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Analysis of Texas Nurses' Preparedness and Perceived Competence in Managing Disasters

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ANALYSIS OF TEXAS NURSES' PREPAREDNESS AND PERCEIVED COMPETENCE IN MANAGING DISASTERS

by

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Acknowledgments

I wish to dedicate my dissertation to my children Lindsey, Brandon and Alyssa. I hope they will always value the gift of knowledge and education as much as I do, and know, as my mother taught me, this is the one thing that no one can ever take away from you. Be all that you can be, and make the world a better place by making a difference.

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Table of Contents

Abstract

ANALYSIS OF TEXAS NURSES' PREPAREDNESS AND PERCEIVED COMPETENCE IN MANAGING DISASTERS

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Natural and human-induced disasters have been increasing in prevalence and severity. On average a disaster takes place somewhere in the world every day (Pan American Health Organization/World Health Organization, 2000). Major disasters fall into two significant categories, human-induced and natural. The increased prevalence in natural disasters (James, Subbarao & Lanier, 2008) has made nurses' preparedness a national priority.

This dissertation examines and addresses nurses' lack of preparedness for major disaster events. The first article is a State of the Science article that examines current literature related to nursing and disaster preparedness. The purpose of this article is to explore research related to nursing preparedness and identify gaps in the literature. The second article examines data related to nurses' preparedness and perceived competence in managing disasters. It includes an examination of actual and perceived preparedness using two instruments. This work contributes to nursing science by offering an actual research study that examines this important aspect of disaster preparedness. It is important because nursing comprises the largest portion of the healthcare workforce. This

work reveals that nurses' perceived preparedness has a direct relationship to their previous experience in working in a disaster situation or in a disaster aftermath situation, such as a post-disaster shelter.

Overview of the Research Study

Overall Purpose of the Study

The purpose of this study is to explore the state of disaster preparedness among Texas nurses in rural areas. A major goal of this undertaking is to determine nurses' perceived familiarity with disaster situations. This work explores nurses' self-reported perceived ability to respond effectively to major disaster events. It includes an analysis of which factors impact nurses' readiness for disasters. This study may assist hospitals, organizations, and communities to identify gaps and strengthen their disaster preparedness programs to utilize the nurses to their full capabilities.

Introduction of Articles Appended

This work is inclusive of two articles. The first article, *Nurses' Readiness for Disasters: State of the Science,* examines current disaster preparedness literature and nurses readiness for disasters. This article explores the scope and strength of nurse preparedness on an international, national, state, and local level. While a number of studies related to disaster response are available, a dearth of research studies that specifically examine nurses in relation to disaster preparedness is evident. The state of the science paper focuses on challenges and barriers to nurse preparedness and identifies strategies to improve the disaster response in the United States and around the globe. The review of studies covering global disasters and nurse preparedness to provide an effective disaster response points to several themes worth consideration. Nurses are integral partners in all aspects of disaster response. The two most common recommendations call

for more relevant educational offerings to prepare nurses for disaster participation and more research to identify gaps in the disaster response plans.

The second article, *Analysis of Texas Nurses' Preparedness and Perceived Competence in Managing Disasters,* is a report of the findings of a study aimed at assessing responses of nurses regarding their preparedness, past experience, and perceived competence in managing disasters in Texas. The study's major goal is to determine rural nurses' perceived familiarity with disaster situations and their confidence in mitigating disaster situations. Contextual and demographic factors that impact nurses' readiness for disasters are discussed. This research study was undertaken to describe the current status of nurse preparedness to manage disasters in order to help communities and health care systems strengthen their emergency-response programs. Nurses' prior disaster experience is a strong determinant of their perceived abilities and competence. Their willingness to assume risk in a bio-terrorism event or pandemic is also linked to their perceived preparedness.

Evaluation of this Project

An objective evaluation of the study is offered for consideration. The minimum sample size to achieve statistical significance and rigor was proposed to be n=150; however, the actual sample size was n=653 allowing a broader representation of hospital-based rural nurses as well as boosting confidence in the findings. Different methods of recruitment of subjects to respond to the survey were used depending on the needs and preferences of the facility. Recruitment methods included the posting of the survey link for two weeks directly into an online hospital news broadcast, advertising the link on the hospital intranet for a month, and flyers posted on the nursing units. Hospital

management support of nurse participation, or lack thereof, in the form of reminders and focusing attention on the survey may have influenced response rates. Several of the hospitals had very low participation. Using multiple hospitals limits the control of advertising and administrative support, but the value of a more geographically-dispersed population was felt to outweigh the problem of ensuring a similar administrative support effort by all hospitals. The survey was housed on an online data collection site called Qualtrics which was accessed using a link provided to the nurses at work. Online data collection was a satisfactory strategy which reduced time and expense in accessing the sample and analyzing the data. Finding a wide sample of nurses with varying degrees of exposure to disasters is a challenge, and targeting rural hospitals is believed to have been a satisfactory way to get a snapshot of nurse preparedness for disaster management in rural Texas.

This study fills a gap in understanding the nurse's perspective of competence in managing major disaster events in rural areas. It points to the importance of considering all areas of the country, not just major metropolitan areas, when doing disaster planning and provider assessment. The goal is to ensure that all disasters are met with the optimal level to response to save lives and optimize outcomes in rural areas. This study is a contribution toward that goal.

Recommendations Based on Findings

Disaster preparedness has been an increasing focus of many national and nursing initiatives. In spite of the increase in prevalence of natural and human-induced disasters, preparedness efforts remain seemingly unchanged. Numerous mandates and admonitions have been issued by the American Hospital Association (AHA), the World Health

Organization (WHO), the Joint Commission on Accreditation of Health Organizations (JCAHO), and the Federal Emergency Management Agency (FEMA); nevertheless, mass-causality/incident and disaster preparedness remains inadequate, and research is limited (Coyle, Sapnas & Ward-Presson, 2007). The findings of these studies indicate that more research needs to be done examining disaster preparedness among nurses.

Recommendations include a replication of the study to examine nurses' preparedness and perceived competence in disaster preparedness in metropolitan areas and military or government facilities. A comparison study would also be helpful to determine if there is a difference among groups based on location, type of facility, and association with the military regarding experience in disaster situations and perceptions of preparedness to manage a disaster situation. The current study was conducted in an area which is prone to tornadoes and receives residual effects from hurricanes. Replication in areas where other types of disasters are prevalent, such as along the Gulf Coast where hurricanes occur, would also add a needed component to the statewide assessment of readiness to manage disasters in Texas. Findings from this study suggest that nurses must seek opportunities to be actively involved in major disaster events, because experience has demonstrated enhancement of nurses' perceived competence in managing disaster situations.

The study of management in a disaster situation is challenging because of the capricious nature of the disaster situation itself. A mass casualty situation is often unanticipated and always chaotic. But its very nature, the disaster scenario is almost impossible to anticipate with accuracy which makes planning such a challenge. Drills and simulations lack the chaotic imprint of a real disaster which makes preparation for the

actual event so difficult. Knowing how nurses perceive their own preparedness and how much actual experience they have had in disaster management can give hospitals a glimpse into their own response potential. Designing ways to improve readiness depends on knowing the baseline from which hospitals operate. A further recommendation is for hospitals to continue to reevaluate their own disaster plans and nurse readiness including keeping a current record of which nurses have actual disaster experience. This data assessment could be done during annual evaluations. Knowing which nurses feel prepared to engage in disaster participation can help hospitals make vital personnel decisions in the midst of a disaster declaration. This study represents one attempt to assess nurse readiness as a contribution toward helping healthcare facilities maintain a state of readiness in order to maximize resources and save lives.

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Nurses' Readiness for Disasters: The State of the Science

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Abstract

Awareness of disaster preparedness has penetrated every level of the government and has captured the attention of citizens around the world. The increased prevalence of natural disasters cannot be denied, and the growing turbulence of world affairs is the focus of intense media attention. Nurses make up the largest sector of the healthcare workforce and are integral responders to major natural and human-induced disasters. It is essential that nurses have the knowledge and preparation needed to respond effectively, not only for the benefit of health care organizations, but for the safety of the community at large. This article explores the scope and strength of nurse preparedness on an international, national, and local level. While a number of studies related to disaster response are available, there appears to be a dearth of research studies that examine nurses in relation to disaster preparedness. The purpose of this article is to explore the current state of science regarding disaster preparedness among nurses.

Key words: disaster preparedness, emergency preparedness, nursing, research, nurses' perceptions, bioterrorism, education

Nurses' Readiness for Disasters: The State of the Science

Disaster preparedness has been an increasing focus of many national and nursing initiatives. In spite of the increase in prevalence of natural and human-induced disasters, preparedness efforts remain seemingly unchanged. Numerous mandates and admonitions have been issued by the American Hospital Association (AHA), the World Health Organization (WHO), the Joint Commission on Accreditation of Health Organizations (JCAHO), and the Federal Emergency Management Agency (FEMA); nevertheless, mass-causality/incident and disaster preparedness remains inadequate, and research is limited (Coyle, Sapnas & Ward-Presson, 2007).

There is no doubt that natural and human-induced disasters are increasing in magnitude and frequency (James, Subbarao & Lanier, 2008). The end results of such disasters are often loss of life and wide-spread devastation. A disaster takes place somewhere in the world every day (Madden, 2010). Registered nurses make up the largest percentage of the professional healthcare workforce (Marshall, 2009). The Bureau of Labor Statistics (2010) reports 2.6 million registered nurse jobs in the US in 2010 and projects an increase of 22% by 2018. Disaster response preparation for nurses is of paramount importance for effective efforts to mitigate the detrimental effects to person, community and property (Fung, Lai & Loke, 2009).

This article presents the most recent research in the state of the science regarding disaster readiness among nurses presented from a global or macro preparedness perspective to a micro or more personal level of preparedness. It will also focus on the challenges and barriers to nurse preparedness as well as strategies to improve the disaster response in the United States and around the globe. This state of the science effort

included a review of multiple databases including OVID, CINAHL plus full text, and Medline using dates ranging from 2005-2011. Reviewed literature included editorials, conference abstracts, book reviews, and news briefs which made up approximately 30% of the literature review. Other items reviewed (40%) included case studies and predominately non-research related articles consisting of topics including older adults, nursing homes, pediatric trauma, nephrology and emergency room preparedness, models, drills, and bioterrorism. At least 20% of the articles came from other countries such as China, Australia, British Columbia, West Africa, India, Jordan, Canada, Sweden, Africa, Britain and the Republic of Singapore, many of which were research based and some solely in the language of origin. From a global perspective, 12 of the applicable articles were from international journals or had main authors who were from countries other than the U.S. Even among the research articles, 7 of 9 were articles examining nurses' readiness for disasters conducted in other countries.

It is worth mentioning that the RAND Corporation undertook an extensive review of the literature on behalf of the Department of Health and Human Services in 2009 entitled, "A National Agenda for Public Health Systems Research on Emergency Preparedness" (Acosta et al., 2009). This study was based on multiple priorities delineated by a panel of specialists. Among the public health systems research agenda priorities was Research Area 3 focusing on resources and infrastructure which identified workforce and training as key priority areas. While infrastructure needs revolved largely around technology diffusion to enhance public response to disasters, the need for workforce training research goals section reflected a research gap in identifying how non-physician personnel can be best utilized to improve public health surge capacity during

an emergency event. The purpose of this analysis is to identify the evidence base for how nurses are prepared to fit into that public health emergency management model.

Status of Global Disasters – The Macro View

The year 2011 broke many records for natural disasters all over the world (Sullivan, 2011). Recent major events have had a detrimental impact on human life and economies, such as the major earthquakes in Haiti, Chile and Japan; the tsunamis' in Southeast Asia, Indonesia and Japan; and major hurricanes in the US Atlantic and Gulf Coast areas. The international community has a varied track record of emergency response and effective management of disaster situations. Disaster preparedness is defined as the comprehensive knowledge, skills, abilities, and actions needed to prepare for and respond to unexpected events. These events may be threatened, actual or suspected, chemical, biological, radiological, nuclear or explosive and may be human-induced or natural in origin (Slepski, 2007). The purpose of disaster preparedness and planning is to minimize the negative outcomes of disasters (Barnes, Hanson, Novilla, Meacham, McIntyre & Erickson, 2008).

In the midst of the 2009-2010 global Pandemic H1N1 influenza outbreak, Dr. Margaret Chan, Director-General of the WHO, stated that gaps in response, coping, and mitigation capacities in different countries must be a top priority for WHO and the international community (2008). Serious disaster preparedness planning efforts should be embedded into the healthcare and community culture with the goal of minimizing damage and saving lives. Nurses are often at the forefront of natural disasters and put themselves at risk. Twedell (2009) reported that nurses from the SARS epidemic in Canada, Hong Kong and Taiwan expressed a sense of hopelessness, fear of unknown

disease, increased level of risk, fear of termination of employment and an overall stressful situation.

