

albendazole were provided according to the age factors and injured population (WHO, 2010b).

*Primary health care services after earthquake disaster.* The primary health services during the earthquake disaster are provision of basic needs such as food, shelter and security, immunization services, water supply and sanitation, vector control, risk communication and public education and communication, collaboration and referral services (Jafari et al., 2011; Powers & Daily, 2010; Veenema, 2012). Health care services after the disasters may be significantly affected in terms of health infrastructure, health workers, medical supplies and equipment during the disaster (Powers & Daily, 2010). Concerning the fulfillment of the basic needs and safety of the population primary health care services must be established. Nurses must have understanding about methods of health promotion, basic principles of environmental health along with the strategies of disease prevention (Veenema, 2012).

Large scale disaster always creates problems related to the food security, shelter management as well as the security of the affected victims. However, the nature of food and nutrition problems depends on the type of disaster, its duration and size of the area affected, and nutritional status of the population prior to the disaster. Providing safe food and nutritional support to the vulnerable population in the community such as infants, pregnant women, older people, people with chronic illness and disabilities is important during and after the disaster. In addition, food borne illness such as salmonellosis, giardiasis, amoebiasis and so forth is common at the times of the disasters. Regarding the food safety concern, WHO has issued the recommendation for ensuring food safety. The food safety measures during the disaster includes (i) keep food clean for preventing the spread and growth of harmful microorganisms (ii) separate cooked and uncooked food to inhibit transfer of harmful

microorganisms (iii) cook thoroughly to kill dangerous microorganisms (iv) keep food at appropriate temperatures to inhibit growth of harmful microorganisms and (v) use safe water to wash raw materials to prevent contamination (Veenema, 2012).

Adequate housing and shelter is essential human right following the disaster in which survivors have right to live in security, peace and dignity. The aim of shelter related intervention in disaster situation must address the issues such as protection from environmental issues, privacy, dignity and physical as well as psychological security as well as support of livelihood. In addition, community participation in decision making for the shelters as well as environmental considerations must be made while providing shelter management (Powers & Daily, 2010).

Provision of safe and sufficient water is essential during and after the disaster. To prevent the outbreaks of the diarrheal diseases and other water-borne diseases, supplies of water per person must be adequate which is a minimum of 20 liters per person per day for drinking, washing, bathing, and excreta disposal, and management of solid wastes (Kouadio et al., 2012). Nurses need to collaborate with the public health staffs and agencies which are responsible for monitoring and assessing the quantity and quality of water supply in recovery phase of the emergencies and disasters. Safe disposal of human excreta through the provision of toilets helps to prevent excreta related diseases (Veenema, 2012). Moreover, recovery programs should include construction of latrines as well as educate and encourage the community people to use the latrines.

Vector control is the primary public health intervention for reducing transmission of vector borne disease such as malaria, dengue, and plague. For malaria vector control, several measures such as insecticide-treated mosquito nets can be

distributed following disaster. In addition, indoor residual spraying with insecticides is appropriate for populations living in permanent housing structures with vectors residing indoors. For dengue vector control various sanitation measures must be taken such as proper solid waste disposal, improved water storage practices, including covering containers to prevent access to mosquitoes (Kouadio et al., 2012; Veenema, 2012).

### **Judgment ability of nurses regarding earthquake disaster.**

Kataoka-Yahiro and Saylor (1994) defined judgment is the outcome of the critical thinking that is relevant to nursing problems in a variety of settings. Clinical judgment is the informed opinion that relates observation and assessment of the patients to identifying and evaluating alternative nursing options (Standing, 2014).

During the emergency or disaster situation, the judgments and decisions that are made in the first minutes, hours, and days are critical to successful rescue, damage control, prevention of death, injury and structural loss, and the overall resolution of the disaster. In additions, regardless of the situation that may be emergency or non-emergency situations, judgments and decisions must be based on ethical as well as legal rational (Aliakbari et al., 2015). Judgment and decisions are quickly made during the emergency and disaster situations. For example during triage, whether to put injured patient in red zone or yellow zone, the decision must be made within 30 seconds to 1 minute. The judgment and decisions made any situation that may be static or dynamic situation determines the outcome of the patients (Noon, 2014). It is important to assess the status of the perceived judgment and decision making skills among nurses, in order to plan and facilitate appropriate judgment and decision making skills through training, decision support system as well as the simulation sessions.

*Care of community.* Judgment and decision making ability while responding disaster for the care of community includes mass casualty triage.

Disaster triage is the prioritization of victims during a disaster based on illness/injury, severity, prognosis, and resource availability (Mace & Mayer, 2008). During triage, the decision maker must know what they are doing, why they are doing it and which action to take to achieve a positive and satisfactory action (Kennedy, Aghababian, Gans, & Lewis, 1996). Triage involves clinical judgments that have to be made within a short span of time and these decisions have major implications for the safety and outcome of patients. In addition improper triage judgments and decisions during the mass casualty triage leads to over-triage and under-triage. Over triaging patients leads to waste of scarce resources whereas under-triaging patients may endanger patient safety causing negative outcome (Khorram-Manesh, Lennquist Montán, Hedelin, Kihlgren, & Örténwall, 2011). The patients or victims who have greatest chance of survival in limited resources (time, equipment and supplies and manpower) must be managed first because of scarce resources.

During disaster, mass casualty triage must be taken in every stage such as in the field, before transportation, at emergency units and prior to surgery. So, in every stage lifesaving treatment are given and decisions made on further treatment given in relation to available resources. Nurses must make judgment and decision regardless of age, occupation and economic status of the patient within the array of ethical and legal principles. In addition, ethical principle such as autonomy, veracity, fidelity, justice and beneficence must be followed while making triage decisions (Good, 2008; Repine, Lisagor, & Cohen, 2005). However, during disaster nursing triage it is difficult and challenging for nurses to make judgment and decisions following the principle of triage (greatest good for the greatest number) and the



principle of ethics (justice, autonomy, beneficence) at the same time. For instance, a nurse triaging patients on the basis of priority of care and allocate resource accordingly in disaster scene, such situation obviously creates the bias and inequity of care making the decisions more complicated making principle of justice on controversy (Good, 2008). In this situation, nurses must make good effort for the effective judgment and decision based on ethical principles with the help of national, institutional and organizational protocols and guidelines (Kong, 2013).

Body (2014) discussed about the ethical dilemmas in emergency medicine in which certain triage situations has been given where health care providers have to make decisions by critical thinking and following ethical principles. For example, when there are limited resources, patients with yellow tag who can wait 60 minutes have been waiting for over 1 hour and at the same time the red tagged patient arrived. Now, in this situation, would it matter if the yellow tagged patients had waited for more than 2 hours instead of 60 minutes or the red tagged patients will be given priority rather than yellow tagged patients who waited beyond 1 hour? (Body, 2014). Kilner (2002) surveyed the accuracy of triage decisions made by the pre-hospital emergency health care providers (100 doctors, 59 nurses and 74 paramedics). The accuracy of triage decision making skills was assessed using 20 individual case scenarios.

***Care of individuals and families.*** In this section, judgment and decision making ability of the nurses during earthquake disaster response consists emergency patient care. During the disaster the nurses are allocated for the emergency patient care where nurses must make judgment and decision quickly in order to allocate right resource to right number of patient thus maximizing the patient outcome. Judgment and decision making during emergency condition are often

complicated due to huge number of patient at a time with similar condition .Alike triage decision making, nurses in emergency situation may have the ethical dilemmas such as protection of life versus protection of resources, balance of benefit versus risk, withholding versus withdrawing life support/care, maintaining autonomy and so on (Eyal, Firth, & Group, 2012; Hasan Kasule, 2011).

During mass casualty events where there are limited life sustaining resources, several ethical challenges were faced by the health care providers. For example, during Haiti earthquake health care providers faced several ethical challenges such as limited oxygen tank. Health care provider had to decide whether to provide oxygen to the one individual who have asthma to stay alive or to reserve that oxygen for other patients who may get more benefit out of it (Geale, 2012). In addition, due to limited resources patients categorized as expectant (Black) are rejected for the curative treatment. At that time, the patient care must be focused on palliative treatment and the nurses must make decisions to alleviate comfort and facilitate peaceful death (Devereaux et al., 2008).

***Psychological care.*** During the disasters, psychological care can be given to the victims with existing mental health problem and victims with acute mental health problems. During the situations of scarce resources, health care personnel must have adequate judgment abilities and decision making capacity in order to distribute the resources by adopting principles of ethics.

Alike other disciplines, there are various ethical principle in order to make judgment and decisions during emergency situations (Pate & Fisher, 2007; Shahriari, Mohammadi, Abbaszadeh, & Bahrami, 2013). Respecting autonomy includes taking informed consent from the patients before providing psychological care, respecting patient's belief and providing privacy while taking data and providing

care. In addition, justice is another ethical principle which is used to make decisions for fair distribution of the resources. During disasters, conflicts may arise between giving priority to patients with chronic mental health problems or patients with acute psychiatric problems.

Beneficence is another principle that has been used to guide decision during emergency psychiatric care (Pate & Fisher, 2007). Sometimes the health care providers may have to override the other ethical principles in order to bring benefit or good outcome to the patients. For example, a husband searching for her wife in hospital/evacuation area, the beneficence of the wife and husband overrides confidentiality of the patients. In addition, non-maleficence is an obligation to avoid doing harm while giving psychological care. For example, health care providers may refuse to perform potentially harmful procedures to the psychiatric or addicted patients.

***Care of vulnerable populations.*** Judgment and decision making among vulnerable populations is even more challenging than other groups of populations due to their physical and psychological constraints. Older populations during disaster are more vulnerable and nurses' faces tremendous ethical challenges in order to make decisions during triage and emergency care.

Various physiological changes that take place during the disasters makes older populations frail. They may not hear, understand or remember the instructions on what to do during mass casualty incidents. In addition, the underlying pathological conditions such as cardiovascular disease, respiratory problems, chronic kidney diseases and mental health issues places older people at higher risk for decompensation especially in stressed and anxious condition during disasters. In this condition, when a nurse tagged patient as yellow based on triage guideline. But, due

to inability of the body to maintain homeostasis for longer time, these patients may get worst after short period of time. On the other hand, if these patients are given priority as red “urgent”, other patients who could be saved with the same resources could be missed (Donatelli & Somes, 2012; Joan Somes & Donatelli, 2014; J. Somes & Stephens Donatelli, 2012).

During disaster response, resources such as medications, equipment and staffs may all be limited, leading a tendency to discriminate against older and vulnerable populations. For example, if there is limited number of ventilators, beds or dosage of medication, who is the appropriate person to receive it, an old man or young adult who have been tagged as urgent (Joan Somes & Donatelli, 2014)?

***Long-term individual family and community recovery.*** Disaster recovery activities are followed by the response activities. After active relief and chaotic response, in recovery phase, the challenge starts from managing and providing basic primary health care to long-term rehabilitation of the population. The primary health care services includes ensuring adequate water and sanitation facilities, food safety, vector control, vaccination campaigns, establish essential clinical services and providing basic laboratory facilities (Jafari et al., 2011). During disaster situation, need of population exceeds the available resources. So, nurses have challenges in making judgment and decisions in order to distribute the limited resources to right person at right time (Moodley et al., 2013).

After the emergency response in earthquake disaster, communicable diseases including vaccine preventable diseases can spread faster due to crowded area and unhygienic conditions during crisis situation. In order to reduce communicable disease transmission, interventions such as vaccination, should be deployed along with food, water and shelter. Several issues can arise while making decision to

allocate limited vaccination supply which includes balance between benefits and harms and obtaining informed consent (Moodley et al., 2013). Firstly, while distributing vaccination to the community people, adequate information about the vaccination must be obtained including its dosage and side effects in order to reduce harm related to improper dosage and side effects of the medications which may include death of the victim. Secondly, fair supply or distribution of the vaccination must be done ensuring maximum benefit for maximum number of victims. However, in some cases priority may be given to the most vulnerable populations such as children, elderly or pregnant women and poor and marginalized victims who have high chance of disease transmission or depending on the community priorities.

Moreover, deciding to obtain valid consent form before any intervention is vital which holds the principle of the respect of autonomy of the victims. Information regarding the risk and benefits of the vaccinations should be communicated to the target victims in order to make informed decisions. In addition, sometimes the victim's best interest and benefits must be kept beyond the victims or their family choice to receive vaccination. For example, children are particularly high risk for contracting communicable diseases during disasters. While making decisions in this case, parents' refusal to have their children vaccinated should be respected if the risk of disease is low. On the other hand, if children who are at particularly higher risk of communicable diseases, parental refusal may be overruled to protect the child's best interest and benefit (Finn & Savulescu, 2011).

## **Factors Related to Nurses' Knowledge, Skills and Judgment Ability Regarding Earthquake Disaster**

Several factors are associated with the knowledge, skills and judgment ability of nurses on disaster nursing. Nurses' have been known as the largest healthcare workforces who are at frontline in disaster and emergency situations. So, all nurses must have basic knowledge, skills and judgment ability regarding disaster nursing to respond disaster situation effectively (ICN, 2009). Factors such as training and education, previous experiences, self-preparedness and working experiences have been significantly associated with the nurses' knowledge, skills and judgment ability in disaster.

**Training and education.** The understanding of the disaster nursing concept and its competencies through education and training aid nurses to function disaster event effectively. Studies have found that the knowledge and skills of nurses on disaster nursing has been associated with the training and education. For instance, Hermawati (2010) found that training and education is positively correlated with nurses' preparedness of knowledge and skills in tsunami disaster nursing. Maulidar (2011) explored that educational background is one of the factor that caused low level of knowledge of nurses' regarding tsunami disaster nursing.

Training helps nurses to increase their disaster knowledge and skills. For example, after giving disaster nursing education program, knowledge level increased significantly among nurses on disaster preparedness (Burnock, 2014; Ghanbari, Maddah, Khankeh, Karimloo, & Ardalan, 2011). The guidance booklet had significant positive improvement in nurses' knowledge regarding disaster preparedness (Diab & Mabrouk, 2015). Furthermore, training program for public

health leaders in China enhanced knowledge, self-assessment of skills and improved emergency capability (Wang et al., 2008).

Clinical skills of the disaster nurses have been associated with the knowledge of the nurses on disaster nursing. For instance, Husna (2010) found that higher the level of knowledge in tsunami disaster nursing, higher is the clinical skills among nurses.

**Previous experience.** Previous disaster response experiences provide the nurses with the confidence and feeling of preparedness for the further disasters (Hammad, Arbon, Gebbie, & Hutton, 2012). Prior experience in disaster situation has been positively linked with knowledge and skills of nurses regarding disaster nursing (Hermawati, 2010). Al Thobaity et al., (2015) found that 26.01% of nurses ( $n = 600$ ) had their knowledge and skills through the real disaster experiences. Nurses who had previous experience regarding tsunami disaster had higher knowledge level and clinical skills (Husna, 2010; Maulidar, 2011). Moreover, previous participation in a major disaster and past experience in a post disaster shelter care was significantly associated with the disaster competency among the Texas nurses (Baack & Alfred, 2013).

Clinical judgment and decision ability of nurses has been linked with the past experiences. Dietrich (2010) reported that past experiences in the emergency situation may influence nurses' judgment and decision making abilities. A quantitative study done by Yang et al. (2010) reported that previous experience in disaster situation helped nurses to find helping and caring role.

**Self-preparedness.** Self-preparedness of nurses toward disaster preparedness also leads to increased knowledge and skills of nurses in disaster nursing. Nurses who had lack of self-preparedness had low level of knowledge and

perceived skills (Al Khalaileh et al., 2012; Maulidar, 2011; O'Sullivan et al., 2008). In order to work more effectively and with fewer mistakes in real situation, nurses must update their knowledge periodically and prepare themselves for future disasters (Nasrabadi et al., 2007).

**Working experience.** Another factor which influences the competency of nurses in responding disaster events is clinical working experiences. Al Khalaileh (2012) found that there was significant difference on level of knowledge, skills and preparedness among nurses with more experience and less experience. For example, nurses with higher experience had high level of knowledge skills and preparedness.

