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Nurses in Northwest Arkansas

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### Abstract

Despite years of training and experience, evidence suggests nurses report wide gaps in emergency competencies and disaster preparedness. Further, nurses report low levels of familiarity in competencies related to planning for disasters, implementing disaster guidelines, and assessing patients exposed to biological and chemical agents. This research sought to establish the self-reported level of emergency preparedness competencies of nurses in Northwest Arkansas, an area that faces a diverse set of potential disasters ranging from nuclear accidents to pandemic disease. Additionally, differences between the level of preparedness by education level or work specialty were studied. The results are alarming in that the scores indicate a significant weakness in nurses' emergency preparedness knowledge, regardless of education or work specialty. It is of great concern that nurses have low levels of familiarity with disaster response concepts. This research is congruent with extant literature demonstrating that nurses across the United States lack sufficient knowledge in the arena of emergency preparedness. In the event of a disaster, the community would be detrimentally impacted by this lack of vital knowledge, potentially degrading patient outcomes. The results of this survey, as well as previous research, demonstrate the need to improve the education of nurses so they may meet the demands of the population in the most urgent of situations.

## Emergency Preparedness Competencies Among Nurses in Northwest Arkansas

In the past decade, the United States has experienced 266 natural and technological disasters amounting to over 5,400 deaths and an excess of \$471 billion in damage (Guha-Sapir, Below, & Hoyois, 2015). Both natural and technological emergencies affect the lives of thousands of Americans each year and can strike at any time. The United States has experienced disasters ranging from natural disasters, terrorism, and nuclear accidents. Medical professionals that respond to these emergencies have a great influence on health outcome of the victims. However, healthcare workers competencies during these events may not be at an acceptable level due to the lack of formalized education and training. It is estimated that nurses have had a low level of exposure and familiarity to emergency preparedness. Regardless of age or education level, most nurses lack competencies in large-scale disaster preparation and disaster care settings (Baack & Alfred, 2013). An evaluation of the current level of knowledge in emergency preparedness must be obtained to enhance the education and training of nurses with the goal of alleviating suffering and preventing loss of life. The purpose of this study was to determine the current level of competency in knowledge of emergency preparedness topics for nurses in Northwest Arkansas and if such knowledge differs significantly between units of care.

### **Background and Significance**

In the Northwest Arkansas area there are many potential disasters that health care professionals might encounter. Arkansas Nuclear One, the nuclear power plant close to Russellville, Arkansas, poses many concerns for Arkansas health. The Nuclear Regulatory Commission has identified several safety violations and has placed the plant in Column 3, with Column 4 being inoperable, of the NRC Action Matrix (United States Nuclear Regulatory

Commission, 2015). The power plant was recently ranked one of the worst performing in the nation after an accident killed one worker and injured several others (Smith, 2015). Fortunately this accident did not release any radiation into the surrounding areas. This incident increased the awareness of potential nuclear disasters our state must plan for. Viral health pandemics like the seasonal flu, Ebola, and the new Zika virus also pose a risk to the Northwest Arkansas area. While the Zika virus and Ebola are rare, the flu kills over 23,000 Americans each year (Arkansas Department of Health, 2011). Training Arkansas nurses to respond to various disasters can greatly impact the outcome for those patients.

A standard baccalaureate program for nursing education is time limited with an enormous amount of knowledge and skills obtained in a relatively short period of time. The American Association of Colleges of Nursing lists several emergency preparedness competencies in *The Essentials of Baccalaureate Education for Professional Nursing Practice* (2008). Of these core competencies several relate to emergency preparedness emphasizing that nurses need to “understand one’s role and participation in emergency preparedness and disaster response with an awareness of environmental factors and the risks they pose to self and patients” (American Association of Colleges of Nursing, 2008, p. 32). However, a recent pilot study revealed that 10% of current nurses feel prepared to work in a disaster or emergency and 9% of current nurses feel confident providing care within the first 72 hours following a disaster event (Nash, 2015).

The Wisconsin Health Alert Network developed a comprehensive tool in 2003 to assess nurses’ emergency preparedness competencies and overall preparedness for large-scale disasters and emergency events. The EPIQ, Emergency Preparedness Information Questionnaire, is designed to assess multiple dimensions of preparedness among nurses of all education and population backgrounds (Garbutt, Peltier, & Fitzpatrick, 2008). The EPIQ was adapted and

utilized in a pre-test post-test design in Pittsburg, Pennsylvania to evaluate the levels of competencies before and after implementing an emergency preparedness-training program. The tool facilitated evaluation of the current preparedness levels, implementation of a training program, and assessment of post-education preparedness levels (Georgino et al., 2015). In various research studies the EPIQ has helped discover and improve the emergency preparedness and confidence of nurses (Baack & Alfred, 2013; Garbutt, Peltier, & Fitzpatrick, 2008; Georgino, Kress, Alexander, & Beach, 2015). The EPIQ continues to prove as a valid and reliable tool for evaluating self-reported emergency preparedness competencies in professional nurses and improving emergency preparedness (Garbutt et al., 2008).

