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# Most Effective Interventions for Disaster Relief Preparation

Elizabeth Keating  
*Oral Roberts University*

Faith Edwards  
*Oral Roberts University*

Cheryl Swanson PhD, RN  
*Oral Roberts University*

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MOST EFFECTIVE INTERVENTIONS FOR DISASTER RELIEF PREPARATION

Elizabeth Keating

Faith Edwards

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of the requirements for the degree of

Bachelor of Science in Nursing

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Oral Roberts University

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~Elizabeth

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~Faith

## Abstract

Because disasters are sometimes unpredictable and difficult to measure, it is exceedingly important to have properly trained healthcare professionals that are prepared for a variety of natural and manmade crises. Victims affected by disasters may be numerous and have severe injuries, but nurses, as first-responders, with proper education and experience can drastically reduce the amount of casualties in a particular disaster. However, it is clear that nurses currently feel unprepared in the event of a natural or manmade disaster, and therefore need more training and preparation for such occurrences. This systematic research review set out to find the most effective interventions for educating and training nurses in disaster relief preparedness. Articles were collected from the literature on the topic in order to review what research exists relating to disaster training and education for nurses, both pre- and post-licensure. These articles were screened based on relevance of title, abstract, and content, and must have been written within the last 10 years. With a final sample size of 15 articles, it was found that the most effective interventions for the education of nurses in the field of disaster relief preparedness were blended-learning techniques including lecture content, web-based learning, and both computer and real-life scenario drills. These educational exercises should be incorporated into nursing schools and healthcare facilities in order to thoroughly train all current and future nurses. As for research, this study has identified a need to conduct further research to test and implement a standardized curriculum in hospitals and nursing schools across the nation to better prepare nurses for an active role in disaster relief.

*Keywords: disaster relief, nurses, interventions, education, training*

### Most Effective Interventions for Disaster Relief Preparation

Over the last 20 years, the number of disasters has significantly increased in the United States (U.S.) (Federal Emergency Management Agency, 2017). With this dramatic rise comes the reality that most healthcare professionals will be involved in a disaster at some point in their career, which generates the need for these professionals, specifically nurses, to be prepared. As the largest workforce in healthcare, totaling 2.7 million (U.S Department of Labor Statistics, 2015), the preparation of registered nurses in the event of a disaster can significantly determine the success or failure of disaster relief efforts (Baack & Alfred, 2013).

Before 1996, the number of disasters reported in the U.S. never exceeded 50 per year. In 1996, however, that number rose to 158, never dropping below 79 per year since then, with the highest being 242 disasters in 2011 (FEMA, 2017). These events do not come without a cost, requiring a Disaster Relief Fund in the federal budget of over \$6 billion (U.S Department of Homeland Security, 2013). The National Oceanic and Atmospheric Administration (NOAA) reports that since 1980 there have been 203 separate natural disasters where the damage has amounted to at least \$1 billion, up to a cumulative \$1.1 trillion (2017). Perhaps even more detrimental are the lives these disasters have claimed. According to the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), the global annual average of lives lost in disasters from 2003-2012 totaled 106,654 (2014). Due to the detrimental impact and increasing occurrence of these disasters, it is imperative for nurses to be adequately prepared for the worst case scenario.

## **Background**

Since the profession of nursing was established, nurses have been involved in disaster response, regardless of whether it was officially recognized or not (Gebbie & Qureshi, 2006). While they did provide attention to the injured and attempt to meet basic needs, many nurses were untrained for participation in disaster relief. This began to change at the end of World War II when disaster training was implemented for nurses in America (Alim, Kawabata, & Nakazama, 2015). Alim and colleagues (2015) reference an article by Cole (1960) stating that these training programs began to grow from 1951 to 1960 and during this time 14,405 registered nurses received disaster preparedness courses. In addition, the disaster plan project trained a total of 656,333 home nurses and first aid responders (Alim et al., 2015). Soon to follow this swell of training was the first successful large-scale disaster drill, which took place in London, Ontario, Canada in 1974. Continuing through the years, nurses have remained increasingly involved in disaster relief education programs.