A major concern facing public health nurses, especially in third-world communities, is the increase in vector-borne illnesses as a result of climatic changes. Malaria continues to be prevalent among communities in Africa and claims 1 in 5 children in Sub-Saharan Africa (Shuman, 2011). West Nile virus may occur in drought conditions, and natural predators of mosquitoes are greatly reduced during drought. Dengue and malaria thrive in wet conditions such as flooding and tropical rainy seasons (Shuman, 2011). Nursing interventions and management of vector-borne illnesses are also important in the aftermath of disasters when waters become stagnant or gastro-intestinal disease becomes prevalent due to unsanitary or over-crowded conditions that result from lack of electricity and/or plumbing.

Advanced planning and mitigation are crucial for all countries and at all levels of government. It is especially imperative for healthcare providers to have a thorough knowledge of what lies ahead to take decisive action for training and mock-drills. The International Council of Nurses (ICN), in conjunction with the WHO, published the *ICN Framework of Disaster Nursing Competencies* and recognized an accelerated and present need to build capacities of nurses at all levels in order to "safeguard populations, limit injuries and deaths, and maintain health system functioning and community well-being, in the midst of continued health threats and disasters" (Dorsey, 2009, p. iv). The PAHO and WHO have issued a call for countries to undertake six core actions to make their health facilities safe during emergencies: 1) assess the safety of hospital, 2) protect and train health workers for emergencies, 3) plan for emergency response, 4) design and build

resilient hospitals, 5) adopt national policies and programs for safe hospitals, and 6) protect equipment, medicines and supplies (Hareyan, 2009). Nurses will be intimately involved with all of these goals.

Regulatory Issues Surrounding Disaster Response – A National View

In the United States, the National Oceanic and Atmospheric Administration (NOAA) website reports that costs for natural disasters in 2011 exceeded 35 billion dollars within the first six months of the year (2011). As delineated in its 1996 *Guide for All-hazards Emergency Operation Planning*, FEMA defines a hazards analysis as a process and method to identify possible and probable hazards in a particular geographic area or location. FEMA defines hazard mitigation as "sustained action taken to reduce or eliminate the long-term risk to people and property from hazards and their effects" (p. 1). The goals of the National Mitigation strategy are designed to encourage a national focus on hazard mitigation. These goals are: 1) to substantially increase the public awareness of national hazards risk so that the public demands safer communities in which to live; and 2) to significantly reduce the risk of loss of life, injury, economic costs and destruction of natural and cultural resources that result from natural hazards (n.a., 1996). The all-hazards methodology should be the basis for mitigation efforts and emergency operations plans (EOP).

Since requests for assistance may take up to three days, local and state authorities must be prepared to sustain themselves for this length of time. Nurses are frequently among the first responders and provide the interim and maintenance care for disaster victims. The nurse workforce must be knowledgeable, willing, and able to assist in state and local disasters. An American Nurses Association (ANA) Issue Brief (2010) states

that the ANA continues to "partner with government groups, non-government organizations, employers, and individual registered nurses to achieve systems, policies, and laws that enable the registered nurse and other providers to respond confidently and to ensure that the needs of the American public will be met during a disaster" (p. 1). In a publication of the Joint Commission on Accreditation of Health Organizations (n.a., 2008) entitled *Emergency Management in Healthcare, An all-hazards Approach,* the JCAHO mandates that hospitals have an all-hazards emergency operations plan. Many national plans are based on the Hospital Incident Command System. In February of 2003, President George W. Bush's Homeland Security Presidential Directive-5 created the National Incident Management System (NIMS). NIMS created the first standard domestic incident response that united local, state and federal governments. It provided a framework for interoperability and compatibility among various response organizations. NIMS was established to be a flexible framework that allows all agencies on all levels to work together regardless of the type of incident, size, complexity or location. Nurses should be thoroughly versed in NIMS and the Incident Command System (ICS). The Department of Homeland Security (2007) created the 2008 *National Response Framework,* a document on how the U.S. conducts an all-hazards response. It demarcates how each level of government should respond in the event of a major disaster from small municipalities to cities, regions, states and tribal entities. Nurses should be very familiar with these frameworks to maximize their facilities' response and mitigation efforts for disasters.

Wynd (2006) reported a dearth of literature regarding models related to nursing disaster response and preparedness, especially in military nursing. Military nurses are

increasingly deployed to sites of major disasters. U. S. Military nurses are trained to handle surge capacity (Adams, 2009). Surge capacity is defined by the American College of Emergency Physicians (n.d.) clinical practice and management website as "a measurable representation of a health care system's ability to manage a sudden or rapidly progressive influx of patients within the currently available resources at a given point in time" (para 1). Mass care is also a phenomenon the U.S. Military nurses encounter, especially during wartime periods when choices during triage must include life and death decisions. According to Wynd (2006), the mass care response is founded on the principle of providing the greatest amount of good for the greatest number of people in consideration of the confines of limited resources. Mass care may include mass causalities, mass evacuations, mass immunizations, and triage. There is slim evidence regarding the ability of non-military community-based hospital nurses and public health agencies to be able to respond to and manage surge capacity and mass events in a civilian disaster situation.

Public Health Preparedness and Response Issues – A Regional View

Public health in most states is managed using a regional approach with the state being separated into service delivery regions. These regions are often the basis for managing community safety and health during disaster events. Rebmann, Carrico, and English (2008) identified some of these regional challenges as assessing and identifying uncommon diseases or conditions which include infection prevention and control, assessing signs and symptoms of diseases during mass casualty incidents, addressing public health education and communication, and building partnerships with outside agencies. Barlow (2008) suggests that nurses may need to confront disasters by arming

themselves with fundamental skills, like assessing a patient's color and capillary refill instead of using a pulse oximeter, and refining critical thinking skills. Public health nurses are on the front lines of public interface, and education is needed to provide them with the skills they need to mitigate disaster events, identify uncommon presentations of infectious diseases, provide public education, and coordinate mass casualty events and responses (Rebmann, Carrico & English, 2008). Another educational imperative involves the ability of the public health nurse to mitigate public health surge capacity to a human-induced or natural disaster event (Polivka, Stanley, Gordon, Taulbee, Kieffer & McCorkle, 2008). Surge capacity in its application to public health does not fit the traditional acute care facility definition and must be modified to meet the specific need of the region and each community. Surge capacity is one of six national focus areas for the Target Capabilities list in the National Preparedness Goals listed in the National Homeland Securities document entitled, *National Preparedness Guidelines* (2007). Writers of this report advocate the need for training and public health educational competencies (Polivka et al., 2008). Emergency-preparedness education must continue through life-long learning and may be effectively delivered using technology simulations.

Simulation to provide a basic preparation for managing large disaster events is beginning to be used more frequently in training and planning efforts. Morrison and Catanzaro (2010) conducted a disaster simulation exercise that involved 83 senior public health nursing students. While students felt the purpose of the experience was clear, they expressed feeling overwhelmed and anxious. They did report that the experience was important and recognized their ability to apply nursing skills from previous courses to the disaster situation. The Association of Community Health Nursing Educators (ACHNE)

makes the recommendation that all nurses should possess basic competencies for responding to a major disaster public health event. Simulation exercises have been employed as a means for teaching students, but it is difficult to measure their success as disasters happen at unpredictable places and times (Morrison & Catanzaro, 2010).

Jacobson, Soto Mas, Hsu, Turley, Miller and Kim (2010) assessed the self-reported terrorism preparedness and training needs of a nurse workforce in North Texas. This study primarily assessed the Department of State Health Services Public Health regions. A cross-sectional prevalence design was used as self-reported surveys examining preparedness for bioterrorism and response were collected from 941 nurses. The results revealed that further assessment and education aimed at increasing competence in bioterrorism and response is needed. Jacobson and colleagues recommend that future studies have national representation of the rural nurse workforce, and nurses' participation in bio-terrorism related studies should be encouraged. Public health nurses must practice their disaster preparedness skills as part of their daily routine, and collaborate with local, regional and state officials in emergency operations. Education of rural nurses should include just-in-time training to educate staff, training on specific skills needed in shelters, and perhaps management of medical needs patients (Jakeway, LaRosa, Cary & Schoenfisch, 2008). It is incumbent upon nurses to be prepared using the World Wide Web, multi-media, conferences, networking with community partners, academic courses, and current professional journals.

Academic Preparation and Scholarship

The complexity of emergency preparedness in education faces significant challenges and barriers in both academia and the professional settings (Jones, Terndrup,

Franz, & Eitzen, 2002). These challenges include, but are not limited to, the lack of standardized and coordinated emergency-related educational efforts within health care agencies, evolving recommendations and planning procedures, curriculum revisions, and lack of flexible time within existing curricula (Buyum, Dubruiel, Torghele, Alperin, & Miner, 2009). Garbutt, Peltier, and Fitzpatrick (2008) noted that there is a lack of emergency preparedness and mass casualty and mass evacuation education in nursing schools.

Buyum et al. (2009) stated that emergency preparedness is offered through the narrow scope of continuing education, and failure to address the barriers will continue to undermine the full capacity of health care workers to respond well during emergency events. Buyum et al. sent a survey to 60 nurses who had participated in an emergency preparedness summit in an effort to determine if the program was useful in integrating emergency preparedness into the curricula. It was deemed useful by most participants, but deficiencies, such as lack of education involving explosive agents, mass casualty training, bioterrorism response, and triage, were identified.

Douglas (2007) states that major incidents and disasters can be multidimensional and thus can impact nurses working in every specialty. Sometimes a disaster response may take nurses out of their specialty areas into the disaster realm and perhaps out of their comfort zone. Douglas suggests a collaborative effort of community and vested partners to share learning and use disaster planning to identify the gaps in their systems. Gap analysis provides knowledge of what must be improved and can serve as a framework for contingency planning.

A 2007 study conducted by Fung, Loke and Lai (2008) among 164 Hong Kong master's prepared nursing students was used to determine their preparedness for disasters. A 26-item survey measured demographics, nursing experience, preparedness at work, protocols, and questions regarding agencies or public services that should respond in disaster situations. The study also examined students and nurses' educational needs and materials to help them be more prepared. The study concluded that 97% of nurses stated that they were inadequately prepared to respond to major disasters. Out of the nursing sample, 84.8% believed that a protocol was in place at their hospitals. Only 61% had read the protocol, while another 14.2% did not believe there was a protocol in place. When asked how they would respond if a disaster were to occur while the nurses were at work: one-third of the respondents reported they would follow hospital protocol, while one-third reported they would just wait for instructions from their supervisors. Other respondents said they would warn other people before escaping (24.4%), some would evacuate patients (15.2%), and finally some would escape as soon as possible (7.3%). Fung et al. concluded that 97% of nurses felt they were unprepared to handle major disasters and believed that they would benefit from more focused and directed training.

Adams and Canclini (2008) examined the effect of a project to promote active involvement of baccalaureate nursing student in working with community partners to plan, implement and evaluate a community-based, health education program to create efficiency in future disasters. The project was a collaborative effort of the community and Texas Christian University nursing students. The conclusions were that the project was a success and increased students awareness of the need for community partnerships. Adams

and Canclini suggest that schools of nursing do have a crucial role to play in preparing the community for disasters.

Buyum et al (2009) state that nursing is "challenged by the need to incorporate increasingly complex, diverse, and cross-cutting subject matter into already crowded curricula" (p. 210). Students must be prepared to step up to participate in the event of a natural or human-induced disaster where their role will be to supplement the delivery of emergency services by licensed qualified personnel. How schools will integrate this information into tight curricular boundaries is a challenge to nursing education leaders throughout the country.

Nursing scholarship has had some focus on disaster preparedness. A few studies have included systematic reviews such as a review of Australian literature by Chapman and Arbon (2008). The authors reviewed 16 articles from a local university database identifying 4 main themes: Nurse/student issues; concerns, attitudes and perceived preparedness for disaster response; disaster planning in acute settings; and surge capacities of acute settings. The authors concluded that there was an increased concern regarding disaster preparedness among health care workers and nurses. Studies revealed education in disaster response, disaster planning, and surge capacity is not well implemented or standardized in acute care setting. They identified gaps in Australian and International settings; however, no clear recommendations for improvements were found. They determined a need for more focused research.

Another systematic review of the literature came from Secor-Turner and O'Boyle in 2006. They conducted an extensive review of the literature and included 21 articles that examined variables that may influence nurses working during a bioterrorism event.

