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THE ROLE OF RESILIENCE AND PREPAREDNESS IN NURSES WORKING DURING HURRICANE DISASTERS

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THE ROLE OF RESILIENCE AND PREPAREDNESS IN NURSES WORKING DURING HURRICANE DISASTERS

by

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Abstract

THE ROLE OF RESILIENCE AND PREPAREDNESS IN NURSES WORKING DURING HURRICANE DISASTERS

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Problem: Resilience is the ability to "bounce back" from adversity and can serve as an avenue for nurses to recover from the disaster and subsequent potential issues related to coping with the event. To date, very little is found in the literature specific to nurses and how they adapt to and recover from disasters in their personal or professional lives.

Theory: Taormina's (2015) theory of adult personal resilience and Veenema's disaster management model (World Health Organization [WHO] and International Council of Nurses [ICN], 2009) provided the foundation of this study.

Hypothesis: It is hypothesized that levels of personal and professional preparedness affect resilience and that resilience affects compassion satisfaction and/or compassion fatigue.

Design/Methods: A non-experimental descriptive correlational design was used. A convenience sample of 110 nurses, APRN, RN, or LVN, who have worked in a disaster or during a disaster relief effort were recruited. Data collection occurred during October 2018. Information collected included personal and professional preparedness/demographic information, the Connor-Davidson-10 (CD-RISC-10) resilience scale, Taormina's Adult Personal Resilience Scale (APRS), and the Professional Quality of Life Scale (ProQOL).

Analysis: Data was analyzed using Pearson's correlation and linear regression with moderation.

Keywords: hurricane, resilience, preparedness, nurses, compassion satisfaction, compassion fatigue

Chapter 1

Nurses often work in stressful situations. They enter the profession understanding their jobs will, at times, involve extreme stress and require them to make tough decisions in difficult environments (Turner, 2015). However, many nurses never imagine themselves caring for patients in a disaster-stricken zone. The once pristine working conditions change to post-disaster chaos (Scrymgeour, Smith, & Paton, 2016). This is not the scene in which most nurses imagine caring for their patients. The added stress and adversity that disaster brings can have deleterious effects on nurses (Clukey, 2010; Mao et al., 2018). Resilient nurses seem to rebound and recover to their pre-disaster level (Broussard & Myers, 2010; Mealer et al., 2012). This is not the case for all nurses. Others experience poor health and/or mental health outcomes because of their experiences while working during a disaster (Quevillon et al., 2016). Understanding resilience in nurses who have worked in a disaster is important in helping other nurses cope with and process the problems that come with disaster nursing.

Background

Nurses who work during and after a disaster encounter unusual and extraordinary circumstances (Quevillon et al., 2016). They are required to care for patients during uncertain times and are expected to provide excellent care and maintain consistency under poor working conditions (Battles, 2007; Thormar et al., 2016). A disaster is a sudden, unexpected event that interrupts functioning of communities and families, and it

causes loss greater than the community resources can provide (International Federation of Red Cross [IFRC], 2018). Disasters can be natural, such as hurricanes and tornadoes, or they can be man-made or technological, like oil spills or explosions. Regardless of the type of disaster, nurses are expected to provide care for the influx of patients who need medical assistance during and in the aftermath of the disaster (Park, 2016; Quevillon et al., 2016). Ideally, nurses and the facilities in which they work have planned for disasters and have the processes in place to adapt to circumstances as they evolve (Gowan, Sloan, & Park, 2015). Disasters can have harmful effects on the physical, psychological, and social health of those involved in the rescue and care of disaster victims (Mao et al., 2018), and they affect all dimensions of human life, including environmental, social, and economic arenas (Giarratano, Savage, Barcelona-deMendoza, & Harville, 2014). Nurses must be able to cope with the difficulties of providing care during a disaster and have the capability to process all they experience (Giarratano et al., 2014). The ability to cope and process is necessary if they are to continue to be effective in the nursing profession (Clukey, 2010). Working during a disaster presents extreme circumstances that can lead a nurse to cope in one of two ways: compassion satisfaction (CS) or compassion fatigue (CF). Compassion satisfaction results in fulfillment in one's work while compassion fatigue results in feeling overwhelmed and experiencing traumatic thoughts about an event or circumstance (Stamm, 2010). One characteristic that nurses must possess to recover from the disaster is resilience (Aiena, Buchanan, Smith, & Schulenberg, 2016).

Resilience has been studied both at the individual and community levels in many populations (Abramson et al., 2015; Broussard & Myers, 2010; Heagle, 2016; Mealer et al., 2012). However, little research has been conducted on the importance of resilience in

nurses (Broussard & Myers, 2010; Mealer et al., 2012; Mealer, Jones, & Meek, 2017; Stangeland, 2010). Nurses are on the frontlines of care during and after disasters, and they should be ready to cope with the chaos and trauma of a disaster (Giarratano et al., 2014; Stangeland, 2010). Adverse psychological effects can occur if nurses are not able to recover from the disaster (Battles, 2007; Clukey, 2010). If a nurse has long term negative effects, that nurse may not function effectively in the professional role. One avenue to help nurses recover is through understanding resilience (Tseng et al., 2017; Turner, 2015). Understanding the role of resilience and how to promote it in the aftermath of a disaster, is an important step in helping to ensure a ready workforce. (Giarratano et al., 2014).

Statement of the Problem

Resilience has been studied in individuals, communities, and special populations (Heagle, 2016; Mealer, Jones, & Meek, 2017; Tseng et al., 2017). Resilience in nurses, however, has not been studied extensively (Battles, 2007; Broussard & Myers, 2010; Mealer et al., 2012). There is an evident gap in the literature related to resilience in disaster nursing. Nurses who work during a disaster are at risk for adverse effects, such as compassion fatigue (Turner, 2015). To date little is known about the role of resilience and compassion fatigue.

Purpose of the Study

This study will advance the knowledge of how resilience affects nurses who work in disasters. The outcomes of compassion satisfaction and compassion fatigue may provide increased understanding of the role of resilience and how different personal and professional preparedness levels affect resilience. The information gained by this

research study may provide the foundation for possible interventions to improve resilience in nurses who will work during a disaster.

Theoretical Framework

This research study was grounded in Taormina's (2015) Theory of Adult Personal Resilience and the Veenema disaster model (WHO & ICN, 2009). Taormina's theory explains resilience as having four domains. Veenema's model encompasses preparedness across the disaster continuum. Both will be described below. Combining these two frameworks provides an excellent structure to examine resilience and its effects on nurses who experience working during hurricane disasters (see Appendix A for proposed structure).

Taormina (2015) posits that resilience is an internal trait that allows the person to withstand, rebound, and recover from difficulties. Resilience is a multi-dimensional trait that encompasses four domains: determination, endurance, adaptability, and recuperability.

Determination is defined as the resolve a person has to continue on and persevere through difficulty. It is part of the cognitive dimension of resilience. Determination helps the person keep going despite hard times and setbacks.

Endurance is the ability and strength of the person to withstand difficulty. This domain of resilience includes both cognitive and physical characteristics. For nurses, this may mean enduring difficult physical circumstances and having the mental endurance to continue the job in hopes of better times ahead.

Adaptability allows the person to be flexible and deal with adversity and change. This domain of resilience is more cognitive because the person must adapt thinking, not

just behavior. In disasters, nurses must be able to adapt how they provide care due to limited and ever-changing resources and environments.

Finally, recuperability allows the person to recover from difficult circumstances and return to "normal." Like endurance, recuperability addresses both cognitive and physical characteristics. Resilient nurses who work in a disaster show recuperability when they can physically deal with and recuperate from changes that come about from disaster. They also cognitively recuperate by processing all they have seen and heard and use it positively.

Resilience involves characteristics and experiences a person gains over the lifetime. These characteristics and experiences are specific to the person, which is another reason resilience is considered a personal trait. This theory allows researchers the ability to study resilience as a multi-dimensional construct, whereas much of the work done to date only measures one dimension of resilience (Taormina, 2015).

The attributes in the resilience framework are necessary when faced with disaster. There are three phases to disaster management: pre-disaster, during disaster, and post-disaster (WHO & ICN, 2009). Specific components in each phase are essential for successful transition through a disaster. Resilience is an important piece of moving through a disaster, as well. It is posited that the four domains of resilience are present throughout the process. Nurses need determination throughout the process beginning in the pre-disaster phase. Endurance and adaptability are essential during the disaster, and recuperability is important in the post-disaster phase.

The Veenema disaster management model (WHO & ICN, 2009) includes basic knowledge necessary in the different phases of disaster: before, during, and after disaster.

Essential components must be in place during each phase for successful disaster management. Nurses play an important role in preparing for a disaster.

Before the disaster, prevention/mitigation policies and preparedness initiatives must be in place to reduce risks of disaster, promote health, and educate and prepare others for possible disaster. Proactive planning is necessary if nurses are going to be ready to respond. During the planning and mitigation phase, assessment of risk is important to reduce impact and negative effects of disasters. The development of a psychosocial plan to lessen the psychosocial impact of a disaster is also important (Veenema, 2007).

During the disaster, nurses must respond and be able to care for individuals, communities, and vulnerable populations (WHO & ICN, 2009). The focus during the disaster is the actual relief effort. Having a good plan and emergency management team can help lead to better relief efforts (Veenema, 2007).

After the disaster, nurses will help in the recovery phase and will help individuals, communities, and vulnerable populations recuperate from the disaster (WHO & ICN, 2009). The recovery phase can be a long process and should be holistic in nature to provide care to the whole person. Nurses must be cognizant of both the needs of the patients in their care, as well as their own self-care needs during recovery. This is a very important process to assist in stabilizing both individuals and communities and assisting them in returning to normal (Veenema, 2007).

Research Questions

The following research questions relate to nurses who have personal and professional disaster experience with hurricanes:

1. Are specific domains of adult personal resilience related to preparedness in each phase of the disaster?
2. Does level of preparedness influence post-disaster compassion?
3. Is there convergent validity between the Adult Personal Resilience Scale (APRS) and the Connor-Davidson Resilience Scale-10 (CD-RISC-10)?
4. Does resilience (APRS and CD-RISC-10) influence post-disaster compassion?
5. Does resilience (APRS and CD-RISC-10) moderate the relationship between preparedness and post-disaster compassion?

Overview of the Design of the Study

This quantitative study utilized a cross-sectional design. Nurses who worked during natural disasters (i.e. Hurricane Harvey) in the Gulf Coast region of Texas were recruited. Nurses were asked to complete demographic data, including age, gender, educational level, and role in healthcare, as well as questions about their personal and professional disaster preparedness. In addition to demographic information, participants completed three surveys: Taormina's scale of adult personal resilience (APRS), the Connor-Davidson Resilience Scale-10 (CD-RISC-10), and the Professional Quality of Life (ProQOL) scale.

Definition of Terms

The following table includes pertinent definitions of terms used in the study. Both conceptual and operational definitions are included.