This increase of disaster relief over time has been significantly affected by the U.S. government. The Federal Disaster Relief Program was created in 1950 by the U.S. Congress, and was designed to be a continuous source of aid in the event of disasters in the United States. Before this program was created, the U.S government responded with funds and individual laws on a case-by-case basis. The Federal Disaster Relief Program, however, was arranged so that the federal government could assist in response efforts by supplementing the resources and efforts of state and local governments. It was clear, though, that the rehabilitation of some communities was outside the reach of some local governments. This led to the creation of the Disaster Relief Act in 1966, allowing the

federal government to assist not only in response, but also in recovery of disasters.

Eventually, in 1979, the Federal Emergency Management Agency (FEMA) was created by President Jimmy Carter, which allocated all disaster response efforts and authority away from the president and other federal agencies directly to FEMA (FEMA, 2008).

Since this time, disaster relief preparedness education has continued to increase to provide more training programs and opportunities for nurses. Currently, nurses can take disaster relief training programs through organizations like the American Red Cross and FEMA or independent local programs like those offered through some specific hospitals (Georgino, Kress, Alexander, & Beach, 2015). Yet despite the presence of these programs, nurses have consistently reported feelings of unpreparedness in regards to disaster response (Baack & Alfred, 2013; Jacobson, Soto Mas, Hsu, Turley, Miller, & Kim, 2010).

There have been multiple attempts to solve this dilemma of reported unpreparedness. This trial-and-error process has led to a variety of approaches, several of which have turned up fruitless. For example, due to the unpredictable nature of disasters, the preparation that occurs can be a “knee-jerk” response that is not always effective. Such reactive training is often not based on evidence and varies greatly between programs (Veenema et al., 2015). However, it is possible to rely too much on evidence-based theoretical principles, as in the case of the Nepal earthquake of 2015. After the relief effort, many responders reported that while many knew the theoretical approach, it proved very challenging to implement it. When the real disaster occurred, many of the disaster protocols and procedures failed because they were simply a theory and had never before been applied to reality (Hall, Lee, Cartwright, Marahatta, Karki, & Simkhada,

2017). Another ineffective solution to disaster training is relying too heavily on the hospital experience of the nurses. Nurses are called to step up in the event of a disaster, but studies have revealed that nurses are inadequately prepared to participate in a relief effort (Baack & Alfred, 2013; Veenema et al., 2015); thus, relying solely on this qualification results in an ineffective disaster response. There have been many calls to action in order to address some of these issues, yet few are sustained long enough to make a large-scale change in disaster relief efforts (Veenema et al., 2015).

### **Significance**

With nurses often being the first-responders in crisis situations, it is important that there is a base level of knowledge to handling these disasters. Three nationally renowned disaster relief training programs are offered through American Red Cross, FEMA, and Salvation Army. These organizations offer courses to volunteers who desire to participate in disaster relief, with no medical experience required.

The availability of American Red Cross courses varies by region. As an example, courses offered in the northern Texas area range from assessment basics to supervisor training, and from self-taught to instructor-led group classes. Some require participants to take a test upon completion of the course. There is one course that is geared specifically to nursing students, called “Disaster Health and Sheltering for Nursing Students”, in which those wishing to participate can take an online course for free. Nursing school faculty can then choose to register with a local chapter of the Red Cross and have a Red Cross Disaster Health Services RN teach a two-hour class to complete the “Health and Sheltering” course (American Red Cross, 2017). In contrast, the New York region Red Cross offers 40 hours of training on courses with topics ranging from mental health to



terrorism to assessment. However, there are many regions in the U.S, such as Delaware, that are not represented by a Red Cross chapter, limiting the effectiveness that these courses can have on a wide population.

FEMA offers its classes in a similar format through its National Training and Educational Division. Their offerings include disaster-specific classes on events like biological incidents, bombings, and mass casualty incidents. The delivery types range from online to in-class to a combination of both (National Training and Educational Division, 2017).