Variables identified were psychological impact (coping and post-traumatic stress disorder), short supplies, high demand of work and hours, basic needs being met, risk of exposure to bioterrorism agents, and environment of fear. They concluded that limited data are available regarding the concerns and fears of nurses regarding their clinical role and working conditions during a bioterrorism event. They noted that adequate training and preparation is essential to prepare nurses to safely function and minimize emotional and psychological trauma.

Assessing Nurse Perceptions and Preparation for Disasters – A Micro View

During major disaster events, the demand for nursing staff is much greater than the demands for any other health care professionals (Lavin, 2006). The role of nurses during disasters has expanded from simply caring for the sick and injured to development of the ability to react to a disaster in terms of preparedness, mitigation, response, recovery and evaluation (Gebbie & Qureshi, 2006). One of the issues influencing nursing response to disaster situations is a lack of research regarding disaster nursing (Fung, et al., 2009; Garbutt et al., 2008), and poor understanding regarding nurses' perceptions of expectations during a disaster (Garbutt, et al, 2008). Nurses' perceptions of disaster relate to their awareness of vulnerability to unpredictable events and affects how prepared nurse should be (Fung, Lai & Luen, 2009).

Instrumentation to measure nurse preparedness for disasters remains a driving force for adequate assessment on a micro and macro level. A study by Yang and Luo (2010) examined an evaluation of an instrument to measure disaster preparedness and coping among community nurses. After a rigorous Delphi study, the instrument was deemed reliable and consistent among the experts. It was concluded that the study will

provide a scientific and systematic evaluation tool for evaluating disaster coping capacity of community nurses.

Al Khalaileh, Bond, Beckstrand and Al-Talafha (2009) conducted a study to determine the validity of a Disaster Preparedness Evaluation tool which was modified from its original version originally designed for nurse practitioners. The authors translated the tool into Arabic and administered it to 474 Jordanian registered nurses. The study was conducted to determine the questionnaire's psychometric properties, reliability, validity and factorial structure. The findings revealed that the survey was valid and reliable, but no specific findings related to nurse preparedness were reported. The purpose of the survey itself was to examine nurses' perceptions regarding disaster preparedness as well as their confidence in abilities for shelter operations, patient education, bioterrorism, psychological interventions, symptom management, recognition of biological weapons, logistics, local emergency response and other associated questions.

Garbutt, Peltier and Fitzpatrick (2008) examined an instrument in their study that measures nurses' familiarity with emergency preparedness. They examine the Emergency Preparedness Information Questionnaire (EPIQ). It is a 44-item instrument that assesses nurses' self-reported familiarity with eight dimensions of emergency preparedness. It also includes a self-reported measure of overall preparedness for a large scale emergency event. The instrument was originally created in 2003 and used in one large study by Wisnieweski, Dennik-Champion and Peltier (2004). The authors concluded that the questionnaire was a reliable and valid instrument for assessing nurses' familiarity with emergency preparedness. During this study, they expanded the EPIQ to include the

nurses' self-reported familiarity with emergency preparedness competency dimensions. They also suggested that further studies be done to examine nursing preparedness and emergency preparedness curricula. While the validity and reliability of instrumentation is very important, so are the yields from such data. This data will provide essential information on nurses' perceived abilities and perceptions regarding disaster preparedness and awareness.

A study by Fung, Lai and Yuen (2008) conducted in Hong Kong examined individual nurses' perceptions of disaster. The most important finding was identification of what events the nurses considered to be disasters. Disasters ranged from a major traffic accident to the SARS outbreak, extreme weather events, and a recent event of an overcrowding stampede of a night club that had resulted in 20 deaths and 71 injuries. The focus of this description was not to determine nurses' preparedness for disasters, but rather their perception of what constitutes a disaster.

A study conducted by Hammad, Arbon, and Gebbie (2011) examined Australian registered nurses knowledge and perceptions of their roles in disaster response. A self-reported questionnaire was distributed among 152 nurses in metropolitan public emergency departments. The study revealed three main themes from the data: South Australian nurses had minimal previous disaster experience (real or simulated); many had disaster education and training (however, questions were raised regarding appropriateness, relevance, and availability of such education); and the nurses had a low level of disaster knowledge. The authors concluded that the nurses would benefit from more appropriate disaster education and training, and suggested that there is a need for further research into appropriateness of education and training.

The nurses' duty to self during such times of disaster cannot be understated. During Hurricane Katrina and Rita, nurses' needs were unanticipated and largely unmet (Powell-Young, Baker & Hogan, 2006). Physical needs and basic provision of clean clothes, food, rest, respite and therapeutic accommodations must be considered. In addition, nurses in disaster response situations are faced with psychosocial needs, considerations for personal responsibilities (families), safety issues, and increasing anxiety from patients which must all be considered in the planning and mitigation phase of preparation (Qureshi et al., 2005). Good (2007) identified after-hours issues of obtaining information and supplies as a need during preparation for nurse response to disaster situations. Other challenges faced by nurses were poor communication and lack of preparation. Nurses expressed concern that disaster plan expectations were not clearly communicated, and a clear connection between the plan itself and those expected to carry it out was not conveyed (Good, 2007).

Castro et al., (2008) identified needs of Nurses in Texas nursing homes and assisted living facilities during disasters. He noted that nurses voiced a need for clear communication down the line, and contingency plans that are easy to follow. Staff articulated a need for improved training, education in disaster plans and the need to see hospital administration during crises. Following hurricane Floyd in Florida, nurses stated that they need to feel that the organization has a palpable commitment to safety and that leadership values safety and training/education (French, Sole & Byers, 2002).

It is evident that nurses' perceptions vary based on locality, area of expertise, previous experience, education and training. Each nurse has a personal responsibility to be prepared for a disaster situation. The role of federal, state, local, and academic

institutions is to provide the means for nurses to become better prepared. How this preparation occurs remains a challenge to the basic premise of disaster preparedness.

Summary and conclusions

Disaster situations place heavy demands on nurses, and few measures are in place to actually meet the physical, emotional, and psychological demands that they experience as the direct result of exposure to such events. Substantial challenges exist in providing for adequate disaster preparedness among nurses at the local, state, national, and international levels. Singular among the needs to provide adequate nurse disaster preparation is the lack of evidence regarding the best way to provide continuing education and current information about disaster management to nurses. Further, nursing education is faced with a paucity of peer-reviewed and published research pertaining to the availability, adequacy and effectiveness of existing instruction and lack of emergency preparedness in nursing curricula (Slepski, 2007). It is imperative that nurses be active participants in interdisciplinary teams who are engaged in decision-making regarding critical care services delivery and the logistics of emergency planning whether for a pandemic or mass casualty event (Hynes, 2006).

This article presented an overview of the most recent research in the state of the science regarding disaster readiness among nurses. It focused on challenges and barriers to nurse preparedness and identified strategies to improve the disaster response in the United States and around the globe. The review of studies covering global disasters and nurse preparedness to provide an effective disaster response points to several themes worth consideration. Nurses must be the backbone of any disaster response. The two most common recommendations call for more relevant education offerings to prepare

nurses for disaster participation and more research to identify gaps in the disaster response plans. Measurement of nurse competence and confidence was discussed. While some instruments are available, there is limited confidence in their ability to discriminate between the levels of preparedness and the on-going needs to enhance disaster response. Large amounts of data on threats and disasters are available, but getting that information into the hands of nurses who can apply the lessons learned to their own disaster plans is lacking. At both the macro level of global preparedness and the micro level of community-based nurses planning for the safety of their families and communities, the need for further research is evident. A study of the perceived preparedness of hospital-based nurses will be an important first step in assessing the capability of rural areas of the US to react to a disaster. The lives and safety of many Americans will be in the hands of nurses when a disaster strikes. Knowing what is there and what is needed will contribute to the coordination of a disaster plan that has the best possible outcomes for the public and the nursing profession of the future. Nurse leaders and administrators must provide more than a cursory response to disaster preparedness and nurse's needs. Nurses must speak the language of disaster preparedness and be efficient enough to plan, prepare, respond, and mitigate obstacles before disasters occur, during disaster events, and throughout the aftermath that disasters leave in their wake.

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Analysis of Texas Nurses' Preparedness and Perceived Competence in Managing Disasters

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Abstract

Aim: This paper is a descriptive analysis of rural nurses' perceived readiness to manage disaster situations.

Background: Global increases in natural and human-induced disasters have called attention to the part that health providers play in mitigation and recovery. Nursing comprises the largest healthcare workforce, and yet there is very little research examining nurses' readiness for disaster.

Methods: The 58-item Disaster Readiness Questionnaire was used to survey hospital-based nurses from rural communities in Texas. The data were collected by emailing a link through the various hospital intranet sites resulting in a sample size of 653 nurses.

Results: Findings revealed that most nurses are not confident in their abilities to respond to major disaster events. The nurses who were confident were more likely to have had actual prior experience in disasters and/or shelters. Self-regulation of behavior (motivation) was a significant predictor of perceived nurse competence to manage disasters only in regard to the nurse's willingness to assume the risk of involvement in a disaster situation. Healthcare climate and job satisfaction were not a determinant of disaster preparedness.

Conclusion: Since nurses are involved in planning, mitigation, response, and recovery aspects of disasters, they should actively seek opportunities to participate in actual disaster events, mock drills, and further educational opportunities specific to disaster preparedness. Administrators must support and encourage disaster preparedness education of nurses to promote hospital readiness to provide community care delivery in the event of a disaster situation.

Key words: disasters, disaster preparedness nursing, nursing research, emergency preparedness.

Analysis of Texas Nurses' Preparedness and Perceived Competence in Managing Disasters

Problem of study

Natural and human-induced disasters have increased in prevalence in recent years. Factors promoting disasters include global civil unrest resulting in human-induced disasters; direct and indirect effects of global climate change; denser populations living in coastal areas; and emerging infectious disease with pandemic potential. The Intergovernmental Panel on Climate Change projects extreme weather events and associated natural disasters to increase in prevalence and intensity around the globe (Scheffran and Battaglini, 2011).

Due to the increased prevalence of disasters on a global scale, research on emergency health responders is vitally important. Because of their numbers and distribution throughout the nation and the world, nurses serve in vital roles to mitigate the effects of major disasters. Few formal research studies exist which analyze perceived disaster preparedness of American nurses that differentiate and explore possible mediating factors.

The purpose of this research is to describe the state of disaster preparedness among nurses in specific areas of a southern state which is prone to natural disasters such as, but not limited to, tornadoes and wildfires. The geographic focus is on rural areas of eastern, northern, and central Texas. The major goal is to determine rural nurses' perceived familiarity with disaster protocols and their confidence in mitigating disaster situations. Finally, selected contextual and demographic factors that impact nurses' readiness for disasters are described. This research study was undertaken to describe the

current status of nurse preparedness to manage disasters in order to help communities and health care systems strengthen their emergency-response programs.

Brief Overview of the Literature

Major disaster events may be human-induced or an act of nature. Human-induced disasters refer to disasters related to human error or human action which cause significant damage to the environment, people, and/or property. Examples of human-induced disasters may include a terrorist event or arson resulting in wildfire. Doig, Coenraads, Lowe, and Makula (2006) describe natural disasters as geological events triggered by nature; variant changes in global weather patterns due to metrological events; and biological disasters that result from the actions of living agents such as disease or insect pests. According to the Pan American Health Organization (2000), a subsidiary of the World Health Organization, a disaster takes place somewhere in the world every day.

Emergency preparedness is an essential step to help healthcare personnel effectively prepare to mitigate the effects of a major disaster. Emergency preparedness is defined by Slepski (2005) as comprehensive skills, abilities, knowledge, and actions that are needed to respond and prepare for a threat, actual or suspected, chemical, radiological, nuclear, biological or explosive in nature, a natural or human-induced incident. During major disaster events, the demand for nursing staff is much greater than the demands for any other health care professionals (Lavin, 2006). Nurses should anticipate an expanded role during disaster events to include; caring for the sick and injured (Gebbie & Qureshi, 2002), infection control, contingency planning to prevent further damage, triage, mass immunizations, mass evacuations, and treatment for mass casualties. Disaster preparedness for nurses is of paramount importance for effective

response to mitigate the detrimental effects to person, community and property (Fung, Lai & Loke, 2009). Emergency preparedness and disaster preparedness will be used interchangeably for the purposes of this study. Not only must nurses be prepared to respond to major disasters to meet the needs of those affected, but they must also possess the knowledge needed for management of patients with special needs, such as the elderly, children, persons with mobility impairments, and even persons with mental health issues. Most healthcare professionals do not respond to disasters frequently. In order to respond as an effective member of the response team and perform well, the nurse must be familiar with the needed core abilities (Gebbie & Qureshi, 2002).