Table 1: Definitions of Terms

Variable	Conceptual Definition	Operational Definition
Resilience	The ability of a person to endure, bounce back, and recover from difficulty	Taormina's (2015) Scale of Adult Personal Resilience: 20 items, 4 subscales with 5 items for each domain;

	(Hu, Zhang, & Wang, 2015)	scored 1-5 (strongly disagree to strongly agree); lower scores=lower resilience; Connor-Davidson Resilience Scale (CD-RISC-10): 10 items, scored 0-4; high scores=high resilience, low scores=low resilience
Disaster preparedness	Having the knowledge and skills to be able to provide care and minimize poor outcomes when local resources are diminished (WHO & ICN, 2009)	Self-assessed disaster preparedness across the continuum: 6 items with 2 questions exploring each phase of the disaster; one question in each phase related to personal preparedness and one question related to professional preparedness (scale validation in progress)
Post-disaster compassion	Positive or deleterious effects resulting from the disaster: Positive: Compassion Satisfaction (CS) Negative: Compassion Fatigue (CF)	Professional Quality of Life Scale (ProQOL): 20 items, 10 for CS and 10 for CF

Organization of the Dissertation

This dissertation was organized in a five-chapter format. Chapter one provided an overview of the study and includes the background and significance of the problem, research questions, and theoretical framework. Chapter two gave a review of current literature related to resilience. Chapter three summarized the study design and discuss methodology. Chapter four discussed the results of the proposed study and will contain statistical analyses. Chapter five included a summary and conclusions of the study and discussed strengths and limitations.

Summary of the Chapter

This chapter provided and overview of the proposed research study. Resilience specific to disaster nursing is an under-explored area. There is a significant gap in the literature related to how resilience affects nurses who work in disasters. It is important to understand the role resilience plays before, during, and after the disaster and how preparedness levels affect both resilience and compassion. The aim of the current study was to discover how preparedness affects resilience and their relationship, as well as to determine if there is a relationship between resilience and specific outcomes of CS and CF post disaster for nurses in that environment. The study incorporated two theories: Taormina's (2015) theory of adult personal resilience, which will look at resilience as an internal trait with four domains, and Veenema's disaster framework that examines disaster nursing across the continuum of pre-disaster, during disaster, and post-disaster (WHO & ICN, 2009).

Chapter 2

Research in disaster nursing is limited. General studies have been published about disaster preparedness and issues encountered in the aftermath of disaster (Aiena et al., 2016; Lowe et al., 2015; Tseng et al., 2017). Most of the disaster studies including nurses are not specific, and they group nurses in with other rescue workers (Clukey, 2010; Quevillon et al., 2016). Very little research has been done pertaining to the concepts of resilience in nurses who work in disasters (Broussard & Myers, 2010; Turner, 2015). In addition to resilience, studies about its relation to disaster effects are limited (Battles, 2007; Burnett, 2017). This chapter discusses the current literature available about resilience and effects of disasters, both generally and in nursing.

Definition of Resilience

Resilience has been studied in different areas, and there is no standard definition. Essentially, many agree that resilience is to "bounce back," respond to, and recover effectively from adversity (Garcia-Dia et al., 2013; Lowe et al., 2015; Mealer, Jones, & Meek, 2017; Scrymageour, Smith, & Paton, 2016; Sharma & Sharma, 2016). Resilient people can function with stability in the face of extreme difficulty (Mealer, Jones, & Moss, 2012) and maintain a positive attitude (Turner, 2015).

Researchers have described resilience as a multi-dimensional characteristic (Mealer et al., 2012) or trait (Hu, Zhang, & Wang, 2015), a dynamic, evolving process (Garcia-Dia et al., 2013; Tseng et al., 2017), and a combination of these (Heagle, 2016). This lack of agreement has made it difficult to consistently define resilience across

disciplines and populations. Mealer et al. (2012) discussed how resilience can be, at least partially, learned. Many studies have indicated that resilience training programs can be beneficial in improving resilience in the face of disaster (Heagle, 2016; Mao et al., 2018; Mealer, Jones, & Moss, 2012; Tseng et al., 2017).

Resilience as a trait was described in Hu, Zhang, and Wang's (2015) meta-analysis. The authors posit that resilience is personal and is an internal trait that allows a person to deal with difficulty, cope, and adjust well. Hu, Zhang, and Wang (2015) discovered that the presence of trait resilience was inversely correlated with negative mental health indicators and positively correlated with good mental health indicators. Resilience can lessen the impact of adverse effects of adversity (Oshio et al., 2018). Oshio et al. (2018) described the resilience literature as focusing on one of two approaches: ego-resilience, which is the individual's capacity or personal reserve available to adapt to situations, and trait resilience, which is a personality characteristic that enhances the individual's ability to adapt. The ability to cope, move on, and adapt positively from traumatic or negative experiences is another definition of trait resilience (Broussard & Myers, 2010).

Resilience as a combination of personal characteristics and external variables was described by Liu, Reed, and Girard (2017). These authors presented a model of resilience that identifies core resilience, interpersonal resilience, and external resilience. Core resilience includes personal factors while interpersonal resilience includes factors such as education, skills, and relationships. Finally, external resilience encompasses socio-ecological factors such as geography, governmental issues, and access to resources.

They believe these factors work together to form a fluid, evolving resilient (or not resilient) individual.

Heagle (2017) studied resilience from a community perspective and described it as an adaptive process that a community employs after adversity. The process is ongoing and allows for change and adaptation after a difficult event, such as a disaster. Abramson et al. (2015) also described resilience as a process. An individual or community must first be affected by adversity and must adapt and recover from the adversity. Several studies were found in the literature related to community resilience (Abramson et al., 2015; Gowan, Sloan, & Kirk, 2015; Heagle, 2016) but few about individual resilience (Aiena et al., 2016; Burnett, 2017; Clukey, 2010; Quevillon, 2016) and even fewer specific to nursing in disasters (Battles, 2007; Broussard & Myers, 2010; Stangeland, 2010).

Current Nursing and Disaster Resilience Literature

Mealer et al. (2012, 2017) studied resilience in ICU nurses. They found nurses with higher resilience had a positive world view. These nurses understood that some patient outcomes were beyond their control, and they approached situations with optimism and the attitude to provide the best care possible. They also were connected socially through positive family, friend, and collegial relationships, and they maintained balance in their lives and practiced good self-care through physical and spiritual exercises (Mealer, Jones, & Moss, 2012). Mealer et al. (2012) also performed a quantitative study based on the same population and found that highly resilient nurses were significantly different than those who were not highly resilient. Whereas only 8% of the highly resilient group experienced post-traumatic stress disorder (PTSD), 28% who were not

highly resilient experienced symptoms ($p < 0.001$). The resilient group was also significantly lower in rates of anxiety and depression (8% and 2%, respectively) than the lower resilient group (21% and 14%, $p = 0.003$ and $p < 0.001$, respectively; Mealer et al., 2012). In a secondary analysis, Mealer, Jones, and Meek (2017) found that competence and perseverance, which they contend are characteristics of resilience, are inversely related to PTSD. These studies were completed on critical care nurses in their normal working environment. The findings are not specific to nurses who worked in a disaster setting.

Only two studies exploring resilience in nurses who worked during a disaster were found. Tseng et al. (2017) discussed resilience of Taiwanese nurses caring for mass burn casualty patients after the Formosa color dust explosion. They discovered that resilience is significantly associated with secondary traumatic stress and that as resilience increased, secondary traumatic stress levels decreased. Resilience was also found to be a protective factor for professional quality of life. Broussard and Myers (2010) completed a qualitative study of school nurses who experienced Hurricanes Katrina and Rita in 2005 and Hurricanes Gustav and Ike in 2008. They found that resilience seemed to develop over time. The nurses stated they felt better prepared for the 2008 hurricanes because they had lived through the 2005 hurricanes. Three major themes included (1) anticipating the disaster, (2) returning after the storm, and (3) making the decision to stay. The nurses in the study spoke of lessons learned about disaster preparedness and changes made between the 2005 and 2008 seasons. Support from communities and other organizations was important as they returned after the storm and began to deal with loss both personally and with their students. Each of the five school nurses made the decision to stay and be

committed to their communities. They felt the need to help their community recover and were willing to do the work of getting back to normal.

Other studies have explored resilience in coastal residents affected by the Gulf Oil Spill (Aiena et al., 2016) and community resilience (Lowe et al., 2015). Resilience and meaning were found to be inversely related to PTSD in those affected by the Gulf Oil Spill. As resilience and meaning levels increased, PTSD symptoms decreased (Aiena et al., 2016). Lowe et al. (2015) studied communities affected by Hurricane Sandy and found that individual and community level factors work together to shape resilience and how people respond to disaster. Community resilience is influenced by higher social capital and higher economic development (Heagle, 2016). Mao et al. (2018) found in their literature review that many studies have placed nurses in the same category as all healthcare/rescue workers and have not looked specifically at nursing needs. It is difficult to mine out specific needs for nurses working in disasters when they are not studied separately from other healthcare workers.

Domains of Resilience

Determination

Determination during adversity is evident in the resilience literature. Broussard and Myers (2010), in their qualitative study, describe school nurses in Louisiana as determined to care for their communities both after Hurricanes Katrina and Rita in 2005 and Hurricanes Gustav and Ike in 2008. This attitude of determination fostered their resilience as they dealt with the trauma of living through hurricanes. Determination was evident in nurses who worked in South Texas during Hurricane Ike as they worked in

deteriorating conditions and developed solutions to care for patients despite a lack of resources (Stangeland, 2010).

Endurance

Nurses exhibit endurance. Resilient ICU nurses endure uncontrollable patient outcomes and stressful situations and can find the good in an often-chaotic environment (Mealer, Jones, & Moss, 2012). Nurses face stress and unknowns daily in their work, and they must choose to cope with adversity and continue to function well (Garcia-Dia et al., 2013). Many nurses working in a disaster must show endurance. This, too, was shown in Stangeland's (2010) qualitative study as nurses endured hardships and still pressed on to care for their patients.

Adaptability

Adaptability of school nurses in the face of hurricanes is evident in how they learned from the 2005 storms and were better prepared in 2008 (Broussard & Meyers, 2010). These nurses learned from previous experience and adapted their disaster plans so that they were better prepared when the storms hit again. They displayed the resilient characteristic of adaptability as they coped with an unstable environment and used their available resources to come through the storm in a positive manner.

Recuperability

Recuperability, or the ability to recover from difficulties, is often messy and complicated (Giarratano et al., 2013) and can be seen in the school nurses in Louisiana (Broussard & Myers, 2010). They displayed a sense of commitment to do what needed to be done to help their community and themselves recover from the hurricanes in a positive way. ICU nurses display recuperability as they learn to cope with the stressful

environment and critical patients and find a way to maintain a normal life (Mealer et al., 2012).

Adverse Effects of Disaster Work

Several studies have focused on adverse effects of disasters or adversity and their relationship with resilience. The main adverse effects are PTSD and secondary traumatic stress (STS), but other effects could include anxiety, depression, substance abuse, and others (Min et al., 2013).