The Salvation Army offers a variety of courses with topics including food services, spiritual services, social work, more medically focused classes such as emergency assistance techniques, and countless others. Classes offered vary greatly between states, with some providing a variety of courses year-round, while others may hold none at all. These courses are arranged according to difficulty level (some requiring prerequisites), and are facilitated in a group setting to encourage collaboration with other volunteers (Salvation Army, 2017). Although these three organizations offer a variety of curriculum, they are difficult to access unless you are a volunteer for the organization, excluding a large number of pre- and post-licensed nurses from receiving training.

Despite these training programs, it is evident that the education of pre- and post-licensed nurses regarding crisis relief efforts is far too inconsistent to provide optimal results. In the past, attempts to train and deploy a large number of nurses in the event of a disaster have been disjointed and almost impossible to maintain (Veenema et al., 2015). Most of the issues that have hindered the success of these attempts are usually related to lack of education. These can be attributed to inadequate knowledge of a formal plan,

absence of disaster training in nursing schools, inaccurate views of the nurse's role in a crisis, and variance in training between different hospitals and communities. It is also critical for nurses to be knowledgeable about how to properly cater to different populations of victims, including children, the elderly, and the disabled (Baack & Alfred, 2013).

A principle issue in the acquisition of this much-needed knowledge is the deficit of research in the area of disaster relief nursing. While the American Association of Colleges of Nursing (AACN) does require some disaster relief education, the material that is provided is neither completely evidenced based, nor provided by enough sources to produce adequate education on the subject (Veenema et al., 2015). The research that has been done, however, is difficult to analyze because disasters are unpredictable, therefore the results of the studies are based off of self-evaluation (Alim et al., 2015). Without being able to compare nurses that have received certain forms of education to those who have not in a real disaster scenario, it is difficult to test the effectiveness of the programs that have been formed. Thus, the education that exists thus far is both inconsistent and incomplete (Chan et al., 2010).

### **Problem and Purpose Statement**

As the number of disasters increases, the demand for properly trained nurses to participate in the relief effort continues to climb. However, despite the presence of various training programs, most relief nurses report feeling unprepared for disaster response. The purpose of this systematic research review was to search current literature for techniques and programs that have proven effective in preparing nurses for disaster

relief. The question this review sought to answer was, “What are the most effective interventions to prepare nurses for disaster relief?”

### **Definition of Variables**

The variables in this study include interventions and disaster relief preparedness. Interventions, the independent variable, are defined for the purposes of this study as the component of the implementation phase of the nursing process in which the focus is on what the nurse will accomplish. For instance, the outcome of the nursing process is geared towards what the patient or community will achieve through the nursing process, while the interventions are focused on what the nurse will do to accomplish the goals (Craven, Hirnle, & Jensen, 2013). In order to define the dependent variable, disaster relief preparedness, it is important to define the term disaster. A disaster is either a man-made or natural occurrence that interrupts the important operations of a community such as health/sanitation services, environment, economy, transportation, and contact between individuals and organizations, causing widespread losses that are far too great for the community’s resources to cope with alone (Achora & Kamanyire, 2016; Gebbie & Qureshi, 2006). Disaster relief preparedness can therefore be defined as the high-level of training, planning, and preparation nurses undergo to have the comprehensive skills, abilities, knowledge and personal feelings of preparedness to effectively respond to a disaster (Baack & Alfred, 2013; Georgino, et al., 2015; Slepski, 2005).

### **Methodology**

This systematic research review was conducted from February to August of 2017. Databases utilized were Medline, Academic Search Complete, Ovid, CINAHL, and EagleSearch. The searches were initiated using the following key terms, singly and in

combination: disaster, relief, training, education, preparation, programs, nursing, management, nursing intervention, organization, administration, drill, hospital, ineffective disaster, simulation, and curriculum. The time frame, databases, and keywords included offered the widest range of available literature on the topic

The combination of searches yielded over 18,000 results. Articles were narrowed down by scanning for relevance to the research question, starting with the title. If the titles were promising, the abstracts were scanned. The content of the articles continuing to show potential was then scanned in full. Saved articles were analyzed and critiqued for their quality, rigor, and ability to answer the research question. The three criteria for including articles for this study were these: publication date between 2013-2017, with a few exceptions made for articles containing foundational content to the research question; publication in English; and available to the researchers in full text. The total number of articles that met the requirements of the study to be included in the sample was 15.