It is believed that the majority of nurses in most states, including Texas, are largely unprepared to respond to and manage major disaster situations. Factors that affect mitigation may include age, lack of disaster preparedness education in nursing schools (Garbutt, Peltier, and Fitzpatrick, 2008), lack of knowledge of a formal plan regarding preparedness in the practice setting (Goodhue, Burke, Chamber, Ferrer & Upperman, 2010), lack of understanding of communication methods in disaster preparedness (Coyle, Sapnas & Ward-Presson, 2007), and perception of what constitutes disaster preparedness (Fung, Lai & Loke, 2009).

Gaps in the literature

Global climate changes will increase the probability of extreme weather events, including heat waves, drought, wildfire, cyclones, and heavy precipitation that may lead to floods and landslides (Keim, 2008). The devastation caused by natural and human-induced disasters costs the government billions of dollars on an annual basis (Wall, 2011). The prevalence and magnitude of recent major events have had a detrimental

impact on human life, communities, and the already suffering economies in the United States and other areas of the world.

According to Fung, Lai and Loke (2009), research is scarce regarding disaster nursing. There is a lack of understanding regarding nurses' perceptions of their roles and preparation for providing safe and effective care during and after a disaster. Training is quite variable in spite of the regulatory mandates (Goodhue, Burke, Chambers, Ferrer & Upperman, 2010). Mass-causality/incident and disaster preparedness remains inadequate, and research is limited in regard to nursing preparedness (Coyle, Sapnas & Ward-Presson, 2007). The implication is that training for disasters may be vastly different from hospital to hospital, community to community, and among various organizations. A comprehensive assessment of potential and likely hazards or all-hazards analysis should be conducted to ensure that the probability of proper management of a specific disaster event is addressed. Garbutt, Peltier, and Fitzpartick (2008) claim that more research is needed to assess nurses' familiarity with emergency preparedness because it is crucial to have a nursing workforce ready to respond to a major disaster occurrence.

Theoretical framework

The theoretical underpinning of this study consisted of certain aspects of Deci's Self-determinism Theory (SDT). SDT stems from social psychology and is a macro theory of motivation and personality which encompasses several micro-theories. SDT uses an organismic perspective by claiming that individuals are active organisms who seek challenges in their environment in an attempt to achieve personal growth and development (Deci & Ryan, 2002). The desired outcome of this study was to determine what factors may influence nurses to be prepared for major disaster events. There are four

factors which influence this engagement and contribute to maintaining it over a period of time (Figure 1). The four basic factors are *individual differences, self-regulation of behavior* (which includes motivation and relatedness), *perceived competence and healthcare climate* (which includes autonomy and control). These four factors form the basis a person's readiness, ability, and commitment to making a behavior change. The behavior change of interest in this study involves actions taken to prepare one for response to a disaster situation.

Conceptual and operational definitions of study variables

The four factors which make up the Self-determinism Model are defined for the purposes of explaining disaster preparedness among nurses. *Individual differences* are the factors pertinent to the nurse or the nurse group which may indicate more experience or exposure suggesting that extraneous factors can influence the person's readiness to change and maintain behavior. SDT promotes the belief that individuals have innate psychological needs that are the basis for self-motivation and personality integration (Ryan & Deci, 2000). *Self-regulation* refers to intrinsically-generated motivation to take an action which will impel a person toward a specific goal (Ryan & Deci, 2000). It refers to the motivation behind the choices people make without any external influences and interference (Chirkov, Ryan, Kim & Kaplan, 2003) and is essentially the degree to which an individual behavior is motivated by self. *Perceived competence* is the feeling that one can accomplish the behaviors and reach a goal (Deci & Ryan, 2000). It refers to the individual being effective in dealing with the actual environment (White, Dermen, & Conners, 1999). *Healthcare climate* includes socio-environmental conditions which facilitate the satisfaction of three basic psychological needs: relatedness, competence, and

autonomy (Deci & Ryan, 2002). The conceptual contribution of the SDT model to the current study was to determine if measuring these four factors (individual differences, self-regulation, perceived competence, and healthcare climate) provided a context for describing the disaster preparedness state of nurses in a selected area of Texas which is susceptible to weather-related emergencies, most notably, tornadoes and wildfires.

Conceptual definitions based on the theoretical framework provide clarity for the concepts to be measured. The concepts are operationalized through a combined instrument entitled the Disaster Readiness Questionnaire (DRQ) which incorporates aspects of the Emergency Preparedness Information questionnaire (EPIQ), self-determinism scale, job satisfaction scale and some researcher generated questions. Specific operational definitions and measurements are found in Table 1.

Study Design

A descriptive, correlational design was used to measure nurse preparedness for disaster response. An online survey instrument was sent to hospital-based nurses in rural areas of North, East, the Panhandle, and Central Texas. The study included nurses from a variety of specialty practice areas and levels of experience who work in the specified geographic area.

Participants

The survey was made available online via a Qualtrics survey link to two major rural health care systems and two small rural hospitals located in the Panhandle, North, and Central Texas. Responses predominately came from nurses in the two larger health care systems serving geographically large rural populations. Nurses were asked to voluntarily take the survey, and as an incentive, their names were entered into a drawing

for an I-Pad 2. Out of the 653 nurses who took the survey, a sample size of approximately n=620 was used for analysis. Not all respondents' data were complete, and a listwise deletion was used which resulted in smaller sample sizes depending on the type of statistics that were analyzed. There were no exclusion criteria for the acquired sample. Licensed Vocational Nurses, Registered Nurses, and Advanced Practice Nurses were encouraged to participate. Sample size was estimated using G-Power 3.1.0 online program (Faul, Erdfelder, Lang, & Buchner, 2009). A priori analysis using a moderate effect size .50, power of .80, and α=0.05 yielded a desired sample size N=150. There were approximately 176,000 registered nurses in Texas in 2010 (Texas Board of Nursing, 2010) with 9% working in rural areas (Combs, n.d.). The sample for this study represents 4% of the available rural nurse workforce in Texas (rural nurses = 15,540; sample = 650).

Instruments

The total survey contained 58 questions (including one optional text question) divided into 4 main sections. The survey incorporates components of the Emergency Preparedness Information Questionnaire (EPIQ) which is a tool that comprehensively assesses civilian nurses' perceived familiarity with eight competency dimensions of emergency preparedness (Garbutt, Peltier & Fitzpatrick, 2008).

Part I. Professional and demographic data consists of participant description information including role, specialty area, years in nursing, age, ethnicity, and two researcher generated questions regarding previous experience with disaster situations. The demographic questions were fill-in the blank or offered options for response selection. The two researcher-generated questions were: "Have you ever actively

participated in an actual major disaster event?" and "Have you ever worked in a post-disaster shelter?" These two questions had a yes/no response option.

Part II. Emergency Preparedness Information Questionnaire (EPIQ). The EPIQ consists of 9 subscales. (One subscale consisting of two questions about isolation/quarantine was inadvertently omitted in translation of the survey into Qualtrics.) The summed total of the EPIQ subscales measured a nurse's self-reported familiarity with aspects of emergency preparedness. It includes eight dimensions of emergency preparedness measured on a Likert scale of 1 = not familiar to 5 = very familiar. The subscale dimensions include familiarity with the Incident Command System (ICS); ethical issues in triage; epidemiology and surveillance; familiarity with decontamination; familiarity with communication and connectivity; familiarity with psychological issues; familiarity with special populations; and familiarity with accessing vital resources. Garbutt, Peltier, and Fitzpatrick (2008) reported Cronbach's alphas for the subscales ranging from 0.83-0.94 and 0.97 for the EPIQ total score. Internal consistency reliability was also strong in this study with Cronbach's alphas for the subscales ranging from 0.84 – 0.95 (Table 4) and 0.98 for the EPIQ total score. The total summed score of the EPIQ is used as a measure of nurses' perceived competence in disaster preparedness. A separate measure of nurses' perceived competence in disasters was used to add rigor to the findings and to determine if a shorter assessment might work during a disaster response situation when time is of the essence. The second measure of nurses' perceived competence in disasters is the Nurses Assessment of Readiness (NAR) scale which includes only two questions. The first question is from the EPIQ, "Please provide an assessment of your overall familiarity with response activities/preparedness in the case of

a large-scale emergency event." It is measured on a five-point Likert scale of 1-not at all familiar to 5-very familiar. The second question is researcher generated "If you had to respond to a major disaster in your hospital/community today, how prepared do you feel you are to effectively respond?" This question is measured with a 5 point Likert scale of 1-not at all prepared to 5-very prepared. The NAR scale attempts to encapsulate a more global measure of Perceived Competence in Disasters which can be administered immediately. Chronbach's alpha for the NAR in this study sample was 0.90. The EPIQ subscale responses were summed and compared to the Nurses' Assessment of Readiness scale to determine the concurrent validity of the shorter version. The EPIQ summed score and the NAR summed score were each used as an outcome variable measure in two separate multiple regressions to determine variance in perceived competence in disasters.

Part III. Self-Regulation (SR) survey contained three questions relating to self-regulation (motivation) to engage in disaster preparedness activities. The self-regulation questions explore the nurses' likelihood of participating in community disasters (Likert scale 1=not likely to 5=very likely), commitment to participation should a large scale disaster occur (1=not at all committed to 5=very committed), and willingness to assume risk of involvement in a disaster situation such as pandemic or bioterrorism (1=not likely to 5=very likely). Cronbach's alpha for the SR in this study sample was 0.91.

Part IV. The final portion of the instrument determined Healthcare Climate as manifested by job satisfaction. Healthcare Climate was measured by the Job Satisfaction Questionnaire (Wieck, Dols, & Northam, 2009). It specifically addresses questions related to employment based on a 5-point Likert scale, such as; overall job satisfaction (1=highly dissatisfied to 5=highly satisfied), likeliness to recommend current employer

to colleagues (1=highly unlikely to 5=likely), willingness to accept the same job again (1=would definitely not take the same job to 5=would definitely take the same job), and consideration of reward and responsibility commensuration (1=not at all to 5=to a great extent). Cronbach's alpha for the HCC in this study was 0.85.

All surveys were completed online. Approximate completion time for the entire instrument was approximately 15-20 minutes.

Research Questions

This study examined and answered the following research questions:

1. What is the perceived competence of rural nurses regarding their disaster preparedness?
2. Which of the variables - individual differences (age, years of experience, and previous disaster experience), self-regulation, and healthcare climate - most influence perceived competence in disaster preparedness?
3. Is there a relationship between self-regulation scores and perceived competence in disaster preparedness?
4. What is the concurrent validity of two measures of Perceived Competence in Disaster Preparedness?
5. Are there generational differences in Perceived Competence in Disasters and Self-Regulation to engage in emergency situations?

Data Analysis

Data were entered using the SPSS Statistics GradPack for Windows 17.0. Descriptive statistics were used to determine the perceived competence of nurses regarding disaster preparedness. Multiple regression analyses were used to determine the

extent to which the variables of individual differences (age, years of experience, role, and previous disaster experience), self-regulation, and healthcare climate influenced perceived competence in disaster preparedness. Separate multiple regressions were conducted, first using the EPIQ summed score and second, using the NAR summed score as outcome variables. To determine a relationship between the self-regulation (SR) and nurses' perceived competence in disaster preparedness, multiple regression analyses was conducted using the three individual questions on the SR scale as the predictor variables and the EPIQ summed score and NAR summed score as outcome variables. In order to provide an assessment of the concurrent validity of the two scales used to measure the same variable, nurses' perceived competence in disasters, the EPIQ summed score and NAR summed score were analyzed using a Pearson Correlation Coefficient. Finally, an ANOVA was used to determine if generational differences influenced perceived competence in disasters and self-regulation to engage in emergency situations.

Findings

Demographics

The demographic characteristics are depicted in Table 1 and represent age, years of experience in nursing, current position or professional role, specialty practice area and ethnicity. The nurses averaged 42 years of age and 15 years of nursing experience. Most respondents were registered nurses (84%) and Caucasian (86%). The nurses represented a broad range of specialties, predominantly Medical-Surgical (19.8%) and myriad responses of "other" (33%), ranging in area from Doctor's office, specialty practice etc.

Response rate varied with the different Health Care Systems as depicted in Table 2. Response rates ranged from only 7 from one hospital to 292 from one of the healthcare

systems. Methodology recruitment may have been affected by immediate online link access in some of the sites instead of having to type in the survey link as happened in one of the sites where fliers were posted, but the link was not directly accessible online.

Research Questions 1: What is the perceived competence of rural nurses regarding their disaster preparedness?