Since the attacks on the world trade center in 2001 the American public has been more aware of the increased threat of terrorism attacks in the United States. A study done in rural Texas revealed that as few as 10% of nurses are confident in assessing and diagnosis patients exposed to bioterrorism agents (Jacobson, Soto Mas, Hsu, Turley, Miller, & Kim, 2010). Despite years of training and experience nurses in various studies have self-reported wide gaps in emergency competencies and disaster preparedness (Nash, 2015; Whetzel, Walker-Cillo, Chan, & Trivett, 2013; Al Khalaileh, Bond, & Alasad, 2012; Jacobson, Soto Mas, Hsu, Turley, Miller, & Kim, 2010). Nurses reported low levels of familiarity in competencies related to planning for disasters, implementing disaster guidelines, and assessing patients exposed to biological and chemical agents (Al Khalaileh, Bond, & Alasad, 2012). Nash (2015) and Whetzel et al. (2013) reported that with gaps in professional disaster preparedness came gaps in personal preparedness. The authors revealed that nurses have not taken action to prepare for disasters and that personal preparedness amongst nurses greatly influences facility and professional emergency preparedness (Nash, 2015; Whetzel et al., 2013).

In the interest of minimizing the potentially devastating impact on human life and health subsequent to a disaster, increasing emphasis has been placed on the emergency preparedness competencies among health care workers, particularly nurses (Nowak, Fitzpatrick, Schmidt, & DeRanieri, 2015; Kuntz, Frable, Qureshi, & Strong, 2008; Steed, Howe, Pruitt, & Sherrill, 2004). Steed et al. (2004) point toward the importance of educating front line health care personnel, of which nurses are an integral part. These authors describe the necessary components of bioterrorism education that should be incorporated in nursing school curricula. Additionally, models of emergency preparedness teaching strategies which are derived from and in partnership with volunteer disaster relief agencies have demonstrated effectiveness in improving core disaster nursing skills (Nowak et al., 2015). The proactive education and preparation of nurses in areas of emergency preparedness is emphasized by the Association of Community Health Nursing Educators (Kuntz et al., 2008) who also provide input on basic essential curricular content for public health nursing emergency preparedness.

Large surges of patients during disasters stretch health care staff and resources thin. In these moments the weakness of the American health care system are ever present. Nurses are forced to allocate precious resources to those they see fit. In an attempt to improve these conditions the Centers for Medicaid and Medicare Services (CMS) created the “Emergency Preparedness Requirements for Medicare and Medicaid Participating Providers and Suppliers” (Veenema, Losinski, & Hilmi, 2016). The Centers for Disease Control and Prevention (CDC) also created the guideline “Biological and Chemical Terrorism: Strategic Plan for Preparedness and Response” for disaster response (Centers for Disease Control and Prevention (CDC), 2000). While the guidelines are aimed to better prepare health care facilities several obstacles remain. The U.S. shortage of nursing professionals and the lack of funding to support these guidelines

make it difficult for all facilities to comply (Veenema, Losinski, & Hilmi, 2016; McHugh, 2010). New health care policies are needed to fill the gap in funding and to create a plan to overcome the current shortage of nursing professionals in order to be fully prepared for disasters.

Nursing students graduate with a large gap in knowledge between what they know and what they need to know to be prepared for emergency situations. A pre-test post-test study revealed that undergraduate nursing students that received emergency training had a higher self-reported level of skills and confidence in disaster situations (Alim, Kawabata, & Nakazawa, 2015). Authors reported that simulation training using a combination of actors and simulators are both effective and cost friendly. These actor simulations placed students “in the moment”, therefore improving nursing students decision making during a disaster event while giving them simulated real life experiences (Morrison & Catanzaro, 2010; Kaplan, Connor, Ferranti, Holmes, & Spencer, 2012). The knowledge the nursing students gain from these simulations will be carried with them into their professional role as a graduate nurse. It is important to assess the current level of emergency preparedness of nurses in the Northwest Arkansas area in order to provide appropriate education and training to close the competency gap.

### **Research Questions**

This study examines emergency preparedness competencies with the following research questions: 1) What is the current level of competency in emergency preparedness of nurses? and 2) Are there significant differences in the level of competency in emergency preparedness between units of care?

### **Instruments**

The EPIQ was utilized to evaluate nurses’ familiarity with various emergency preparedness competencies. The reliability of the tool has been established in various studies



where it was used with a reliability coefficient alpha value between 0.827-0.94 (Wisniewski, Dennik-Champion, & Peltier, 2004). The EPIQ survey will be used in this study to determine emergency preparedness competencies.