In addition, nurses' experience was important factor for decision making during emergency situation (Gunnarsson & Warrén Stomberg, 2009). Triage nurses who had high years of experience had higher judgment accuracy in emergency departments (Chen et al., 2010).

### **Summary of the Literature**

To conclude, earthquake is one of the natural disaster that have high occurrence worldwide leading to physical and psychological health impact on human health. Nurses as a largest workforce around the world must be prepared for the disaster as it can happen to any person, place or nation. ICN have emphasized that every nurses around the world must be prepared in terms of knowledge, skills and judgment regarding the disaster. To work effectively when earthquake disaster occur, nurses must have disaster nursing competencies related to earthquake. Several studies have found that nurses are not well prepared to respond disaster events. In addition, studies have explored the nurses' knowledge and skills specific to one phase



(preparedness phase) and disaster in general. A developing country like Nepal, which has been hit by the earthquake frequently, should have well prepared nurses in order to respond disaster effectively. Till the date, limited studies have been conducted regarding the competencies of nurses in any kind of disaster.

In order to fill this gap, this study was conducted to describe the level of disaster nursing competencies in terms of knowledge, skills and judgment ability regarding earthquake among nurses in Nepal. The concept derived from the ICN framework has provided a conceptual framework underpinning this study. In addition, to relate the concept on earthquake disaster additional studies that has been conducted especially in earthquake disaster has been added in this study.

Earthquake disaster nursing can be explained as implementation of basic knowledge, skills and judgment ability to recognize and address various health impacts caused by the earthquake disaster in public health. The identified roles of nurses in earthquake disaster are health educator, clinical role such as mass casualty triage, safe patient transportation and first aid, communicator, leader, coordinator of care, infection control and so on. The knowledge and perceived skills and judgment ability of the nurses regarding earthquake disaster in response phase includes care of community, care of individuals and families, psychological care and care of vulnerable populations. The recovery phase includes knowledge, skills and judgment ability of nurses in long term individual, family and community recovery care in earthquake disaster. Moreover, several factors such as education and training, previous experiences, self-preparedness and working experiences are associated with the knowledge, skills and judgment ability of nurse.

## **Chapter 3**

### **Research Methodology**

This chapter presents the research methodology details which consists of the research design, population and samples, instrumentation, validity and reliability of the instruments, data collection procedures, ethical considerations, and data analysis of the study.

#### **Research Design**

This descriptive survey study was aimed to describe the levels of nurses' competencies in terms of knowledge, skills and judgment ability regarding earthquake disaster in Nepal.

#### **Population and Samples**

**Target population.** The target population in this study was nurses who were working at different hospitals (tertiary hospital to district level hospitals) of earthquake disaster affected and non-affected areas in Nepal.

**Sample size estimation.** The researcher used proportion of the known population to determine the sample size of this study. According to Singchangchai, Khampalikit, and Na-Sae (1996), if the sample size ranges above 10,000, approximately 1% of its subject can be used to represent it. The total population of the registered nurses in Nepal is 33,293 (Nepal Nursing Council, 2015) and 1 % of the population were included which was about 332 for the sample size. To ensure that the minimum number was met, an additional 10 % of the subjects were added to the

sample. Thus, the potential nurses of 366 were approached initially.

**Sampling technique.** In this study, multi-stage stratified purposive random sampling was used. There are 14 zones and 75 districts in Nepal. The earthquake occurred in six zones and nurses in the non-affected area were recruited for helping people those affected areas. The following steps were followed for the sampling.

At first, two zones each were purposively selected from the list of earthquake each affected and non-affected area on the basis of geographically accessibility to those areas. After that, one central level hospital, two zonal/regional level hospital, two medical college teaching hospital and 4 district hospitals were randomly selected from each of two zones resulting in the survey of 18 different levels of hospitals. The samples in each hospital were randomly taken by using the proportion formula in order to reach 366 sample sizes. The process of sampling is shown in figure 1.

There were 1857 nurses working in the 18 different levels of hospitals. In order to estimate the proportionate sampling and reach estimated sample size, following formula has been used:

$$n_1 = \frac{N_1}{N_{\text{total}}} \times n$$

$n_1$  = Sample from each zones/district

$N_1$  = Population of each zones/districts

$N_{\text{total}}$  = Total population of randomly selected zones and districts

( $N=1857$ )

$n$  = sample (366)

Thus, 151 nurses were selected in earthquake affected areas and 215 nurses were selected in non- affected areas (Table 1). Further, the nurses were selected randomly by listing the number of nurses who met the inclusion criteria and lottery method was used to select each nurse. The number of nurses from each zone and district is shown in table 1.

**Inclusion criteria.** Inclusion criteria in this study were registered nurses: (1) having at least three years of diploma level of education in general nursing, (2) being currently working as a registered nurse in a hospital setting and (3) being willing to participate in the study.

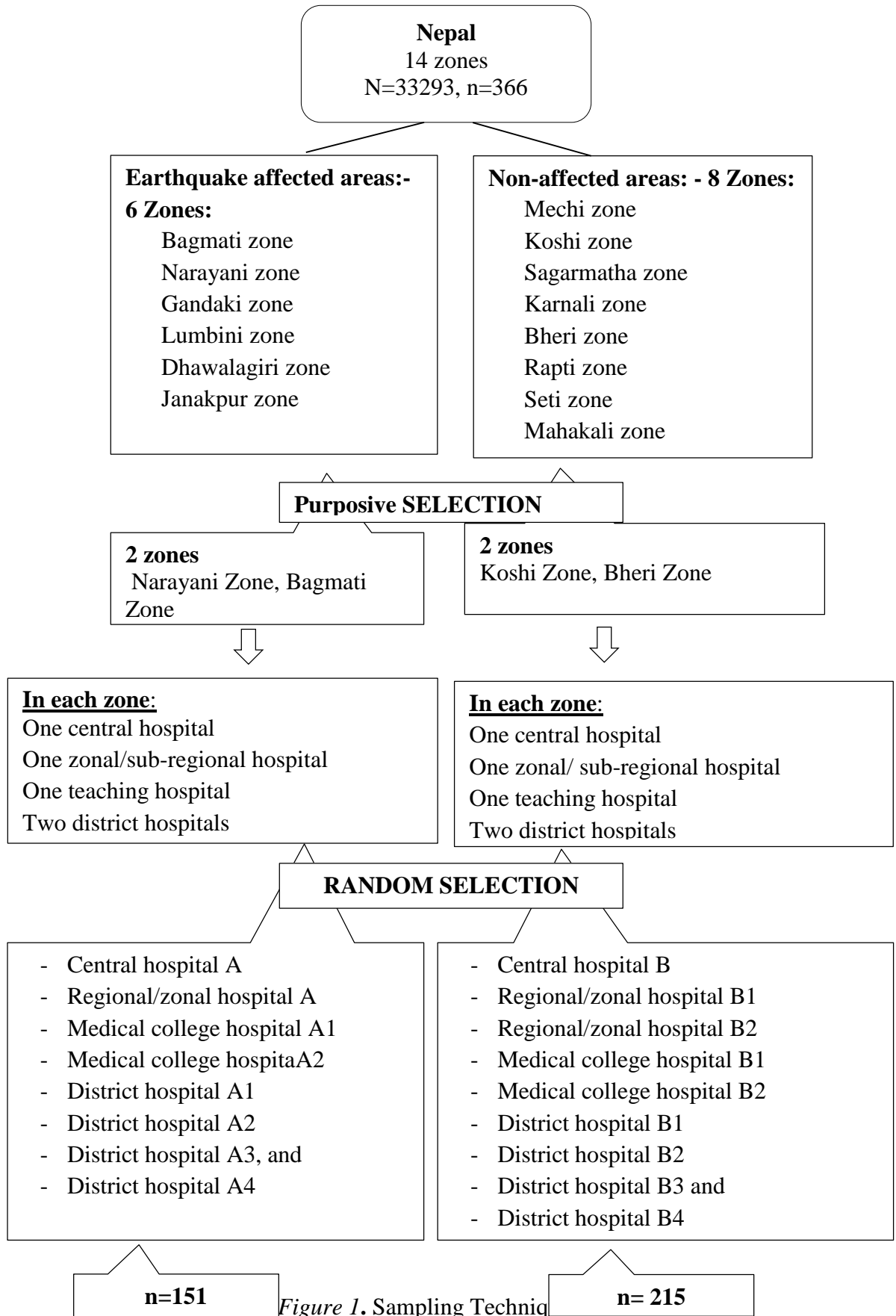


Table 1

*Number of Nurses from Each Hospital*

No.	Hospitals	N1	n <sub>1</sub>	No. of response
<i>Earthquake affected areas</i>				
1.	Central hospital A	283	55	53
2.	Regional/zonal hospital A	25	5	5
3.	Medical college hospital A1	300	59	50
4.	Medical college hospital A2	25	5	5
5.	District hospital A1	15	3	3
6.	District hospital A2	8	2	2
7.	District hospital A3	100	20	20
8.	District hospital A4	7	2	2
<i>Earthquake non-affected areas</i>				
1.	Central hospital B	570	112	83
2.	Regional/zonal hospital B1	312	61	40
3.	Regional/zonal hospital B2	100	20	15
4.	Medical college hospital B1	50	9	9
5.	Medical college hospital B2	25	5	5
6.	District hospital B1	6	2	2
7.	District hospital B2	16	3	3
8.	District hospital B3	11	2	2
9.	District hospital B4	4	1	1
Total		1857	366	300

*Note.* A= Affected area, B= Non-Affected area

## **Instrumentation**

In this study, four self-report instruments were used: (1) Demographic Data Questionnaire (DDQ), (2) Nurses' Knowledge in Earthquake Disaster Questionnaire (NK-EDQ) (3) Nurses' Perceived Skills in Earthquake Disaster Questionnaire (NS-EDQ), and (4) Nurses' Perceived Judgment in Earthquake Disaster (NJ-EDQ).

**Demographic Data Questionnaire (DDQ).** The Demographic Data Questionnaire consists of 8 items and two parts. The first part consists of demographic data which includes age and religion of the participants. The second part consists of education, training and work related information which includes educational background, working setting, training and education, working experience, previous disaster response experiences, self-preparedness on disaster and preferred teaching/learning method of trainings (Appendix C).

**Nurses' Knowledge in Earthquake Disaster Questionnaire (NK-EDQ).** Nurses' knowledge in earthquake disaster questionnaire is based on the ICN (2009) conceptual framework and literature review. The questionnaire consists of 30 items using True/false format in which score of 0 and 1 was given for an incorrect and a correct answer respectively (Appendix E). The total items of the questionnaires are 30, which is divided into knowledge in response and recovery phase.

Furthermore, each phase is divided into following domains. In response phase, there are four domains as (1) Care of community- Community response to earthquake disaster and collaboration with disaster response team (1 item), mortality caused by earthquake disaster (1 item), morbidities or injuries caused by earthquake disaster (1 item), resource management (1 item), communication skills (1 item), community based health education (1 item), (2) Care of individual and families- assessment and

triage in earthquake disaster response (3 items), trauma and wound care(2 items), spiritual care (1 item), culturally competent care (1 item), communication with patients and families (1 items), ethical and legal issues during earthquake disaster (3 items), patient referral and transportation (2 items), (3) Psychological care (2 items) and (4) care of vulnerable population (3 items). The recovery phase is composed of one domain as (5) long term individual, family and community recovery- surveillance (1 item), disease outbreak after earthquake disaster (2 items), and primary health care services after earthquake disaster (3 items). The total score will be the sum of all correct answers which ranges from 0-30. Higher score indicates higher level of knowledge. For the standardization of knowledge scores, the mean scores were converted into mean percentage scores for interpretation. The level of knowledge was categorized into five levels (Oermann & Gaberson, 2013) as follows.

Level of knowledge	Mean Percentage score (%)
Very low	<60.00
Low	60.00-69.99
Moderate	70.00-79.99
High	80.00-89.99
Very high	>90.00

#### **Nurses' Perceived skills in Earthquake Disaster Questionnaire**

**(NS-EDQ).** Nurses' perceived in skill related to earthquake disaster questionnaire is based on the conceptual framework based on ICN (2009) and literature review. The questionnaire consists of 30 items which is divided into skills in response and recovery phase. Furthermore, each phase is divided into following domains. In



response phase, there are four domains as (1) Care of community- community response to earthquake disaster and collaboration with disaster response team (1 item), mortality caused by earthquake disaster (1 item), morbidities or injuries caused by earthquake disaster (1 item), resource management (2 items), communication skills (1 item), community based health education (1 item), (2) Care of individual and families- assessment and triage in earthquake disaster response (3 items), trauma and wound care (4 items), spiritual care (2 item), culturally competent care (1 items), patient referral and transportation (1 item), ethical and legal issues during earthquake disaster (2 items), (3) Psychological care (3 items) and (4) care of vulnerable population (2 items). The recovery phase is composed of one domain as (5) long term individual, family and community recovery- surveillance (1 items), disease outbreak after earthquake disaster (2 items), and primary health care services after earthquake disaster (2 items). Each item will be rated by using three point likert scale based on participants perceived skills in caring for earthquake disaster with the values as: 1 = Poor, 2 = Fair, 3 = Good (Appendix F). The possible scores ranged from 30 to 90. Higher score indicated higher level of perceived skills. For the standardization of perceived skills scores, the scores were converted into a percentage for interpretation. For the interpretation of the mean scores were converted into mean percentages. After the interpretation, the scores were recorded in order to match the scores with the knowledge and judgment ability (*Secondary data analysis: An introduction for psychologists*, 2011). The scores were recoded as zero for poor (one) or fair (two) response and one for good (three) response. The total recoded scores ranged from 0-30. Finally, the mean scores were converted into mean percentage score. The level of perceived scores were interpreted as follows (Oermann & Gaberson, 2013).

Level of knowledge	Mean Percentage score (%)
Very low	<60.00
Low	60.00-69.99
Moderate	70.00-79.99
High	80.00-89.99
Very high	>90.00

### **Nurses' Perceived Judgment Ability of Nurses in Earthquake**

**Disaster Questionnaire (NJ-EDQ).** Nurses' perceived judgment ability in earthquake disaster questionnaire is based on the conceptual framework and literature reviews. Self-reported scenario-based problem solving questionnaire was given to evaluate the judgment ability of nurses in earthquake disaster situations. The questionnaire consists of 10 items, which was divided into judgment ability in response and recovery phase (Appendix G). Furthermore, each phase is divided into following domains. In response phase, there are four domains as (1) Care of community (2 items), (2) Care of individual and families (3 items), (3) Psychological care (2 items), and (4) care of vulnerable population (1 item). The recovery phase is composed of one domain, (5) long term individual, family and community recovery (2 items). Multiple choice formats with one correct answer in which score of 0 or 1 was given for an incorrect and a correct answer respectively. The possible scores range from 0-10, higher score indicates appropriate level of perceived judgment ability. For the standardization of perceived judgment ability scores, the mean scores were converted into mean percentage for interpretation. Level of perceived judgment ability was categorized into five levels (Oermann & Gaberson, 2013).

Level of perceived judgment ability	Mean percentage (%)
Very poor	<60.00
Poor	60.00-69.99
Average	70.00-79.99
Good	80.00- 89.99
Very good	>90.00

**Nurses' competencies related to earthquake disaster.** The disaster nursing competencies of nurses related to earthquake disaster was measured by getting the sum of mean percentage scores of knowledge, recoded perceived skills and perceived judgment ability. The mean percentage scores were added: Knowledge score (0-100) + perceived skills score (0-100) + perceived judgment ability (0-100). So, the total mean percentage scores ranged from 0-100. Level of disaster nursing competencies was categorized into five levels (Oermann & Gaberson, 2013).

Level of competency	Total mean percentage score (%)
Very poor competency	<60.00
Poor competency	60.00-69.99
Average competency	70.00-79.99
High competency	80.00- 89.99
Very high competency	>90.00

### **Validity and Reliability of Research Instruments**

**The validity of the instruments.** Three experts in emergency and disaster nursing as (1) a lecturer from the Faculty of Nursing, Surgical department, Prince of Songkla University in Thailand, (2) a lecturer from Faculty of Nursing, Khon Kaen University, Thailand and (3) a nurse administrator in Nepal who have

experience in disaster and currently working for the policy development related to disaster in Nepal, examined the instruments for their face validity. Then, the recommendations of all three experts were used to modify the instruments. At first, there were 40 questions for knowledge and perceived skills each and 10 questions for the judgment ability were proposed for the validity. Experts suggested to concise the questionnaire and make it less so that the respondents do not feel burden to fill it up due to lengthy questionnaires. Then, the questionnaires that were marked irrelevant were removed. Finally, 30 questionnaires for knowledge and perceived skills each and 10 questionnaires for perceived judgment ability were tested for its reliability.