The nurses' perceived competence in disaster preparedness was measured using two instruments. The first measure of perceived competence in disaster preparedness was the EPIQ Summed score [*n*=618; *M*=90.0; *SD*=31.7; Range= 41 - 205]. With a median in the range of scores being a score of 82.5, the mean of 90 suggests that the overall perceived competence of nurses relating to their familiarity with disasters is somewhat low. The alternate measure of perceived competence was the Nurses' Assessment of Readiness scale (a two-item scale). The sum scores of the NAR scale [*n*=618; *M*=4.2; *SD*=1.85; Range=2-10] indicates that nurses do not feel prepared to effectively respond in a disaster situations. Data indicate that nurses feel they are not very familiar with response and preparedness activities for large-scale emergency events.

Research Question 2: Which of the variables-individual differences (age, years of experience, previous disaster and shelter experience), self-regulation, and health care climate-most influence perceived competence in disaster preparedness? Nurses' perceived competence in disasters was measured with two scales: the 41 item EPIQ scale and the two-item NAR Scale

Most of the individual differences had no statistical impact on the nurses' perceived disaster preparedness as measured by the EPIQ Summed Score. However, two of the individual differences, previous participation in a major disaster event (r = .347, p

< .001) and prior work in a post-disaster shelter (r = .226, p < .001) were significantly correlated with the EPIQ total score. These two individual scores were included with the total Self-regulation score, and the Healthcare Climate score in a standard regression procedure to examine the contribution to the perceived competence in disaster preparedness as measured by the EPIQ Summed score. The R^2 = .259, adjusted R^2 = .254 and standard error of the estimate =27.19 indicate for the population, approximately 25% of the variance in perceived competence could be explained by these predictors. The ANOVA [F (4, 615) = 53.79, p < .001] supports significance of the model.

T-tests were used to determine which of the beta weights associated with the four predictors included in the regression were significant. Participation in a major disaster (t = 6.58, p < .001), past experience in a post-disaster shelter (t = 2.27, p = .024), and Self-Regulation (t = 9.84, p < .001) were significant predictors with the greatest contribution coming from the Self-Regulation (motivation) scale. The contribution of each variable to perceived competence in disaster preparedness is presented in Table 5.

A second standard multiple regression was performed to examine the contribution of the same predictor variables when the nurses' perceived competence in disaster preparedness was measured by the two-item NAR total score. All four of the individual differences, age (r = .126, p = .002), years of nursing experience (r = .150, p = .001), previous participation in a major disaster event (r = .408, p < .001), and prior work in a post-disaster shelter (r = .213, p < .001) were significantly correlated with the NAR total score. The four individual differences were entered in the first block and SR and HCC were entered in the second block of the standard multiple regression procedure. Two models were produced with the second model comprised of all the variables explaining

about 10% more variance and thus considered the best for this investigation. The model $R^2 = .291$, adjusted $R^2 = .283$ and standard error of the estimate =1.60 indicate for the population, approximately 28% of the variance in perceived competence could be accounted for by these 6 predictors. The ANOVA [$F (6, 515) = 35.24$, $p < .001$] supports significance of the model.

T-tests were used to determine which of the beta weights associated with the six predictors included in the regression were significant. Prior participation in a major disaster ($t = 7.67$, $p < .001$) and Self-Regulation ($t = 7.98$, $p < .001$) were significant predictors with both contributing similarly to the explanation of variance in the nurses' perceived competence in disaster preparedness as measured by the NAR. The contribution of each variable to perceived competence in disaster preparedness is presented in Table 5.

Research Question 3: Is there a relationship between self-regulation scores and perceived competence in disaster preparedness?

This question examines the relationship between self-regulation scores and perceived competence in disaster preparedness. The predictor variables were the three individual questions making up the Self-regulation Scale which were measured against the outcome variables of the EPIQ summed score and the NAR summed score in two separate Multiple Regression analyses.

The Enter method was again utilized to discern the relationship between self-regulation and the nurses' perceived competence in disasters as measured by the EPIQ total score.). The R^2=.195, the adjusted R^2= .191and the standard error of the estimate 28.47 indicates that results from a sample drawn from the population would be similar to

those from this sample. The ANOVA (F (3, 609) =49.2, $p < .001$) supports the significance of the regression model. The beta weights contributed by each of the three domains of the Self-regulation Scale are depicted in Table 6. It is interesting to note that among the Self-Regulation domains, *willingness to assume risk of involvement in a bioterrorism event* (t = 3.88, p < .001) makes the only significant contribution to the nurses' perceived competence in disaster preparedness as measured by the EPIQ. It is necessary to interpret the individual contribution of these predictors with caution as all of the predictors were intercorrelated (r > .80); however, the collinearity statistics (VIF < 10 and tolerance > .2) were all acceptable.

A second standard multiple regression was performed to examine the contribution of the domains of self-regulation to the nurses' perceived competence in disaster preparedness as measured by the two-item NAR total score. The model $R^2 = .161$, adjusted $R^2 = .157$ and standard error of the estimate =1.71 indicate for the population, approximately 16% of the variance in perceived competence could be accounted for by these three predictors. The ANOVA [F (3, 607) = 38.96, p < .001] supports significance of the model.

T-tests were used to determine which of the beta weights associated with the three predictors included in the regression were significant. *Likeliness to get involved and prepare for disasters in the community* (t = 2.18, p < .029) and *willingness to assume the risk of involvement in a bioterrorism event* (t = 2.81, p < .005) were significant predictors with both contributing similarly to the explanation of variance in the nurses' perceived competence in disaster preparedness as measured by the NAR subscale. The contribution of each variable to perceived competence in disaster preparedness is presented in Table 6.

These results should also be interpreted with caution due to the intercorrelation of the predictor variables but acceptable collinearity statistics were demonstrated.

These results suggest that self-regulation domains alone, though significant, may not be the strongest or most reliable way to predict the nurses' perceived competence for disasters. However, when self-regulation scores are combined with individual differences and healthcare climate (job satisfaction) scores, as they were in Question #2, one may have more confidence in the perceived competence scores as measured by both the EPIQ total score and the NAR summed score.

Research Question 4: What is the concurrent validity of two measures of Perceived Competence in Disaster Preparedness?

To determine the concurrent validity of two measures of Perceived Competence in Disaster Preparedness, the researcher measured the EPIQ total Score and the NAR total score using a Pearson Correlation Coefficient. The EPIQ and the NAR are significantly correlated [r=.876; $p< .001$; n=623] and could be considered valid, but not entirely interchangeable, measures of some important aspects of nurses' overall perceived competence in disaster preparedness.

Research Question 5: Are there generational differences in Perceived Competence in Disasters and Self-Regulation to engage in emergency situations?

Finally, to determine the generational difference in nurses' perceived competence in disaster preparedness and self-regulation, the researchers measured the EPIQ total score, NAR total score, and the self-regulation total score using an ANOVA. The results in Table 7 revealed that there was no significant difference in the three age groups and nurses' perceived competence in disaster preparedness and self-regulation to engage in

emergency situations. Age group categories can be found in Table 2. Strauss and Howe (2000) describe generations as "groups of age-determined populations moving through time, each group possessing a distinctive sense of self" (p. 32). The generations are further divided into distinguishable groups, Millennials 11-30, Generation X 31-50, and the Boomers >50 (Strauss & Howe, 2000, p. 32) which were the basis for categories in this analysis.

Discussion of Findings

Deci's Self-determinism Theory (SDT) was used to guide the testing of a sample of rural nurses regarding their preparedness to function in the emergency situation of a natural or human-induced disaster (Deci & Ryan, 2002). The four factors of the SDT are *individual differences, self-regulation of behavior* (which includes motivation and relatedness), *perceived competence and healthcare climate* (which includes autonomy and control). These factors were considered in relation to their influence on engagement and contribution to disaster preparedness. The SDT model is proposed as a basis of assessing a person's readiness, ability, and commitment to making a behavior change. The change focus of this study was the actions to prepare one to respond to a disaster situation.

Individual differences

Individual differences regarding role, age, years of experience in nursing, ethnicity, and specialty area were essentially found to be non-significant. The average age of nurses was 42, which is only slightly lower than the national average of RN's at 44.5 ("Average age of Registered Nurses", 2011), and lower than the Texas average of 46 according to the Texas Nursing Workforce Shortage Coalition (n.d.). There was a good

representation of the sample from across the generations. Although not a significant determinant of nursing preparedness, clinical or specialty area should be noted. While only 1.3% of the participants worked in mental health, there is a current focus on psychiatric care of individuals who have survived a disaster event (Jones, 2006). Health care disciplines must be prepared to deal with the immediate and post-disaster mental health issues. This includes not only staff training to treat physical injury but also, according to Jones (2006), the aftermath of post-traumatic stress, depression, and socioeconomic upheavals within communities. Nurses themselves report being emotionally challenged and overwhelmed after participating in major disaster events (Good, 2007; Jones, 2006). The low number of mental health professionals may reflect the focus of this study on hospital-based nurses in rural areas where mental health services are sparse.

Approximately 20% of the survey respondents worked in critical care and emergency departments (ED). A disaster event can create a surge of patients that could easily overwhelm the ED's ability to provide organized and effective care (Powers, 2009). ED nurses are often at the forefront of care and have the potential of exposure to deadly gasses, toxins, and biologic agents. Powers advises that ED staff possesses the ability to recognize signs and symptoms of various types of agents and infectious disease as well as knowledge of the decontamination process. The low scores of nurses regarding their preparedness for disaster indicates that training for both ED and critical care nurses may be indicated. This education must be comprehensive and include not only basic classes reviewing disaster preparedness content, but application of knowledge, mass care, and contingency planning.

The two questions “Have you ever actively participated in an actual major disaster event?” and “Have you ever worked in a post-disaster shelter” both influenced nurses’ perceived competence in disaster preparedness. These two items were significantly correlated with the EPIQ scores which give some support to their effectiveness in evaluating over all perceived competence of nurses in disaster situations. Further concurrent validation of this two-item scale is recommended before it could be considered valid as an indicator of perceived competence; but the brevity of this type of assessment in an emergency situation is enticing. The looming question, however, is how to ensure that nurses do get actual experience with disaster management if it is relevant to their perceived competence and willingness to participate in emergency situations.

Self-regulation

Self-regulation of behavior was a significant predictor of perceived nurse competence to manage disasters only in regard to the nurse’s willingness to assume the risk of involvement in a disaster situation such as a bioterrorism event or pandemic. One can speculate that perhaps nurses’ fervor and devotion to help others while putting themselves at risk denotes dedication and commitment to going above and beyond to learn about disaster preparedness (motivation) or to directly participate (relatedness) in a disaster event. Since self-regulation is motivated by self (Ryan & Deci, 2000), further exploration is required to determine if part of this motivation relates to a higher degree of self-actualization or is perhaps influenced by upbringing or prior experience. While Chirkov et al. (2003) states that self-regulation refers to intrinsically-generated motivation to take action regardless of external influences and interference, one might question a nurse’s reflexive willingness to respond with little thought for self, especially

in the chaos of a bio-terrorism event or pandemic. Further studies should be undertaken to explore self-regulation of nurses related to their likelihood, commitment, and willingness to assume the risk of involvement in a disaster event.

Perceived competence

The overall nurses' perceived competence (autonomy and control) in disaster preparedness was measured by the EPIQ summed scale which pertained to overall questions regarding disaster preparedness issues such as the Incident Command System, special populations, mental health, etc. The nurses' average perceived competence was lower than the midpoint of the range of competence scores. This suggests that most nurses are not confident in their abilities to respond to major disaster events in a multitude of scenarios, populations, and settings. The nurses who were more confident in their abilities, or scored higher on the EPIQ, were also those willing to assume greater risk (see Table 6). The NAR was measured by the nurse's self-assessment of familiarity with response activities and preparedness in the event of a large-scale emergency event. The implications suggest that there may be a need for consistent training in different types of disaster scenarios with contingency planning in order for nurses to feel more confident in their abilities to respond to an actual event. The Joint Commission on Accreditation of Healthcare Organization ("Revisions to Emergency Management", 2007) mandates that hospitals have disaster drills for their organizations and communities in which they serve. They suggest that drills are critiqued to identify deficiencies and opportunities for improvement. However, since the sample of rural nurses all worked in hospitals, the data do not support the effectiveness of current disaster drills in helping nurses feel competent in their abilities to manage a disaster.

Healthcare Climate

The healthcare climate was measured by a job satisfaction scale. Nurse job satisfaction was found to have no relationship to the nurses' overall perceived competence in managing disasters. Hospitals can have some comfort in knowing that low perception of competence in disasters does not influence their staff's satisfaction with their jobs. Other measures, such as morale, might be preferable to job satisfaction for measuring healthcare climate in nurses.