Quantitative data analysis of the instrument was performed by examining the use of the mean and standard deviation as a measure of dispersion. A five point Likert scale will provide interval level data using the categories Very Familiar = 1 with ascending numbers indicating decreased familiarity to Not Familiar = 5. There are 45 questions pertaining to 11 domains of emergency preparedness knowledge and 27 questions pertaining to participant demographics, previous disaster experience, and personal preparedness levels. The higher the score, the lower the level of perceived competency.

## **Methods**

### *Sample*

The sample for this study was comprised of all skill levels of nurses currently employed by three inpatient health care facilities and outpatient facility. Following Institutional Review Board approval, data was collected from the following units: Rehabilitation Unit, Orthopedics, Medical/Surgical, Acute Care Unit, Intensive Care Unit, Ambulatory Surgery, Behavioral Health, the Emergency Department, Cardiology and a home health agency. This study was a cross-sectional study to ascertain self-reported emergency preparedness competencies at a single point in time. Convenience sampling of individuals who attended unit meetings was used. Study inclusion criteria were adults able to read and write in English and who have a current nursing license. Exclusion criteria are anyone without a current nursing license or who is not currently practicing at collaborating health care facilities. Overall, 187 surveys were completed ( $N = 187$ ). Comparisons were made between participants at all health care facilities. No

statistically significant differences on any variables were found between participants in any of the facilities.

Ages of the participants ranged from 21 to 65 ( $M = 40.93$ ;  $SD = 12.14$ ). The participants were primarily female ( $N=157$ ; 83.9%). A majority of the participants had one to three dependents ( $N=114$ ; 60.9%), 50 (26.7%) had no dependents and 23 (12.3%) had four to six dependents. There were 48 (27.7%) acute care nurses in the sample, 76 (43.19%) inpatient nurses, and 52 (29.55%) nurses in the outpatient setting. Among the total participants, 36 (19.4%) were Licensed Practical Nurses (LPN), 78 (41.9%) were Associate Degree Nurses (ADN), 55 (29.6%) were Baccalaureate prepared (BSN) nurses, 9 (4.8%) were Masters prepared nurses, and 6 (3.2%) were Nurse Practitioners. Two participants did not indicate their education level.

#### *Data Analysis*

Data were analyzed using SPSS version 23. To analyze the first research question, “What is the current level of competency in emergency preparedness of nurses?”, each of the sections of emergency preparedness knowledge were broken down into subsections. Subsections included detection of and response to an event, the Incident Command System and your role within it, ethical issues in triage, epidemiology and surveillance, isolation/quarantine, decontamination, communication/connectivity, psychological issues, special populations, accessing critical resources, and overall familiarity. Each of these sections was provided an overall score for each individual based on the level of familiarity indicated in the 5 point Likert scale. The higher the score, the lower the level of perceived competency. Descriptive statistics provide a measure of dispersion around the mean.

For the second research question, “Are there significant differences in the level of competency in emergency preparedness between units of care?”, each of the sections of emergency preparedness knowledge were broken down into subsections. Subsections included detection of and response to an event, the Incident Command System and your role within it, ethical issues in triage, epidemiology and surveillance, isolation/quarantine, decontamination, communication/connectivity, psychological issues, special populations, and accessing critical resources. The sum of each of these sections provided an overall score for each individual based on the level of familiarity indicated in the 5 point Likert scale. The higher the score, the lower the level of perceived competency.

### Results

For the first research question, “What is the current level of competency in emergency preparedness of nurses?”, each of the sections of emergency preparedness knowledge were broken down into subsections. Please see Table 1 for the results.

Table 1. Competencies in Emergency Preparedness

<b>EPIQ Subsection Category</b>	<i>N</i>	Min in sample	Max in sample	Max possible Score	Mean Score
Detection and Response	147	7	33	35	17.82
Incident Command System	171	8	40	40	20.54
Ethical Issues	176	8	40	40	22.01
Epidemiology	179	4	20	20	9.79
Isolation/Quarantine	173	2	10	10	4.96
Decontamination	180	3	15	15	7.88
Communication/Connectivity	177	7	35	35	17.18
Psychological Issues	180	4	20	20	10.33
Special Populations	184	2	10	10	5.03
Accessing Critical Resources	180	3	15	15	6.49

For the second research question, “Are there significant differences in the level of competency in emergency preparedness between units of care?”, data did not meet the assumptions of normality so a nonparametric test was selected. A Kruskal-Wallis H test was run to determine if there were differences in the subsections of the EPIQ questionnaire scores between nine groups with different knowledge levels: CCU/ICU, ED, Women’s Services, Pediatrics, Med-Surg, Ambulatory Care, Surgical Services, Cardiology, and home health clinic. Distributions of the EPIQ subsection scores were not similar for all groups, as assessed by visual inspection of a boxplot. The distributions of the EPIQ subsections scores were statistically significantly different between groups for the detection of and response to an event,  $\chi^2(8) = 16.938, p = .050$ . The mean ranks of the EPIQ subsection scores were not statistically significant between groups for any other domain of the EPIQ. Please see table 2 for details.