**The reliability of the instruments.** The researcher examined the internal consistency reliability of NK-EDQ, NS-EDQ and NJ-EDQ by testing the questionnaires on 20 subjects who were similar to the nurses in the main study. For NK-EDQ and NJ-EDQ, Kuder-Richardson formula was used and yielded the coefficient of .79 and .74 respectively. For NS-EDQ, Chronbach's alpha coefficient was calculated and found to be .80.

### **Data Collection Procedures**

The researcher obtained permission from the Institutional review board (IRB) of the Faculty of Nursing, Prince of Songkla University, Thailand. After that, the researcher asked and took the letter from the Dean, Faculty of Nursing, Prince of Songkla University for the Nepal Health Research Council (NHRC) and selected hospital in Nepal for getting permission to collect the data. In addition, the researcher obtained permission from Nepal Health Research Council (NHRC).

After obtaining permission, the researcher contact the medical and nursing director of the respected hospitals in order get the permission and further to

explain the objectives of the study along with its benefits, maintaining confidentiality, and also explained about the method of data collection.

After that, two research assistants were selected from only two hospitals in order to take responsibility for collecting data in their respective hospital. The researcher could not take the research assistants from the rest of the hospitals because this was against the rules of the hospitals in which nurses are not allowed to do extra activities other than their duties. So, the researcher went to collect the data in rest of the hospitals. The two research assistants (registered nurses) had qualification of bachelor in nursing (BN) education and had experience on previous data collection. They were explained about the study via telephone and the technique of data collection and how to check its completeness. The research assistants were expected to collect the data from their respected hospital, check its completeness and send them back to the researcher.

The researcher and research assistants listed the name of the nurses who work in different wards of the selected hospital and prepared the list of the potential participants who met the inclusion criteria. After that, random selection (lottery method) was done in order to select nurses from each hospital.

The researcher and research assistants from the hospital distributed the questionnaires to the selected participants and explained the purpose, benefits and ethical considerations of the study to each participant.

After that, one week time was given to each participant to fill a questionnaire and return to the responsible nurses. The researcher made follow-up phone calls to the research assistants from two hospitals. The participants approximately took 20-30 minutes to administer completely. The researcher and

research assistants checked the completion of the questionnaires. The minimum and maximum time to return questionnaire was 1 week and 3 weeks respectively.

The confidentiality of the participants was maintained by keeping participants anonymous and further, after the complete entry of the data into the computer program, the questionnaires were destroyed after the completion of the study.

### **Ethical Consideration**

Data were collected after the receiving an approval from Institutional Review Board (IRB), Faculty of Nursing, Prince of Songkla University, Thailand. Firstly, the researcher asked the permission from the Nepal Health Research Council (NHRC). The permission from the medical and nursing director of respected hospital for the data collection was obtained. The nurses who met the inclusion criteria were approached by letter for their agreement of participation (Appendix B). The consent form and questionnaire were attached. The nurses who were ready to participate in this study were explained about the study purpose, significance of the study along with the expectation from the subject's participation. In addition they were informed about the rules to refuse or withdraw the participation from this study any time for any reason without any negative consequences. The code system was used to hide the identities of all nurses and the data are used only for this study purpose.

### **Data Analysis**

A total of 366 Registered nurses (RNs) were approached for the study participation. Thirty nurses did not return the questionnaires. Three hundred and thirty six questionnaires were returned yielding 91 % response rate. Empty and incomplete

questionnaires were excluded from the study sample and data analysis ( $n = 36$ ).

Finally, 300 (81%) complete questionnaires were used for the study analysis.

After data collection, statistical software was used to analyze data. Based on the objectives of the study, descriptive statistics was used to assess the demographic characteristics and level disaster nursing competencies, knowledge, perceived skills, judgment ability and disaster nursing competencies of nurses regarding earthquake disaster.

Firstly, the data were checked for the normal distribution (Appendix H). The result showed that the data of the level of nurses' knowledge, perceived skills and judgment ability in earthquake disaster nursing were found to be normally distributed, so frequencies, percentages, means and standard deviations were used for data analysis.

## Chapter 4

### Results and Discussions

This chapter presents the results of the study and a discussion of the findings. The result of the study includes (1) the demographic data and disaster experiences (2) the level of knowledge, perceived skills, judgment ability and disaster nursing competencies related to earthquake among nurses in Nepal. The findings are discussed and presented as follows by each objective.

#### Results

**Demographic data.** RNs in this study aged between 20 to 58 years with the mean age of 27.4 years (SD = 8.3). Most (94.3%) of the RNs followed Hindu religion. More than half (59%) of them had diploma level of education. Two thirds (66.3 %) worked as RNs for less than 6 years of experience and mainly in government hospitals (63.2%). Forty - seven percent of them worked in earthquake affected area. The working settings were from various areas, such as medical department (19.3%), surgical department (16.7%), critical care (16.3%) and so forth. The demographic characteristics of RNs are shown in Table 2.



Table 2

*Frequency and Percentage of RNs' Demographic Characteristics (N=300)*

Demographic characteristics	<i>n</i>	%
<b>Age(Years)</b>		
<i>(Min =20, Max = 58, M = 27.4, SD = 8.3)</i>		
Below 30	235	78.3
30-40	38	12.7
41-50	14	4.7
Above 50	13	4.3
<b>Religion</b>		
Hindu	283	94.4
Buddhist	15	5.0
Christian	1	0.3
Others	1	0.3
<b>Nursing Education Background</b>		
Diploma level	177	59.0
Bachelor level	118	39.3
Master level	5	1.7
<b>Geographical Area of Working</b>		
Earthquake affected area	140	47.0
Earthquake non-affected area	160	53.0
<b>Type of Hospital</b>		
Governmental hospitals	190	63.3
Nongovernmental hospitals	110	36.7

Table 2 (Continued)

Demographic characteristics	<i>n</i>	%
Level of Hospital (only government hospitals)		
Central level hospital	136	71.6
Regional/zonal level hospital	19	10.0
District level hospital	35	18.4
Working Setting		
Emergency department	39	13.1
Medical department	58	19.3
Surgical department	50	16.7
Critical care unit	49	16.3
Pediatric department	25	8.3
Obstetrics/gynecology unit	37	12.3
Others (orthopedics unit, hemodialysis unit, neurosurgery unit)	42	14.0
Working experience as a Nurse (years)		
<i>(Min =1, Max = 38, M = 5.9, SD = 7.8)</i>		
< 6	199	66.4
6-10	52	17.3
>10	49	16.3

**Nurses' disaster experiences.** As shown in Table 3, more than three fourth (78%) of the RNs did not have experiences in disaster training or attending disaster nursing educations. Only one fourth RNs (22%) had previous experiences in caring patients during earthquake disaster in past 5 years. Of this, 16 % of nurses had

disaster experience less than one month. Regarding self-preparedness for the future disaster, only 4.7% of them reported that they “always” read books and materials related to disaster. Majority of RNs (72.7 %) reported that they “sometimes” search and read disaster related materials from the internet whereas 67.7% of RNs “never” attended seminar and conference related to disaster. Almost all RNs (95.7%) had never received disaster drills and exercise scenarios at their working hospitals. In addition, 46 % of RNs perceived themselves that they were not ready to face with future disaster.

Table 3

*Frequency and Percentage of RNs' Disaster Experiences (N=300)*

Disaster experiences	<i>n</i>	%
<b>Experience in Disaster Training or Attending Disaster Nursing Education</b>		
Yes	66	22.0
No	234	78.0
<b>Previous Experiences in Disaster Care</b>		
Yes	95	31.7
No	205	68.3
<b>Disaster Self-preparedness:</b>		
Read books and materials related to disasters		
Never	21	7.0
Sometimes	222	74.0
Often	43	14.3
Always	14	4.7
Search disaster related materials in internets		
Never	41	13.7

Table 3 (Continued)

Disaster experiences	<i>n</i>	%
Sometimes	218	72.7
Often	36	12.0
Always	5	1.6
Attend seminars and conferences related to disaster		
Never	203	67.7
Sometimes	81	27.0
Often	15	5.0
Always	1	0.3
Disaster Drills/exercise Scenario at Hospital		
Yes	13	4.3
No	287	95.7
Ready to Face with Future Disaster		
Yes	163	54.3
No	137	45.7
Preferred Teaching/learning Method for Training		
Face to face training	235	78.3
Online/ web based training	13	4.3
Video tapes	44	14.7
Others (role play)	8	2.7
Preferred Types of Training		
One day workshop	65	21.7
Attend conference	26	8.7

Table 3 (continued)

Disaster experiences	<i>n</i>	%
Take a training course	199	66.3
Others (simulations/disaster drills)	10	3.3
Duration of involvement in caring for patients in previous disasters (months)		
<i>(Min = 0, Max = 5, M = 2.5, SD = 1.8)</i>		
None	205	68.3
< 1	48	16.0
2-3	28	9.4
>4	19	6.3
Types of trainings received (n=66)		
BLS	10	15.2
BLS, BTLS	4	6.0
BLS, IC	8	12.1
WC, IC	14	21.2
DM, IC	12	18.2
BLS, DM, DT	9	13.6
DM, DT, MHC	5	7.6
BLS, BTLS, BCLS, ACLS	4	6.1

*Note.* BLS = Basic life Support, BTLS = Basic Trauma life Support, BCLS = Basic

Cardiac Life Support, ACLS = Advanced Cardiac Life Support,

DM = Disaster Management, DT= Disaster Triage, IC = Infection Control,

MHC = Mental Health care

**Level of knowledge, perceived skills, judgment ability and disaster nursing competencies regarding earthquake disaster.** As shown in table 4, overall knowledge ( $M = 70.1, SD = 10.0$ ) of the RNs regarding earthquake disaster were at a moderate level. In response phase, the level of knowledge were at a low level ( $M = 66.4, SD = 9.5$ ) whereas high level of knowledge ( $M = 84.8, SD = 21.4$ ) was seen in recovery phase.

The perceived skills of the RNs regarding earthquake disaster were at a moderate level ( $M = 76.4, SD = 13.5$ ). In response phase, the level of perceived skills were at a moderate level ( $M = 75.4, SD = 13.4$ ) whereas RNs had a high level of perceived skills ( $M = 80.1, SD = 17.1$ ) in recovery phase regarding earthquake disaster.

The overall judgment ability were at a very poor level ( $M = 56.9, SD = 17.7$ ). Similarly, the level of judgment ability were at a very poor level ( $M = 46.7, SD = 17.0$ ) in response phase, however RNs had good level of judgment ability ( $M = 81.8, SD = 31.6$ ) in recovery phase regarding earthquake disaster.

Finally, overall competency regarding earthquake disaster was at a poor level ( $M = 62.5, SD = 14.4$ ).

Table 4

*Mean, Standard Deviation and Level of the Nurses' Knowledge, Perceived Skills, Perceived Judgment Ability and Disaster Nursing Competencies Related to Earthquake Disaster in Response and Recovery Phase (N=300)*

Disaster phases	Knowledge			Perceived skills			Judgment ability			Competency		
	<i>M</i>	<i>SD</i>	Level	<i>M</i>	<i>SD</i>	Level	<i>M</i>	<i>SD</i>	Level	<i>M</i>	<i>SD</i>	Level
Total scores	70.1	10.0	Moderate	76.4	13.5	Moderate	56.9	17.7	Very poor	62.5	14.4	Poor
Response	66.4	9.5	Low	75.4	13.4	Moderate	46.7	17.0	Very poor	-	-	-
Recovery	84.8	21.4	High	80.1	17.4	High	81.8	31.6	Good	-	-	-

*Note.* *M* = Mean percentage, *SD* = Standard deviation

When we look at the detail of each variable, the top three highest and lowest score were described. As shown in Table 5, the top three highest knowledge score on earthquake disaster from all 30 items were (1) assessing nurses knowledge on morbidities or injuries caused by earthquake disaster ( $M = 96.0, SD = 20.4$ ), (2) assessing nurses knowledge on resource management ( $M = 93.0, SD = 26.1$ ), and (3) assessing the nurses' knowledge on possible interventions to control outbreak of infectious disease ( $M = 93.0, SD = 26.1$ ). On the other hand, the three items that had the lowest knowledge scores were (1) assessing the nurses' knowledge to identify the purpose of triage in earthquake disaster response ( $M = 12.0, SD = 32.9$ ), (2) assessing the nurses knowledge on wound assessment and care ( $M = 15.0, SD = 35.8$ ), and (3) assessing the nurses' knowledge on triage assessment and triage in earthquake disaster response ( $M = 31.0, SD = 46.2$ ).

As shown in Table 6, the top three highest score of perceived skills were related to (1) performing dressing and bandaging the injured patients ( $M = 85.7, SD = 21.9$ ), (2) communicating with team members, victims and their families for appropriate nursing care ( $M = 83.8, SD = 21.9$ ), and (3) educating community population regarding food and drinking water safety and environmental sanitation to prevent food and water borne illness ( $M = 83.8, SD = 21.4$ ). On the other hand, three areas in which nurses had the lowest score of skills were related to (1) using START (Simple Triage and Rapid Treatment) system and categorizing patient on the basis of ability to walk, respirations, perfusions and obey command ( $M = 65.9, SD = 24.7$ ), (2) organizing, refer and evaluate mental health and psychosocial care ( $M = 69.7, SD = 23.3$ ), and (3) providing spiritual intervention such as peaceful environment, facilitating religious coping, facilitating religious activities ( $M = 70.1, SD = 24.2$ ).



As shown in Table 7 the top three highest score of perceived judgment ability were related to (1) transport patient safely during earthquake disaster ( $M = 82.7, SD = 37.9$ ), (2) provide primary health care to the patients ( $M = 82.0, SD = 38.5$ ), (3) immunize the mass population in a community ( $M = 81.7, SD = 38.8$ ). On the other hand, three areas in which nurses perceived themselves to have lowest score of perceived judgment ability were related to (1) sort the patient on the basis of color coding triage system ( $M = 2.0, SD = 14.0$ ), (2) manage resources during responding earthquake disaster ( $M = 17.7, SD = 38.2$ ), and (3) assess the psychological symptoms and provide appropriate intervention during earthquake disaster ( $M = 54.0, SD = 49.9$ ).

Table 5

*Mean and Standard Deviation of the Top Three Highest and Lowest Knowledge Scores Related to Earthquake Disaster (N= 300)*

Knowledge related to earthquake disaster	<i>M (SD)</i>	Disaster Phase
Top three highest scores		
1. Morbidities or injuries caused by earthquake disaster	96.0 (20.4)	Response
2. Resource management	93.0 (26.1)	Response
3. Possible interventions to control outbreak of infectious disease	93.0 (26.1)	Recovery
Top three lowest scores		
1. Identify the purpose of triage in earthquake disaster response	12.0 (32.9)	Response
2. Wound assessment and care	15.0 (35.8)	Response
3. Triage assessment and triage in earthquake disaster response	31.0 (46.2)	Response

*Note.* *M* = Mean percentage, *SD* = Standard deviation

Table 6  
*Mean and Standard Deviation of Perceived Skills Related to Earthquake Disaster with the Top Three Highest and Lowest Scores (N= 300)*

Perceived skills related to earthquake disaster	<i>M (SD)</i>	Disaster Phases
Top three highest scores		
1. Perform dressing and bandaging the injured patients	85.7 (21.9)	Response
2. Communicate with team members, victims and their families for appropriate nursing care	83.8 (21.9)	Response
3. Educate community population regarding food and drinking water safety and environmental sanitation to prevent food and water borne illness	83.8 (21.4)	Recovery
Top three lowest scores		
1. Use START (Simple Triage and Rapid Treatment) system	65.9 (24.7)	Response
2. Organize, refer and evaluate mental health and psychosocial care	69.7 (23.3)	Response
3. Provide spiritual intervention such as peaceful environment, facilitating religious coping, facilitating religious activities	70.1 (24.2)	Response

*Note.* *M* = Mean percentage, *SD* = Standard deviation

Table 7

*Mean and Standard Deviation of the Top Three Highest and Lowest Perceived Judgment Ability Scores Related to Earthquake Disaster (N= 300)*

Perceived judgment ability related to earthquake disaster	<i>M (SD)</i>	Disaster Phase
Top three highest scores		
1. Transport patient safely during earthquake disaster	82.7 (37.9)	Response
2. Provide primary health care to the patients	82.0 (38.5)	Recovery
3. Immunize to the mass population in a community	81.7 (38.8)	Recovery
Top three lowest scores		
1. Sort the patient on the basis of color coding triage system	2.0 (14.0)	Response
2. Manage resources during responding earthquake disaster	17.7 (38.2)	Response
3. Assess the psychological symptoms and provide appropriate intervention during earthquake disaster	54.0 (49.9)	Response

*Note.* *M* = Mean percentage, *SD* = Standard deviation

## Discussion

The findings of this study showed that RNs had a moderate level of knowledge and perceived skills whereas a very poor level of judgment ability. Overall, the mean score of disaster nursing competencies were at a poor level. The explanations are shown in following points.