Overall Nurse Readiness

Most nurses reported a perception of low to average competence in responding to a major disaster event and were not very familiar (see Table 4) with elements associated with disaster events such as biological agents, the Incident Command System (ICS), their agency's response to a large-scale emergency event, triage during disasters, epidemiology and surveillance, decontamination, communication during an event, psychological issues, management of special populations during a major disaster, and assessment of critical resources. Most scores were consistently below the mid-point. These findings are consistent with nursing research literature of overall preparedness (Garbutt, Peltier & Fitzpatrick, 2008; Gebbie & Qureshi, 2002; Fung, Lai & Loke, 2009). The findings indicate that nurses need opportunities to engage in disaster planning, mock drills, and/or actual events when possible to increase competence in disaster situations, confidence in abilities and to increase familiarity with disaster preparedness. Most disaster situations depend on the availability of volunteers to help manage the chaos and needs of victims. Helping nurses participate in these events by allowing paid-time-off, travel, and support

might be an investment by hospitals that would pay high dividends in the event of a subsequent local disaster.

A final, open-ended optional question was posed, "Is there anything else that you would like to share that would help us better prepare nurses to react in disaster situations?" Out of the approximately 25% that answered the question, 70% stated that more education was needed. These responses for education varied in education type and included mock-drills, classroom education, continued review, on-site practice, more consistent education, emotional preparation, and requirement of annual competencies. Other educational needs included education regarding bioterrorism, nursing specific duties, interdisciplinary and after-hours drills, continuing education, and incorporation of community in disaster preparedness training activities. Ideas for education included "quick-read" cards or binders that the nurses could use at a glance, ongoing education (monthly or quarterly), and incorporation of disaster preparedness education in nursing schools. Many of those who responded to this optional question stated that computer-based learning was *not* an effective method for educating the nurses. Ambulatory care nurses, cancer center nurses, and other non-inpatient nurses stated that they felt very unprepared for disasters. The other 30% of responses expressed concerns regarding care of family members during disasters, the need for the organization to "take charge", weekly or monthly tips in the organizations' newsletter, and the creation of protocols or standard operating procedures. Approximately 10-15% of respondents stated that they had previous disaster experience in the military or were directly responsible for disaster and emergency preparedness within their facilities. Lastly, a few expressed fear at the

prospect of being so unprepared and appreciation that the topic of disaster preparedness was being addressed.

Limitations:

Caution should be used in generalizing these findings to other hospitals or areas of the country. The capricious nature of disasters and the specific needs of different hospitals and regions of the country related to the types of anticipated and unanticipated disasters make broad generalizations risky. All data were self-report, so there is no verification of actual competence in disaster methods and techniques.

Conclusions and Recommendations

The purpose of this study was to provide an accurate description and in-depth analysis of the factors that affect disaster preparedness of rural Texas nurses as a means of supplying a context for future disaster planning. Following a comprehensive systematic review of the literature, Williams, Nocera and Casteel (2008) concluded that the available literature was insufficient to determine whether training interventions for health care providers are effective in improving knowledge and skills in disaster response. This study lends support to the idea that actual participation in disaster events may improve nurses' perceived competence in disaster preparedness response. It is apparent that nurses feel that hands-on education would make them feel better prepared, as expressed in the responses to the optional question.

Globally nurses should be encouraged to participate in and seek out opportunities for training in mock disaster drills and actual disaster events. Nurses should conduct research and publish the findings in international journals to share their experiences with other nations. Organizations should take advantage of others' experiences by bringing in

expert trainers, speakers, and evaluators to assess current methods of planning and preparation for disaster management.

Nationally, nurses must understand their role in the planning, mitigation, response and recovery aspects of disasters and make a national contribution by creating awareness, and participating (volunteering) in national disasters events and trainings. They should be encouraged to step out of their comfort zone and assume other positions, such as Emergency Operations coordinator and positions of leadership in the Emergency Operations Center during a mock-drill or actual event. The ANA Code of ethics (2nd provision) states that nurses' primary commitment is to the patient (ANA, 2001); however, the 5th provision states that the nurse owes the same duties to self as to others, including the responsibility to preserve integrity and safety (Twedell, 2009). The nurse must be clear regarding personal responsibilities during a major disaster event which will include being faced with ethical considerations. These considerations, as well as the emotional and physical aspects of disasters, should be incorporated into the training process. The responsibility of caring for the injured and afflicted during a major disaster is important, but nurses cannot take care of others if they first do not take care of themselves. Nurses should be proactive in disaster preparedness legislation and policies by keeping informed and serving in consultant roles when discussions on disaster response occur.

Among local communities, it is clear that nurses do not feel prepared to deal with disasters. The hospital nurse population may not be ready to step into a disaster response role. Public health organizations should include mitigation and contingency planning seminars and forums which include hospital nurses. Public health nurses will often be

responsible for setting up shelters, infection control, and seeing to needs of the public en masse. Aside from providing direct care to those in needs, nurses should be aware of potential disease threats in the aftermath of disasters including short and long-term illnesses that disasters leave in their wake (Jones, 2006). These sequelae of disasters are often managed in the hospital setting. Increasing hospital nurse competence in managing disasters is one way of providing local response and management which may help prevent unnecessary admissions and utilization of limited hospital resources during surge situations.

Facilities must invest in providing the time to send nurses for further education on disaster preparedness so they can make significant contributions to their profession and their own organizations. Facilities should encourage nursing involvement in community disaster planning and preparedness activities. Finally, organizations must have contingency plans for everything, including social isolation during pandemic and direct or indirect care of the nurses' family members (Jones, 2006; Garbutt, Peltier & Fitzpatrick, 2008, Quereshi et al., 2005).

A major message from this study is that training for nurses must be a consistent on-going aspect of their careers and should be commensurate with the possibilities of both human-induced and natural disaster events. Previous experience seems to be the greatest determinant of perceived competence in disaster preparedness. Self-regulation also contributes to perceived competence in disaster preparedness for nurses. Nurses should encourage their facilities to host all aspects of disaster training, especially mass casualty, mass evacuation, mass immunization, mass triage, and mass fatality training, on a regular basis involving community partners when possible. In addition to being strong

patient advocates, nurses must speak up for their colleagues, the community, and themselves so that the health needs associated with disasters are quickly and efficiently addressed.

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Table 1. Conceptual and Operational Definitions

Factor (from SDT Model)	Operational definition	Measure Description
Individual differences	Age, years of experience, education, previous disaster experience. Measured by multiple choice, selection or fill-in the blanks.	Part I of the overall survey, demographics and 2 researcher generated questions.
Self-regulation	Motivation (preparation, participation, and commitment), measured by the Self-regulation Scale.	Self-regulation scale. Three item-scale with a summed score (5 point Likert scale with 5 most desirable; range is 3-15)
Perceived competence	*Perceived competence* is the feeling that one can accomplish the behaviors and reach a goal (Deci & Ryan, 2000). It refers to the individual being effective in dealing with the actual environment (White, Dermen, & Conners, 1999).	Overall perceived competence will be measured by the EPIQ total scale score of 41 items, 5-point Likert type scale with items ranging from 1 – very familiar to 5 – not familiar. The items are formed into 9 subscale scores and a total score. Nurses Assessment of Readiness (NAR) scale is comprised of two items that are also on a 5-point Likert – type scale with items ranging from 1 – very familiar to 5 – not familiar; 1-not at all prepared to 5-very prepared. These two scales will be considered separately during analysis.
Health care climate	*Healthcare climate* includes socio-environmental conditions which	Healthcare climate will be measured by the Job Satisfaction Questionnaire (Wieck, Dols,

Table 1. Conceptual and Operational Definitions continued

	facilitate the satisfaction of three basic psychological needs: relatedness, competence, and autonomy (Deci & Ryan, 2000).	& Northam, 2009), a four-item survey using a 5-point Likert scale with 1 indicating low satisfaction and 5 indicating high satisfaction ; the range of scores is 4 to 20.
Maintaining behavior change	Not measured	Not measured
Factor (other factors which need explication)	**Operational definition**	**Measure Description**
Disaster Preparedness	Emergency preparedness is defined by Slepski (2005) as comprehensive skills, abilities, knowledge and actions that are needed to respond and prepare for a threat, actual or suspected, chemical, radiological, nuclear, biological or explosive in nature, a natural or man-made incident.	The EPIQ subscale score and the NAR scale will measure perception of preparedness.
Generation	Strauss and Howe (2000) describe generations as "groups of age-determined populations moving through time, each group possessing a distinctive sense of self" (p. 32).	Millennials 11-30 Generation X 31-50 Boomers and older >50 (Strauss & Howe, 2000, p.3)

Table 2. Demographic characteristics

Variable	Percent	Frequency
Age groups - Generations		
Millennials (11-30 yrs)	22.6%	142
Generation X (31-50 yrs)	46.5%	292
Boomers (>50 yrs)	30.9%	194
Current position (Professional role)		
LVN	14%	90
RN	84%	525
APRN	2%	11
Clinical area		
Medical/Surgical	20%	124
OB/GYN	7%	45
Critical Care	12%	73
Psych/Mental Health	1%	9
OR/PACU	9%	53
Emergency Services	9%	53
Pediatrics	9%	53
Other	34%	211
Ethnicity		
African-American	2%	11
American Indian	1%	4
Asian/Pacific Islander	3%	18
Caucasian	86%	540
Hispanic	8%	49
Other	1%	3
Missing	2%	1

Table 3. Nurses response rate and recruitment method

Hospital or Healthcare System	Total nurses employed	Total nurses responding	Response rate	Method of recruitment
Hendrick Health Care System of Abilene	983	292	29.7%	Emails of flier with link to survey from Nurse Administrator. Survey open for 30 days.
Midland Memorial Hospital	600	7	1.16%	Posted flier on nursing units.
NorthWest Texas Hospital of Amarillo	737	40	5.4%	Flier sent via email
Scott and White Health Care System	3380	250	7.4%	In facility "News at Noon" for 2 weeks with link.

Table 4. Perceived competence by EPIQ total and subscale score (*n*=618)

EPIQ subscale descriptives	Mean (std dev)	Range	Subscale Reliability*
Emergency terms and activities	15.3 (4.8)	7-35	.87
Incident Command System	19.2 (7.7)	8-40	.95
Ethical decisions in triage	10.1 (4.2)	4-20	.93
Epidemiology and surveillance	7.6 (3.3)	4-20	.90
Decontamination	7.0 (2.9)	3-15	.89
Communication/connectivity	12.3 (5.4)	6-30	.93
Psychological issues	8.3 (3.6)	4-20	.92
Managing special populations	4.3 (2.0)	2-10	.92
Critical resource access	5.6 (2.6)	3-15	.84
Total Score	90.0 (31.7)	41 - 205	.98
(* Chronbach's Alpha)			

Table 5. Coefficients for Research Question #2: Individual Differences Influence on Disaster Preparedness

Dependent Variable: EPIQ Summed Score	*B*	*β*	*t*	Sig	*n*
Constant	105.60		9.61	.000	620
Individual differences Previous disaster experience Worked in post-disaster shelter	 20.10 9.58	 .242 .084	 6.57 2.27	 .000 .024	
Self-regulation (ER)	3.35	.359	9.84	.000	
Healthcare climate (HCC)	.365	.036	1.02	.308	
Dependent Variable: NAR Score	***B***	***β***	***t***	**Sig**	***n***
Constant	5.40		7.3	.000	620
Individual differences Previous disaster experience Worked in post-disaster shelter	 1.49 .47	 .31 .07	 7.67 1.79	 .000 .074	
Self-regulation (ER)	.18	.31	7.98	.000	
Healthcare climate (HCC)	.03	.06	1.43	.152	

