

## **Review: Public Health Nurses' Roles and Competencies in Disaster Management**

Ardia Putra, S.Kep., Ns<sup>1</sup>, Wongchan Petpichetchian, PhD, RN<sup>2</sup>, Khomapak Maneewat, PhD<sup>3</sup>

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**Background:** Currently, the incidence of disasters the biggest catastrophes that threaten people's livelihoods, health, and even lives has been increasing around the world. This situation provides the challenge for health care professionals, particularly public health nurses (PHNs), to be actively involved in disaster management.

**Purpose:** The purposes of this study are to review PHNs' roles and competencies in disaster management in facing with natural disaster.

**Method:** A relevant literature searched from databases: PubMed, CINAHL, the Cochrane and ProQuest Medical Library, and Science Direct were conducted. Key words used to retrieve included role and competency of PHNs or community nurses in disaster, disaster management, and disaster nursing. Searching was limited in English language, full text, and the year of publication starting from 2000.

**Results:** Twenty-eight related studies were intensively reviewed. Several roles for PHNs in disaster management were identified. PHNs hold major roles in providing health management and assistance throughout the community and public healthcare system during all disaster phases including preparedness, response, and recovery phase. Moreover, determining PHNs' involvement in disaster management requires certain competencies to assure their contribution in disaster events. In addition, training and education, and the experience with disaster event can influence the PHNs' competency in responding to disaster occurrences.

**Conclusion:** Literatures showed that PHNs play roles as one of the valuable resources and are actively involved in disaster management. PHNs' roles and competencies in disaster management is necessary because they are well-recognized and trusted in the community and frequently work closely with the disadvantaged and vulnerable group who often affected by disasters.

**Key words:** disaster management, public health nurses, roles, competency.

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<sup>1</sup> Master of Nursing Science Student, Faculty of Nursing, Prince of Songkla University, Thailand and Lecturer of Nursing Science Program, Medical Faculty, Syiah Kuala University, Banda Aceh, Indonesia.

<sup>2</sup> Assistant Professor, Surgical Nursing Department, Faculty of Nursing, Prince of Songkla University, Thailand.

<sup>3</sup> Assistant Professor, Surgical Nursing Department, Faculty of Nursing, Prince of Songkla University, Thailand.

## **Background**

Disaster is classified as the biggest catastrophe that threatens people's livelihoods, health, and even their lives, in general (Yamamoto, 2006). Recently, the frequency of disasters has been increasing around the world (Vogt & Kulbok, 2008), and approximately more than 255 million people are impacted by disasters (Kahn, Schultz, Miller, & Anderson, 2009). Thus, around 62,000 people per annum died as a result of large-scale global disasters (Sztajnkrzyca, Madsen, & Ba'ez, 2006).

In general, disasters happen naturally or can be human-made. Natural disasters often happen suddenly or unexpectedly such as storms, floods, earthquakes, tsunami, and eruptions (Vogt & Kulbok, 2008). Humans can also make disasters as a result from error, neglect, or intentional harm such as bioterrorism, bomb threats, epidemics, fires, radioactive-material leaks, and wars (Rogers & Lawhorn, 2007). In short, the disaster is the condition in which destructive effects of an event provoke by nature or human beings surpass the available resources required by community or region.

A higher frequency of disasters challenges every country to develop appropriate strategies to reduce impacts of disaster (Yamamoto, 2006). For example, the biggest earthquake on the December 26, 2004 in Aceh-Indonesia and followed by tsunami, approximately affected more than 500,000 people (Vogt & Kulbok, 2008). Then, the earthquake was developed later in May 27, 2006 near Yogyakarta City which resulted in 5,700 fatalities, 37,000 injured as well as the collapse of over 300,000 buildings and more than 3 billion US dollars economics loss ("Natural Disaster in Indonesia," 2010). Recently, the 7.7 magnitude wave (MW) earthquake occurred on April 7, 2010, at the area of the coast of Aceh in northwestern Indonesia. Although, the tsunami and fatal incident were not generated from this occurrence, psychological effect could be detected such as public panic and also generated power blackouts around the Simeulue Island (Ahmadi, 2010).