**Nurses' knowledge, perceived skills, judgment ability and disaster nursing competencies regarding earthquake disaster.** In this study, it was found that although nurses' in Nepal had moderate level of knowledge and perceived skills, they were unable to integrate those knowledge and skills in order to make a good judgment and decision in emergency or disaster situation. Several factors might have influenced the findings of this study which has been discussed in the following paragraphs.

Firstly, the educational level of the nurses plays a vital role in enhancing the knowledge, skills, judgment ability and competency of the nurses. More than half of RNs (59%) in this study were educated at diploma level. With the low level of educational background, nurses have limited knowledge in order to seek information thus, limiting the ability to develop the skills that are especially required for disaster response. Similar to a previous study by Chan (2009) who found that Hong Kong nurses who had baccalaureate, master or doctoral level of education showed higher level of knowledge and perceived skills than the diploma level in clinical management system. In Nepal, old curriculum (since 1997) has been used in diploma nursing program with minimum revisions (Regmi, K., Regmi, S., & Shahi, 2010) and the content of disaster nursing has not been integrated (Council for Technical Education and Vocational Training, 2013). Current evidence shows negligible inclusion of disaster knowledge and skills in nursing curricula in developed

as well as developing countries (Achora & Kamanyire, 2016, Usher & Mayner, 2011). Consequently, nurses with diploma level of education may have minimum or none exposure in disaster nursing education.

Moreover, critical thinking is the cognitive ability which is required in order to make sound clinical decision and judgment (LaMartina & Ward-Smith, 2014). Nursing competence, judgment ability and critical thinking ability of nurses with a master's degree was significantly better than those with bachelor's degree or diploma level of education (Chang, Chang, Kuo, Yang, & Chou, 2011; Shin, Ha, Shin, & Davis, 2006; Vargo, 2009). Hence, we can conclude that educational level might have influenced on the poor level of judgment ability and nursing competency regarding earthquake disaster.

In addition, insufficiency in skills to seek information as part of education level might influence their knowledge, skills and judgment ability. Since the preparedness to participate in disaster activities plays a great role in enhancing the knowledge, skills and decision making ability of nurses on disaster (Al Khalaileh et al., 2012; Al Thobaity et al., 2015; Hagbaghery, Salsali, & Ahmadi, 2004; Maulidar, 2011; O'Sullivan et al., 2008). However, only 14 % and 12 % of RNs in this study often read books and search internet to gain knowledge related to disaster in order to prepare themselves for the disaster. So, the necessary skills to seek information related to the disaster may be required which is similar to the previous studies in terms of insufficient or moderate level of knowledge, skills and judgment abilities related to preparedness of different types of disaster (Al Khalaileh et al., 2012; Husna, 2010; Usher et al., 2015).

The second reason in explanation of overall knowledge and perceived skills at a moderate level is related to nurse's experience in disaster and attending the

disaster trainings. The experience in disaster trainings and having a direct experience in disaster may also help to upgrade the knowledge and confidence of the nurses to respond to the disasters (Chapman & Arbon, 2008; Hammad et al., 2012; Hermawati, 2010; Husna, 2010). Since the experience and training can help nurses gain insight and absorb information from others and learn from mistake and repeated action in similar situations may increase knowledge and skills. However, seventy-eight percent of the respondents in this study did not have experiences in disaster training and no direct experience in disaster care (63.2%). Similar evidence have also shown from a previous study that more than half of nurses in Japan who took part in humanitarian aid and disaster response did not have any disaster medical training experience (Noguchi, Inoue, Shimano, Shibayama, & Shinchi, 2016) and also only 19 % of nurses in Asia pacific-region had participated in disaster trainings and previous disasters (Usher et al., 2015). Consequently, disaster trainings and previous disaster response experience might affect the knowledge and perceived skills.

In addition, nurses were mostly young who have been working less than 6 years. The age of the nurses may also influence the knowledge, perceived skills and nursing competency. A previous study showed that nurses who were young (26-30 years) had lower level of knowledge and skills than middle adults (31-40 years) in clinical management systems (Chan, 2009). In addition, nursing competence of nurses over 40 years of age was significantly better than those 31–40 and 20–30 years of age (Chang et al., 2011). This finding could be linked with the skills that the more years of clinical experience among older nurses, the higher skill they would have. This was also supported by other studies that nurses with more experience reported to have higher level of skills and preparedness on disasters (Al Khalaileh et al., 2012; Hermawati, 2010; Husna, 2010).

Nurses' judgment ability and competency might be influenced by their clinical experience. Majority of nurses in this study had clinical experience less than 6 years. Nurses with over five working years of experience were significantly better than those with fewer than five years in terms of critical thinking ability and nursing competency (Chang et al., 2011). In order to learn clinical judgment and decision making, practical experience in actual patient care is equally important. It is through the experience which makes novice nurse to an expert nurse and studies have found that nurses with higher clinical experience felt that they were more confident in making clinical judgment (Gunnarsson & Warrén Stomberg, 2009; Jahanpour, Sharif, Salsali, Kaveh, & Williams, 2010).

Knowledge forms a basis for human skills, judgment and decision making (Evans & Donnelly, 2006; Gunnarsson & Warrén Stomberg, 2009; Husna, 2010). In order to incorporate skills and make correct judgment in nursing practice, knowledge is a key factor. Knowledge guides nurses on when and how to use the correct skills (Evans & Donnelly, 2006). In other words, adequate knowledge leads to better nursing performance. Accordingly, the moderate level of overall knowledge might have influenced moderate level of perceived skills. However, when it comes with the critical thinking ability, nurses had very poor level of judgment ability though they had moderate level of knowledge. It might be partly due to nurses need to act logically with critical thinking ability in short period of time in an emergency situations which have typically complex problems with extreme consequences. Nurses in previous earthquake response found unfamiliar working environment with the scarce resources as a major challenge in order to make decision on appropriate course of actions (Yang et al., 2010).



The level of knowledge and judgment was low and very poor particularly in response phase. However, nurses had moderate level of perceived skills related to earthquake disaster response except they had a high level of knowledge, perceived skills and good level judgment ability in recovery phase (Table 4). This finding indicates that nurses were more involved and aware of the disaster relief activities and its importance. This is partly because many nurses may themselves be the victim of the disaster and they were able to participate in post disaster phase rather than response phase. In addition, comparatively more nurses would be dispatched for the patient care as found Japan where more than 55% of the nurses were dispatched in the post-disaster phase so the nurses in Japan had less experience in the response phase care (Noguchi et al., 2016).

Although the first aid and triage were considered as important for responding earthquake disaster (Yan et al., 2015), majority of nurses' in this study had low level of knowledge related to triage and wound care item (Table 5) indicating low knowledge regarding triage and wound care in response phase. This finding of the study is in accordance with the previous study which found a low level of triage knowledge among emergency nurses and level of nurse's education might affect the nurse's role in responding to an emergency disaster (Aloyce, Leshabari, & Brysiewicz, 2014; Fathoni, Sangchan, & Songwathana, 2013). Although, wound care is performed routinely in everyday practice, the reason behind low knowledge scores might be because the nurses were unaware of the current evidence based guideline related to wound care during the disasters. Current evidence suggests cleaning and debridement of wound rather than primary closure which causes wound infection (Wuthisuthimethawee et al., 2015). Similar to this finding, Danish nurse who worked

in hospital departments also had low knowledge in wound management (Zarchi, Latif, Haugaard, Hjalager, & Jemec, 2014).

On contrary, Hermawati (2010) found a moderate high level of perceived knowledge among nurses in triage and wound care. This difference may be due to two reasons. Firstly, the previous study had recruited the samples from only one central hospital whereas this study included nurses from central to district level of hospitals. Secondly, majority of the nurses (86%) in previous study had attended trainings and education related to disaster whereas majority of nurses (78 %) in this study did not have any trainings and education related to disaster. In addition, in this study, the nurses' knowledge was objectively measured which showed their actual knowledge related to earthquake disaster, whereas in the previous study, the nurses' feeling of preparedness on knowledge were measured subjectively by using self-report likert scale which may differ from actual knowledge level.

During earthquake response, skills on debridement and dressing were most frequently used by the nurses and bandaging was ranked as one of the most important for the training for nurses (Yin et al., 2011). In addition, good communication skills were perceived to be important skill in order to respond earthquake disaster (Yan et al., 2015). Nurses had high perceived skills on performing dressing and bandaging to the injured patients and communicating with team members, victims and their families. The high level of perceived skills in these areas might be because these skills are most frequently performed skills in daily routine practice. Communication along with good interpersonal relationship and social interaction are considered as important for nurses to feel comfortable in their workplace (Rickard et al., as cited in Aloyce et al., 2014).

The skills of performing mass casualty triage and psychological guidance and counseling were essential skills for the nurses in earthquake response (Yan et al., 2015; Yin et al., 2011). However, nurses still had low score of perceived skills these areas. This might be because triage skills are found to be influenced by triage knowledge, working experience and training experience (Fathoni et al., 2013). As mentioned earlier, the knowledge of the nurses in triage assessment and performance was at low level. Majority of nurses in this study had working experience less than six years and did not had trainings and educations related to disaster. So, these factors might have contributed to the low level of knowledge in triage. However, the finding is contradictory with the previous studies which found moderate to high level of perceived triage skills (Bahrami, Aliakbari, & Aein, 2014a; Fathoni, 2010; Hermawati, 2010; Husna, 2010). One of the reasons behind the opposite findings may be from the sample taken in these studies. One study took emergency nurses who might have greater experience in triaging the patients while others included nurses only from central hospital with high rate of trainings related to disaster. Furthermore, low level of psychological care skills can be explained with very low level of knowledge regarding assessment and screening of mental health problems among nurses in this study (Appendix- I).

Similar with knowledge and perceived skills, nurses had very poor judgment ability regarding triage. This finding indicates that nurses have poor competency in performing triage. The finding is in accordance with the previous study conducted by Kilner (2002) and Chen et al. (2010) in which majority health care providers including nurses made poor triage judgment and decisions. Several factors can influence triage judgment and decision making. For instance, Morteza, Azad, Farahnaz, and Abbas (2014) found that skills related to triage and previous

experience in triaging patients relatively increases the judgment and decision making capacity in triaging patients during emergency situation. In addition, other factors such as clinical experience especially in emergency department and higher educational level also has positive influence in making judgment related to triage (Chen et al., 2010). Lastly, in this study, nurses working in different clinical departments might have influenced poor judgment ability among nurses with relatively low knowledge and perceived skills to act in emergency situation.

In addition, other factors which have not been included in this study might have influenced poor judgment ability of nurses regarding earthquake disaster. Factors such as values, believes, locus of control, stress, cognitive abilities are found to have influence in nurses clinical decision making (Bakr, Sherif, Eid, & ELshal, 2013).

## Chapter 5

### Conclusions and Recommendations

A descriptive study design was used to describe level of knowledge, perceived skills, judgment ability and disaster nursing competencies regarding earthquake among nurses in Nepal. The study was conducted from February 2016- April 2016. The instrument for data collection was a questionnaire composed of four parts: nurses' demographic characteristics, knowledge regarding earthquake disaster, Perceived skills regarding earthquake disaster and perceived judgment ability regarding earthquake disaster. The summary of findings, strengths and limitations of the study, and recommendations are discussed in this chapter.

#### Summary of Study Findings

The study revealed that nurses reported a moderate level of knowledge regarding earthquake disaster. Knowledge in response phase was at a low level whereas it was seen at a high level in recovery phase. Lack of knowledge areas were: (1) triage assessment and management and (2) wound assessment and care. The study also revealed that nurses reported a moderate level of perceived skills regarding earthquake disaster. They had moderate level of perceived skills in response phase and high level in recovery phase. Furthermore, the low perceived skills areas were: (1) using START system of triage, (2) organizing, referring and evaluating mental health and psychological care (3) providing spiritual intervention. In addition, nurses judgment ability in general and in response phase of earthquake disaster were at a very poor level. However, it was found at a good level in recovery phase. The areas

were nurses had poor judgment level were: (1) short the patients on the basis of color coding triage system, (2) Manage resources during earthquake disaster and (3) assess the psychological symptoms and provide appropriate intervention during earthquake disaster. Finally, overall level of disaster nursing competencies was found to be at a poor level. The majority of the nurses never received disaster trainings and education related to earthquake which may have influenced on overall nursing competencies regarding earthquake disaster.

### **Strengths of the Study**

This study explores about Nepalese nurses' competencies in terms of knowledge, skills and judgment ability especially in earthquake disaster. Strength of this study includes large coverage of sample (from both earthquake affected and non-affected areas) which could be representative of RNs for the generalization. In addition, the questionnaires were developed based on ICN disaster nursing framework and literature review by the researcher to measure knowledge, skills and judgment ability related to earthquake disaster.

### **Limitations of the Study**

The findings may not be generalized to all RNs in Nepal due to some limitations. Firstly, the study participants involved only working registered nurses in hospitals without including nurse educators and public health nurses. Secondly, the findings of this study were specific to government and medical college teaching hospitals. Lastly, the knowledge, perceived skills and judgment ability questionnaires were focused only in response and recovery phase of earthquake disaster.

## **Recommendations**

The findings of this study are useful for policy makers, nursing practice, nursing education and future nursing research.

**Policy makers.** The findings could serve as an evidence for health policy makers or stakeholders in the hospital to prepare and raise awareness of nurses to respond upcoming disasters. Disaster nursing training are needed with the support of nurse leaders and government and integrate content specific to earthquake in future disaster nursing education at the diploma level.

**Nursing practice.** The finding of this study indicates poor level of competencies and judgment ability regarding earthquake disaster, which is probably due to the fact that the nurses received less disaster trainings and education. In addition, it may be due to the limited evaluation of nurses' competencies related to disaster by hospital authority. Hospitals must be required to establish disaster response plan and initiate in- service education, disaster trainings, mock/ drills exercises particularly focusing on developing nurses' skills for judgment and decision making in emergency situation as well as skills in triage, wound care and psychological support. Hospitals should provide or facilitate nurses to gain access of available resources related to disaster nursing care for self-direct learning (for example- provision of computers and internets, providing books and articles related to disaster).

**Nursing education.** The findings of this study suggest nursing educators and curriculum developers to integrate content related to disasters in future disaster nursing education at the diploma level. As Nepal is prone to all kinds of disaster, preparing nurses by upgrading their knowledge, skills and judgment ability

through education can help nation to develop competent nurses to respond future disaster.

**Nursing research.** Further study is needed to develop knowledge and training packages and or program in improving nurse's knowledge, skills and judgment abilities particularly in response phase and may test the effect of the program on nurses competencies on disaster care.