Compassion Fatigue/Secondary Traumatic Stress

Another common adverse effect of disasters is compassion fatigue, which is also used interchangeably in the literature with STS (Burnett, 2017). Compassion fatigue is an acute significant stress response related to a traumatic event that decreases capacity for empathy and leads to emotional exhaustion, depersonalization, avoidance and numbing behaviors (Burnett, 2017). Tseng et al. (2017) studied nurses caring for burn patients in Taiwan after an explosion and determined that resilience had a significant relationship with lower levels of STS.

A more chronic form of CF is burnout, which is also another adverse response to working in a disaster. Burnett's (2017) study examined crisis response workers, none of whom were nurses. He found a strong correlation between CF and burnout (r = .56, p = .00, r^2 = .32) and a medium negative correlation between CF and resilience (r = -.38, p = .00, r^2 = .15). The findings indicated that as CF scores decreased, resilience increased and as resilience increased, burnout decreased.

Post-Traumatic Stress Disorder

PTSD is defined as having intense fear or feelings of helplessness after a traumatic or disturbing experience (Battles, 2007). Nurses are vulnerable to PTSD, and Mao et al. (2018) found the incidence in nursing to be 30%. PTSD is difficult to recognize and has three clusters of symptoms: 1) reliving the experience, having intrusive thoughts, nightmares, or flashbacks 2) avoidance of stimuli related to the experience, such as people, places, or symbols 3) a state of hyper-arousal, which manifests as impaired concentration, sleep disturbances, and inability to live in the present, have positive emotions, and make healthy decisions (Horton, 2011; Thormar et al., 2016). Quevillon et al. (2016) studied relief workers and found it imperative for helpers to care for themselves and engage in self-care practices before, during, and after working a disaster. The authors found self-care lessened stress reactions that can lead to adverse effects like physical illness, PTSD, alcohol and substance abuse, anxiety, depression, and secondary traumatic stress. If these effects occur after a disaster, they may prevent the worker from continuing as a part of the workforce, which will result in a loss of workers available (Quevillon et al., 2016). In a qualitative study of volunteers who worked during Hurricanes Katrina and Rita, Clukey (2010) found that seven of the 10 participants experienced symptoms that are consistent with PTSD and STS. Many of them were able to overcome the adverse effects because of the transformative nature of the experience and the meaning they found in it. Of the participants, only two were involved in healthcare, and they were not specified as nurses or other healthcare workers.

Many individual characteristics have been associated with PTSD. After Hurricane Sandy made landfall in the Northeast United States in 2012, Lowe et al. (2015)

examined adverse effects of the hurricane at both the individual and community levels. They found that PTSD was significantly related to older age, non-Hispanic Black race, education level of high school or less, and higher levels of disaster-related trauma. Depression was significantly related to higher levels of disaster-related trauma and the presence of previous disaster experience. PTSD in Turkish earthquake survivors was found to be associated with female gender, religiousness, and neurotic personality traits, whereas a decrease in PTSD was found with the personality trait of optimism (Ikizer, Karanci, & Dogulu, 2016).

Aiena et al. (2015) studied Mississippi residents affected by the Gulf Oil Spill in 2010. Of those residents, the more they were affected by the spill, the greater the frequency of PTSD. Both resilience and perceived meaning of life were significant factors in predicting PTSD.

Positive Effects of Disaster Nursing

Compassion Satisfaction

A positive effect resulting from experiences in disaster nursing is compassion satisfaction (Tseng et al., 2017). CS encompasses positive feelings people have about their well-being and their ability to help others (Stamm, 2009). Current literature is mixed regarding the presence of a relationship between CS and resilience. Hu, Zhang, and Wang (2015) found in their meta-analysis that resilience was positively correlated with positive mental health indicators, and age, gender, and adversity significantly influenced that relationship. However, resilience and CS did not have a significant relationship (Tseng et al., 2017).

Other authors have studied the phenomenon of CS. Clukey (2010) studied relief workers who volunteered in Hurricanes Katrina and Rita and discovered that while they felt stressed and anxious about their work in the hurricanes, there was a sense of meaning in their work. They felt the help they provided those in need brought satisfaction and lessened to poor pieces of experiencing a disaster. While not specifically labeled CS, these feelings could be considered CS. Levels of CS are mixed in the literature. Some authors have found workers with high CS, while others have found workers with low CS (Burnett, 2017). Since the questions asked of these participants were about their current situation, it is difficult to generalize because different workplaces have different dynamics. Burnett (2017) found a significant negative relationship between CS and burnout, meaning that those more satisfied in their job were less likely to experience burnout.

Disaster Preparedness

There is consensus in the literature that nurses need to be involved in disaster planning (Labrague et al., 2016; Nash, 2015). In their integrative review, Scrymageour, Smith, and Paton (2016) discussed nursing needs in disasters. They stated that nurses should be involved in the planning and preparation stages since they are on the frontline of care when disaster hits. Preparation for disaster encompasses both personal and professional aspects of the nurse's life (Nash, 2015).

Personal disaster preparedness includes preparations made for oneself and family members. This includes gathering emergency supplies and having a disaster plan (Nash, 2015). Nurses who were personally prepared ranged from 36.4% (Lim et al., 2013) to 50% (Al Khalaileh, Bond, & Alasad, 2012). Researchers have shown that nurses who

have better personal preparedness are better able to respond to work and meet patient needs (Al Khalaileh, Bond, & Alasad, 2012; Nash, 2015).

Professional preparedness is a continuous endeavor to ensure nurses can perform work functions during a disaster. Without proper planning, patient outcomes can be poor (Labrague et al., 2015). Education is imperative to develop knowledge, skills, and abilities to provide effective care (Nash, 2015), and this must occur for nurse to be professionally prepared (Gowan, Sloan, & Kirk, 2015). Labrague et al. (2015) found 80% of nurses did not feel prepared and had lower confidence levels to perform their roles in a disaster. The authors found that nurses knew their facilities had disaster policies, but they were unsure how to implement them; therefore, it is important to practice and review protocols before a disaster occurs.

Resilience Scales

Resilience has been measured with different scales, but only two were used in the disaster literature (Aiena et al., 2016; Turner, 2015). The most commonly used tool was the Connor-Davidson resilience scale (CD-RISC). It is a 25-item scale used to measure coping ability and has been used and validated in a variety of populations with a Cronbach's $\alpha = 0.89$ (Mealer et al., 2012; Sharma & Sharma, 2016; Tseng et al., 2017). A Likert-scale is used in this tool with scores ranging from 0-100. A score of 80 indicates resilience and a score of 92 indicates highly resilient. A shorter version with comparable reliability was developed from the original. Cronbach's $\alpha=0.87$ was found in studies of Danish hospital workers, and $\alpha= .092$ was found in a study of Chinese ambulance and medical personnel (Davidson & Connor, 2018). This version, the CD-RISC-10, contains 10 items with a possible score of 0-40 (Davidson & Connor, 2018).

Another tool used in the literature was the Resilience Scale (RS; Aiena et al., 2016). A short form of the original 25-item tool, the RS-14, was developed to directly measure perceived resilience. The 14-item short form (RS-14) has a score range of 14-98 and Cronbach's α=0.93 (Aiena et al., 2016). Higher scores are indicative of greater resilience.

The Gap in the Literature

The literature review revealed a significant gap concerning understanding of resilience in disaster nursing (Tseng et al., 2017). There is a need to understand nurses needs before, during, and after a disaster (Giarratano et al., 2014; Stangeland, 2010). Research is needed to understand how nurses can prepare for disaster and how the disaster will impact their role (Turner, 2015). More focus is needed on how nurses respond to and adapt after disaster (Scrymageour, Smith, & Paton, 2016) and how to help nurses modify behaviors and attitudes to persevere through disaster recovery (Gowan, Sloan, & Kirk, 2015). As has been noted, the definition of resilience is vague, and a clear meaning of the concept is needed to truly understand how resilience impacts nurses who experience working in a disaster (Aiena et al., 2016; Heagle, 2016). Studies that exclusively examine this population are needed.

Summary

Many individual characteristics can improve resilience in a person. Personality, temperament, optimism, perseverance, and humor are all common traits in highly resilient people (Aiena et al., 2016; Mealer et al., 2012). Other important factors in resilience include positive coping skills, faith (Mealer, Jones, & Meek, 2017), self-efficacy (Garcia-Dia et al., 2013; Sharma & Sharma, 2016), and flexibility (Heagle,

2016). Other studies have found that strong support systems (Mealer, Jones, & Meek, 2017) and goal-oriented behaviors also improved resilience (Mealer et al., 2012).

Highly resilient people have better outcomes after disaster than those who have lower resilience (Garcia-Dia et al., 2013; Mealer et al., 2017; Turner, 2015). After disaster, those who exhibit resilience have fewer psychological issues (Giarratano et al., 2014). Common consequences of disaster include PTSD, CF/STS, anxiety, and depression. Mao et al. (2018) found that those with higher resilience experienced lower levels of PTSD and alcohol abuse, as well as increased work output. Resilience levels can help coping with difficult circumstances and reduce the prevalence of psychological disorders after disaster strikes (Garcia-Dia et al., 2013; Giarratano et al., 2014; Turner, 2015).

In addition to resilience, the level of preparedness of nurses who respond to and work in disasters effects their readiness to work. Nurses more readily report to work when they are personally prepared with home and family plans (Al Khalaileh, Bond, & Alasad, 2012). Professional preparedness is also important for the nurses to understand roles, responsibilities, and protocols during a disaster (Nash, 2015). When preparedness plans are in places, it is more likely to have more positive patient outcomes (Labrague et al., 2015).

The major domains of resilience, determination, endurance, adaptability, and recuperability, have been discussed, as well as the current literature in the general population (Aiena et al., 2016; Lowe et al., 2015; Taormina, 2015). Also explored were specific aspects of preparedness important to nurses who respond to and work in disasters. The lack of nursing literature related to resilience in disaster nursing is evident.

Based on the lack of evidence in the literature, studies examining resilience and its effects in disaster nursing are needed.

Chapter Three

This chapter contains an overview of the methodology of the study. Included in this chapter are the study purpose and design, the methods of data collection and analysis, and protection of human subjects. Instruments used, as well as their reliability and validity, will also be discussed.

Purpose and Design of the Study

The purpose of this study was to explore how personal characteristics and preparedness affect resilience in nurses who have responded to a disaster either in their workplace or in a hurricane relief effort. Also, the researcher explored how resilience affected the outcomes of compassion satisfaction and secondary traumatic stress/compassion fatigue in this population of nurses. With these purposes in mind, a quantitative study was conducted utilizing a non-experimental descriptive correlational design (Portney & Watkins, 2015).

Methods

Sample

A convenience sample of nurses who worked either in their place of employment or in a relief effort during a hurricane in the Gulf Coast region of Texas was utilized. Primary sampling utilized snowballing techniques. The call for participants was advertised in the Texas Nurses Association (TNA) e-newsletter, and emails were sent to the presidents of the Gulf Coast TNA districts for distribution to their members. Also, participants were recruited using social media through Facebook nurse groups and

personal pages of colleagues. Emails were sent to colleagues requesting them to share the survey with nurses they know who may meet eligibility for the study.