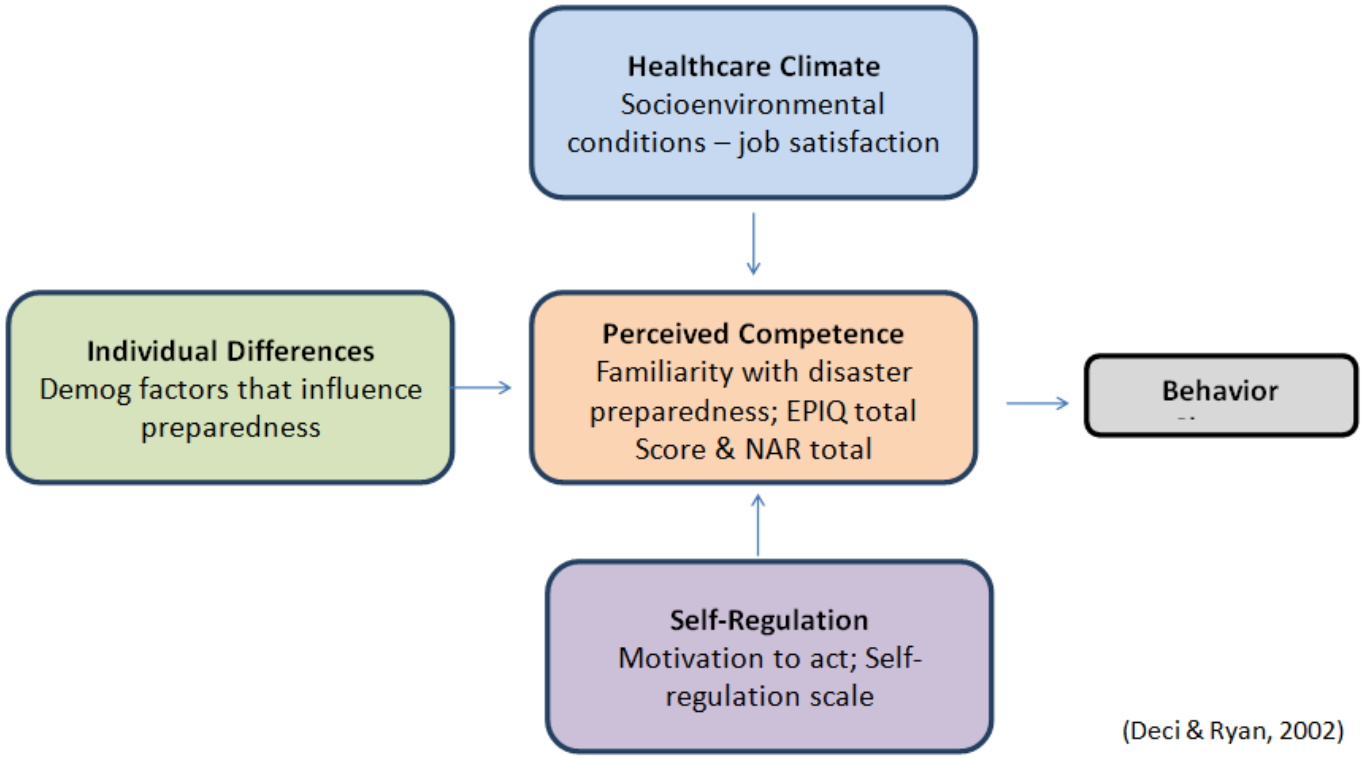
Table 6. Coefficients for Research Question #3: Specific Self-regulation Questions (n=3) Influence on Disaster Preparedness

Dependent Variable: EPIQ Summed Score	*B*	*β*	*t*	Sig	*n*
Constant (EPIQ)	48.1		13.2	.000	613
Q1.Likeliness of involvement in disaster	2.60	.103	1.60	.122	
Q2.Commitment to participation in disaster	3.20	.119	1.52	.129	
Q3. Willingness to assume risk of biologic event	6.80	.251	3.90	.000	
Dependent Variable: NAR Score	*B*	*β*	*t*	Sig	*n*
Constant (EPIQ)	2.03		9.30	.000	613
Q1.Likeliness of involvement in disaster	.22	.148	2.20	.029	
Q2.Commitment to participation in disaster	.156	.10	1.20	.214	
Q3. Willingness to assume risk of biologic event	.30	.186	2.80	.005	

Table 7. ANOVA Between Generational Groups (n=628)

Variables	F	p value
Perceived Competence (EPIQ Summed Score)	.375	.688
Perceived Competence (NAR Summed Score)	1.9	.145
Self-regulation Scale	.358	.700

Figure 1. Self-determinism Model Modified for Disaster Preparedness Study



(Deci & Ryan, 2002)

Appendix A: Instruments

Questionnaire

This questionnaire is designed to test nurses' preparedness for major disaster events. Please answer the following questions.

Part I. Professional and Demographic data

1. Select your current professional role (select only one response).
   __LVN
   __RN
   __Advanced Practice RN

2. What is your specialty practice area?
   ___ Medical-surgical
   ___ Diagnostic
   ___ OB-Gyn
   ___ Critical Care
   ___Psych/mental health
   ___ Pediatrics/Neonatal
   ___ Operating Room/PACU
   ___ Emergency services

3. How many years have you been a nurse? _____years

4. What is your age? _____

5. What is your ethnicity?
   ___Caucasian (White)
   ___Black or African American
   ___Asian or Pacific Islander
   ___Hispanic or Latin
   ___American Indian
   ___Other _____ (please write in)

6. Have you ever actively participated in an actual major disaster event? __Yes __No

7. Have you ever worked in a post-disaster shelter? __ Yes ___ No

Part II Emergency Preparedness Information Questionnaire

I. Familiarity with emergency preparedness terms and activities. 1=very familiar and 5 not familiar.

8. Signs/symptoms of exposure to different biological agents. 1 2 3 4 5
9. Signs/symptoms of anthrax inhalation. 1 2 3 4 5

10. Modes of transmission for different types of biological agents (i.e. anthrax, smallpox, etc). 1 2 3 4 5
11. Match antidote and prophylactic medications to specific biological/chemical agents.
    1 2 3 4 5
12. Possible adverse reactions to smallpox vaccination. 1 2 3 4 5
13. Basic first aid in a large-scale emergency event (including oxygen administration and ventilation). 1 2 3 4 5
14. How to evaluate the effectiveness of your own actions during a large-scale emergency event.
    1 2 3 4 5

II. Please rate your degree of familiarity with the Incident Command System (ICS) and your role within it. 1=very familiar and 5 not familiar

15. The content of emergency operations plan (EOP) in your agency/organization.
    1 2 3 4 5
16. To which functional group in the Incident Command System (ICS) you would be assigned during a large-scale emergency event. 1 2 3 4 5
17. The physical location where you would report to if a large-scale emergency event occurred. 1 2 3 4 5
18. Assess and respond to site safety issues for self, co-workers, and victims during a large-scale emergency event. 1 2 3 4 5
19. The strategic rationale used to develop the ICS response/action plan.
    1 2 3 4 5
20. Your agency's preparedness for responding to a large-scale emergency event.
    1 2 3 4 5
21. Differences between decision-making processes in the Incident Command System for a large-scale emergency event and non-emergency situations.
    1 2 3 4 5
22. Tasks that should NOT be delegated to volunteers in a large-scale emergency event.
    1 2 3 4 5

III. Please rate your responses to your familiarity with ethical issues in triage. 1=very familiar and 5=not familiar.

23. How to perform a rapid physical assessment of a victim of a large-scale emergency event.
    1 2 3 4 5
24. How to perform a rapid mental health assessment of a victim of a large-scale emergency event.
    1 2 3 4 5

25. How to assist with triage in a large-scale emergency event.

1 2 3 4 5

26. General issues related to the proper handling of the dead during a large-scale emergency event (ethical, legal, cultural, and safety).

1 2 3 4 5

IV. Please rate your responses to your familiarity with epidemiology and surveillance. 1=very familiar and 5 not familiar

27. History and physical assessment surveillance data for creating a high index of suspicion that a patient has been exposed to a category A, B, or C biological agent.

1 2 3 4 5

28. When to report an unusual set of symptoms to an epidemiologist.

1 2 3 4 5

29. Diseases that are immediately reportable to state health departments.

1 2 3 4 5

30. Ability to identify the exacerbation of an underlying disease due to exposure to a chemical or biological agent, or to radiation.

1 2 3 4 5

V. Please rate your responses to your familiarity with decontamination. 1=very familiar and 5=not familiar

31. Selection of the appropriate personal protective equipment (PPE) when caring for patients exposed to a biological, chemical or radiological agent.

1 2 3 4 5

32. The decontamination procedures stated in your facility's Emergency Operations Plan.

1 2 3 4 5

33. The impact on the environment from a large-scale emergency event.

1 2 3 4 5

VI. Please rate your responses to your familiarity with communication/connectivity. 1=very familiar and 5=not familiar.

34. The procedure used to document provision of care in a large-scale emergency event.

1 2 3 4 5

35. Chain of custody during a large-scale emergency event.

1 2 3 4 5

36. Procedures for communicating critical patient information to those transporting patients.

1 2 3 4 5

37. Effectively present information about degree of risk to various audiences.
    1 2 3 4 5
38. Identify the different abilities of key partners in your Emergency Operations Plan (EOP).
    1 2 3 4 5
39. Appropriate debriefing activities following a large-scale emergency event.
    1 2 3 4 5
40. Use of all types of communication devices (phone, fax, email, satellite phones, PDAs, etc). 1 2 3 4 5

VII. Please rate your responses to your familiarity with Psychological issues. 1=very familiar and 5=not familiar

41. Appropriate psychological support for all parties involved in a large-scale emergency event.
    1 2 3 4 5
42. Provide health counseling/education to patient regarding the long-term impact of chemical, biological, radiological, nuclear and explosive (CBRNE) agents.
    1 2 3 4 5
43. Signs of post-traumatic stress in patients seen for routine health care following an event.
    1 2 3 4 5
44. How to evaluate a teenager to detect post-traumatic mental health problems.
    1 2 3 4 5

VIII. Please rate your responses to your familiarity with special populations. 1=very familiar and 5=not familiar.

45. Procedures for providing care to children/youth during a large-scale emergency vent in cases where prior consent from parent/legal guardian is not possible.
    1 2 3 4 5
46. The appropriate care of sensitive/vulnerable patient groups during a large-scale emergency (i.e., aged, pregnant, women and the disabled. 1 2 3 4 5

IX. Please rate your responses to your familiarity with accessing critical resources. 1=very familiar and 5=not familiar.

47. During an event, where to quickly access up-to-date resources about specific (chemical, biological, radiological, nuclear, and explosive) agents.
    1 2 3 4 5
48. Determine the appropriate agency to which reportable disease are to be directed.
    1 2 3 4 5
49. The process for gaining access to the Strategic National Stockpile (SNS).
    1 2 3 4 5

Nurses' Assessment and Readiness: scale 1=very familiar and 5=not familiar.

50. Please provide an assessment of your overall familiarity with response activities/preparedness in the case of a large-scale emergency event.

    1 2 3 4 5

51. If you had to respond to a major disaster in your hospital/community today, how prepared do you feel to effectively respond? 1=not very effective and 5 very effective

    1 2 3 4 5

Part III. Self-regulation questions

52. How likely would you say you are to get involved and prepare for disasters in your community? 1=not likely to 5=very likely
    1=not likely
    2=somewhat likely
    3=neutral or don't know
    4=somewhat likely
    5=very likely

53. How committed are you to participating in emergency preparedness measures in your community? 1=not committed to 5=very committed
    1=not at all committed
    2=somewhat committed
    3=neutral or don't know
    4=somewhat committed
    5=very committed

54. How willing are you to assume the risk of involvement in a disaster situation (bioterrorism event, pandemic etc)? 1=not likely to 5=very likely
    1=not likely
    2=somewhat likely
    3=neutral or don't know
    4=somewhat likely
    5=very likely

Part IV. Healthcare Climate – we will close with four questions about your job…

55. Overall, how satisfied are you with your current position?

    ___highly dissatisfied
    ___generally dissatisfied
    ___neutral
    ___generally satisfied
    ___highly satisfied

56. How likely are you to recommend your current employment setting to your nurse colleagues as a desirable place to work?
    ___highly unlikely

___somewhat unlikely
___neutral
___somewhat likely
___highly likely

57. Knowing what you know now, if you had to decide all over again whether to take the job you have now, what would you decide?
___would definitely not take the same job
___would probably not take the same job
___neutral
___would probably take the same job
___would definitely take the same job

58. To what extent are you fairly rewarded considering the responsibilities you have?
___not at all
___to a slight extent
___to some extent
___to a considerable extent
___to a great extent

Optional last question:
What would be the best way to help you increase your preparedness to act in a disaster situation?
Thank-you very much for your participation!

Appendix B: IRB Approval

IRB/Institutional Approval University of Texas at Tyler

The University of Texas at Tyler
Institutional Review Board

June 23, 2011

Dear Ms. Baack:

Your request to conduct the study entitled *Analysis of Texas Nurses' Preparedness and Perceived Competence in Managing Disasters* is approved as an expedited study, IRB #Sum2011-70 by The University of Texas at Tyler Institutional Review Board. This approval includes the waiver of written informed consent. Please use the introduction/instructions to the survey as attached to this approval letter. Please ensure that any research assistants or co-investigators have completed human protection training, and have forwarded their certificates to the IRB office (G. Duke).