Beyond these three big events, Indonesia has been threatened by disaster annually. In 2009, monthly reports revealed the evidences of 5 earthquakes (range of severity was from 6-7.5 MW), 4 landslides, 3 volcano warnings and eruptions, 2 floods and a forest fire in Indonesia ("Natural Disaster in Indonesia," 2010). Indonesia can be categorized as a vulnerable country for its high frequency of disaster ("Natural Disaster in Indonesia," 2010). Thus, disaster management in term of facing natural disasters is highly needed to be developed in order to face with unpredicted situation effectively. To meet this aim, many professionals need to support this plan (Savage & Kub, 2009).

Since nurses are the highest number of healthcare providers, they are required to play the major role in disaster management (WHO, 2006). Historically, since the nursing era of Florence Nightingale, nurses have been allocating several roles in disaster management (Jakeway, LaRosa, Cary, & Schoenfisch, 2008) because of the nurses' qualification assessment skills, priority settings, communication, collaboration, and they are also critical thinkers who can make essential decision in emergency situations (Stanley, 2005).

In addition, since the disasters affect people's health and public healthcare system, Public Health Nurses (PHNs) hold major role in providing health management and assistance at all disaster phases (Vogt & Kulbok, 2008) including pre-event (preparedness), event (response/relief), and post-event (recovery). Getting involved toward these phases is recommended as a comprehensive disaster management for PHNs (Polivka, et al., 2008; Rogers & Lawhorn, 2007). Determining the PHNs' preparedness for future disaster is therefore very crucial, since disasters, particularly natural disasters, are mostly generated unintentionally and without specific warning (Vogt & Kulbok, 2008). As the first line responder, PHNs have to understand about their roles in disaster management and preparedness (Jennings-Sanders, 2004). PHNs are also responsible for preparing themselves to acquire required knowledge and skills in caring for the disaster survivors as well as preparing to achieve the readiness for future disaster events (WHO, 2006).

## **Objectives**

This study aims to explore the contribution of PHNs in disaster management in facing natural disasters. The specific objectives of the study are to:

- a. Explore the roles of PHNs in disaster management
- b. Explore the competencies of PHNs in disaster management
- c. Describe the contributing factor to PHNs' competencies in disaster management

## **Methods of the Study**

To meet the objectives of the study, the <http://lib.med.psu.ac.th/libmedeng/> was used as the main channel to search related journals, articles, and other comprehensive reports from the classic nursing and health-related databases such as PubMed, Cumulative Index to Nursing and Allied Health (CINAHL), the Cochrane Library, ProQuest Medical Library, and Science Direct from the year 2000 up to September 2009. Also, the universal case entry website such as google-web and google-scholar were used. The qualified or criterion meet

articles (e.g. from the Elsevier publisher) were selected systematically. The numbers of keywords were used to obtain those articles including disaster management, community or public health nurses, roles, and competency.

## **Results and Discussion**

Generally, human and technology cannot predict and prevent the occurrences and the incidence of natural disasters (Vogt & Kulbok, 2008). Therefore, public health care system needs to develop adequate disaster management capabilities for all healthcare staff (Tekeli-Yeşil, 2006). Disaster management can be defined as the arrangements of the potential adverse effects that derived from disaster (Manitoba, 2000) to maintain a safety environment and provide continuum necessarily healthcare services for the victims throughout disaster event (Qureshi & Gebbie, 2007).

Furthermore, in order to determine the successfulness of disaster management, it is needed to describe the disaster activities into specific stages or phases. Thus, phases of disaster management are classified, identified, and categorized differently. For instance, Rogers, Randolph, and Mastroianni (as cited in Rogers and Lawhorn, 2007) have been applied the Haddon matrix pattern to develop a comprehensive disaster management. The modified pattern consists of three phases that are pre-event (preparedness), event (response/relief), and recovery (post-event). Thus, all healthcare providers, including public health nurses were recommended to be actively involved and responsible in every phase.