Eligibility criteria included: (a) nurse, either a registered nurse (RN), licensed vocational nurse (LVN), or advanced practice nurse (APRN), in the Gulf Coast region who worked during a hurricane or in a hurricane response effort, such as Hurricane Harvey; (b) ability to read and speak English; and (c) access to a computer to complete the survey. Participants were screened for eligibility and consented to completing the online survey. Information gathered through the survey included demographic questions, including age, gender, specialty area of practice, previous disaster experience, and levels of personal and professional preparedness. Resilience was measured using two tools, the Taormina Personal Adult Resilience Scale (APRS) and the Connor-Davidson Resilience Scale (CD-RISC-10). The Professional Quality of Life Scale (ProQOL) measured compassion satisfaction and compassion fatigue.

Sample size was determined using a power analysis with G*Power (Faul, Erdfelder, Lang, & Buchner, 2007). To avoid a type II error, a medium effect size (0.3), power of .95, and alpha of .05 was used. With two predictors, a sample size of 88 was required. Allowing for attrition and incomplete data, a sample of at least 110 was recruited.

Protection of Human Subjects/Informed Consent

Participants received information about the study and provided online consent at the beginning of the Qualtrics survey. Participants were informed about the purpose of the research, the methods used to collect data, time needed to participate, protection of personal information, any potential risks and benefits, their right to refuse to participate,

and the researcher's contact information. Completion of the survey was considered informed consent. The proposed study was approved by the University of Texas at Tyler Institutional Review Board (IRB).

Measures/Instruments

Taormina Adult Personal Resilience Scale (APRS)

The Adult Personal Resilience Scale is based on Taormina's (2015) theory of adult personal resilience. There are four subscales in the instrument measuring each of the four domains of resilience: determination, endurance, adaptability, and recuperability. Each subscale has five questions for a total of 20 items. Using a 7-point Likert scale, the range of scores is 20-140. Reliability of the scale is appropriate with Cronbach's α ranging from 0.77-0.83 for the subscales. The instrument was also tested on two different populations with known differences in resilience levels; t-tests for all subscales were found to be significant with $p < .001$ (Taormina, 2015).

Connor-Davidson Resilience Scale (CD-RISC)

The CD-RISC-10 is a 10-item self-report measure of resilience. Originally, it was a 25-item scale, and there are now three authorized versions of the instrument, with 25, 10, and two items. The validity of the 10-item scale is similar to the original 25-item scale. Since the findings are valid and reliable with the ten-question version, the researcher chose to utilize the short version so as not to overburden the participants.

Participants retrospectively answered the questions based on how they felt working the disaster. A Likert scale was used with scores ranging from 0-4 on each item, with a range of 0-40. Higher scores indicate greater resilience levels. The median score for the CD-RISC-10 is 32. Scores are separated into quartiles, with the first quartile (Q1)

representing the lowest scoring, or least resilient, group and the fourth quartile (Q4) representing the highest scoring, or most resilient, group. The scores for each quartile in the CD-RISC-10 are 0-29, 30-32, 33-36, and 37-40. The CD-RISC has been tested in the general population and in specific populations with Cronbach's alpha ranging from 0.78-0.90 for the CD-RISC-10 (Davidson & Connor, 2018).

Professional Quality of Life Scale (ProQOL)

The ProQOL measures both positive and negative effects of one's professional life (Burnett, 2017; Stamm, 2010). Compassion satisfaction is a positive outcome and is the pleasure felt from being able to do a job well. Compassion fatigue occurs when people are exposed to extremely stressful or traumatic events at work and experience secondary traumatic stress (Stamm, 2010). The ProQOL also contains a third subscale, burnout, but that subscale is not being used in this study.

The scale is a self-reported instrument utilizing a 5-point Likert scale (1-5) with 30 items. There are ten items in each of the subscales, giving each subscale the range of 10-50. The reliabilities of the CS and CF subscales are .88 and .81, respectively. Higher scores in each category indicate greater presence of those characteristics. Higher scores on the CS subscale indicate professional satisfaction, and higher scores on the CF subscale indicate presence of stress professionally (Stamm, 2010). For the purposes of this study, the ProQOL will be used to determine if resilience affects one positively (compassion satisfaction) or negatively (compassion fatigue). Research has been performed using part or all of the tool (Stamm, 2010).

There was no concise, summary scale located for measuring personal and professional preparedness across the disaster continuum. A six-item scale was developed

to capture the general sense of the nurses' personal and professional preparedness status. Three registered nurses with disaster nursing experience vetted the initial scale. It was then pilot tested and included in the survey. Reliability and validity details of the researcher-developed scale are included in the results section. Also included in the results section are the results of the qualitative questions nurses were asked about the preparedness scale.

Data Collection

Participants were recruited using e-mail and social media. Once the study purpose was explained and consent given, the participant completed the survey answering questions from the ARS, CD-RISC, and ProQOL instruments along with providing demographic and personal information. Nurses who have worked during a hurricane in the Gulf Coast region of Texas were targeted. Contacts with hospitals in that region assisted in advertising the study.

Data collection occurred online through an online survey format, Qualtrics. The participants completed all instruments, the CD-RISC-10, ARS, and ProQOL, and demographic information in one Qualtrics survey. Data was anonymous and accessible only by the researcher and faculty chair. After participants completed the survey, their information was kept in a password protected database. Their identity was protected by giving each participant a number; therefore, names of participants will not be used.

Data Analysis

Data was analyzed using SPSS software, the Statistical Package for the Social Sciences version 24 (IBM Corp., Armonk, NY, 2016). Data was assessed for normality, and parametric assumption tests were completed. Missing data and outliers were

reviewed and eliminated or transformed as required. Those responders who did not complete the majority of the questions were eliminated. No major outliers were discovered. A 95% confidence interval with an alpha of .05 was used to determine statistical significance. Descriptive statistics provided information about the sample. Pearson's *r* correlation was completed to determine the extent that personal characteristics, preparedness levels, and compassion were related to resilience. Linear regression tests were completed separately to determine the effect resilience, as measured by the CD-RISC- 10 and the APRS, has on compassion satisfaction and compassion fatigue. Also, linear regression tests determined how personal preparedness and resilience affected compassion satisfaction or compassion fatigue and if the influence of personal and professional preparedness was moderated by resilience to influence compassion satisfaction or compassion fatigue (Field, 2013). Since the data not meet the assumptions of normality, data was bootstrapped to improve robustness. This helped the researcher determine if personal preparedness influenced resilience and CF and CS. The mean score of the APRS and CD-RISC-10 scales were used to measure resilience, and the mean scores of compassion satisfaction and compassion fatigue subscales of the ProQOL were used. Preparedness scores included the means of the total personal scale and professional scale, as well as the mean scores of each phase of the disaster, before, during, and after. A Pearson's correlation was completed to determine if personal preparedness was related to professional preparedness. There is a significant relationship between personal and professional preparedness ($r = .811$, $p < .001$).

Procedures to Control Rigor

Heterogeneity of the sample was achieved by recruiting nurses from different facilities, different roles, and different areas in the Gulf Coast region. Nurses with different backgrounds and specialties were included in the study to provide a diverse picture of nurses who have worked in a disaster setting.

An appropriate sample size was used to ensure proper significance in the findings. The G*Power calculation of 88 for the sample size reduced the potential for error in data analysis (Faul, Erdfelder, Lang, & Buchner, 2007). Allowing for attrition and incomplete data, a sample of at least 110 nurses were recruited. Participants were given adequate instructions before beginning the survey. This helped minimize incomplete surveys and missing data.

Summary

This chapter provided an overview of the study purpose, design, sample, data collection, and data analysis procedures. Also included were the protection of human subjects, methodology, and a discussion of the instruments to be used in the study. Finally, the measures that were taken to control rigor of the study were discussed at the end of the chapter.

Chapter 4

Chapter four includes all findings related to the data collected in the study. An overview of the study participants will be discussed. Analysis of each of the research questions will be explored, as well as incidental findings. Finally, discussion and summary of the findings will be at the end of the chapter.

Research Participants

A convenience sample was recruited utilizing the Texas Nurses Association newsletter and contacts with district presidents in the Gulf Coast Region. The call for participants was spread by word of mouth through nursing colleagues and via social media on personal and professional pages. A total of 120 participants began the survey on Qualtrics. As the data was analyzed, twenty-one surveys were deleted because they were not completed. Those surveys were started and either no questions or just the demographic questions were answered. Therefore, there was no data related to resilience and preparedness gathered; those responses were eliminated. The final sample included 99 completed surveys.

Demographic data were collected on all participants to describe the characteristics of the sample. The sample was 94% female. Ages of respondents ranged from 22-75, with a mean age of 44.7 years. Almost half of the sample were either associate degree or bachelor's degree registered nurses, while 3% were licensed vocational nurses and 47.5% held master's or doctoral degrees. The majority of the sample (68.7%) had previous disaster experience, and most worked during the hurricane at the same facility where they

were employed before the hurricane. Just over half of the respondents (52.5%) were staff nurses, while 30% held management positions. Of the 17.2% who answered "other" for their usual nursing role, they were either nurse practitioners, educators, or both. See Table 2 for complete demographic data.

Table 2: Demographics Profile, N=99

		N	%
Gender			
	Male	6	6
	Female	93	94
Age (Range 22-75, mean 44.7)			
	22-40	40	40.4
	41-60	48	48.5
	60-75	11	11.1
Education Level			
	LVN/LPN	3	3
	Associates Degree RN	8	8.1
	Bachelor's Degree RN	41	41.4
	Master's Degree	37	37.4
	Doctoral	10	10.1
Previous Disaster Experience			
	Yes	68	68.7
	No	31	31.3
Nursing Role in Disaster			
	Worked in same facility where employed	60	60.6
	Triage/mobile clinic	7	7.1
	Relief effort	12	12.1
	Other*	18	18.2
	No response	2	2
Usual Nursing Role			
	Staff nurse	52	52.5
	Mid-management	20	20.2
	Upper-management	10	10.1
	Other**	17	17.2

*Other Nursing Role in Disaster: worked at shelter, city command center, other facility accepting displaced patients, ambulance staging, fire department
**Other Usual Nursing Role: Nurse practitioner, nurse educator, or both

Assumptions for Parametric Testing and Reliability

Survey results were exported into SPSS for analysis. Resilience measures (APRS and CD-RISC-10) were analyzed with total mean scores, and the subscale mean scores for the APRS were also calculated. Mean scores were used for the preparedness

questions as a total mean and subscale means (pre- during- and post-disaster preparedness). Post-disaster compassion was measured with the mean scores of compassion satisfaction and compassion fatigue from the ProQOL instrument.