### **Findings**

The articles in this sample represent the most current literature on the subject of disaster relief preparedness interventions, with dates of publication ranging from 2010-2017. The sample obtained in this systematic review is comprised of 11 quantitative studies (Alim et al., 2015; Aluisio et al., 2016; Baack & Alfred, 2013; Dubovsky et al., 2017; Farra, 2012; Farra, Smith, & Bashaw, 2016; Georgino, Kress, Alexander, & Beach, 2015; Hutchinson et al., 2011; Jacobson et al., 2010; Jonson, Pettersson, Rybing, Nilsson, & Prytz, 2017; Yin et al., 2011), 2 qualitative studies (Khorram-Manesh et al., 2016; Ulrich, Farra, Smith, & Hodgson, 2014), 1 clinical guideline (Veenema et al., 2016), and 1 mixed-methods study (Shannon, 2015). The research is primarily experimental in

nature, including detailed explanations of tested interventions and how participants responded to them. The following table outlines the pertinent information about each study, including authors, years of publication, type and level of study, sample size, and findings.

Table 1  
Summarized Findings

Author(s)/Year	Types of Study/Level of Evidence	Sample Size	Interventions
Alim et al., 2015	Quantitative (III)	225	95% of participants felt that drill increased knowledge and confidence.
Aluisio et al., 2016	Quantitative (III)	60	Case-based learning scored higher than simulation exercises.
Baack & Alfred, 2013	Quantitative (IV)	620	Experience and hands-on participation such as working in a disaster shelter.
Dubovsky et al., 2017	Quantitative (III)	10	70% of participants found simulation useful for learning Virtual Reality Simulation showed better retention of learned knowledge on a two-month post-test compared to a web-based learning exercise alone.
Farra, 2012	Quantitative (III)	42	
Farra et al., 2016	Quantitative (III)	64	Hands-on learning combined with classwork led to 90% of rubric criteria being met or partially met.
Georgino et al., 2015	Quantitative (III)	63	85% felt that classroom curriculum improved knowledge
Hutchinson et al., 2011	Quantitative (III)	81	Didactic and simulated learning experiences: pre/post test design, simulation experience, and student self-evaluation.

Author(s)/Year	Types of Study/Level of Evidence	Sample Size	Interventions
Jacobson et al., 2010	Quantitative (IV)	941	<ul style="list-style-type: none"> <li>• Instructor-led, small-group workshops</li> <li>• Internet for self-paced learning</li> </ul>
Jonson et al., 2017	Quantitative (IV)	13	Computer-based simulation increased general confidence of charge nurses, but not in handling specific disaster responsibilities.
Khorram-Manesh et al., 2016	Qualitative (IV)	187	Blended learning (various means of teaching methods) is the most cost-effective and suitable type of teaching
Shannon, C.C., 2015	Quantitative/Qualitative (IV)	63	Combination of teaching methods: lecture, web-based, and simulation.
Ulrich et al., 2014	Qualitative (IV)	107	Virtual Reality Simulation helped students focus on training at hand.
Veenema et al., 2016	Qualitative (IV)	70	<ul style="list-style-type: none"> <li>• Adopt crisis standard based on set framework</li> <li>• Recognize factors for nurses to hesitate response</li> <li>• Develop national nursing competencies</li> <li>• Develop and integrate learning opportunities into curriculum</li> <li>• Broaden existing education for emergency nursing</li> <li>• Establish a national resource to give guidance to education efforts</li> <li>• Ensure that government procedures are prioritizing emergency nursing</li> <li>• Encourage volunteers by providing liability coverage and coverage in case of harm for volunteers</li> <li>• Analyze gaps in literature, resources, and skills</li> </ul>
Yin et al., 2011	Quantitative (IV)	89	<ul style="list-style-type: none"> <li>• 3+ years of experience</li> <li>• Emergency rescue training</li> <li>• Emergency department experience</li> </ul>