### *Public health nurses' roles in disaster management*

Primarily, public health nursing (PHN) is defined as “the practice of promoting and protecting the health of populations using knowledge from nursing, social, and public health sciences” (APHA, 1996). PHN can be classified as a specialty area in nursing because it has a different focus and scope of practice from the common nurse who work in clinical practice (Williams & Stanhope, 2008).

As one of the nursing disciplines, PHNs have responsibility to assist people using their knowledge and skill either caring for healthy or sick person in all situation: normal, emergency, and disaster. In addition, they should also enhance their profession's capability to ensure adequate healthcare services before and after a disaster by their contribution in all disaster phases (Fung, Loke, & Lai, 2008). This provision is important because the disasters affect people's health and public healthcare system (Vogt & Kulbok, 2008), PHNs hold major role in providing health management and assistance, and allocating care during time of

disaster (Cole, 2005) to reduce the impact of the disaster impact in the community. With this regard, PHNs are responsible to help individual and community equally regardless to individual economical and social status (Jakeway, et al., 2008). The roles of PHNs for each disaster phase are discussed as follows:

*PHNs' roles in preparedness phase*

Preparedness phase refers to the structure of planning for responding to disaster and other emergency events in order to enhance public awareness of the nature of disaster and prepare for future disaster event and its consequences (Qureshi & Gebbie, 2007). In this phase, PHNs must identify disaster risks and populations, particularly vulnerable groups; cooperate with other agencies in developing plans to decrease the morbidity and mortality rates, which is being able to advocate and help in developing public policies to reduce the potential effects of disaster (Vogt & Kulbok, 2008). In addition, Polivka and colleagues (2008) recommended PHNs to concentrate more on personal preparedness, such as understanding about key terms, concepts, and roles in disaster preparedness, knowing about health department's disaster plan and being familiar with communication equipments which are suitable for disaster situations.

All PHNs' roles in the preparation phase are very crucial in determining the successfulness in disaster response and recovery phase (Rowney & Barton, 2005). Thus, to achieve quality disaster management, supports from qualified staff nurses in term of their capability to provide care and perform disaster management activities in each phase are required (Stanley, et al., 2008).

*PHNs' roles in response phase*

In response phase, the first priority of action is needed to concern about warning, mobilization, and evacuation, followed by assessing the impact of disaster with a list of direct needs of the community, assessing and communicating information regarding health related effects to relevant government agencies. Then, PHNs have to continue helping the victims in the emergency situation (Vogt & Kulbok, 2008).

The major focus of PHNs after the end of disaster is to provide life-saving immediately through rescue efforts (Davies, 2005). PHNs, here, sort out and prioritize casualties' victims by using disaster triage strategy in order to allocate adequate treatments

(Polivka, et al., 2008). The following activities consist of rapid needs' assessment; first-aids and medical assistant in emergency situation, prevention of injury and promotion of sanitary food and water, establishment or restoration of modes communication and transportation, surveillance of infectious disease, mental and psychosocial problem of individuals, families, and communities, risk assessment by inspecting shelter sites and previous cases, and evacuation of community members from affected areas (Polivka, et al.; Vogt & Kulbok, 2008).

#### *PHNs' roles in recovery phase*

The recovery phase aims to return the condition of public health system and community back to normal, as well as increases the strength of staff and community for future disaster management (Davies, 2005). In this phase, roles and responsibilities for PHNs, which includes providing continuum cares and helps for the victims, are major concerns at the period right after a disaster occurred (Vogt & Kulbok, 2008). In addition, they should participate in the evaluation of disaster response and subsequent redrafting of the response plans with other healthcare providers for future disaster management. For instance, PHNs should participate in interviewing process, contributing to disaster plan modifications, and coordinating community efforts to address the psychosocial and public health impact of the disaster event (Polivka, et al., 2008).