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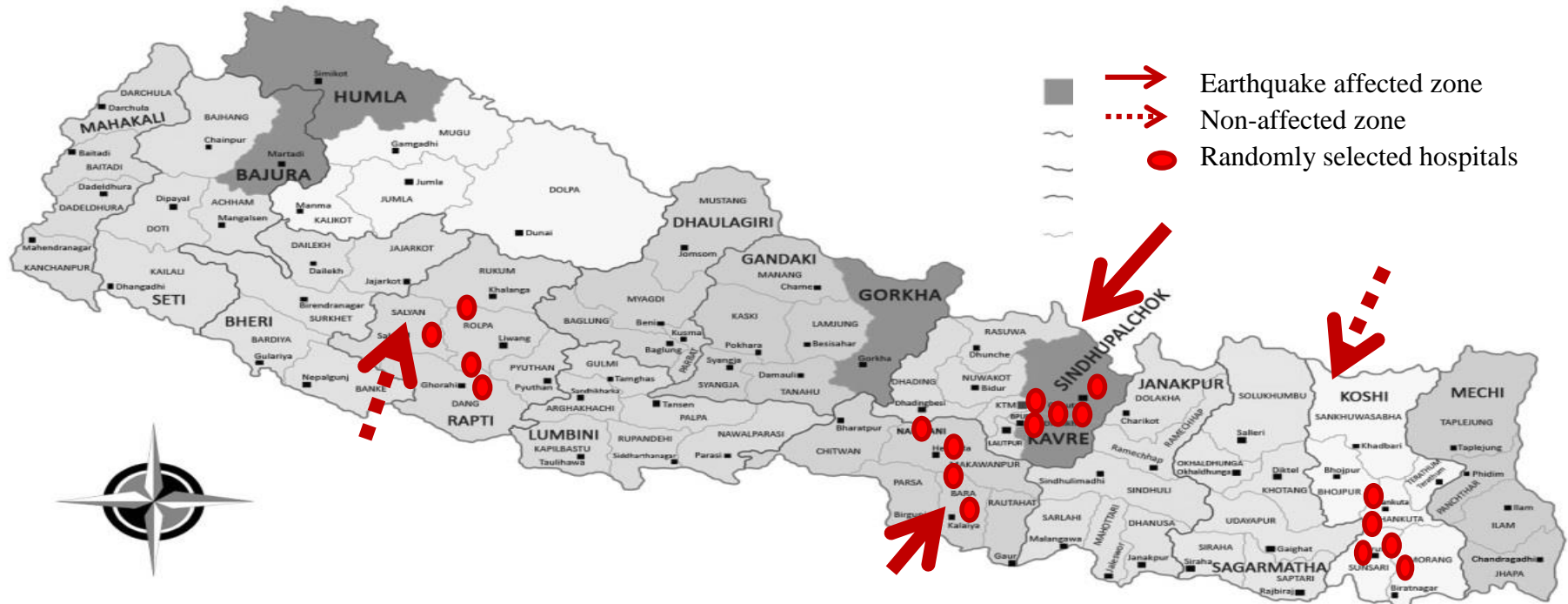
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## Appendices

### Appendix A

### Sample Distribution



## **Appendix B**

### **Informed Consent**

**Investigator(s) name:** Pritika Basnet, Masters in nursing science student at Prince of Songkla University, Songkhla, Thailand

**Study title:** Disaster Nursing Competencies Related to Earthquake Among Nurses in Nepal.

**Purpose of the study:** The purposes of this research study are to describe the level of disaster nursing competencies in terms of knowledge, perceived skills and judgment ability regarding response and recovery phase of earthquake disaster among nurses in Nepal.

#### **Description of the study**

As a participant in the study, I will understand the objective, benefits of the study and decide to participate in this study. The objective of this study is to describe the level of disaster nursing competencies (knowledge, skills and judgment ability) regarding earthquake. After that, I will fill the questionnaires that have been given to me. After completion of the questionnaires, the researcher will rate my level of knowledge, skills and judgment ability on earthquake disaster nursing. For the purpose of anonymity, I will receive code to be used in the set of questionnaires. In addition, I will be required to complete a demographic questionnaire, knowledge on earthquake disaster nursing questionnaire, perceived skills on earthquake disaster nursing questionnaire and perceived judgment ability on earthquake disaster nursing questionnaire. The demographic questionnaire will ask for information such as age, race, nursing education background, working area, training and education, working experiences and self-preparedness questionnaires. The knowledge, perceived skills

and judgment ability questionnaires will ask questions regarding earthquake disaster nursing.

There will be no cost to me related to study participation.

**Risks and discomforts**

There are no identifiable risks to being a participant in this study.

**Benefits**

There are no direct benefits of participating in this study; however, the knowledge received may be of value to develop disaster nursing education and trainings.

**Confidentiality**

All documents and information referring to this research study will be kept confidential in accordance with national ethical and legal regulations. I understand that data generated by the study may be reviewed by Prince of Songkla University's Institutional Review Board, which is the committee responsible for ensuring my welfare and rights as a research participant, to assure proper conduct of the study and compliance with university regulations. The information collected during my participation in this study will be kept by the researcher indefinitely. My confidentiality will be protected by the use of a code and my name will be kept anonymous. The data will be analyzed in groups and individual scores will be not identifiable in any publications or presentations.

**Termination of participation**

I may choose to withdraw from this study at any time and for any reason. If I choose to drop out of the study, I will contact the investigator and my research records will be destroyed.

### **Compensation**

I will not receive payment for being in this study. Participation in this study is strictly voluntary. There will be no cost to me for participating in this research.

### **Voluntary participation**

I understand that my participation in this study is voluntary, and that refusal to participate will involve no penalty or loss or benefits to me. I am free to withdraw or refuse consent, or to discontinue my participation in this study at any time without penalty or consequence. If I withdraw or refuse to participate in this study, it will not impact my relationship with other staffs or head nurses. I voluntarily give my consent to participate in this research study. I understand that I will be given a copy of this consent form.

Date:.....

Participant

Researcher

( )

( )

If you have any questions or queries, please contact me or my thesis advisor (Assoc. Prof. Dr. Praneed Songwatthana) at the following address:

Pritika Basnet  
 Address: Morang, Nepal  
 Email ID: [basnetkhuse20@gmail.com](mailto:basnetkhuse20@gmail.com)  
 Phone No: +977-9849093923

Assoc. Prof. Dr Praneed Songwatthana  
 Faculty of Nursing, Prince of Songkla  
 University, HatYai, Thailand  
 Email: praneed.s@psu.ac.th



**Appendix C**  
**Demographic Data Questionnaire (DDQ)**

**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. Religion: 1 ( ) Hindu 2 ( ) others, identify.....

**B. Education, Training and Work related Information**

3. Nursing educational background:
  - 1 ( ) Diploma level                      2 ( ) Bachelor level                      3 ( ) Master level
4. Working setting:
  - 1 ( ) Emergency department    2 ( ) Medical department
  - 3 ( ) Surgical Department      4 ( ) Critical care
  - 5 ( ) Pediatric Department    6 ( ) Obstetrics/ Gynecology
  - 7 ( ) Public health                8 ( ) others please specify.....
5. Experiences in disaster training or attending disaster nursing education
  - 1 ( ) No                                      2 ( ) Yes please respond in detail 5.1
  - 5.1. Number of trainings and times of attending training and education related to disaster within past 3 years:
    - 1 ( ) Basic Life Support (BLS) \_\_\_\_ times
    - 2 ( ) Basic Trauma Life Support (BTLS) \_\_\_\_ times
    - 3 ( ) Basic Cardiac Life Support (BCLS) \_\_\_\_ times
    - 4 ( ) Advanced Cardiac Life Support (ACLS) \_\_\_\_ times
    - 5 ( ) Disaster management \_\_\_\_ times
    - 6 ( ) Disaster triage \_\_\_\_\_times
    - 7 ( ) Wound care\_\_\_\_\_times
    - 8 ( ) Infection control \_\_\_\_ times
    - 9 ( ) Psychosocial and Mental health care \_\_\_\_ times
    - 10 ( ) others please specify.....
6. Working experience as a nurse ..... years



- 1 ( ) face to face training
- 2 ( ) online/ web based training
- 3 ( ) video tapes
- 4 ( ) others (please specify).....

12. Which type of disaster training do you prefer to be best suitable?

- 1 ( ) one day workshop
- 2 ( ) attend conference
- 3 ( ) take a training course
- 4 ( ) others (please specify).....

**Appendix D**  
**Questionnaire Blueprint**

Table 1.

*Questionnaire Blueprint of Knowledge, Skills, Judgment Ability*

Domains and Sub-domains	Knowledge	Skills	Judgment
<b>Care of community</b>			2 items
Community response to earthquake disaster	1 item	1 item	
Mortality caused by earthquake disaster	1 item	1 item	
Morbidities or injuries caused by earthquake disaster	1 item	1 item	
Resource management	1 item	2 items	
Communication skills	1 item	1 item	
Community based health education	1 item	1 item	
<b>Care of individual and community</b>			3 items
Assessment and triage in earthquake disaster response	3 items	3 items	
Trauma and wound care	2 items	4 items	
Spiritual care	1 item	2 items	
Culturally competent care	1 item	1 item	
Communication with patients and families	1 item	-	
Ethical and legal issues during earthquake disaster	3 items	2 item	
Patient referral and transportation	2 items	1 item	
<b>Psychological care</b>	2 items	3 items	2 items
<b>Care of vulnerable population</b>	3 items	2 items	1 item

Table 1 (continue)

Domains and Sub-domains	Knowledge	Skills	Judgment
<b>Long term individual, family and community recovery</b>			2 items
Surveillance	1 item	1 item	
Disease outbreak after earthquake disaster	2 items	2 items	
Primary health care services after earthquake disaster	3 items	2 items	

**Appendix E**  
**Nurses Knowledge Regarding Earthquake Disaster Questionnaire**  
**(NK-EDQ)**

This questionnaire is developed to assess general nurses' knowledge regarding earthquake disaster nursing in response and recovery phase. Please read the following statement and tick (✓) on "True" or "False" for each statement based on your knowledge.

**Questions and response**

No.	Question	Answer	
		True	False
1.	During earthquake disaster, nurses focus on care for safety, security, access of food and water, medical care and shelters for the earthquake victims.	✓	
2.	The primary cause of death during earthquake disaster is respiratory failure.		✓
3.	Most of the victims suffer from multiple fractures during earthquake disaster.	✓	
4.	One of the strategies to manage the resources during caring earthquake victims is accurate assessment and triage.	✓	
5.	Nurses have to communicate between hospitals to know whether the hospital already exceeded its capacity for treating victims.	✓	
6.	Nutrition is more concerned rather than food safety to the community mass during earthquake disaster.		✓
7.	Triage done in emergency department is similar with the triage done in earthquake disaster.		✓
8.	Nurses during the disaster triage delivers appropriate care for victim with the critical condition.		✓
9.	Nurses perform triage to short the casualties on the basis of priority of treatment due to the lack of resources during earthquake disaster.	✓	
10.	A victim arrived with open wound; the wound must be closed immediately after dressing to prevent wound contamination.		✓

No.	Question	Answer	
		True	False
11.	Wounds that are seen dirty must be given a tetanus toxoid vaccine.	✓	
12.	If the disaster victims shares nurses about their feelings like “why god do this?” and question about justice and meaning of life, then the victim needs spiritual care.	✓	
13.	Nurse need to understand the culture of the target population to provide culturally appropriated care during earthquake disaster.	✓	
14.	During the disaster, one method to communicate with the patient includes empathizing patients and showing how the other person seems to be feeling.	✓	
15.	During emergency in disaster nursing care, nurses need not follow the ethical principles such as respect for human right.		✓
16.	Endotracheal intubation could be performed in emergency situation when there are no any physicians beside them.		✓
17.	Nurses have to provide appropriate pain relief and sedatives to the patients who are beyond emergency care.	✓	
18.	Patients who fall down or collapsed from the earthquake needs to be transported quickly without spinal immobilization.		✓
19.	Every patient who are triaged have to refer and transport for further management during earthquake disaster response.		✓
20.	During earthquake disaster, the incidence of mental health problems in adult population is higher than other groups.	✓	
21.	The most common mental health and psychosocial intervention during the disasters are counseling, psycho-education and providing social support.	✓	
22.	During earthquake disaster, victims are classified as high risk population on the basis of age only.		✓
23.	It is essential to identify persons with disabilities and respond with the special health care needs during the acute	✓	

No.	Question	Answer	
		True	False
	response phase of the disaster.		
24.	The high risk groups during emergency situation are elderly, women, children and disabled population.	✓	
25.	Nurses need to detect the potential outbreaks and track disease after earthquake disaster.	✓	
26.	Water source contamination, poor sanitation and crowded population in a shelter are major cause of diarrhea following earthquake disaster.	✓	
27.	Health education program should focus on hygiene practice, safe water and food helps in prevention of the transmission of the infectious disease among the sheltered population.	✓	
28.	The nursing intervention after earthquake in the shelter must concern about protection from environmental issues, privacy, dignity, physical and psychological security as well as support of livelihood.	✓	
29.	The recovery phase nursing intervention does not focus on the construction of latrines and educate the community in the use of these latrines.		✓
30.	Vector control measures after the earthquake disaster includes proper solid waste disposal, improved water storage practices, and covering containers to prevent access to mosquitoes.	✓	



## Appendix F

### Nurses' Perceived Skills Regarding Earthquake Disaster Questionnaire

#### (NS-EDQ)

Please read the following statement carefully and answer all of the questions that apply for you based on your perceived skills in caring for earthquake disaster.

There are five options available 1=poor, 2=fair, 3= good. Please tick (√) in the appropriate column.

Poor= I think I am not able to perform this skill during and after earthquake disaster.

Fair= I think I am able to perform this skill to some extent during and after earthquake disaster.

Good=I think I am able to perform this skill confidently during and after earthquake disaster.

No	Your skills Regarding Earthquake Disaster nursing care	Poor (1)	Fair (2)	Good (3)
1.	Collaborate with the disaster response team to reduce hazards and risks in disaster affected area.			
2.	Identify the cause of mortality during earthquake disaster.			
3.	Identify the morbidity patterns in earthquake disaster such as fractures, lacerations, crush syndrome.			
4.	Evaluate the health needs and available resources in the earthquake disaster affected area to meet the basic need of the population.			
5.	Manage resources and supplies required to provide care in the community.			
6.	Communicate with team members, victims and their families for appropriate nursing care.			
7.	Provide community based health education regarding health implications and its prevention of the earthquake disaster.			
8.	Perform a rapid assessment of victims and their nursing care needs.			
9.	Use color code triage system and classifying patients			

No	Your skills Regarding Earthquake Disaster nursing care	Poor (1)	Fair (2)	Good (3)
	by color code such as black, red, yellow.			
10.	Use START (Simple Triage and Rapid Treatment) system and categorizing patient on the basis of ability to walk, respirations, perfusions and obey command.			
11.	Assess the type of injuries such as lacerations, soft tissue injuries, fractures, dislocations, sprains and identify crush injuries.			
12.	Perform dressing and bandaging the injured patients.			
13.	Assess pain intensity and administer prescribed analgesics.			
14.	Evaluate outcome of nursing care and revise care as required.			
15.	Arrange the appropriate referral system and channels of the respected disaster sites to manage timely transport victims during and after the earthquake.			
16.	Assess the symptoms of spiritual distress such as feeling hopelessness and despair, feeling guilty, wondering about life and death.			
17.	Provide spiritual intervention such as peaceful environment, facilitating religious coping, facilitating religious activities.			
18.	Provide care based on the culture of the individual and the community.			
19.	Provide individual nursing care following the code of ethics such as respect for human rights, including cultural rights, and to be treated with respect.			
20.	Follow appropriate legal practice while providing nursing care during earthquake disaster.			
21.	Assess the risk factors of the people to develop psychological problems.			
22.	Provide psychological intervention such as patient			

No	Your skills Regarding Earthquake Disaster nursing care	Poor (1)	Fair (2)	Good (3)
	and family counseling, offering safety, comfort and communication and Psycho-education.			
23.	Organize, refer and evaluate mental health and psychosocial care.			
24.	Identify vulnerable population during earthquake disaster response.			
25.	Implement the nursing care that reflects the need of vulnerable populations impacted by the earthquake disaster.			
26.	Collect the data and identify the risk population for the disease outbreak.			
27.	Identify the risk factors for the transmission of the communicable disease			
28.	Identify the signs and symptoms of suspected communicable diseases after earthquake disaster.			
29.	Help survivors for the provision of safe food and nutritional support especially to the high risk population such as pregnant women, children.			
30.	Educate community population regarding food and drinking water safety and environmental sanitation to prevent food and water borne illness.			