Data analysis showed that the results were negatively skewed but met the assumptions of collinearity. Due to a failed assumption of normal distribution and to increase confidence in the results of parametric testing, the bootstrap method was performed. This also increases the confidence in generalizing results to the population. Reliability was measured by Cronbach's α, which was found to be appropriate with values ranging from .827-.876 for all variables (see table 3 below). Overall, all scores in all instruments were considered reliable.

Table 3: Variables Reliability Summary

Variable	Scoring	Cronbach's alpha	Mean	SD
Preparedness-Total	Likert scale, 6 questions, scores 1-5 (completely unprepared to completely prepared); mean score of all 3 phases	.843	3.72	.911
Preparedness-Before	Likert scale, mean score, assess personal and professional preparedness before disaster	.849	3.56	1.08
Preparedness-During	Likert scale, mean score, assess personal and professional preparedness during disaster	.848	3.70	.99
Preparedness-After	Likert scale, mean score, assess personal and professional preparedness after disaster	.854	3.88	.98
Personal Preparedness	Mean score of personal preparedness over	.85	3.64	1.02

	the phases of disaster			
Professional preparedness	Mean score of professional preparedness over the phases of disaster	.81	3.80	.896
APRS-Total	Likert scale, scores 1-7, mean total score, assess adult resilience	.827	6.34	1.04
APRS-D	Likert scale, mean score, assess determination subscale	.840	6.47	1.07
APRS-E	Likert scale, mean score, assess endurance subscale	.831	6.47	1.09
APRS-A	Likert scale, mean score, assess adaptability subscale	.826	6.33	1.13
APRS-R	Likert scale, mean score, assess recuperability subscale	.831	6.18	1.15
CD-RISC-10	Likert scale, score 0-4, mean score, assess personal resilience	.851	3.47	.47
ProQOL-CS	Likert scale, score 1-5, mean score, assess post disaster compassion satisfaction	.876	4.49	.44
ProQOL-CF	Likert scale, score 1-5, mean score, assess post disaster compassion fatigue	.858	2.34	.59

Development of Preparedness Questions

Six questions were designed to assess how prepared nurses were to deal with both personal and professional issues before, during, and after the hurricane. Two questions were asked about each phase, with one being about personal preparedness and the other about professional preparedness. The questions were scored on a Likert scale, and

responses ranged from 1 (not prepared at all) to 5 (completely prepared). The responses were then scored as a total mean score, as well as total means for each disaster phase.

Since these questions had not been tested before, a pilot study was performed. Respondents were asked to complete the survey and then answer questions about the items. For example, participants were asked what it meant to them to be personally or professionally prepared before, during, and after the hurricane (see appendix F for complete questions). Unfortunately, only four responses were received during the pilot. For this study, the qualitative questions were included with the main survey to demonstrate evidence of content validity.

Content analysis was completed on all responses after the close of the survey. Including the four who participated in the pilot survey, responses were assessed for common themes or categories using an inductive content analysis approach. This approach was chosen because the goal was to analyze new data that was not well researched (Elo & Kyngas, 2007). The qualitative data in this study was needed to assess the preparedness portion of the survey and to describe or interpret quantitative data, which is appropriate for inductive content analysis (Vaismoradi, Turunen, & Bondas, 2013).

Data were analyzed utilizing Erlingsson & Brysiewicz's (2017) guide for content analysis. The qualitative data was first read and reread to provide the researcher with a general feeling of the responses. Then the responses were broken down into meaning units and coded into different groups. Next, the data was coded into bigger themes that answered each question.

Pre-hurricane

Personal Preparedness

The first question asked the respondents what personal preparedness before the hurricane meant to them (n=83). Four themes emerged relating to personal preparedness pre-hurricane. First, having a plan was important. Respondents spoke of "having all their ducks in a row" before the hurricane hit. They found it important to have a plan for not being able to go home and knowing where to stay if they were evacuated. Also, beginning to formulate a contingency plan for the recovery period was mentioned. Several respondents stated that it was important to take the time to prepare well and make plans to care for their families and pets.

Another theme that emerged in personal preparedness pre-hurricane was having the necessities needed to survive several days. Most respondents stated the need to have enough food, medications, water, and clothing stockpiled. One participant stated the importance of having medications ready for her son when she shared, "I have a child who is insulin dependent and has epilepsy. I worry about who will care for her if I'm not able to be there and her care providers can't be there." Also mentioned were having batteries, candles, flashlights, and vital documents. Many respondents kept some type of "go bag" ready with supplies and had cars filled with gas and cash on hand since many ATMs go down during a hurricane.

Safety was a third theme discussed in preparing for the hurricane. Many were concerned about the safety of their spouse, children, and pets because they would be separated during the storm. Safety of the family meant having an escape route or evacuation plan in place as well as protecting their home. Many respondents moved

belongings upstairs and shuttered the windows. Having home insurance in order was also important.

Finally, having good communication and support from their loved ones helped the nurses prepare for the hurricane. Knowing how to reach family and having their support before they had to leave for work helped prepare the nurses emotionally, mentally, and physically for the pending hurricane. Open communication was important in organizing how to deal with what was coming and to designate a meeting place for afterwards in case of evacuation. Being able to talk and make plans helped the nurses feel prepared to leave their families and be able to focus on their work.

Professional Preparedness

The nurses were also asked what it meant to them to be prepared professionally before the hurricane, and seventy-five responded. Four themes emerged related to professional preparedness. The most overarching theme for the participants was having a good plan. Respondents stressed the importance of having enough staff, medications, and supplies to survive less than optimal conditions. They stated the need to have a plan to work with limited supplies, such as laundry/linens, and to adjust accordingly. For those who were to stay at their facility during the storm, they had to plan to take enough clothing, food, water, medications, toiletries, and sometimes bedding for the time they would stay at work. Plans were needed to organize the facility's resources and to plan for where to house the staff. Safety for staff and patients was important, and plans for displaced patients and power back-up plans were essential.

A second theme related to professional preparedness included communication and training. Many nurses stated that it was important for administration at facilities to

communicate with staff about expectations for working during the hurricane. Communication was needed to let staff know what to bring and how to report to work. Training was also important. Drills and practice sessions, in addition to knowing facility policies and protocols, were important for the nurses to understand their role when the storm hit. One respondent shared about a facility that was not well prepared and stated, "I'm not sure professional preparedness was thought about during the event. Since then, we have disaster preparedness for health care professionals." Many nurses stated the importance of management communicating plans and expectations to the staff.

The third theme of flexibility emerged. The nurses knew that working during a hurricane would bring challenges, and they had to prepare to have a flexible attitude that would help them during that time. Many stated that they knew changes would happen and duties could change during the hurricane, and they needed to be flexible and be ready for "when things go amiss."

Finally, being prepared emotionally and mentally was important. For those with family, it was difficult to know that they would be separated during the storm, and they had to prepare emotionally to be away from them. Nurses knew it would be hard work to care for patients during a hurricane, and they had to mentally prepare to be present with their patients and provide excellent care despite hard times and limited resources.

During the Hurricane

Personal Preparedness

Respondents were asked what preparedness for themselves and their family entailed during the hurricane. Three themes emerged from the responses (n=86). First, having a plan was important. It was imperative that the family and the nurse planned an

evacuation route if needed and designated a meeting place for after the hurricane. As with preparedness pre-hurricane, planning to have necessary supplies was important. Food, water, medications, and clothing were needed. Planning for a power outage included having flashlights, candles, an all-weather radio, a hand-crank phone charger, and gas for the generator.

Another theme of personal preparedness during the hurricane was safety. Many respondents mentioned the importance of being in a safe place, and several stated the need to "hunker down" and try to stay dry while the storm passes. Safety of family and pets was important to the nurses who responded.

Finally, being prepared emotionally and mentally for the hurricane to hit was important. Many nurses were away from family during the hurricane, and they had to be prepared to be away. Many responses indicated how difficult it was for nurses to leave their families and go to work. One respondent prepared to be away by "making sure my husband was able to care for my children for multiple days, that he could be off work, and that he had the food and supplies he needed if he needed to manage without electricity for multiple days." Having ways to communicate during the hurricane helped them to be mentally prepared for the storm. It was important for their mental health to be able to communicate with their families and monitor how their loved ones were doing throughout the hurricane.

Professional Preparedness

During the hurricane, three themes for professional preparedness emerged (n=75). Self-care was a major theme. Both physical and mental health were mentioned in the responses. The nurses discussed the importance of finding time to rest and sleep while

locked down at work. Also important was getting downtime so as not to be overwhelmed at the situation. Nurses discussed the need to focus on work during the hurricane. It was easy to get worried about what was going on with family and loved ones outside, but they mentioned how important it was to push personal issues aside to focus on caring for the patients. They also had to be mentally prepared for the different work environment. Knowing they may lose power, be moved to a different unit, and be required to work in subpar conditions helped them prepare for the storm.

Another theme that emerged was communication. It was important for management to communicate with staff about expectations and roles during the hurricane. Staff needed updates on the status of the facility, the storm, and staffing issues. The nurses felt it important that management stay in close communication with staff and check on them often to determine needs and other issues.

Finally, having a plan to work with limited supplies was a theme for professional preparedness during the hurricane. With the likelihood of a power outage, it was important to have a plan to access patient records, as well as have a plan for back-up power. The nurses wanted to understand how patient medications and other supplies would be accessed, as well as how to creatively prepare to continue good patient care. One nurse discussed the difficulty to truly plan for working in the disaster and stated, "I don't believe you can ever be prepared to work five days straight caring for critically ill children, charging a CVICU, and sleeping on a cot, but while you're enduring the process you learn to remain calm and face challenges as they come."

After the Hurricane

Personal Preparedness

The nurses were asked what personal preparedness entailed for themselves and their families after the hurricane (n=83). Four themes emerged from the data. First was the importance of having a plan to deal with the aftermath. If they were displaced, a plan was needed for shelter, whether that meant staying with family or friends or elsewhere. One respondent described her plan for after the hurricane: "I ensure I have an alternative place with necessary supplies in case my home is destroyed." Plans for how to get more household supplies was desired. Many nurses were prepared to withstand a few days to a week without replenishing supplies. However, nurses were not prepared for disaster displacement that lasted longer than one week. After that time, nurses were concerned with how they would wash clothes, replenish groceries, and purchase more supplies.

A second theme from the data was clean-up. Many nurses wanted to return home and restore the damage that occurred. They listed needing tarps, chainsaws, bleach, repair tools, and other cleaning supplies for restoration efforts.

It was also important to have a support system in place, which was the third theme discovered in the data. All kinds of people were needed to help the respondents transition to life after the hurricane. They needed help from friends, family, and neighbors, and they also felt the need to help them as much as they could. Also important was knowing different resources for help, from law enforcement to shelters to resources for helping clean up.

Finally, the forth theme that emerged was mental preparedness. Nurses felt it important to be ready mentally to deal with the damage of the hurricane. Many of them

had no idea what they would see when they got back home, and they were mentally prepared for the worst. They wanted to reconnect with family and process all that happened. Having a time to decompress, debrief, and talk about the events surrounding the hurricane was important to the nurses.