As mentioned above, these three phases of disaster are interrelated or inextricably linked with each other. All PHNs therefore need to clearly understand their roles in every phase as well as develop their competencies in disaster management which are discussed in the following section.

#### *Public health nurses' competencies in disaster management*

In general, competency is defined as a performance of group member by integrating and applying the knowledge, skills, and personal abilities to perform the professional role safely and ethically (WHO, 2008) in order to improve or achieve the organizational goal (Hsu, et al., 2006; Rowney & Barton, 2005). Nurses, particularly PHNs, as the largest subgroup of the healthcare workforce (Fung, et al., 2008), should be aware and should prepare themselves to be ready to respond to disastrous events such as by learning from the effects or impacts from previous disasters (Kuntz, Frable, Qureshi, & Strong, 2008). Thus, PHNs need to develop their competencies in disaster management in order to provide

essential health care services and psychological support for the disaster victims (Fritsch & Zang, 2009).

The criteria used to determine PHNs' core competencies discussed here is based on the works conducted by Gebbie and Qureshi (2002), Jennings-Sanders (2004), Kuntz et al. (2008), Polivka et al. (2008), and Vogt and Kulbok (2008). And according to these previous studies, the competencies of PHNs are based on three main phases: preparedness, response, and recovery as detailed in the following.

### *Preparedness*

Preparedness is the phase of developing strategy to organize the disaster response prior to its occurrence with the aim to create PHNs' awareness to disaster in order to be promptly ready for specific types of disaster (Qureshi & Gebbie, 2007). In this phase PHNs have to understand about key terms, concepts, and their roles in disaster preparedness (Jennings-Sanders, 2004; Polivka, et al., 2008). Moreover, PHNs must be knowledgeable regarding the possible risk of disaster in their areas as well as the vulnerable population to a disaster impact (Jennings-Sanders; Kuntz, et al., 2008; Vogt & Kulbok, 2008). In addition, PHNs should identify related agencies and other resources in order to develop disaster plan to limit the morbidity and mortality rate, and construct the appropriate communication system for responding to disaster event (Gebbie & Qureshi, 2002; Jennings-Sanders; Kuntz, et al.).

### *Response*

Response is the phase of implementing the tentative disaster plan (Qureshi & Gebbie, 2007). In this phase, the first concerned action is adequate warning to the community regarding disaster event that will be occurred (Vogt & Kulbok, 2008). The major focuses during this phase are life-saving, first-aids, and emergency treatment (Davies, 2005; Vogt & Kulbok). According to Jennings-Sanders (2004), Polivka et al. (2008), and Vogt and Kulbok, PHNs should establish disaster triage strategy in order to sort and prioritize the victims for allocating adequate treatment. Then, providing care for disaster victims will be continually allocated to save the victims' life and stabilize their condition (Jennings-Sanders; WHO, 2005).

For this purpose, PHNs need to have sufficient technical skills including administering medication/vaccination at mass dispensing sites, conducting case investigation, and applying the personal protective equipment (PPE) (Gebbie & Qureshi, 2002; Polivka, et

al., 2008). Furthermore, PHNs need to be able to calculate and evaluate the number of disaster impact (e.g. infectious disease, mental and psychosocial problem of individuals, families, and communities) by using surveillance method (Polivka, et al.). Finally, in order to maintain collaboration and coordination among health care service and/or providers, and informing the community about risk of disaster, PHNs need to be familiar with communication equipments (Gebbie & Qureshi; Jennings-Sanders, 2004).

### *Recovery*

Recovery phase is the situation after disaster is over with its impacts to the community and population (Wynd, 2006). During this phase, PHNs are responsible to evaluate the impacts of the disaster including morbidity and mortality rates, health care costs, and disaster related costs; improve health status, disaster-nursing knowledge, effectiveness of the disaster-nursing plan, and collaboration between inter-organization (Jennings-Sanders, 2004). This strategy is useful for identifying the disaster plan modification which is useful in minimizing the weaknesses of previous plans. This strategy is valuable to apply in future occurrences in collaboration with other health care providers and community (Gebbie & Qureshi, 2002; Jennings-Sanders; Kuntz et al., 2008; Polivka et al, 2008).

