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# Emergency Preparedness Competencies Among Nurses in Northwest Arkansas

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Abstract

Existing literature suggests that nurses lack basic knowledge and skills related to emergency and disaster preparedness. Nurses nationwide have reported low levels of understanding related to numerous facets of emergency and disaster knowledge and planning. The purpose of this research was to determine the self-reported level of emergency preparedness competencies of nurses in the Northwest Arkansas area and whether those competencies varied by level of nursing education. The Emergency Preparedness Information Questionnaire (EPIQ) was utilized to measure knowledge. The results suggest that nurses across the board are unprepared in the event of an emergency or disaster situation. No statistically significant differences were found by educational type, as the clear majority of participants self-reported that they lacked emergency preparedness knowledge and training. The results of this study correlate to existing research, which is troubling to say the least. Nurses are vastly underprepared for emergency and disaster situations and lack the basic knowledge and training to respond to such events. In the event of a disaster, the impact of nurse responders would be severely lacking and could possibly cause more harm to affected communities rather than help. These results, as well as previous research, prove that there is a great need for improvement of nursing education for future and existing nurses related to emergency and disaster preparedness.

Emergency Preparedness Competencies Among Nurses in Northwest Arkansas

From 2005 to 2015, there were 266 natural and technical disasters in the United States (US) resulting in over 5,400 deaths, 9,600 injuries and affecting almost 16,000,000 individuals across the country (Guha-Sapir, Below & Hoyois, 2015).  In the US, natural disasters, acts of terrorism and outbreaks of disease have all had an impact in the past ten years.  There has been an increase in disasters worldwide in the last three decades as well as an increase in the number of infectious disease outbreaks (Smith et al., 2014).  When these unpredictable events occur some of the most essential responders are healthcare professionals.  Nurses make up the largest healthcare workforce, possessing competencies, knowledge and training vital for adequate emergency and disaster preparedness (Health Resources and Services Administration, 2010).

Northwest Arkansas is home to Arkansas Nuclear One, a nuclear power plant in Pope County (Entergy Nuclear, 2013).  This plant is a potential concern for future disasters as it is ranked as one of the least safe nuclear power plants in the US after an accident resulting in the death of an employee (US Nuclear Regulatory Commission, 2015).  Other future health concerns in Northwest Arkansas include diseases such as tuberculosis and influenza, measles and the Zika virus (Centers for Disease Control, 2016a; 2016b).  Healthcare professionals require education and training to provide proper care in the wake of such disasters and facilitate improved patient outcomes.  The purpose of this study is to evaluate the current self-reported competencies in emergency preparedness and response in Northwest Arkansas and to determine if they differ significantly by education level.

## Background and Significance

The Centers for Disease Control have established guidelines for educating nurses on various types of disease outbreaks and appropriate actions and precautions (Steed, Howe, Pruitt,

& Windsor, 2004).  The International Nursing Coalition for Mass Casualty Education (INCMCE; 2003) has produced basic competencies all nurses should have in preparation for natural and technical disasters.  Despite established standards and recommendations, nurses have been found to be lacking in the most basic of emergency and disaster preparedness competencies (Al Khalaileh, Bond, & Alasad, 2010; Veenema, Losinki, & Hilmi, 2016).  A self-assessment of nurses in a rural Texas area found that less than only 10% of the participating nurses were confident in their disaster preparedness knowledge and skills (Jacobson et al., 2010).  Another study found that emergency department nurses in New Jersey were unsure of their roles in disaster response and were generally unprepared for potential disasters or emergencies (Whetzel, Walker-Cillo, Chan & Trivett, 2013).  Nurses in Jordan were also studied, and similar results of unpreparedness were found, with 65% of nurses rating their disaster preparedness as weak (Al Khalaileh et al., 2011).

The American Association of Colleges of Nursing (AACN) lists emergency preparedness as an essential competency in nursing education (AACN, 2008; INCMCE, 2003).  It was found that undergraduate nursing students who underwent emergency training and simulation self-reported a higher level of skill and confidence in emergency and disaster situations (Alim, Kawabata, & Nakazawa, 2014).  Despite this, knowledge and skills related to emergency preparedness have not been a high priority and may rarely be included in most nursing school curriculums (Kaplan, Connor, Ferranti, Holmes & Spencer, 2011).

The Emergency Preparedness Information Questionnaire (EPIQ) has been utilized to assess emergency preparedness competencies among various populations of nurses (Baack & Alfred, 2013; Garbutt, Peltier, & Fitzpatrick, 2008; Georgino, Kress, Alexander, & Beach, 2015).  The EPIQ was utilized in a pre- and post- test study examining nurse competencies in

emergency preparedness before and after education (Georgino et al., 2015). These researchers assessed emergency preparedness competencies, provided participant nurses with emergency preparedness education, and measured participant knowledge after the education. The utilization of the EPIQ served to provide valid measurement of significant improvement in knowledge (Georgino et al., 2015). Baack and Alfred (2013) utilized the EPIQ to determine the perceived level of competency among nurses in the Texas panhandle. They found that most nurses are not confident in their ability to respond to major disaster events. Further studies continue to confirm the validity and reliability of the EPIQ to measure self-reported emergency preparedness competency (Garbutt et al., 2008).