**Appendix G**  
**Nurses' Judgment Ability regarding Earthquake Disaster Questionnaire**  
**NJ-EDQ**

Please read the following case scenario carefully and circle (O) the appropriate response that you think you would do in those situation.

Scenario,

At 5 PM, On April 23 a devastating earthquake with a magnitude of 7.2 RS struck the central development region of Nepal. The epicenter for the earthquake disaster was Gorkha district. Many people have been rescuing and you are the nurse responding to the mass casualty in certain area. What will you do in the following situation?

1. A lot of injured victims are brought into the emergency (ER) that you are responding, but the hospital has limited resources (equipment) to treat all the victims. In this situation you will:
  - a) Triage the victims based on their severity.
  - b) Cooperate and collaborate with the other departments in the hospitals.
  - c) Follow the hospital emergency incident command system to manage and treat the victims. ✓
  - d) Treat the patient on the basis of first come first service.
2. A lot of peoples are coming to search and track their family members at the hospital. You are busy with caring a lot of victims, how will you respond to the family members who are searching for their family:
  - a) Meet each family member of victims to provide information.
  - b) Provide accurate information to the information center of the hospital to reduce stress caused by misinformation. ✓
  - c) Ask junior staffs to provide information to family members of the victims.
  - d) Don't make any communication because you are too busy with caring patients.
3. A 55 years female presented with chest injury, respiration rate > 30 breath/min, have weak radial pulse and unconscious. However, you are unable to maintain open airway of the patient. You have to triage this patient, which of the following will you categorize the patient?
  - a) Immediate(Red)
  - b) Urgent(yellow)

c) Delayed (Green)

d) Expectant (black) ✓

4. A 34 years female patient has been categorized as beyond emergency care, and you know her well because she used to admit at your ward, what kind of emergency care will you provide to the patient?
- Provide first aid and resuscitation.
  - Provide palliative care by giving pain relieving medication. ✓
  - Leave the patient and go for next victim triage.
  - Ask the volunteer to take her home because she does not have chance to survive.
5. A 25 years male patient has been suspected to have spinal cord injury, but you have no equipment to move to the safe place, in this situation you will:
- Wait someone to help patient to the hospital without any intervention.
  - Make some arrangement for immobilization and send to the hospital. ✓
  - Stay with patient and monitor patient's condition.
  - Leave the patient because nurses cannot provide pre-hospital management of patient with spinal cord injury.
6. A woman age 46, presented to the clinic where you are providing relief activities for evaluation and treatment of chronic depression and anxiety. She said she wasn't in the affected area and nothing had happened to her family and friends. However, she was worried because she saw many victims dying in internet and television. In addition, you have other acute patients waiting for the psychological care. What will you do in this situation?
- Provide detailed psychological counseling to the patient.
  - Provide initial counseling, acutely manage her symptoms and continue her treatment as needed. ✓
  - Give priority to acute patients who are waiting for psychological support.
  - Tell the patient to come later because you are too busy to give psychological counseling.
7. A woman, age 45, came to the clinic in tears because she was separated from her husband after an earthquake. She said that her husband has schizophrenia, and she asked if you had seen him at your clinic. In fact, he was in your clinic. What will you do in this situation?
- Do not tell her about the patient to maintain confidentiality of the patient.
  - Obtain permission from the patient in order to disclose his information.

- c) Ask the senior staff for permission to allow the wife to meet with her husband.
  - d) Tell her about the patient in order to identify, locate, and notify family members responsible for the individual's care. ✓
8. When you are distributing food supplies to the mass population, but there are limited food supplies, in this situation, you will give priority to:
- a) Children under five and elderly over 65.
  - b) Pre adolescents and chronically ill victims.
  - c) Growing children and lactating women.
  - d) Pregnant or lactating women and children under 5 years. ✓
9. Suppose you have to immunize to the mass population in a community, and you have limited resources (vaccines). In this situation, you will provide vaccination on the basis of:
- a) First come first service.
  - b) High risk (vulnerable) populations ✓
  - c) Children only.
  - d) Adult only.
10. A 5 year child was brought by her mother with mild diarrhea, you have limited resources/equipment to provide care to the child, what will you do in this situation?
- a) Refer the child to the hospital.
  - b) Provide oral rehydration solution and monitor patient. ✓
  - c) Perform intravenous intervention.
  - d) Due to limited resources, tell the mother that mild diarrhea will be resolved without any intervention.

## Appendix H

### **The Result of Normality Test of scores on Nurses Knowledge, Perceived Skills and Perceived Judgment Ability Regarding Earthquake Disaster**

The normal distribution test was used to test the assumption of parametric statistics. This test was done by using “Skewness” value; above and below  $\pm 0.2$  is considered as severe skewness.

The knowledge related to earthquake disaster score

Mean=70.07

Median=70.00

SD=10.01

Skewness= (mean-median)/SD

$$= (70.07-70.00)/10.01$$

$$=0.1$$

The value of the skewness of total knowledge score related to earthquake disaster is 0.1, which lies between  $\pm 0.2$ . So, we can assume that the data is normally distributed.

The perceived skills related to earthquake disaster score

Mean=76.21

Median=77.78

SD=13.52

Skewness= (mean-median)/SD

$$= (76.21-77.78)/13.52$$

$$= - 0.12$$

The value of the skewness of total perceived skills score related to earthquake disaster is 0.12, which lies between  $\pm 0.2$ . So, we can assume that the data is normally distributed.

The perceived Judgmental abilities related to earthquake disaster score

$$\text{Mean}=56.87$$

$$\text{Median}=60.00$$

$$\text{SD}=17.71$$

$$\text{Skewness}= (\text{mean}-\text{median})/\text{SD}$$

$$= (56.87-60.00)/17.71$$

$$= - 0.18$$

The value of the skewness of total perceived judgment abilities score related to earthquake disaster is 0.12, which lies between  $\pm 0.2$ . So, we can assume that the data is normally distributed.



## Appendix I

### Frequency, Percentage, Mean, Standard Deviation of each Item of Knowledge

#### Scores Related to Earthquake Disaster

Table 2

*Frequency, Percentage, Mean, Standard Deviation of each Item of Knowledge*

Knowledge related to earthquake disaster	True <i>n (%)</i>	False <i>n (%)</i>	<i>M (SD)</i>
<b>Response phase</b>			
1. Community response to earthquake disaster.	277 (92.3)	23 (7.7)	92.0 (26.7)
2. Mortality caused by earthquake disaster	180 (60.0)	120 (40.0)	60.0 (49.1)
3. Morbidities or injuries caused by earthquake disaster.	287 (95.7)	13 (4.3)	96.0 (20.4)
4. Knowledge on resource management.	278 (92.7)	22 (7.3)	93.0 (26.1)
5. Communication skills.	259 (86.3)	41 (13.7)	86.0 (34.4)
6. Community based health education.	183 (61.0)	117 (39.0)	61.0 (48.9)
7. Triage in earthquake disaster response.	92 (30.7)	208 (69.3)	31.0 (46.2)
8. Triage in earthquake disaster response.	37 (12.3)	263 (87.7)	12.0 (32.9)
9. Purpose of Triage in earthquake disaster response.	211(70.3)	89 (29.7)	70.0 (45.8)
10. Wound assessment and care.	45 (15.0)	255 (85.0)	15.0 (35.8)
11. Vaccination related to wound infection.	235 (78.3)	65 (21.7)	78.0 (41.3)
12. Spiritual care during earthquake disaster.	239 (79.7)	61 (20.3)	80.0 (40.3)
13. Culturally competent care during earthquake disaster.	183(61.0)	117 (39.0)	61.0 (48.9)

Table 2 (continue)

Knowledge related to earthquake disaster	True	False	<i>M (SD)</i>
	<i>n (%)</i>	<i>n (%)</i>	
1. Communication with patients and families	231 (77.0)	69 (23.0)	77.0 (42.2)
2. Following ethical principle during earthquake disaster.	201 (67.0)	99 (33.0)	67.0 (47.1)
3. Legal issues during earthquake disaster.	200 (66.7)	100 (33.3)	67.0 (47.2)
4. Providing pain relief measures during earthquake disaster.	212 (70.7)	88 (29.3)	71.0 (45.6)
5. Patient transportation during earthquake disaster.	140 (46.7)	160 (53.3)	47.0 (50.0)
6. Patient referral during earthquake disaster.	215 (71.7)	85 (28.3)	72.0 (45.1)
7. Screening high risk patient for mental problems during earthquake disaster.	125 (41.7)	175 (58.3)	42.0 (49.4)
8. Identifying common mental health and psychosocial interventions.	264 (88.0)	36 (12.0)	88.0 (32.6)
9. Screening persons with disabilities during the acute response phase of the disaster	218 (72.7)	82 (27.3)	73.0 (44.6)
10. Care of vulnerable populations during disaster.	233 (77.7)	67 (22.3)	78.0 (41.7)
11. Identifying high risk population during disaster.	234 (78.0)	66(22.0)	78.0 (41.5)
Recovery phase			
12. Surveillance activities after disaster.	250 (83.3)	50 (16.7)	83.0 (37.3)
13. Identifying the causes of outbreak of			

Table 2 (Continue)

Knowledge related to earthquake disaster	True n (%)	False n (%)	<i>M (SD)</i>
infectious disease.	273 (91.0)	27 (9.0)	91.0 (28.7)
14. Possible interventions to control outbreak of infectious disease.	278 (92.7)	22 (7.3)	93.0 (26.1)
15. Nursing intervention related to shelter management.	255 (85.0)	45 (15.0)	85.0 (35.8)
16. Nursing intervention related to hygiene practice.	202 (67.3)	98 (32.7)	67.0 (47.0)
17. Nursing intervention related to vector control measures.	266 (88.7)	34 (11.3)	89.0(31.8)

## Appendix J

### Frequency, Percentage, Mean, Standard Deviation of each Item of Perceived Skills Scores Related to Earthquake Disaster

Table 3

*Frequency, Percentage, Mean, Standard Deviation of each Item of Perceived Skills*

Perceived skills related to earthquake disaster	Poor <i>n</i> (%)	Fair <i>n</i> (%)	Good <i>n</i> (%)	<i>M</i> ( <i>SD</i> )
<b>Response Phase</b>				
1. Collaborate with the disaster response team.	41 (13.7)	148 (49.3)	111 (37.0)	74.44 (22.4)
2. Identify the cause of mortality during earthquake disaster.	45 (15.0)	162 (54.0)	93 (31.0)	72.00 (22.4)
3. Identify the morbidity patterns in earthquake disaster.	38 (12.7)	141 (47.0)	121 (40.0)	75.89 (22.5)
4. Evaluate the health needs and available resources.	42 (14.0)	141 (47.0)	117 (39.0)	75.00 (22.8)
5. Manage resources and supplies.	34 (11.3)	169 (56.3)	97 (32.3)	73.67 (20.9)
6. Communicate with team members, victims and their families.	27 (9.0)	92 (30.7)	181 (60.3)	83.78 (21.9)
7. Provide community based health education.	23 (7.7)	118 (39.3)	159 (53.0)	81.78 (21.1)
8. Perform a rapid assessment of victims.	24 (8.0)	132 (44.0)	144 (48.0)	80.00 (21.1)

Table 3 (Continue)

Perceived skills related to	Poor	Fair	Good	<i>M (SD)</i>
earthquake disaster	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	
9. Use color code triage system.	29 (9.7)	101(33.7)	170 (56.7)	82.33 (22.2)
10. Use START (Simple Triage and Rapid Treatment) system.	86 (28.7)	170 (56.7)	79 (26.3)	65.89 (24.7)
11. Assess the type of injuries.	47 (15.7)	161(53.7)	92 (30.7)	71.67 (22.2)
12. Perform dressing and bandaging the injured patients.	28 (9.3)	73 (24.3)	199 (66.3)	85.67 (21.9)
13. Assess pain intensity and administer prescribed analgesics.	35 (11.7)	89 (29.7)	176 (58.7)	82.33 (23.2)
14. Evaluate outcome of nursing care and revise care as required.	39 (13.0)	108 (36.0)	153 (51.0)	79.33 (23.5)
15. Arrange the appropriate referral system and channels of the respected disaster sites.	51(17.0)	166 (55.3)	83 (27.7)	70.22 (22.0)
16. Assess the symptoms of spiritual distress.	50 (16.7)	159 (53.0)	91(30.3)	71.22 (22.4)
17. Provide spiritual intervention.	65 (21.7)	139 (46.3)	96 (32.0)	70.11 (24.2)
18. Provide care based on the culture of the individual and the community.	64 (21.3)	140 (46.7)	96 (32.0)	70.22 (24.1)

Table 3 (Continue)

Perceived skills related to	Poor	Fair	Good	<i>M (SD)</i>
earthquake disaster	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	
19. Provide individual nursing care following the code of ethics.	43 (14.3)	126 (42.0)	131 (43.7)	76.44 (23.5)
20. Follow appropriate legal practice.	42 (14.0)	126 (42.3)	131 (43.7)	76.22 (23.2)
21. Assess the risk factors of the people to develop psychological problems.	41 (13.7)	155 (51.7)	104 (34.7)	73.67 (22.1)
22. Provide psychological intervention.	32 (10.7)	141 (47.0)	127 (42.3)	77.22 (21.9)
23. Organize, refer and evaluate mental health and psychosocial care.	61 (20.3)	151 (50.3)	88 (29.3)	69.67 (23.3)
24. Identify vulnerable population during earthquake disaster response.	56 (18.7)	150 (50.0)	94 (31.4)	70.89 (23.2)
25. Implement the nursing care that reflects the need of vulnerable populations impacted by the earthquake disaster.	43 (14.3)	150 (50.0)	107 (35.7)	73.78 (22.5)

Table 3 (Continue)

Perceived skills related to	Poor	Fair	Good	<i>M (SD)</i>
earthquake disaster	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	
<b>Recovery Phase</b>				
26. Collect the data and identify the risk population for the disease outbreak.	32 (10.7)	138 (46.0)	130 (43.3)	77.56 (21.9)
27. Identify the risk factors for the transmission of the communicable disease.	27 (9.0)	122 (40.7)	151 (50.3)	80.44 (21.7)
28. Identify the signs and symptoms of suspected communicable diseases after earthquake disaster.	29 (9.7)	123 (41.0)	148 (49.3)	79.89 (21.9)
29. Provision of safe food and nutritional support especially to the high risk population such as pregnant women, children.	24 (8.0)	141 (47.0)	135 (45.0)	79.00 (20.4)
30. Educate community population regarding food and drinking water safety and environmental sanitation.	24 (8.0)	98 (32.7)	178 (59.3)	83.78 (21.4)

## Appendix K

### Frequency, Percentage, Mean, Standard Deviation of each Item of Judgment

#### Abilities Scores Related to Earthquake Disaster

Table 4

*Frequency, Percentage, Mean, Standard Deviation of each Item of Judgment Abilities*

Perceived Judgment ability related to earthquake disaster	Incorrect answer <i>n</i> (%)	Correct answer <i>n</i> (%)	<i>M</i> ( <i>SD</i> )
1. Manage resources during responding earthquake disaster.	247 (82.3)	53 (17.7)	17.67 (38.2)
2. Communicate with patient and family member during earthquake disaster.	67 (22.3)	233 (77.7)	77.67 (41.7)
3. Sort the patient on the basis of color coding triage system.	294 (98.0)	6 (2.0)	2.00(14.0)
4. Provide emergency care by following ethical principle.	167 (55.7)	133 (44.3)	44.33(49.8)
5. Transport patient safely during earthquake disaster.	52 (17.3)	248 (82.7)	82.67(37.9)
6. Assess the psychological symptoms and provide appropriate intervention during earthquake disaster.	138 (46.0)	162 (54.0)	54.00(49.9)
7. Decide whether to disclose patients' information during emergency			