Professional Preparedness

The nurses were asked what it meant to be prepared professionally to deal with the aftermath of the hurricane (n=77). Three themes emerged from the data. First, having a plan for clean-up was important. Many said they needed to be prepared to restore the facility to pre-disaster levels so they could return to "business as usual." A plan was needed to provide a safe work environment and to obtain all the necessary supplies and equipment to restore the facility. Knowing the facility policy and continuity plan was essential for a good recovery period. Many of the nurses stated they had to have a plan to find a safe route to work before they could get there and help with clean-up efforts. Teamwork was an important piece to make the post-hurricane plans effective.

A second theme from the data was self-care. Many had to prepare themselves to return to work after being there for so long. The overarching concept in this theme was that of rest, both mental and physical. Sleep and rest were very important to recover. Taking some time for personal reflection on the experience was important to process what had happened during the hurricane.

Finally, mental healthcare and debriefing was the last theme in professional preparedness after the hurricane. Many nurses, including themselves, were still dealing with the fallout of the hurricane at home when they had to return to work. Many experienced loss of possessions and still had no power at home when they returned to

work. Nurses needed planned debriefing at work with other nurses and with employee health resources so that they could fully process the disaster experience. Several nurses expressed needing to be prepared to help coworkers and patients cope with loss related to the hurricane. Nurses also needed time with administration to discuss the implementation of the facility disaster plan during the hurricane. One nurse stated, "Participating in formal debriefs with admin personnel to provide input for process improvement" was important. This was a time to communicate what went well, what did not go well, and what improvements were needed in any new plans.

Questions About the Preparedness Scale

Nurses were asked if they felt that the Likert scale questions about personal and professional preparedness before, during, and after the hurricane captured how they felt about preparedness related to the hurricane (n=76). Of the seventy-six respondents, fifty-seven (75%) of them believed the survey captured their feelings about preparedness. Eight respondents (10.5%) felt the questions did not capture their feelings, and eleven (14.5%) felt the survey somewhat captured their feelings.

The final question in the survey requested any additional information that would be beneficial to include in the scale (n=62). Just over half (53%) stated that they did not feel like anything else was needed in the survey. One respondent stated that a qualitative approach would have captured the emotional impact better, and another would have rather explained feelings surrounding the hurricane. Ideas for other items included:

- How far travelled to volunteer
- Other demographic information, such as marital status and number of children (which could affect feelings/response to disaster)

- Facility preparedness: training, drills, preparation of facility, administration involvement, post-disaster counseling
- Level of connection with community resources
- Greatest challenge of delivering care in a disaster area
- Faith and its impact on resilience
- How those with personal experience with a previous disaster felt preparing for another and how helpful was that previous experience
- Monetary impact

Some responses were beyond the purpose of this study. Interestingly, many respondents did not provide further question ideas. Rather, they mentioned personal anecdotes about the difficulties they endured throughout the hurricane. The information obtained from the last question provided ideas for more studies about nurses and their work in disasters.

Quantitative Research Findings

Question 1

Research Question 1: Are specific domains of adult personal resilience related to preparedness in each phase of the disaster?

Pearson's correlation was the statistical test used to answer question one. Personal resilience was measured with mean total scores of the Adult Personal Resilience Scale (APRS) and the Connor-Davidson Resilience Scale (CD-RISC-10). The domains of the APRS were also scored and mean scores used to determine relationships with specific domains of resilience. Preparedness was measured with six preparedness questions addressing personal and professional preparedness levels in the three phases of

disaster (pre-, during-, and post-disaster). The total mean score was intended to reflect the total preparedness level, and each phase mean score was also calculated. To correct for not meeting all assumptions of normality and to increase confidence in generalizing data to the population, the bootstrap method was used.

Total preparedness scores were found to be significantly correlated with the CD-RISC-10 ($r = .527$, $p < .001$) with a 95% CI, [.334, .683] but not the APRS or its subscales (see Table 4). Preparedness pre-hurricane was found to be significantly correlated with the CD-RISC-10 ($r = .472$, $p < .001$), 95% CI, [.279, .630], the APRS adaptability subscale ($r = .202$, $p = .045$), 95% CI, [-.72, .537], and the APRS recuperability subscale ($r = .211$, $p = .036$), 95% CI, [-.05, .534]. These findings of the APRS subscales are significant in the study sample; however, the bootstrap results show no significance since the CI crosses zero. Therefore, these findings are not generalizable to the population without further assessment. For preparedness during the hurricane, only the CD-RISC-10 ($r = .484$, $p < .001$), 95% CI, [.294, .642] showed a significant relationship. The APRS adaptability subscale and preparedness during the hurricane had an almost significant relationship ($p = .058$). Finally, preparedness after the hurricane had only a significant relationship to the CD-RISC-10 ($r = .459$, $p < .001$), 95% CI, [.274, .609]. Neither the APRS or any of its subscales yielded significant results.

The sample showed that resilience as measured by the CD-RISC-10 was more sensitive than resilience measured by the APRS. Preparedness in all phases was significantly related to resilience as measured by the CD-RISC-10. The APRS and its subscales showed little relationship between adult personal resilience and preparedness levels.

Table 4: Preparedness and Resilience Correlations

Variable	Total Preparedness		Preparedness Before		Preparedness During		Preparedness After	
	r	*p*	*r*	*p*	*r*	*P*	*r*	*p*
CD-RISC-10	.527*	<.001	.472*	<.001	.484*	<.001	.459*	<.001
APRS Total	.131	.195	.155	.126	.139	.170	.055	.589
APRS-D	.022	.829	.017	.870	.044	.666	-.001	.988
APRS-E	.127	.212	.141	.164	.125	.217	.071	.484
APRS-A	.176	.082	.202*	.045	.191	.058	.074	.470
APRS-R	.162	.110	.211*	.036	.156	.124	.060	.554

*indicates significant results

Question 2

Research Question 2: Does level of preparedness influence post-disaster compassion?

To answer question 2, a Pearson's *r* correlation was completed. Preparedness was calculated as the mean scores of total preparedness, as well as mean scores of each phase of preparedness. Post-disaster compassion was measured as the mean scores of the compassion satisfaction and compassion fatigue subscales of the ProQOL instrument.

Preparedness, both total and in each phase of disaster, is significantly related to post-disaster compassion. The bootstrap method was used with a 95% CI to improve confidence and generalizability. Total preparedness was found to be significantly related to both compassion satisfaction ($r = .416$, $p < .001$), 95% CI, [.227, .594] and compassion fatigue ($r = -.293$, $p = .003$), 95% CI, [-.507, -.155]. Preparedness before the hurricane was significantly related to both CS ($r = .333$, $p = .001$), 95% CI [.144, .514] and CF ($r = -.213$, $p = .035$), 95% CI [-.40, -.019]. During the disaster, preparedness was significantly related to CS ($r = .381$, $p < .001$), 95% CI [.183, .56] and CF ($r = -.228$, $p = .023$), 95% CI [-.440, -.017]. Finally, a significant relationship was found between preparedness after the disaster and CS ($r = .408$, $p < .001$), 95% CI [.238, .581]) and CF ($r = -.351$, $p < .001$), 95% CI [-.531, -.154].

In this sample, preparedness in all phases of the hurricane played a role in post-disaster compassion, both compassion satisfaction and compassion fatigue. For each participant who was more prepared, compassion satisfaction scores increased. Those who were less prepared experienced more compassion fatigue.

Table 5: Correlation of Preparedness and Compassion

Variable	Total Preparedness		Preparedness Before		Preparedness During		Preparedness After	
	r	*p*	*r*	*p*	*r*	*p*	*R*	*p*
CS	.416*	<.001	.333*	.001	.381*	<.001	.408*	<.001
CF	-.293*	.003	-.213*	.035	-.228*	.023	-.351*	<.001

*Denotes significant relationship

Question 3

Research Question 3: Is there convergent validity between the Adult Personal Resilience Scale (APRS) and the Connor-Davidson Resilience Scale-10 (CD-RISC-10)?

Convergent validity was determined using correlation. The APRS has not been widely used and has not been used in nursing. Therefore, the PI sought to determine if the APRS showed convergent validity with a more well-established tool, the CD-RISC-10.

Mean scores were used for the CD-RISC, the total APRS, and the APRS subscales. With the exception of the determination subscale of the APRS ($r = .117$, $p = .248$), the CD-RISC-10 significantly correlates with the total APRS and the other subscales. The CD-RISC-10 shows adequate convergent validity with the total APRS, as well as with the endurance, adaptability, and recuperability subscales (see table 6 below).

Table 6: Convergent validity of resilience scales

Variable	APRS Total		APRS-D		APRS-E		APRS-A		APRS-R	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
CD-RISC-10	.306*	.002	.117	.248	.253*	.011	.368*	<.001	.394*	<.001

*Denotes significant results

Question 4

Research Question 4: Does resilience (APRS and CD-RISC-10) influence post-disaster compassion?

To answer question four, Pearson's correlation test was performed. To increase confidence due to violation of assumptions, the bootstrap method was completed with a 95% CI. The mean scores of the two resilience scales (CD-RISC-10 and APRS) were used to establish total resilience scores, and the means of the subscales were used for the APRS. Mean scores of the compassion satisfaction and compassion fatigue subscales of the ProQOL instrument were used to determine post-disaster compassion.

Based on the results of the data, only the CD-RISC-10 measure of resilience shows significant influence of post-disaster compassion. Both compassion satisfaction (r = .547, p < .001), 95% CI [.373, .695] and compassion fatigue (r = -.231, p = .021), 95% CI [-.411, -.046] were significantly related to the CD-RISC-10. No significant results were found with the total APRS mean or for any of the subscale means. The CD-RISC-10 seems to be a more sensitive measurement of resilience as related to compassion.

Table 7: Resilience and compassion correlations

Variable	APRS Total		APRS-D		APRS-E		APRS-A		APRS-R		CD-RISC-10	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*P*	*r*	*p*
CS	.114	.263	.029	.777	.083	.417	.154	.128	.154	.129	.547*	<.001
CF	.013	.895	.039	.699	-.002	.988	.061	.551	-.046	.652	-.231*	.021

*Denotes significant results

Question 5

Research Question 5: Does resilience (APRS and CD-RISC-10) moderate the relationship between preparedness and post-disaster compassion?

To answer question five, a two-step moderation regression model was analyzed. Resilience was measured with APRS and CD-RISC-10 total means, preparation was

measured with the total mean of the preparedness score, and post-disaster compassion was measured with the means of the compassion satisfaction and compassion fatigue subscales. The model was run different times with each of the variables for resilience and compassion. In step one, the effect resilience and preparation have on compassion was determined. Step two of the model included the interaction term, which was the product of resilience (either CD-RISC-10 or APRS) and preparedness.