Overall, the sample showed that using a combination of teaching styles including classwork, web-based learning, and hands-on simulation, was the most effective approach to teaching disaster preparation (Alim et al., 2015; Farra et al., 2016; Hutchinson et al., 2011; Khorram-Manesh, et al., 2016; Shannon, 2015). Some studies showed improvements with classroom education alone (Aluisio et al., 2016; Georgino et al., 2015; Jacobson et al., 2010). Other common interventions included practical experience, such as years as a nurse or working in the emergency department (Baack & Alfred, 2013; Yin et al., 2011). In addition, virtual reality simulation was noted as an effective intervention (Dubovsky et al., 2017; Jonson et al., 2017; Ulrich et al. 2014). These interventions and others are discussed in detail in the following section.

## **Discussion**

### **Blended Learning**

Utilization of multiple teaching methods was shown to be the most effective intervention for disaster relief preparation. Integrating various types of learning, including lecture, web-based, and simulation experiences yielded statistically significant improvement on the confidence, performance, and knowledge scores of participants (Alim et al., 2015; Farra et al., 2016; Hutchinson et al., 2011; Shannon, 2015). It was shown to be the most cost-effective and suitable type of teaching, providing the flexibility and adaptability needed for managing a continuously changing disaster environment (Khorram-Manesh et al., 2016). The lecture, web-based learning and other didactic instruction provided prior to the simulation educated participants on the foundational knowledge necessary for disaster relief (Shannon, 2015). However, the lack of a standard training program for disaster preparedness education caused significant variance amongst

each study's training curricula. One trained the participants with materials adapted from course textbooks and the Center for Disease Control and Prevention (Hutchinson et al., 2011), while another focused on the role of nurses, Basic Life Support I & II, and multiagency coordination (Alim et al., 2015). Still another chose to train on various triage methods, responder safety, effective communication, and other topics recommended by FEMA (Shannon, 2015). Therefore, the variances in what each study considered foundational knowledge created inconsistency in training received before the simulation. Despite the incongruence, however, foundational concepts were still taught and the simulation itself provided the opportunity to implement them.

The simulation prepared participants through hands-on experience and skills practice, while also training on the nurse's role in regards to teamwork and collaboration (Alim et al., 2015; Farra et al., 2016; Khorram-Manesh et al., 2016; Shannon, 2015). The drills were held in simulation labs and parking lots, with each showing success in preparing nursing students for disaster relief (Alim et al., 2015; Shannon, 2015). The combination of live actors and patient simulators was also proven to have favorable outcomes (Alim et al., 2015; Shannon, 2015). However, in regards to the creation, implementation, and evaluation of a simulation, there are no standardized objectives or guidelines and thus each study varied on these points. One study used competencies from the Nursing Emergency Preparedness Coalition and the National Center for Disaster Medicine and Public Health and evaluated via survey with a section for qualitative comments (Shannon, 2015), while another did not credit the objectives of their drill to any national competencies and evaluated by interviewing the participants and quantitatively analyzing their answers (Alim et al., 2015). Another study collaborated



with the National Center for Medical Readiness and the National Disaster Health Consortium to create a performance-based rubric to assess the participants' ability during the simulation (Farra et al., 2016). Due to this, a similar incongruence arises to that with the classroom training. Other disadvantages of a simulation include the need for highly skilled trainers as well as the large cost and time needed to create it (Khorram-Manesh et al., 2016). However, each study still showed enormous success with and highly recommended the implementation of a disaster drill (Alim et al., 2015; Farra et al., 2016; Khorram-Manesh et al., 2016; Shannon, 2015).