Please review the UT Tyler IRB Principal Investigator Responsibilities, and acknowledge your understanding of these responsibilities and the following through return of this email to the IRB Chair within one week after receipt of this approval letter:

- This approval is for one year, as of the date of the approval letter
- Request for Continuing Review must be completed for projects extending past one year
- Prompt reporting to the UT Tyler IRB of any proposed changes to this research activity
- Prompt reporting to the UT Tyler IRB and academic department administration will be done of any unanticipated problems involving risks to subjects or others
- Suspension or termination of approval may be done if there is evidence of any serious or continuing noncompliance with Federal Regulations or any aberrations in original proposal.
- Any change in proposal procedures must be promptly reported to the IRB prior to implementing any changes except when necessary to eliminate apparent immediate hazards to the subject.

Best of luck in your research, and do not hesitate to contact me if you need any further assistance.

Sincerely,

Gloria Duke, PhD, RN
Chair, UT Tyler IRB

Appendix C: Hospital Approvals

IRB/Institutional Approvals From Individual Hospitals

Approval from Scott and White Health Care System

midland memorial hospital

Your home for healthcare

Institutional Review Board
IRB00004050 Exp: October 9, 2011
FWA00007049 Exp: June 9, 2013

July 14, 2011

Sylvia Baack, MSN, RN, PhD-candidate
University of Texas at Tyler
720 Retoma Park
Robinson, TX 76706
254-624-3195

Re: Analysis of Texas Nurses' preparedness and perceived competence in Managing disasters.

Ms. Baack,

I am pleased to inform you that in its meeting of July 7, 2011, the Midland Memorial Hospital Institutional Review Board has approved your application to conduct a survey of Midland Memorial Hospital nurses as part of your research project, "Analysis of Texas Nurses' preparedness and perceived competence in Managing disasters". This approval applies to the two campuses stated below:

Midland Memorial Hospital
2200 W. Illinois
Midland, TX 79701

Midland Memorial Hospital, West Campus
4214 Andrews Hwy
Midland, TX 79703

- Your primary contact for Midland Memorial Hospital Institutional Review Board:
  John Harrington, RPh, MBA, CIM
  Director of Pharmacy and IRB Manager
  Midland Memorial Hospital
  2200 W. Illinois
  Midland, TX 79702
  432-686-5222
  - You will be notified in writing if this changes for any reason.

Approval from Hendrick Hospital System

My 17th, 2011

Sylvia Baack, MSN, RN,
PhD Candidate 720
Retoma Park Robinson,
TX 76706

Dear Mrs Baack,

This letter shall serve as formal notification that the following study was granted expedited approval on July 17th, 2011. The Hendrick IRB will meet officially on September 6th, 2011. If any further suggestion comes from this meeting I will inform you within five business days.

"Analysis of Texas Nurses' preparedness and perceived competence in managing disasters"

Approved : July7th, 2011
Expires: July 16th, 2012

If you have any questions you may contact me at 325.670.5550 or

gperryfo^ehendrick.org Sincerely,

Gregory K. Perry, PharmD,
R.Ph, BCPS-AQID
Pharmacy Clinical Manger
HIRB Chair 1900 Pine
Street Abilene, TX 79601

Approval from Northwest Hospital

K. Lynn Wieck RN, PhD, FAAN
Jacqueline M. Braithwaite Professor
The University of Texas at Tyler
College of Nursing

June 21, 2011

This document is affirmation of a telephone conversation with Ms. Becky Hunter in response to the email below in which she indicated willingness for her hospital, Northwest Texas Hospital in Amarillo, Texas, to participate in the study of nurse preparedness for disasters being conducted by Sylvia Baack, doctoral student. Ms. Hunter referred us to her assistant, Bach Nguyen, who served as the liaison to Ms. Baack in this endeavor. In the call, Ms. Hunter stated that the IRB approval from The University of Texas at Tyler was sufficient to meet the needs of her hospital for ensuring that participant rights were protected; no further IRB application or forms were requested.

Signed: K. Lynn Wieck 6/21/2011
K. Lynn Wieck, Ph.D. Date

From: K. Lynn Wieck, Ph. D. [lynn@drwieck.com]
Sent: Monday, June 20, 2011 11:32 PM
To: becky.hunter@NWTHS.com
Cc: Baack, Sylvia
Subject: Disaster Preparedness Survey for NWTH Nurses

Hi Becky,

I wanted to let you know that my student, Sylvia Baack, will be contacting you about collecting data on your nurses regarding their disaster preparedness state and awareness of disaster mitigation. It is a nice survey, should not take more than 10 minutes to fill out online. She will give your hospital feedback from the findings from your hospital alone and also from all of the hospitals as a group so you can see where you fall in the grand schema. I told her that you would likely give her a contact person with whom she can interact to get the survey online and for details about the hospital expectations regarding IRB, etc. She is a wonderful young nurse who works at the VA in Waco. She has done a lot regarding disaster preparedness and education and has been on some national task forces. I really appreciate your participation. She is going to be one of those young women who makes a mark at the state and federal level. She would like to gather data this summer, so she will be in touch about IRB requirements and logistics. We will work with your person to meet your needs and generally to "stay out of the way." Thanks again for your help, Becky. You know that I will be happy to reciprocate

in any way I can. I am going to copy this note to Sylvia so she will know it is OK to contact you.

My best,
Lynn

K. Lynn Wieck RN, Ph.D., FAAN
Jacqueline M. Braithwaite Professor
The University of Texas at Tyler
College of Nursing and Health Sciences

From: Baack, Sylvia [mailto:sbaack@patriots.uttyler.edu]
Sent: Sunday, July 03, 2011 2:59 PM
To: K. Lynn Wieck, Ph. D.; Hunter, Becky
Subject: RE: Disaster Preparedness Survey for NWTH Nurses

Dear Ms. Hunter, Thank-you for this wonderful opportunity to work with you and your nurses on my research in disaster preparedness. I am attaching my IRB approval from UT Tyler, and my survey. Please provide your IT contact information at your convenience and I will work your IT person and IRB to get everything that you may need from me. I look forward to hearing from you. Sylvia Baack

---

From: Hunter, Becky [Becky.Hunter@nwths.com]
Sent: Monday, July 18, 2011 11:12 PM
To: Baack, Sylvia
Cc: Nguyen, Bach
Subject: RE: Disaster Preparedness Survey for NWTH Nurses

Sylvia,
My apologies for my lack of timeliness in responding back to you. Our director of IT is Bach Nguyen. He contact information is:
Bach.nguyen@nwths.com
Phone: 806-354-1791

Northwest Texas Healthcare System
Becky Hunter, DNP, RN, NEA-BC
Chief Nursing Officer
P.O. Box 1110
1501 S Coulter
Amarillo, TX
Direct: 806.354.1399
Fax: 806-354-1122

Appendix D: Recruitment Flier

How prepared are you to handle natural & man-made disasters?

How prepared are your colleagues?

Want to find out?

Click on the link to take the survey

(survey link here)

Survey is anonymous
Participants will be entered into a drawing for an I-PAD

Principal Investigator: Sylvia Baack, Phone: *(254) 624-3195*

email sbaack@patriots.uttyler.edu

Appendix E: Recruitment protocol

Analysis of Texas Nurses' Preparedness and Perceived Competence in Managing Disasters

Subject Recruitment and Participation Protocol (SRRP)

Recruitment:

Each hospital will be contacted with a request to participate in the study. A contact person will be identified by the Chief Nurse Executive. The PI will interact with the contact person throughout the study and will provide the written follow-up report to this person and the Chief Nurse Executive at the completion of the project. Each hospital will be asked for IRB protocol status for external researcher access. All required forms and protocols will be met prior to data collection.

Nurses will be recruited via invitation from a facility broadcast message or email encouraging them to go to a link to complete the survey. It is anticipated that nurses will complete the survey while on duty on computers located on the nursing units. Filling out the anonymous survey will indicate consent to participate. The initial page of the survey will contain informed consent information and a statement regarding completion indicating consent to participate.

Participation protocol:

PI will work with contact person from each hospital and a designated Information Technology person to discuss the best method for posting a link to the survey.

Participant will click onto link that is distributed via a facility broadcast message or email directing them to go to the link.

Participant will click onto the link to take the 15-20 minute survey.

Incentives will be offered by placing participants' names into a drawing to win an I-pad or other electronic device. To further encourage participation and ensure anonymity, a comment will be included that will read: "Upon completion of the survey, you will be directed to an alternative site which cannot be associated with your survey to register for a free I-pad"

PI name and contact information will be placed on the consent screen and may be printed by the participant or an email will be made available for any questions about the study.

Appendix F: Research Questions Statistical Analysis Plan

For nurses working in rural Texas:

1. What is the perceived competence of rural nurses regarding their disaster preparedness?

a. Research variable – Perceived Competence in Disaster (PCD) preparedness
b. Measured by:
i. EPIQ and subscale scores (I – X)
ii. Nursing Assessment & Readiness (NAR) Scale score (Q 52 & 53)
Statistical analysis – descriptive statistics

2. Which of the variables - individual differences (age, years of experience, education, previous disaster experience), self-regulation, and healthcare climate - most influence perceived competence in disaster preparedness?

a. Predictor variables:
i. Individual differences: (5 individual difference variables -age, years of experience, education, previous disaster experience - Measured by part I of the survey.
ii. Self-regulation (3 questions: Self Reg Scale – Q 55 preparation, Q 56 participation, Q 57 commitment)
iii. Healthcare Climate: (4 items - measured by Job Satisfaction Scale)
b. Outcome variable Perceived Competence in Disaster Preparedness - Measured by the EPIQ scale score (I-X) and NAR score (XI Q 52 & 53)
c. Statistical analysis – 2 separate Multiple Regression analyses, first using the scale score for the EPIQ (I-X) as the outcome and then using the NAR total as the outcome

3. Is there a relationship between self-regulation scores and perceived competence in disaster preparedness?

a. Predictor variables self-regulation (motivation) (Measured by Self Reg Scale 3ques – Q 55 preparation, Q 56 participation, Q 57 commitment)
b. Outcome variable - Perceived Confidence in Disaster Preparedness - Measured by EPIQ scale score (I-X) and NAR score (XI Q 52 & 53)
c. Statistical analysis – 2 separate Multiple Regression analyses, first using the scale score for the EPIQ (I-X) as the outcome and then using the NAR as the outcome

4. What is the concurrent validity of two measures of Perceived Competence in Disaster Preparedness?

a. Measures
i. EPIQ and subscale scores (I – X)
ii. Nurses' assessment and readiness (NAR) score (Q 52 & 53)
b. Statistical analysis - Pearson Correlation Coefficient

5. Are there generational differences in Perceived Competence in Disaster Preparedness and Self-regulation to engage in emergency situations?

a. Measures

i. EPIQ and subscale scores (I – X)

ii. Nurses' assessment and readiness (NAR) score (Q 52 & 53)

iii. Self-regulation Subscale (Q 55-57 measuring preparation, participation, commitment)

b. Statistical analysis - ANOVA for each of the three scales using three age groups (20-30, 31-50, >50 years of age)

Appendix G: Consent Forms

Thank-you for agreeing to participate in this study about nursing during disasters. Please read and answer each question. Your answers are very valuable and will be used to help determine nurses' readiness for disasters in a dissertation research study. Your answers will be anonymous. *Completion of this survey indicates consent to participate in the study*. Upon completion of the survey, you will be directed to an alternative site which cannot be associated with your survey to register for a free I-pad.

Disaster Readiness Questionnaire (DRQ)

This questionnaire is designed to test nurses' preparedness for major disaster events. Please answer the following questions.

Part I. Professional and Demographic data

Select your current professional role (select only one response).

- ○ LVN
- ○ RN
- ○ Advanced Practice RN

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED TWO PAGES.**

NAME Sylvia T. Baack	POSITION TITLE Safe Patient Handling Program Coordinator for Central Texas Veteran's Healthcare System
eRA COMMONS USER NAME	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Texas Tech University Health Sciences Center	BSN	1997	Nursing
Texas Tech University Health Sciences Center	MSN	2005	Geriatrics/Education

NOTE: The Biographical Sketch may not exceed two pages:

A. Positions and Honors.

Positions:

Central Texas Veteran's Health Care System-Safe Patient Handling Program Coordinator

Central Texas Veteran's Health Care System-Emergency Preparedness committee

Heart of Texas Council of Governments-Board Member of Health and Human Services Council

Certified Ombudsman (volunteer) for the State of Texas, Department of Aging and Disability Services

Honors:

Member Sigma Theta Tau
Elected to Chancellors list 2005
Texas Nurses Association Nursing in Excellence Scholarship 2005
Garrison Student Scholar in Geriatrics 2005

B. Publications (Project Related) Selected peer-reviewed publications (in chronological order).