Table 4 (Continue)

Perceived Judgment ability related to	Incorrect	Correct	<i>M (SD)</i>
earthquake disaster	answer	answer	
	<i>n (%)</i>	<i>n (%)</i>	
situation.	128 (42.7)	172 (57.3)	57.33(49.5)
8. Access and provide appropriate care			
to the vulnerable population.	97 (32.3)	203 (67.7)	67.67(46.8)
9. Immunize to the mass population in			
a community.	55 (18.3)	245 (81.7)	81.67(38.8)
10. Provide primary health care to the			
patients.	54 (18.0)	246 (82.0)	82.00 (38.4)

## **Appendix L**

### **List of Experts**

Three experts validated the content validity of the instruments: Nurses Knowledge Regarding Earthquake Disaster Questionnaire (NK-EDQ), Nurses' Perceived Skills Regarding Earthquake Disaster Questionnaire (NS-EDQ) and Nurses' Judgment Ability regarding Earthquake Disaster Questionnaire (NJ-EDQ), they were:

1. Asst. Prof. Dr. Luppana Kitrungrrote

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

2. Asst. Prof. Dr. Pulsuk Siripul

Nursing Lecturer, Faculty of Nursing, Khon Kaen University, Thailand

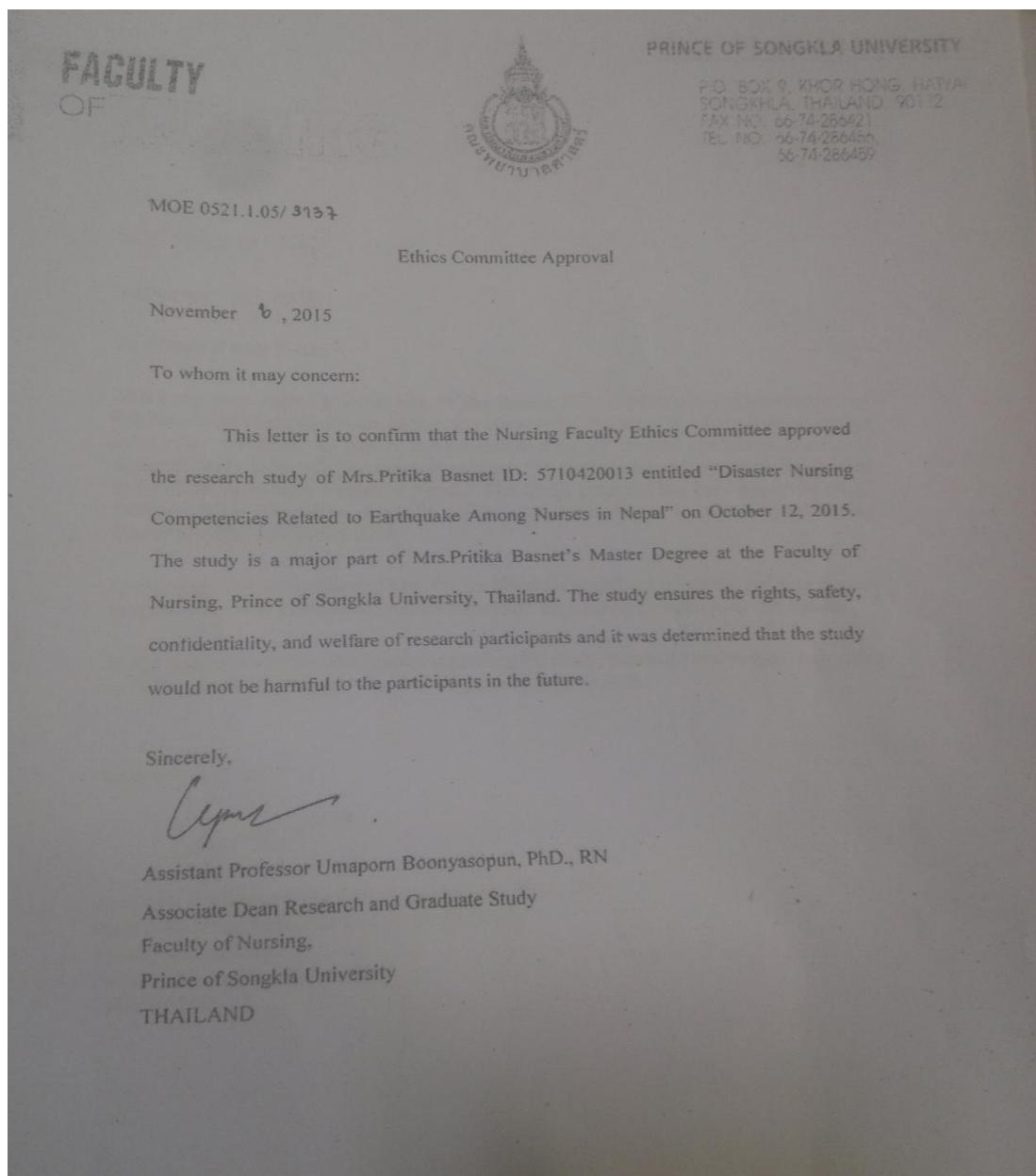
3. Ms. Roshani Tuitui

Nursing Administrator and Nursing Lecturer, National Academy of Medical Sciences (NAMS), Kathmandu, Nepal

## Appendix L


### Letters

#### 1. Ethics Committee Approval Letter From Faculty of Nursing, Prince of Songkla University



2. Letter to Ask Permission for Data Collection to the Hospitals From Faculty of Nursing, Prince of Songkla University

**FACULTY OF NURSING**



**PRINCE OF SONGKLA UNIVERSITY**  
P.O. BOX 9, KHOR HONG, HATYA  
SONGKHLA, THAILAND, 90112  
FAX NO. 66-74-286421  
TEL. NO. 66-74-286456,  
66-74-286459

MOE 0521.1.05/ 3n2

November 4, 2015

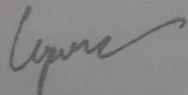
To Whom it may concern,

This letter is to inform you that Mrs. Pritika Basnet, ID. 5710420013, a master student of the Faculty of Nursing, Prince of Songkla University, Thailand, is taking a thesis course in her last semester. As part of the requirement of the course, she has to conduct a research study in Nepal. Her thesis is entitled: "Disaster Nursing Competencies Related to Earthquake Among Nurses in Nepal." The thesis proposal has been approved on 12 October 2015. Therefore, she will collect data from nurses in this hospital during December 2015- February 2016.

I will be greatly appreciated if Mrs. Pritika Basnet is permitted to collect her data in your hospital, as it will provide valuable information for nursing profession in the future.

If you need any further information regarding his study, please do not hesitate to contact us at the above address or e-mail us at: [praneed.s@psu.ac.th](mailto:praneed.s@psu.ac.th).

Sincerely Yours,



Assistant Professor Umaporn Boonyasopun, PhD., RN  
Associate Dean Research and Graduate Study  
Faculty of Nursing,  
Prince of Songkla University  
THAILAND

## 3. Letter of Ethical Approval from Nepal Health Research Council (NHRC)

Government of Nepal  
Nepal Health Research Council (NHRC)

ESTD. 1991

ESTD. 1991

25

Ref. No.: 1167

21 January 2016

Ms. Pritika Basnet  
Principal Investigator  
Prince of Songkla University  
Thiland

Ref: Approval of Research Proposal entitled Disaster Nursing Competencies related to Earthquake among Nurses in Nepal

Dear Ms. Basnet,

It is my pleasure to inform you that the above-mentioned proposal submitted on 3 December 2015 (Reg.no. 326/2015 please use this Reg. No. during further correspondence) has been approved by NHRC Ethical Review Board on 20 January 2016.

As per NHRC rules and regulations, the investigator has to strictly follow the protocol stipulated in the proposal. Any change in objective(s), problem statement, research question or hypothesis, methodology, implementation procedure, data management and budget that may be necessary in course of the implementation of the research proposal can only be made so and implemented after prior approval from this council. Thus, it is compulsory to submit the detail of such changes intended or desired with justification prior to actual change in the protocol.

If the researcher requires transfer of the bio samples to other countries, the investigator should apply to the NHRC for the permission.

Further, the researchers are directed to strictly abide by the National Ethical Guidelines published by NHRC during the implementation of their research proposal and submit progress report and full or summary report upon completion.

As per your research proposal, the total research amount is Self-Funded and accordingly the processing fee amount to NRs. 10,690.00. It is acknowledged that the above-mentioned processing fee has been received at NHRC.


If you have any questions, please contact the Ethical Review M & E section of NHRC.

Thanking you

.....  
Dr. Khem Bahadur Karki  
Member-Secretary

## 4. Letter of Ethical Approval From B.P. Koirala Institute of Health Sciences

F.N. 006


**बी.पी. कोइराला स्वास्थ्य विज्ञान प्रतिष्ठान**  
**B. P. Koirala Institute of Health Sciences**  
 Dharan, Nepal

Date: 10<sup>th</sup> April, 2016

Ref. No. 677/072/073-IRC

Ms. Pritika Basnet  
 Prince of Songkla University  
 Thailand

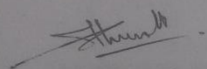
**Subject: Ethical approval of your research proposal "Disaster nursing competencies related to earthquake among nurses in Nepal."**

**Code No.: IRC/0729/016**

Dear Ms. Basnet,

Thank you for submitting your research proposal to the Institutional Review Committee (IRC), BPKIHS. I am pleased to inform you that the committee meeting held on 6<sup>th</sup> April, 2016 has reviewed your proposal and given ethical approval.

With best wishes,

  
 Dr. Ashish Shrestha  
 Member Secretary  
 Institutional Review Committee (IRC)

Head Office, Dharan : 977-25-525555, 977-25-521017 ; Fax: 977-25-520251 ; E-mail: [bpkihs@bpkihs.edu](mailto:bpkihs@bpkihs.edu)  
 Kathmandu Office : 01-4372263, P. O. Box 7053, Kathmandu ; url: [www.bpkihs.edu](http://www.bpkihs.edu)



5. Letter of completion of Data Collection from B.P. Koirala Institute of Health Sciences.

F.N. 006

**वी.पी. कोइराला स्वास्थ्य विज्ञान प्रतिष्ठान**  
**B. P. Koirala Institute of Health Sciences**  
 धरान, नेपाल  
 Dharan, Nepal

Ref. No. Nsg. 192/072/073.

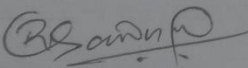
12<sup>th</sup> April, 2016

To,  
 Faculty of Nursing  
 Prince of Songkla University  
 Thailand

Subject: About Research Work

This is to apprise that Ms. Pritika Basnet, Master of Nursing Science, student of Prince of Songkla University has been permitted to carry out her research work entitled "Disaster nursing competencies related to earthquake among nurses in Nepal". She has completed it on 12<sup>th</sup> April 2016.



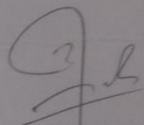
I wish her grand success of her endeavor.



Mr. Ramanand Chaudhary  
 Matron  
 BPKIHS Dharan  
**Matron**

Head Office, Dharan : 977-25-525555, 977-25-521017 ; Fax: 977-25-520251 ; E-mail: [bpkihs@bpkihs.edu](mailto:bpkihs@bpkihs.edu)  
 Kathmandu Office : 01-4372263, P. O. Box 7053, Kathmandu ; url: [www.bpkihs.edu](http://www.bpkihs.edu)

6. Letter of completion of Data Collection from Nobel Medical College  
(Biratnagar).

 Regd. No. 25161/060/51	<b>NOBEL MEDICAL COLLEGE</b> <b>TEACHING HOSPITAL (P.) LTD.</b> (Affiliated to Kathmandu University) Biratnagar, Nepal
Ref no: 956/072/073	
Date: 2072.11.16	
<p><u>To Whom It May Concern</u></p> <p>This is to inform that Ms Pritika Basnet, Masters of Nursing Science student of Prince of Songkla University came to this hospital for collecting data on "Disaster Nursing Competencies related to Earthquake among Nurses in Nepal" and completed it on 2072.11.16.</p>	
 Dipesh Rai Administrative Officer <b>Administrative Officer</b>	
<hr/>	
<b>College &amp; Teaching Hospital:</b> Kanchanbari, Biratnagar, Ward No.: 5, Morang, Nepal Tel: +977-21-461735/460736, Fax: +977-21-460624 GPO Box: 278, Biratnagar e-mail: mgmt@nobelmedicalcollege.com.np	<b>Liasion Office:</b> New Plaza, Putalisadak, Kathman (Way to Anamnagar) Tel: +977-1-4441079/4426149



## 7. Letter of completion of Data Collection from Nepalgunj Medical College.

P.L.No. 614/053/054

**NEPALGUNJ MEDICAL COLLEGE HOSPITAL**  
(Managed by Lord Buddha Educational Academy Ltd.)  
B.P. CHOWK, NEPALGUNJ, (BANKE) NEPAL  
Tel: 00977-81-522458, 523518

Ref. 072/073/200

Date:- 13<sup>th</sup> March 2016


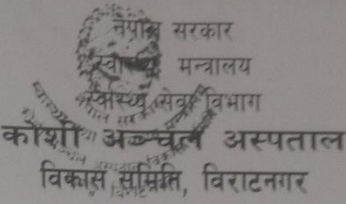
**To Whom It May Concern**

This is to inform that Ms. Pritika Basnet, Masters of <sup>Nursing</sup> Science student of Prince of Songkla University came to this Nepalgunj Medical College Teaching Hospital, Nepalgunj, Banke (Nepal) for collecting data on "Disaster Nursing Competencies related to Earthquake among Nurses in Nepal" and completed it on 13<sup>th</sup> March 2016.

(Dr. Kumar Pokhrel)  
Assistant Director  
NGMC, Nepalgunj

**Dr. Kumar Pokhrel**  
Asst. Director

## 8. Letter of Completion of Data Collection from Koshi Zonal Hospital.

नेपाल सरकार  
 स्वास्थ्य मन्त्रालय  
 स्वास्थ्य सेवा विभाग  
**कोशी अञ्चल अस्पताल**  
 विकास समिति, विराटनगर

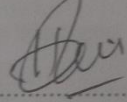
कार्यालय : ५३०१०३  
 : ५३०२८१  
 मे.सु. निवास : ५३०३०४  
 इमरजेन्सी : ५२४२३४

पत्र संख्या :- ०७२/०७३  
 चलानी नम्बर :- १९२९

मिति :- २०७२/१२/३०

विषय :- तथ्यांक संकलन संबन्धमा ।

श्री स्वास्थ्य तथा जनसंख्या मन्त्रालयको च.नं.२४१६ मिति २०७२/०९/०१ को पत्रानुसार Prince of songkla University of Thailand मा अध्यायनरत कोशी हरैचा -१,मोरङ वस्ने श्री प्रितिका वस्नेतले Disaster Nursing competencies Related to Earthquake Among Nurses in Nepal भन्ने शिर्षकमा Thesis को लागि यस अस्पतालको विभिन्न शाखामा सम्पर्क गरी मिति २०७२/११/०६ देखी २०७२/११/१४ सम्म तथ्यांक संकलन गर्नु भएको व्यहोरा प्रमाणित गरीन्छ ।

  
 (हाङ्कोनयूमा राई)  
 विभिन्न अस्पताल नसिङ्ग प्रशासक

## 9. Letter of Completion of Data Collection from Bheri Zonal Hospital.

Emer: 081-520193  
Office: 081-520120  
Fax: 081-520305  
Email: bheri.hospital@gmail.com

Government of Nepal  
Ministry of Health & Population  
**BHERI ZONAL HOSPITAL**  
DEVELOPMENT COMMITTEE

NEPALGUNJ, NEPAL.

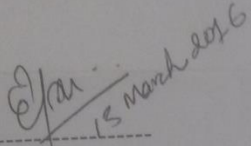
Date: 13 March 2016

Ref No: 680


To Whom It May Concern:

Certified that Ms.pritika Basnet, Masters of Nursing Science student of Prince of Sonkla University came to this hospital for collecting data on "Disaster Nursing Competencies related to Earthquake among Nurses in Nepal" and completed it on 13 March 2016.