### **Classroom Learning**

Several studies showed that classroom learning alone increased disaster preparedness among nurses and nursing students (Aluisio et al., 2016; Georgino et al., 2015). One comparison study proved classroom preparation even more effective than simulation exercises, with nursing students having the highest assessment scores after a case-based learning intervention (Aluisio et al., 2016). The case-based learning intervention was overseen by two workshop instructors who facilitated the group as they worked through triage evaluation and case management together. This proved more successful than a simulation with a live actor (Aluisio et al., 2016). Another study showed improved nurse preparedness with a 2-hour face-to-face presentation every day for 3 days based on the 8 core competencies defined by the Emergency Preparedness Information Questionnaire (EPIQ) (Georgino et al., 2015). Again, due to lack of standard clinical objectives or guidelines for disaster preparedness training, the classroom education was varied and thus its general effectiveness could not be precisely determined. However classroom education was found to be most preferred by nurses, specifically

instructor-led small group workshops with an internet option for self-paced learning (Georgino et al., 2015; Jacobson et al., 2010).

### **Experience**

Experience was also found to be a valuable asset in disaster preparation (Baack & Alfred, 2013; Yin et al., 2011). Studies showed that nurses with more emergency department (ED) experience were more capable of providing essential emergency care such as infection control, triage, critical care interventions, assessment and management of post-traumatic stress disorder, and management of lacerations, fractures, and a wide range of serious injuries than those without ED experience. Nurses who were knowledgeable about signs and symptoms of various infectious diseases and the decontamination process showed higher scores on the Emergency Preparedness Information Questionnaire (EPIQ), which indicated each nurse's self-perception of emergency preparedness (Baack & Alfred, 2013). Therefore, in order to most comprehensively meet disaster control needs, it is preferred that first-responders have a number of years of experience in high-acuity settings to minimize the effects of tragedy on the community and create an organized approach to the management of patient care (Yin et al., 2011). Nurses with more experience were also more confident in their abilities and more willing to accept greater risk than nurses with no hands-on experience (Baack & Alfred, 2013); thus, the nurses with emergency department knowledge, training, and developed skills were found to perform more efficiently and systematically in a disaster situation than were inexperienced nurses (Yin et al., 2011). First-responders having three years of clinical experience as well as expertise in disaster shelters or as emergency nurses are likely to be the most useful in a disaster situation (Baack & Alfred, 2013; Yin

et al., 2011). It is highly encouraged for nurses to also seek out opportunities to develop their skills through mock disaster drills, scenarios, real disaster events, and ED experience in order to continuously refine their skills and knowledge base, as hands-on learning increased nurses' confidence in the event of a disaster (Baack & Alfred, 2013).

### **Computer-Based and Virtual Reality Simulations**

Other noteworthy interventions found in the literature were hands-on and computer-based virtual-reality simulation drills, as they were shown to be highly effective in the use of disaster training (Alim et al., 2015; Dubovsky et al., Farra, 2012; 2017; Ulrich et al., 2014). Virtual reality simulations (VRS) and triage models acted to significantly increase the knowledge retention of nursing students in regards to disaster training and served to simulate the stressors of a real-life ED reaction to disasters (Farra, 2012; Dubovsky et al., 2017). Studies tested the use of two different VRS models, one called "Second Life" and the other called "CliniSpace". The first study compared students who completed an online training program, including pre- and post-assessments, to students who completed the online training, the pre- and post-assessments, and a short VRS. The two groups were completely randomized, and both took a short quiz two months following the training. Second Life allowed participants to assess, triage, decontaminate, and provide first aid to patients in two different scenarios, which included radioactive and explosive events, reflecting on the injuries of the patients. The simulation only took about 20 minutes to complete. Analyzing the results of the two-month post-assessment, the students who participated in the VRS had significantly higher retention rates of the information regarding triage, decontamination, and other disaster competencies (Farra, 2012). CliniSpace acts as a computer-based simulation program,

which the conductors used to project a virtual reality triage center of an urban hospital. This simulation allowed participants to interact with simulated patients in an ED in which they navigated and triaged patients based on assessment priorities as they would in real life. There were 16 total automated “bots”, 4 of which helped the participants navigate the system, and 12 that acted as patients or helped to test those participating in the simulation (Dubovsky et al., 2017). Data from this study showed that a virtual reality triage was effective in successfully modeling the impact of stress on the efficiency of staff in disaster situations. These studies served to gain insight into the advantages of VRS by both increasing student retention rates and proving to be accurate depictions of realistic disaster scenarios, validating the use of VRS as an effective intervention in the training of nurses in the event of catastrophe.