Another role that should be accomplished by PHNs in this phase is providing support to disaster victims. With this regard, PHNs should understand about the impact on physical and psychosocial that commonly derives from disaster event in order to deliver appropriate care for victims that have physical and psychosocial problems (Jennings-Sanders, 2004; Polivka et al., 2008). Finally, the health promotion for community is also considered as the important activity in recovery phase. Health promotion is used to minimize the problem among survivors who live in the camp as a temporary place for many disaster survivors. This activity can also be used to teach the community how to prevent and protect themselves, family, and the population from several infectious and communicable diseases (Jennings-Sanders; Polivka et al.).

### *Contributing factors to PHNs' competencies in disaster management*

As discussed so far, knowledge and skills of PHNs are needed in every phase of disaster to ensure the quality of disaster arrangements in handling the disaster's impact (Polivka, et al., 2008). The preventive element of public health practice is crucial even during post-disaster since much of the normal infrastructure is damaged or non-existent (Chapman &



Arbon, 2008). In this situation, PHNs will face with the lack of equipments and accommodations to meet the demands of the victims. As a result, it can affect nurses' responses in performing their knowledge and skill in disaster field (Jakeway, et al., 2008).

According to previous studies, many experts had been described factors contributing to PHNs' preparedness for disaster management, including training and education (Stanley, 2005; Stanley, et al., 2008; Veenema, 2006; WHO; Yamamoto, 2006), and experience with disaster (Arbon, 2004; Suserud & Haljamie, 1997). Detailed information regarding factors contributing to PHNs' competency is discussed as follow.

### *Training and education*

The increased involvement of PHNs in disaster management begins with their understandings on the comprehensive scope and standards of practice follows by their striving to achieve individual competencies so that they can provide better collaboration with others and contribute to emergency preparedness and response (Jakeway, et al., 2008). Thus, PHNs' preparations by trainings and meeting or workshop on disaster nursing education are the important strategy to increase PHNs competencies which result in reducing the feeling of uncertainty and incompetent when facing with disasters (O'Boyle, Robertson, & Secor-Turner, 2006; Stanley, et al., 2008).

The nursing education is therefore needed to develop an educational program, nursing care strategies, an electronic database, and other trainings and resources to help PHNs to be ready in preparedness and mitigation of disaster through the community (Yamamoto, 2006). However, in most countries, disaster nursing education is seldom provided at the basic nursing education level (Smith, 2006) or nursing curriculums. This issue may become one of the vital factors influencing PHNs' competencies in response to disaster.

Another component influencing nurse's competency in disaster response as the responder in disaster is continuity of nursing education (Fung, et al., 2008; Gebbie & Qureshi, 2002) as it tends to be the most feasible preparedness strategy that provide nurses to be knowledgeable and skilful (Wetta-Hall, Fredrickson, Ablah, Cook, & Molgaard, 2006). The studies regarding the importance of training and education for nurses revealed that the nurse are more likely to have a lack of knowledge on disaster management (Fung, et al.; Jennings-Sanders, Frisch, & Wing, 2005). Accordingly, a study conducted by Fung and colleagues (2008) revealed that majority of nurses (97%) perceived inadequate preparedness on disastrous event. Thus, the researchers recommended that training should be conducted in

basic nursing education. The systematic review on the effectiveness of disaster training for health workers by William and others (2008) also found that training would increase the health workers' competencies in responding to disaster event.