In addition, she has paid NRs.2000.00 as per rules of this hospital for the process of collecting data.

  
 -----  
 (Durga Laxmi Shrestha)  
 Chief Hospital Nursing Administrator

## 10. Letter of Completion of Data Collection from Bir Hospital.

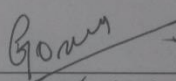

 Government of Nepal  
 Ministry of Health and Population  
**National Academy of Medical Sciences**  
**Bir Hospital**

Ref. No.: \_\_\_\_\_
 
 Mahaboudha 2073/115  
 Date: .....

Subject: **To whom it may concern.**


This is to certify that **Ms. Pritika Basnet** the student of Prince of Songkla University (Master of Nursing Science) have completed her data collection on "Disaster Nursing Competencies Related to Earth Quake Among Nurses in Nepal" from 2072-12-15 to 2073-01-05 in different wards of this hospital.


I wish her all the success for her bright future.


  
 \_\_\_\_\_  
 Prof. Goma Devi Niraula Shrestha  
 Nursing Director  
 NAMS, Bir Hospital



## 11. Letter of Completion of Data Collection from National Trauma Center.

 **National Academy of Medical Sciences**  
**National Trauma Center**  
Kathmandu

 **NATIONAL TRAUMA CENTER**  
KATHMANDU



Ref No.:- 645

Date:-

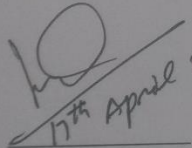
To,  
Faculty of Nursing  
Prince of Songkla University  
Thailand

17<sup>th</sup> April, 2016


**Subject: About Research Work**

This is to apprise that Ms.Pritika Basnet, Master of Nursing Science, Student of Prince of Songkla University has been permitted to carry out her research work entitled "Disaster nursing competencies related to earthquake among nurses in Nepal".She has completed it on 17<sup>th</sup> April, 2016.

*I wish her grand success of her endeavor.*

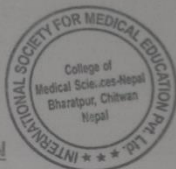
  
17<sup>th</sup> April 2016  
(Dan Bahadur Aidi)  
Section Officer

12. Letter of completion of Data Collection from College of Medical Sciences  
(Bharatpur).


**International Society for Medical Education Pvt. Ltd.**  
**College of Medical Sciences-Nepal**  
 (Affiliated to Kathmandu University & Recognized by Nepal Medical Council)

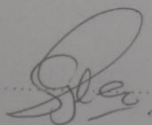
PAN : 301114116

Date : 14.03.2016



TO WHOM IT MAY CONCERN

This is to inform that **Ms. Pritika Basnet**, Masters in Nursing Science student of Prince of Songkla University came to our hospital to collected data on "Disaster Nursing Competencies related to Earthquake among Nurses in Nepal" She was successfully completed her data collection from 06.03.2016 to 14.03.2016.



Mrs. Sita Parajulee, M.Sc(Ped.Nsg), RN, RM  
 Nursing Superintendent

---

P.O. Box: 23, Bharatpur, Chitwan, (Dist.), Nepal  
 Phone: +977-56-524203, 528808 (RD Office), +977-56-525012, 525013 (Hospital), Fax: +977-56-521527  
 Mail: [directorcmsth@gmail.com](mailto:directorcmsth@gmail.com), [info@cmsnepal.edu.np](mailto:info@cmsnepal.edu.np), [info@comsnepal.com](mailto:info@comsnepal.com)  
 Website: [www.cmsnepal.edu.np](http://www.cmsnepal.edu.np)

## 13. Letter of Completion of Data Collection from Nobel Academy Hospital.

 **Nobel Hospital**  
Pvt. Ltd.

P.O. Box No.: 21034  
Sinamangal, Kathmandu, Nepal  
Tel: 4110842, 4110893

प.च.सं: २५.



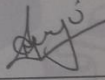
19<sup>th</sup> April 2016

To,  
Faculty Of Nursing  
Prince of Songkla University  
Thailand

**Subject: About Research Work**


This is to apprise that Ms. Pritika Basnet, Master of Nursing Science, student of Prince of Songkla University has been permitted to carry out her research work entitled "Disaster Nursing Competencies related to Earthquake among nurses in Nepal". She has completed it on 19 April 2016.

I wish her good luck for her future endeavors

  
(Manju Dahal)  
Hospital Manager



## 14. Letter of completion of Data Collection from Narayani Zonal Hospital.


  
 नेपाल सरकार  
 स्वास्थ्य तथा जनसंख्या मन्त्रालय  
 स्वास्थ्य सेवा विभाग  
 नारायणी उपक्षेत्रीय अस्पताल विकास समिति  
 वीरगन्ज, पर्सा

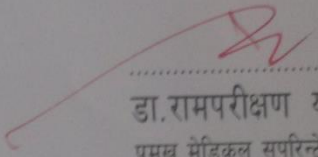
प.सं. : क.प्र.शाखा, २०७२/०७३  
 च.नं. :- १२६९

मिति:- २०७२/११/२०

विषय-आवश्यक सहयोग गरीएको ।

जो जस संग सम्बन्ध छ ।

उपरोक्त सम्बन्धमा स्वा.त.जन संख्या मन्त्रालयको च.नं २१४१६ मिति ०७२।०९।०१को पत्रानुसार कोशी हरैया न.पा.१ का प्रितिका बस्नेतले तथ्यांक संकलन गरी पठाइएको व्यहोरा जानकारीको लागी अनुरोध छ ।

  
 डा.रामपरीक्षण यादव  
 प्रमुख मेडिकल सुपरिन्टेन्डेन्ट  
 प्रमुख मेडिकल सुपरिन्टेन्डन्ट



## 15. Letter of Completion of Data Collection from Bhaktapur District Hospital.

६६९००९८  
६६९००९६  
६६९००९९

नेपाल सरकार  
स्वास्थ्य तथा जनसंख्या मन्त्रालय

**भक्तपुर अस्पताल**

भक्तपुर  
२०६१

पत्र संख्या : ०७२१७३  
चलानी नं

२०७२/१२/८


विषय : तथ्यांक संकलन सम्बन्धमा ।

जो जससंग सम्बन्ध छ ।

श्री सवसथ्य तथा जनसंख्या मन्त्रालयको च.नं. २/४९६ मिति २०७२/०९/०९ को पत्रानुसार Prince of songkla University of Thailand मा अध्ययनरत कोशी हरेचा न.पा. ९, मोरङ वस्ने श्री प्रितिका वस्नेतले Disaster Nursing competencies Related to Earthquake Among Nurses in Nepal भन्ने शिर्षकमा Thesis का लागि यस अस्पतालको विभिन्न शाखामा सम्पर्क राखी मिति २०७२/१२/१५ देखि २०७२/१२/१८ सम्म तथ्यांक संकलन गर्नु भएको व्यहोरा प्रमाणित गरिन्छ । ✓

.....  
विश्वराम न्यौपाने  
शाखा अधिकृत  
शा.अ.  
भक्तपुर अस्पताल

## 16. Letter of Completion of Data Collection from Sindupalchok District hospital.


 नेपाल सरकार  
 स्वास्थ्य तथा जनसंख्या मन्त्रालय  
 स्वास्थ्य सेवा विभाग  
 मध्यमान्चल क्षेत्रीय स्वास्थ्य निरीक्षणालय  
**जिल्ला स्वास्थ्य कार्यालय**  
 सिन्धुपाल्चोक

०११-६२००९२  
 email:  
 sindhupalchokdho@gmail.com

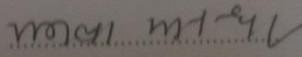
पत्र संख्या : २०७२/०७३  
 चलानी नं. :

चौतारा  
 मिति : २०७२/१२/०७

विषय : तथ्याङ्क संकलन सम्बन्धमा ।

श्री जो जस सग सम्बन्धित छ ।

प्रस्तुत विषयमा prince of songkla univrsity मा अध्ययनरत कोशी अंचल मोरङ जिल्ला हरेचा न.पा. वस्ने श्री प्रितिका बस्नेतले disaster Nursing competencies Related to Earthquake Among Nurses in Nepal भन्ने शिर्षकको Thesis का लागि यस जिल्लाको चौतारा अस्पतालको विभिन्न शाखामा सम्पर्क राखी तथ्याङ्क संकलन गर्नु भएको व्यहोरा प्रमाणित गरिन्छ ।

  
 (मंगला मानन्धर)  
 वरिष्ठ जनसंख्या अधिकृत

## 17. Letter of Completion of Data Collection from Bharatpur District Hospital.

नेपाल सरकार  
स्वास्थ्य तथा जनसंख्या मन्त्रालय  
स्वा.से.वि., मा.क्षे.स्वा. निर्देशनालय

०२१-२२०१  
०२१-२२०२  
०२१-२२४३

**भरतपुर अस्पताल, चितवन**

प.सं ००५१०६३  
च.नं १७४१

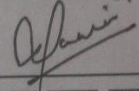
मिति :- २०७२/१२/०१

**विषय :- प्रमाणित गरिएको ।**


श्री Prince of Songkla University ,  
Songkhla, Thailand ।

प्रस्तुत विषयमा त्यहाँको च.नं. ०५२१.१.०५।३११२ मिति November 4 2015 को पत्रानुसार त्यहाँ Master of Nursing Science मा अध्ययनरत विद्यार्थी श्री Pritika Basnet यस अस्पतालमा मिति २०७२।११।२३ गते निम्न विषयमा अनुसन्धान गर्नु भएको व्यहोरा प्रमाणित गरिन्छ ।

**Research Topic:**  
Disaster Nursing Competencies Related to Earthquake Among Nurses in Nepal

  
डा. रुद्र प्रसाद मरासिनी  
नि.प्र.मे.सु.  
जि. प्रमुख मेडिकल सुपरिटेन्डेण्ट

## 18. Letter of Completion of Data Collection from Makwanpur District Hospital.


 नेपाल सरकार  
 स्वास्थ्य तथा जनसंख्या मन्त्रालय  
 स्वास्थ्य सेवा विभाग  
 मध्यमाञ्चल क्षेत्रीय स्वास्थ्य निर्देशनालय  
**हेटौंडा अस्पताल**  
 मकवानपुर, हेटौंडा

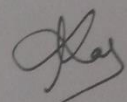
०५७ - ५२०३०५  
 ५२३९७७  
 ५२४५९९

पत्र संख्या :- ०६२१६३  
 चलानी नं.:- ६८४

२०७२/११/२१

विषय: जो जससँग सम्बन्धित छ।

उपरोक्त विषयमा Prince of Songkla University मा अध्ययनरत कोशी हरेचा नगरपालिका १ बस्ने प्रितीका बस्नेतले Disaster Nursing Competencies Related to Earthquake Among Nurses in Nepal भन्ने शीर्षकको Thesis को लागि यस अस्पतालको विभिन्न शाखामा सम्पर्क राखी तथ्याङ्क संकलन गर्नु भएको व्यहोरा प्रमाणित गरिन्छ।

  
 (डा. निशा राई)  
 नि. प्रमुख मेडिकल सुपरिण्टेण्डेण्ट  
 नि. प्रमुख मेडिकल सुपरिण्टेण्डेण्ट





## 20. Letter of Completion of Data Collection from Surkhet District Hospital.

फोन नं. ०८३ ५२३२००  
फ्याक्स ०८३ ५२०२६६

**मध्य पश्चिमांचल क्षेत्रीय अस्पताल**

नेपाल सुर्खेत  
कर्मचारी प्रशासन शाखा  
वीरन्द्रनगर, सुर्खेत

प.सं. ०७२/७३  
च.नं.: ६५४.....

मिति : २०७२/११/२९


विषय: तथ्यांक संकलन सम्बन्धमा ।

श्री जो जस संग सम्बन्धित छ ।

प्रस्तुत विषयमा Prince of songkla Univrsity मा अध्यनरत कोशी हरेचा न.पा. १,  
मोरङ बस्ने श्री प्रितिका बस्नेतले Disaster Nursing competencies Related to  
Earthquake Among Nurses in Nepal भन्ने शिर्षकको Thesis का लागि यस  
अस्पतालको विभिन्न शाखामा सम्पर्क राखी तथ्यांक संकलन गर्नु भएको व्यहोरा प्रमाणित गरिन्छ ।

डा. गणेश थापा  
प्रमुख मेडिकल सुपरिटेन्डेण्ट

## 21. Letter of Completion of Data Collection from Bardiya District Hospital


  
 नेपाल सरकार  
 स्वास्थ्य तथा जनसंख्या मन्त्रालय  
 स्वास्थ्य सेवा विभाग  
 जिल्ला अस्पताल  
 बर्दिया

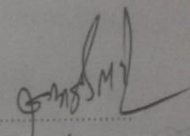
फोन: ०५-४४२०१८८  
 फोन: ०५-४४२११३३

पत्र संख्या:- ०७२/०७३  
 चलानी नम्बर:- ४६६


मिति:- २०७२/११/२७

विषय : जो जस सँग सम्बन्धित छ ।

प्रस्तुत विषयमा prince of songkla university मा अध्ययनरत कोशी हरेचा नगरपालिका १ बस्ने प्रीतीका बस्नेतले Disaster Nursing Competecies Related to Earthquake Among Nurses in Nepal भन्ने शीर्षकको Thesis लागी यस अस्पतालको विभिन्न शाखामा सम्पर्क राखी तथ्यांक संकलन गर्नु भएको व्यहोरा प्रमाणित गरिन्छ ।

  
 डा. अर्जुन भट्ट  
 नि. मे. सु.

## 22. Letter of Completion of Data Collection from Dhankuta District Hospital.



नेपाल सरकार  
 स्वास्थ्य तथा जनसंख्या मंत्रालय  
 स्वास्थ्य सेवा विभाग  
 पञ्चकण्ठ क्षेत्रीय स्वास्थ्य निर्देशनालय  
 जिल्ला स्वास्थ्य कार्यालय  
 धनकुटा

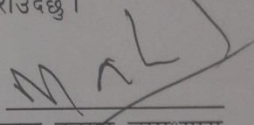
फोन नं. ०२६-५२०-१३५  
 ०२६-५२०३००  
 ०२६-५२०२२७  
 फ्याक्स नं. ०२६-५२०१३४

प.सं.: ०७२/७३  
 च.नं.:  
 प्राप्त पत्र संख्या र मिति:-

मिति: २०७२/११/११

यो जो जस संग सम्बन्धित छ ।

उपरोक्त सम्बन्धमा Prince of Songkla University मा अध्ययनरत कोशी  
 हरैचा नगरपालिका १ का प्रितिका वस्नेतले Disaster Nursing Competencies  
 Related to Earth Quake Among Nurses in Nepal शीर्षकमा Thesis को  
 लागि तथ्याङ्क संकलन गर्न यस अस्पतालबाट गरेको जानकारी गराउदछु ।

  
 डा. मदन कुमार उपाध्याय  
 जिल्ला स्वा. प्रमुख  
 जिल्ला स्वास्थ्य प्रमुख



## VITAE

**Name** Mrs. Pritika Basnet

**Student ID** 5710420013

### **Educational Attainment**

Degree	Institution/University	Year
Bachelor of Science in Nursing	Purbanchal University, Nepal	2008-2012

### **Working experience**

Nursing Educator, Faculty of Nursing (8<sup>th</sup> Dec 2013- 2<sup>nd</sup> August 2014)

Purbanchal University College of Health Sciences (PUCHS)

### **Scholarship Awards during Enrolment**

Thailand's Education Hub for Southern Region of ASEAN Countries (TEH-AC)

Scholarship, Funded by the Graduate school, Prince of Songkla University,  
Thailand.

### **List of publication and Proceeding**

Basnet, P., Songwathana, P., Sae-Sia, W. (2016). Disaster nursing knowledge in earthquake response and relief among Nepalese nurses working in government and non-government sector. *Journal of Nursing Education and Practice*. 6(11), 111-118. doi:10.5430/jnep.v6i11p111

Basnet, P., Songwathana, P., Sae-Sia, W. (2015). Procedural pain after cardiac surgery. How to manage effectively?. *The 1<sup>st</sup> Udayana International Nursing Conference, Bali, Indonesia, November, 6-8, 2015.*