The data was examined for influential cases. Cook's value in all models was less than one, which suggests that no cases cause concern for undue influence on the model (Field, 2013). However, there were three cases outside of the recommended value range for Mahalanobis distance, which for this sample size is greater than 15. In measuring influence with leverage, it was calculated that values greater than .02 could be influential (Field, 2013). Each model was run three times, one with all cases, one excluding Mahalanobis values greater than 15, and one excluding leverage values greater than .02. The leverage model excluded 44 cases, giving a final sample of 55. This extreme exclusion caused different results than the whole sample. Since only three cases were excluded with the Mahalanobis model, the results did not show significant differences. Because Cook's value was appropriate and the exclusion of almost half the sample seemed to no longer be representative of the sample, the final model used was the one containing all 99 respondents.

CD-RISC-10 and Compassion Satisfaction

Both steps in the regression model were found to be significant ($p < .001$). Step 1 in the regression model showed the main effects of resilience measured by CD-RISC-10 and preparedness in a regression equation ($R^2 = .322$, Adj $R^2 = .308$, $p < .001$). This

model found resilience (B = .429, p < .001) to be a significant predictor of compassion satisfaction, but preparedness was not significant (B = .086, p = .076). The model was a significant predictor in step 1, and 32.2% of the variance in compassion satisfaction can be explained primarily by resilience. Step 2 was the analysis of the interaction term, the product of CD-RISC-10 and preparedness (R^2 = .322, Adj. R^2 = .301, p < .001). Both models showed to have significance (model 1, F(2, 96) = 22.79, p < .001; model 2, F(3, 95) = 15.06, p < .001). However, the individual statistics in model two (F change = .059, p = .809, df2 = 95) did not yield significant results. The model meets the assumption of independent error (Durbin-Watson = 1.83). These results suggest that the interaction of resilience and preparedness do not significantly influence compassion satisfaction and that model 1 is the best model for analysis. To strengthen the ability to generalize these findings, the bootstrap method was then performed. This, however, found that bootstrapping preparedness (B = .086, p = .094), 95% CI [-.007, .206] shows that generalization to the population is not appropriate since the CI crosses zero. Resilience measured by CD-RISC showed that generalization is supported (B = .429, p = .001), 95% CI [.217, .577].

Table 8: Test of the Moderating Effect of Resilience (CD-RISC-10) and Preparedness to Compassion Satisfaction

								Descriptives	
Predictor Variable	R^2	Adj. R^2	F Chg	B	SE B	t	Beta	Mean	Std Dev
Step 1	.322	.308	22.785	2.689	.278	9.658			
CD-RISC-10				.429	.094	4.585*	.453	3.47	.466
Preparedness				.086	.048	1.794	.177	3.72	.911
Step 2	.322	.301	.059						
CD-RISC-10				.361	.298	.055	.381		
Preparedness				.016	.292	.055	.033		
CD-RISC-10 x Preparedness				.020	.084	.242	.193	13.13	4.21

Note: n=99; *p< .001

CD-RISC-10 and Compassion Fatigue

To determine the interaction effect of resilience and preparedness with compassion fatigue, the variables were placed in a two-step linear regression model. Step 1 in the regression model showed the main effects of resilience measured by CD-RISC-10 and preparedness in a regression equation (R^2 = .094, Adj R^2 = .075, p = .009). For compassion fatigue, preparedness (B = -.153, p = .041) was a significant contributor of variance, whereas resilience (B = -.135, p = .353) was insignificant in its contribution to the variance. Step 2 was the analysis of the interaction term, the product of CD-RISC-10 and preparedness (R^2 = .10, Adj. R^2 = .072, p = .018). Both models showed to have significance (model 1, F(2, 96) = 4.97, p = .009; model 2, F(3, 95) = 3.52, p = .018); however, the individual statistics in model two did not yield significant results (F change = .643, p = .425, *df2* = 95). The model meets the assumption of independent error (Durbin-Watson = 2.11). These results suggest that the interaction of resilience and preparedness do not significantly influence compassion fatigue. This model was also bootstrapped to determine appropriateness of generalization to the population. Generalization is not appropriate with this model with either CD-RISC (B = -.135, p = .312), 95% CI [-.422, .125] or preparedness (B = -.153, p = .038), 95% CI [-.289, .004] despite preparedness having a significant impact on compassion fatigue in this sample.

Table 9: Test of the Moderating Effect of Resilience (CD-RISC-10) and Preparedness to Compassion Fatigue

								Descriptives	
Predictor Variable	R^2	Adj. R^2	F Chg	B	SE B	t	Beta	Mean	Std Dev
Step 1	.094	.075	4.971	3.379	.429	7.872			
CD-RISC-10				-.135	.144	-.933	-.107	3.47	.466
Preparedness				-.153	.074	-2.068*	-.236	3.72	.911
Step 2	.100	.072	.643	2.203	1.528	1.442			
CD-RISC-10				.214	.458	.467	.169		
Preparedness				.202	.449	.45	.313		
CD-RISC-10 x Preparedness				-.103	.129	-.802	-.737	13.13	4.21

Note: n=99; *p< .05

APRS and Compassion Satisfaction

To determine if resilience as measured by APRS and preparedness interacted, a two-step linear regression model was used. APRS and preparedness were used in step 1, and step 2 added the moderating variable, APRS x preparedness, to examine interaction effects. Both models were found to be significant (model 1, $F(2, 96) = 10.32$, $p < .001$; model 2, $F(3, 95) = 8.98$, $p < .001$). Step 1 in the regression model showed the main effects of resilience measured by APRS and preparedness in a regression equation ($R^2 = .177$, Adj $R^2 = .16$, $p < .001$). This step in the model found preparedness ($B = .198$, $p < .001$) to be a significant predictor of compassion satisfaction, but resilience (APRS; $B = .025$, $p = .523$) was not significant. Step 2 was the analysis of the interaction term, the product of APRS and preparedness ($R^2 = .221$, Adj. $R^2 = .196$, $p < .001$). Step 2 of this model found that resilience as measured by APRS does have a moderating effect on the influence of preparedness on compassion satisfaction ($B = .082$, $p = .023$). However, in this instance, when testing for multicollinearity between these variables, the tolerance level was .033, and the VIF value was 30.535, which both suggest multicollinearity (Field, 2013). The model meets the assumption of independent error (Durbin-Watson = 2.07). Model 1 was found to be significant (F change = 10.32, $p < .001$, $df2 = 96$), and model 2 was also significant (F change = 5.64, $p = .023$, $df2 = 95$).

Table 10: Test of the Moderating Effect of Resilience (APRS) and Preparedness to Compassion Satisfaction

								Descriptives	
Predictor Variable	R^2	Adj. R^2	F Chg	B	SE B	t	Beta	Mean	Std Dev
Step 1	.177	.16	10.318	3.598	.288	12.507*			
APRS				.025	.04	.641	.06	6.36	1.04
Preparedness				.198	.045	4.374*	.409	3.72	.911
Step 2	.221	.196	5.367	4.382	.44	9.957*			
APRS				.037	.039	.941	.087		

Preparedness				-.356	0243	-1.464	-.735		
APRS x Preparedness				.082	.035	2.317**	1.159	14.68	6.23

Note: n=99; *p< .001, **p<.05

APRS and Compassion Fatigue

A two-step linear regression model was examined using the APRS as the resilience measure and preparedness in step 1, and step 2 added the interaction variable, APRS x preparedness, to determine if resilience measured by APRS moderated the effects of preparedness on compassion fatigue. Both steps in the model were found to be significant (model 1, $F(2, 96) = 4.65$, $p = .012$; model 2, $F(3, 95) = 3.14$, $p = .029$); however, individual statistics did not yield significant results for model 2 (F change = .189, $p = .664$, $df2 = 95$). Step 1 in the regression model showed the main effects of resilience measured by APRS and preparedness in a regression equation ($R^2 = .088$, Adj $R^2 = .069$, $p = .012$). This step in the model found preparedness ($B = -.194$, $p = .003$) to be a significant predictor of compassion fatigue, but resilience (APRS; $B = .03$, $p = .592$) was not significant. Step 2 was the analysis of the interaction term, the product of APRS and preparedness ($R^2 = .09$, Adj. $R^2 = .061$, $p = .029$). The moderation variable was not found to be significant ($p = .664$). The model meets the assumption of independent error (Durbin-Watson = 2.09). These results suggest that the interaction of resilience and preparedness do not significantly influence compassion fatigue.

Table 11: Test of the Moderating Effect of Resilience (APRS) and Preparedness to Compassion Fatigue

								Descriptives	
Predictor Variable	R^2	Adj. R^2	F Chg	B	SE B	t	Beta	Mean	Std Dev
Step 1	.088	.069	4.653	2.874	.404	7.116*			
APRS				.03	.056	.537	-.053	6.36	1.04
Preparedness				-.194	.064	-3.047*	-.30	3.72	.911
Step 2	.09	.061	.189	3.086	.634	4.865*			
APRS				.033	.056	.585	.058		
Preparedness				-.344	.351	-.98	-.532		
APRS x Preparedness				.022	.051	.435	.235	14.68	6.23

Note: n=99; *p< .05

Incidental Findings

To determine if personal or professional preparedness across the disaster continuum influenced compassion satisfaction or compassion fatigue, a mean score of personal preparedness before, during, and after the hurricane was calculated. The same calculation was performed for professional preparedness. This allowed the examination of personal or professional preparedness and how it related to post disaster compassion. It was hypothesized that professional preparedness would have a more significant effect on compassion fatigue. Since preparedness showed to be a better predictor of compassion fatigue, the researcher chose to examine personal and professional preparedness separately. A Pearson's correlation was completed. When combining personal preparedness in all three phases of the disaster, compassion fatigue (r = -.318, p = .001) and compassion satisfaction (r = .378, p < .001) were both found to have strong significant correlations. Professional preparedness in all three disaster phases also had a strong significant correlation to compassion fatigue (r = -.234, p = .02) and compassion satisfaction (r = .417, p < .001). These statistics further show the relationship of personal and professional preparedness and how significant preparedness is to post-disaster compassion.

The only demographic variable that showed significance was gender with the APRS and all of its subscales. The total mean for the APRS had a positive correlation with gender (r = .259, p = .01). Positive correlations between gender and each subscale of the APRS were also found, including the determination subscale (r = .271, p = .007), the endurance subscale (r = .212, p = .035), the adaptability subscale (r = .279, p = .005),

and the recuperability subscale (r = .210, p = .037). No significant correlations were found with any of the other demographic variables.

Summary

In chapter four, the results of the analysis were discussed. The qualitative portion of the preparedness questions was explained. Quantitative analysis included correlations and linear regression with moderation. The qualitative analysis provided understanding of what preparedness meant to the nurses before, during, and after the hurricane. A significant correlation was discovered between resilience measured by CD-RISC-10 and preparedness total mean scores and phase mean scores. Preparedness, total and phase scores, were significantly correlated with the adaptability and recuperability subscales of the APRS. Preparedness total and phase mean scores were found to be significantly related to compassion satisfaction and compassion fatigue. Convergent validity was found between the CD-RISC-10 and the APRS and all subscales except the determination subscale. Resilience as measured by the CD-RISC-10 was found to be significantly related to both compassion satisfaction and compassion fatigue, but resilience measured by the APRS was not significantly related to post-disaster compassion. Finally, the data showed that there is no interaction between resilience and preparedness and therefore, there is no significant moderation effect of preparedness and resilience to post-disaster compassion. Resilience was found to be the best predictor of compassion satisfaction. The data showed that the more resilient the nurse was, the more likely they were to exhibit compassion satisfaction. Preparedness, however, was a better predictor of compassion fatigue. The data showed that the less prepared the nurse was personally and professionally the more likely to experience compassion fatigue.