A variety of educational strategies can be used for training and allocating education related to disasters preparedness. Several educational strategies can be utilized for disaster education which include lecture, seminar, distance/online education, field experience, independent study, databases or computer assisted learning, and informal discussion (Jakeway, et al., 2008; Stanley, et al., 2008). These strategy are considered to improve PHNs knowledge and skills, and then capable to articulate the value of their specialty for disaster management. Consequently, others healthcare professions will also understand about the uniqueness abilities of PHNs in unexpected situation like disaster event.

#### *Experience in disaster*

Another factor influenced PHNs' competencies in responding to disaster event is personal experience on disaster event. Becoming experienced nurse is described as a progressive and continuous interaction between experience, meaning and the lived world resulting in a personal and unique understanding of practice (Arbon, 2004). In term of disaster response, experience will relate to readiness for action. The readiness for action by having a feeling of being prepared is commonly found with the PHNs who have previous experience rather than one who lack of experience (Suserud & Haljamie, 1997).

The readiness is described as knowing what should be done, being able to cope with situation, feeling secure and confident in their nursing activity during disaster response. The importance of having qualified personnel including PHNs in disaster site has been widely recognized. The one who had experience of accident and emergency nursing will act more adequately and consistently at the action site than the one who had less experience (Suserud & Haljamie, 1997). Greatness of previous experience may also lead the nurses to increase their confident and mastery. The previous working experience in critical situation requires PHNs to maintain their preparedness of specific knowledge and skills. If the PHNs have updated their knowledge and skills, they can act more effectively with more confident and fewer mistakes, particularly in casualty events (Nasrabdi, Naji, Mirzabeigi, & Dadbakhs, 2007).

## **Conclusion**

The increasing of disaster event around the world had warned every country to be ready to face with unexpected events, including natural disaster. Because of this, the appropriate disaster management in preparedness, response and recovery phase is essential to be established. Even though many disciplines are required to support the disaster management, nurses are considered as one of the healthcare professionals that must be well-prepared to face and deal with the natural disaster. Thus, the awareness is highly needed from nurses, particularly PHNs who work in high-risk area with disaster.

To be effectively engaged during disaster event, PHNs need to prepare themselves to have basic knowledge and skills to face with disaster. Thus, PHNs are responsible to accomplish their role and competencies in all disaster phases, including preparedness, response and recovery phase.

## **Recommendation**

Since disasters, particularly natural disasters, are the events that either human or technology cannot predict the exact time of occurrences, public healthcare systems need to assure that all healthcare staffs including PHNs are ready for disaster occurrences. This requirement is important to protect and prevent human life from the worse impact from disaster. For this purpose, PHNs should know the scope of their responsibility and can define the significant role in preparing for, responding to, and recovering from disasters impacts.

Roles of PHNs in disaster management, therefore, should be included in preparedness, response and recovery phase, in general. PHNs' roles in preparedness phase should consist of personal preparedness including understanding about the key terms, concepts, and roles in disaster preparedness; also knowing about the health department's disaster plan and being familiar with communication equipments which are suitable for disaster situations. In the response phase, warning, mobilization, and evacuation are the first responsibility to be accomplished. Then, assessing the victims' health problems and reporting the data to the relevant government agencies should be performed in order to deliver and stabilize the victims' health condition. Finally, in recovery phase, PHNs should provide continuum cares and helps for the victims, allocate health promotion, and participate in the evaluation of disaster response, including subsequent redrafting of the response plans with other healthcare providers for future disaster management.

Several competencies should be used in determining the capabilities and the effectiveness of PHNs' involvement in each phase of disaster management. For instance, in disaster preparedness, PHNs should be evaluated in the competencies of collaboration with inter-agency and risk identification of disaster and population, while the competencies of early warning, disaster triage, life saving and stabilization, surveillance, risk communication, and technical skills are evaluated in response phase. Lastly, the measured competencies in recovery phase should consist of assessing public health impacts; identifying disaster plan modification, and the continuum of health promotion. In addition, by enhancing their profession's capability and competency throughout training and educational session, the adequate healthcare services in all disaster phases performed by PHNs contribution will be ensured.

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