### **Implications**

After reviewing the literature, it is important to note the possible implications for change in relation to nursing education, nursing practice, and future research in order to properly prepare both licensed and pre-licensed nursing personnel for a disastrous event. These implications will allow the nursing profession to grow and develop into a more efficient and well-prepared task force that is capable of providing the care needed for victims of calamity.

### **Implications for Education**

The implications of this study for nursing education should be highly emphasized. A common theme throughout the current literature shows that classroom learning should be used in conjunction with hands-on simulations for both nursing students and licensed RN's in order to provide comprehensive disaster education for multiple generations of

nurses. As for pre-licensed nursing education, it would be of great benefit for nursing schools to incorporate a standard curriculum that includes hands-on scenarios and disaster drills into their classroom and web-based learning. This would allow students to engage with the material through multiple facets, increasing their familiarity with the concepts and competencies of critical care and disaster nursing.

### **Implications for Practice**

The findings of this study impact nursing practice in preparing post licensure nurses for disaster relief. Education for nurses should include not only classroom instruction but also simulations to provide the foundational knowledge coupled with hands-on experience. The training should extend beyond nursing school or hospital orientation; rather, disaster relief training should be incorporated into ongoing continuing education in order to increase retention of knowledge and skills for an unpredictable event. However, cost proves a barrier in implementation into nursing practice. Creating a more thorough, continuous curriculum is an added expense for the providers that could hinder their willingness to carry out the recommendations. Yet despite this barrier, incorporating these interventions will increase disaster preparedness of nurses and thus should be incorporated into current nursing practice. Additionally, in recruiting for first responders, emergency department experience and backgrounds in disaster relief should be emphasized.

### **Implications for Future Research**

Further research is required in this area. Based on the results of this study, a standardized curriculum composed of the most effective interventions should be developed and tested for effectiveness. First, the new curriculum should be tested and

evaluated independently and then in contrast with the singular interventions of this study to ensure it is the most comprehensive and adequate. Contingent on the findings of future research, a standardized education program for disaster relief preparation for nurses should be established nationwide.

### **Strengths and Limitations**

Strengths of this study included the professional expertise of a doctorate-level mentor that supervised the project. This mentor was consulted on a weekly basis to ensure that the proper research techniques and information were being utilized in order to yield the most accurate results. Other strengths consisted of the genuine interest of the researchers in the subject matter, leading to a desire to further knowledge and gain accurate insight into the issues facing nurses when engaging in disaster relief preparation. Limitations of this research included limited literature, with a sample size of only 15 articles, as well as an inconsistency in the time frame of the research being conducted. The research material was collected and studied over a 10-month period, with the exception of 3 months in which no material was collected or analyzed causing a possible gap in research consistency.

### **Recommendations**

Recommendations for replication of this study include a broader and more extensive search to produce a larger sample size, and a more disciplined approach with an increase of focused time on the research project without large breaks. In addition, during the research process, only one clinical guideline was found related to this topic. Yet this study revealed that developing guidelines for classroom training and simulations would result in a universal, and potentially more effective, disaster relief preparedness program

for nurses. These guidelines should be based on competencies already established as effective and include classroom and simulation creation, implementation, and evaluation.

### **Conclusion**

Research has shown that despite the frequent occurrence of disasters worldwide, most nurses feel unprepared to act in these crisis situations. Thus, there is a need for a comprehensive, educational intervention to increase disaster preparedness. This study evaluated several training methods, including blended learning, classroom learning, experience, and virtual reality simulations, to discover blended learning has the most favorable outcomes. Knowledge from this study may inspire future researchers to develop national guidelines on how to prepare nurses for disaster relief. Nurses make up the largest portion of the healthcare workforce and thus need to feel confident and act competently in the face of an emergent disaster situation. With adequate training based on standardized objectives, nurses could make a large impact on timeliness and effectiveness of disaster response, potentially impacting the number of lives saved.

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