## 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 levels of nursing education?

## Instruments

The Emergency Preparedness Information Questionnaire will be used in this study to determine self-assessed emergency preparedness competencies of nurses. The EPIQ was created by the Wisconsin Health Alert Network and has been used in a number of studies across the United States (Baack & Alfred, 2013; Garbutt et al., 2008; Georgino et al., 2015). Wisniewski, Dennik-Champion and Peltier (2004) determined that each of the EPIQ's dimensions has a high reliability, with α values of 0.83-0.94. The α value of the entire instrument is 0.97, which is quite high and reflects the exceptional reliability of the EPIQ instrument (Garbutt et al., 2008). Completion of the survey by those participating will take approximately 10 minutes.

Quantitative data analysis of the instrument will be 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 levels of nursing education?", 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

| EPIQ Subsection Category | $N$ | 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 levels of nursing education?", 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 five groups with different knowledge levels:  Associate Degree Nurses, Bachelors of Science in Nursing, Masters of Science in Nursing, Nurse Practitioners, Doctorate of Nursing Practice/Doctor of Philosophy (combined) in Nursing.  Distributions of the EPIQ subsection scores were not similar for all groups, as assessed by visual inspection of a boxplot.  The mean ranks of the EPIQ subsection scores were not statistically significant between groups for any of the domains of the EPIQ.  Please see Table 2 for details.

Table 2. EPIQ Subsection Scores between Levels of Education by Domain

| Domain | |
|---|---|
| detection of and response to an event | $\chi^2(4) = 4.545, p = ..337$ |
| the Incident Command System and your role within it | $\chi^2(4) = 4.003, p = .406$ |
| ethical issues in triage | $\chi^2(4) = 1.354, p = .852$ |
| epidemiology and surveillance | $\chi^2(4) = 1.305, p = .860$ |
| isolation/quarantine | $\chi^2(4) = .449, p = .978$ |
| decontamination | $\chi^2(4) = .544, p = .969$ |
| communication/connectivity | $\chi^2(4) = 3.390, p = .495$ |
| psychological issues | $\chi^2(4) = 1.203, p = .878$ |
| special populations | $\chi^2(4) = 2.060, p = .725$ |
| accessing critical resources | $\chi^2(4) = .986, p = .912$ |

## Discussion

The results of this study show that nurses across the board are generally unprepared for emergency or disaster situations.  Nurses reported they lack even basic knowledge on a variety of potential disaster or emergency scenarios.  The data collected by this study correlates to existing literature showing that nurses throughout the United States are unprepared and lack knowledge related to emergency preparedness (Al Khalaileh, Bond, & Alasad, 2010; Jacobson et al., 2010; Veenema, Losinki, & Hilmi, 2016).  This is a significant issue as it affects both the local community and the nation as a whole.  In the event of a disaster, the outcomes of those affected could be negatively affected by the lack of disaster education for such a significant portion healthcare professionals.

Only 27% of the nurses completing the survey reported that they feel well-prepared or somewhat well-prepared if they were to respond to an emergency or disaster situation.  73% reported that they were not prepared or less than well-prepared for any emergency or disaster situation.  The EPIQ tool has 240 available points with higher scores correlating with lower levels of emergency preparedness in the categories.  The scores received by the participating nurses in this study ranged from 46 to 215, with a mean score of 148.43, reflecting a level of general unpreparedness among the nurses in Northwest Arkansas.

There was no significant difference noted in the preparedness level of nurses with different educational backgrounds.  One would assume that those with higher educational levels or degrees would have a higher level of emergency preparedness education, but this is not the case.  There was no significant difference between the results of the least and most educated nurses who participated in this study.

One potential solution to this lack of preparedness is education and training.  The most recent BSN Essentials state that baccalaureate programs should prepare nursing school graduates to respond to disaster, emergency and mass casualty situations (AACN, 2008).  The results of this study and those cited reflect that these essential standards are not being met by baccalaureate nursing programs nationwide.  Nursing programs, by not meeting standards set by the AACN, are not preparing their graduates to respond to potential disaster and emergency situations.  This not only affects nursing graduates by depriving them of knowledge and skills, but has the potential to negatively affect communities by providing them with unprepared healthcare professionals. Continuing education should be tailored to local areas so nurses are prepared for potential disasters in their communities.  Existing literature shows that simulation is an excellent

platform for educating not only nurses but other members of the healthcare workforce on interdisciplinary emergency response (Alim, Kawabata, & Nakazawa, 2014).

## 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

When disasters occur, nurses are often eager to provide whatever assistance they can despite not having the appropriate knowledge or training to do so effectively (Orr, 2002). Unprepared nurses who respond to an emergency or disaster could potentially cause more harm to victims rather than aiding them (Whetzel, Walker-Cillo, Chan & Trivett, 2013).  Nurses make up the largest percentage of the professional healthcare workforce and can provide a significant number of responders in the event of a local or national disaster (Health Resources and Services Administration, 2010).  This study, by identifying the existing gaps in nursing knowledge related to emergency and disaster preparedness, will allow for the creation of tailored education and training programs to better prepare future and existing nurses to respond to emergencies that may affect their communities or even the nation.

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