Table 2. EPIQ Results by Domain

Domain	
detection of and response to an event	$\chi^2(8) = 16.938, p = .050$
Incident Command System and your role within it	$\chi^2(8) = 13.955, p = .124$
ethical issues in triage	$\chi^2(8) = 12.01, p = .202$
epidemiology and surveillance	$\chi^2(8) = 16.333, p = .060$
isolation/quarantine	$\chi^2(8) = 16.333, p = .060$
Decontamination	$\chi^2(8) = 10.057, p = .346$
communication/connectivity	$\chi^2(8) = 11.798, p = .225$
psychological issues	$\chi^2(8) = 11.042, p = .273,$
special populations	$\chi^2(8) = 14.577, p = .103$
and accessing critical resources	$\chi^2(8) = 12.148, p = .205$

## Discussion

The current level of emergency preparedness competencies among nurses is alarming. Nurses have reported they are largely unprepared to respond to disaster events in the Northwest Arkansas area regardless of the nature of the disaster. The data from the study illustrates the lack of preparedness for and knowledge of emergencies. This is congruent with extant literature

highlighting that nurses across the United States lack sufficient knowledge in the arena of emergency preparedness (Nash, 2015; Whetzel, Walker-Cillo, Chan, & Trivett, 2013; Al Khalaileh, Bond, & Alasad, 2012; Jacobson, Soto Mas, Hsu, Turley, Miller, & Kim, 2010). This is of great concern to the community because in the event of a disaster the community would be detrimentally impacted by this lack of vital knowledge, potentially degrading patient outcomes.

Of the nurses who were surveyed only 27% reported that they were well prepared or somewhat well prepared to respond to an emergency event. The remaining 73% of nurses reported that they were less than well prepared or not prepared at all for emergency events. Of the total 240 points available on the EPIQ, a minimum score of 46, a maximum score of 215, and a mean score of 148.43 points was achieved by nurses. The higher scores indicated that the respondents were less familiar with the survey questions- therefore, less prepared for disaster events. The mean score of the EPIQ identified the severity of emergency preparedness education needs for nurses in the Northwest Arkansas area.

Emergency preparedness competencies based on the nurses home unit was evaluated. Unit area and experience had no effect on the level of preparedness of the nurses. Surprisingly the nurses in the emergency department were no more prepared to handle disasters than those who worked in other areas of the hospital. This research demonstrates there were significant differences in response and detection of emergency events based on the unit of the nurse. No other areas of the survey indicated a significant difference.

The BSN essentials for nursing education identify emergency preparedness as a foundation of nursing education. The guidelines state that baccalaureate prepared nurses should be able to “use clinical judgment and decision making skills in appropriate, timely nursing care during disaster, mass casualty, and other emergency situations” (American Association of

Colleges of Nursing 2008). However, there is a disconnect between education standards set forth in the BSN essentials and the current level of nursing preparedness. To improve nurse competencies and knowledge, widespread adaption of the education standard should be implemented. Hands on disaster simulations have proven effective in improving nursing student's preparedness for emergency events at several nursing schools in Southern Texas (Hensarling et al., 2015). Emergency simulations could provide an efficient and interactive learning experience for students and current staff members in the Northwest Arkansas area.

### **Limitations**

Social desirability bias may affect the results of this study because the participants knew the purpose of the study was to determine self-reported emergency preparedness competencies. They may not wish to have appeared unknowledgeable, which could be perceived with a negative connotation. However, the investigators encouraged participants to respond honestly and indicate the confidentiality of the results.

### **Conclusion**

During disasters and emergency situations nurses are eager to jump in and help. However, they may not be educated in specific types of emergency response and management and can end up feeling like a burden. It can also be dangerous for nurses that are not part of an emergency response network to participate. It is estimated that around 10% of bystander "nurses" are not actually licensed in the field that they claim to be. Organizers of emergency response teams have little or no way to validate licensure in the field and priorities are often turned to the patients. Nurses are ready to learn about emergency preparedness and are up for the challenge (Stokowski, 2015). Through the identification of educational need, improved methods of education and training can be implemented to fill identified knowledge gaps, thus bringing

nursing professionals up to the necessary competency level. If nurses were unable to provide adequate care after a disaster event the community would be negatively impacted. Nurses serve an integral part on the impact of community health when disaster strikes.

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