Chapter 5

Summary and Conclusion

Disasters can occur at any time and cause an abundance of challenges to all those affected. Nurses do not always have the ability to stay home with loved ones but are instead called to work to care for patients. Taking care of patients during a hurricane disaster forces nurses to continue excellent patient care even in adverse conditions (Turner, 2015). The purpose of this research study was to explore how preparedness, both personally and professionally, and resilience affected the outcome of post-disaster compassion. Previous research has shown that some nurses experience compassion satisfaction, which causes them to feel good about their work and contribution to their patients (Broussard & Myers, 2010). Others, however, experience compassion fatigue, which is also known as secondary traumatic stress, and can lead to poor physical and mental health outcomes (Quevillon et al., 2016). A non-experimental cross-sectional design was used in this quantitative study. Participants were recruited through email and social media during October and November 2018. They were asked to complete two resilience scales, the Connor-Davidson Resilience Scale (CD-RISC-10) and the Adult Personal Resilience Scale (APRS). To determine preparedness levels, they completed a six-item scale related to personal and professional preparedness before, during, and after the hurricane. Finally, post-disaster compassion was measured using the compassion satisfaction and compassion fatigue subscales of the Professional Quality of Life

(ProQOL) scale. Since the preparedness questions had never been used in a research study before, open-ended questions were asked to determine content validity.

Resilience

Resilience was measured by two instruments in this study. The CD-RISC-10 has been used in many populations and has demonstrated sufficient reliability. The APRS is a newer scale that has not been used with nurses. The two were found to have convergent validity in total score and in all subscales except the determination subscale of the APRS. In answering the other questions related to resilience, the CD-RISC-10 was the more sensitive measure. The APRS, while grounded in Taormina's (2015) adult personal resilience theory, does not seem to capture resilience in nursing as well as the CD-RISC-10.

Resilience measured by the CD-RISC-10 had a significant relationship with both compassion satisfaction and compassion fatigue. These findings are supported by the limited resilience literature in nursing. Tseng et al. (2017) found that as resilience increased, secondary traumatic stress decreased. Mealer et al. (2012, 2017) also found resilience in critical care nurses to be inversely proportional to stress, specifically post-traumatic stress. In the current study, resilience had a strong positive correlation with compassion satisfaction and a negative correlation with compassion fatigue, which indicates that the more resilient the nurse is the less likely the nurse is to suffer from compassion fatigue after a hurricane. When a linear regression analysis was examined to determine if resilience moderated the relationship between preparedness and post-disaster compassion, it was discovered that the more significant predictor of compassion fatigue was preparedness, while resilience was the better predictor of compassion satisfaction.

Preparedness

Preparedness is important in the face of a disaster. The literature shows the importance of nurses being involved in disaster planning at the professional level (Labrague et al., 2016; Nash, 2015). Putting emergency plans in place ensures that nurses are able to provide safe patient care in adverse conditions (Gowan, Sloan, & Kirk, 2015). Being personally prepared for disaster is also important. Preparations for home and family should be in place before the disaster hits (Nash, 2015), but according to the literature, nurses who are personally prepared for a disaster range from 36.4% (Lim et al., 2013) to 50% (Al Khalaileh, Bond, & Alasad, 2012).

With these statistics in mind, the researcher questioned whether preparedness played a part in how nurses reacted to working in a hurricane. Researcher developed questions determined personal and professional preparedness before, during, and after a hurricane. Findings indicated a significant relationship between resilience measured by the CD-RISC-10 and preparedness, including total preparedness and preparedness in all three disaster phases. When using the APRS instrument, there was only a significant relationship between preparedness before the hurricane and adaptability and recuperability subscales. Nurses who were better prepared seemed to be more resilient after the hurricane. Preparedness was found to be positively correlated with compassion satisfaction and negatively correlated with compassion fatigue. In a linear regression model to determine if resilience moderated the relationship of preparedness and compassion, it was found that the was not a significant moderating effect. Also, the most significant finding was that preparedness was a better predictor of compassion fatigue.

Compassion

After working in stressful environments or experiencing a traumatic event such as a disaster, nurses can experience post-disaster compassion in two ways. Either they will experience compassion satisfaction, where they feel positively about their work and experience through the hurricane, or they will experience compassion fatigue and have a stress response that will decrease their ability to cope with the event. Resilience has been found to have a significant inverse relationship with compassion fatigue (Burnett, 2017; Tseng et al., 2017). There are mixed findings regarding CS in the literature; it has been significantly linked with resilience in some studies (Hu, Zhang, & Wang, 2015), while no significant relationship was found in others (Tseng et al., 2017). In the present study, resilience measured by the CD-RISC-10 was found to be significantly related to both compassion satisfaction and compassion fatigue. Resilience was positively correlated with compassion satisfaction and negatively correlated with compassion fatigue. This indicates that the more resilient nurses seemed to experience more compassion satisfaction.

In this study, both CF and CS were found to be significantly related to preparedness. Compassion fatigue was negatively correlated with all preparedness levels, which includes total preparedness and preparedness before, during, and after the hurricane. These findings indicate that the less prepared the nurses were, the more likely they were to experience compassion fatigue after working in the hurricane. Compassion satisfaction was positively correlated with all preparedness levels. This suggests that the more prepared the nurses were, the more likely they were to experience compassion satisfaction.

When placed in a linear regression model, the study findings indicated that resilience does not moderate the effect of preparedness on post-disaster compassion. The model showed that preparedness is a more significant predictor of compassion fatigue while resilience is a more significant predictor of compassion satisfaction. These findings were only found to be significant when resilience was measured with the CD-RISC-10. The APRS instrument did not yield significant results.

Strengths and Limitations

This study has many strengths. It builds on the current body of knowledge and expands the limited understanding of resilience and preparedness in nurses who have worked in a disaster. Neither resilience nor preparedness has been extensively studied in nursing, and this study broadens understanding of these concepts. Surveys in this study demonstrated good reliability and therefore strengthens the findings. It is also a replicable study and could be repeated using a different sample to further strengthen the results. However, no study is without its limitations. Some of those limitations and threats are discussed below.

Internal Threats

One internal threat to validity is statistical regression (Portney & Watkins, 2015). Participants with different demographic characteristics could possibly answer questions differently. Extreme scores could have affected the results of the data. To control for this threat, all data were analyzed to determine if extreme results affected the overall results.

Another threat to internal validity is maturation (Portney & Watkins, 2015). It has been at least a year since the hurricane for those who worked during Hurricane

Harvey and longer than that for those who worked during previous hurricanes. This long amount of time could have affected how these nurses answered the questions. To help minimize this threat, the participants were given specific instructions about how to complete the survey before answering the questions.

Sample selection is also a threat to internal validity (Portney & Watkins, 2015). Nurses who worked along the Gulf Coast of Texas were recruited for this study. This will limit generalizing findings to other nurses. To minimize this threat, nurses from all along the Gulf Coast, not a specific city or area, were recruited. Also, nurses who work in multiple areas were recruited to create a more heterogeneous sample.

Finally, testing procedure was an internal threat to internal validity (Portney & Watkins, 2015). Nurses were given instructions prior to completing the survey in hopes of minimizing incomplete surveys. Only completed surveys were used in final statistical analysis to minimize errors. Because the preparedness questions were used for the first time, the qualitative questions were analyzed to determine if the data collected truly captured personal and professional preparedness.

External Threats

A major external threat to validity in this study is generalizability of findings. Statistical analysis included performing the bootstrap method to improve generalizing findings. However, this method showed in some instances that generalization to the population would not be appropriate. The sample showed to be heterogeneous but was confined to the Gulf Coast. These issues both limit generalization to the population.

Another threat to external validity is sampling. Sampling issues can affect both internal and external validity. Nurses were recruited from all along the Gulf Coast of

Texas. However, with non-random sampling, it is difficult to control participation. Utilizing nurses from many different cities and different types of facilities helped to increase diversity of the sample.

Implications

This study has the potential to affect how nurses prepare themselves personally and professionally to deal with issues before, during, and after a hurricane. Findings indicate that both preparedness and resilience are related to post-disaster compassion. This can be important as facilities make disaster plans. Including nurses in disaster planning pre-disaster benefits the facility and ensures workforce readiness. Nurse involvement in pre-planning may increase professional preparedness as well as improve knowledge and implementation of action plans during disasters. Another important finding, especially for healthcare facilities, was how closely related personal and professional preparedness were. Both qualitative and quantitative data showed the overlap of both types of preparedness. This is important for facilities, and it shows that they have the ability to help employees prepare for hurricanes personally and professionally. Based on the data, the researcher has shown that resilience as well as personal and professional preparedness play a part in post-disaster compassion. Understanding this relationship among resilience, preparedness, and compassion can allow nurses to be ready to face future hurricanes and to be able to deal with them effectively

Recommendations

Future studies are recommended to explore how preparedness and resilience affects nursing care. Expanding the resilience and preparedness knowledge to include

different types of disasters would be beneficial. Interesting data for future consideration was discovered from the qualitative questions in the survey. The role previous disaster experience plays in preparing to work in another disaster should be explored. Other potential studies include exploring the element of faith as it relates to resilience. A qualitative study exploring nurses' feelings and responses to working in a disaster is needed to add to the current body of knowledge. Finally, how management of facilities prepare for the impact of disaster and what that means to their nurses is an important avenue to explore.

Conclusions

Hurricanes are going to occur in coastal areas, and they affect all in the path of the storm (United States Geological Society, 2019). Nurses and facilities must be prepared encounter different issues that will occur pre, during, and post hurricane. Resilience is how one copes with adversity. Helping nurses to understand how they cope with adversity can be beneficial to understanding how they will respond when disaster strikes. From this study, it was found that resilience is an important indicator of compassion satisfaction. The more resilient nurses indicated a higher likelihood of experiencing compassion satisfaction. These findings add to the resilience literature in nursing and support the findings of other studies (Hu, Zhang, & Wang, 2015). More resilient nurses also had a less likelihood of experiencing compassion fatigue, which is supported in the literature (Burnett, 2017; Tseng et al., 2017).

Preparedness was another key factor explored in the study. The level of nurses' preparedness during all phases of the hurricane was a strong predictor of compassion fatigue. These findings support the current preparedness literature (Nash, 2015;

Scrymageour, Smith, & Paton, 2016). The more prepared nurses indicated a lower probability of experiencing compassion fatigue. These findings are an important addition to understanding how nurses manage working during and post disasters. The findings from this study impact how nurses and the facilities in which they work prepare to respond to disasters.

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Appendix A. Theoretical Framework

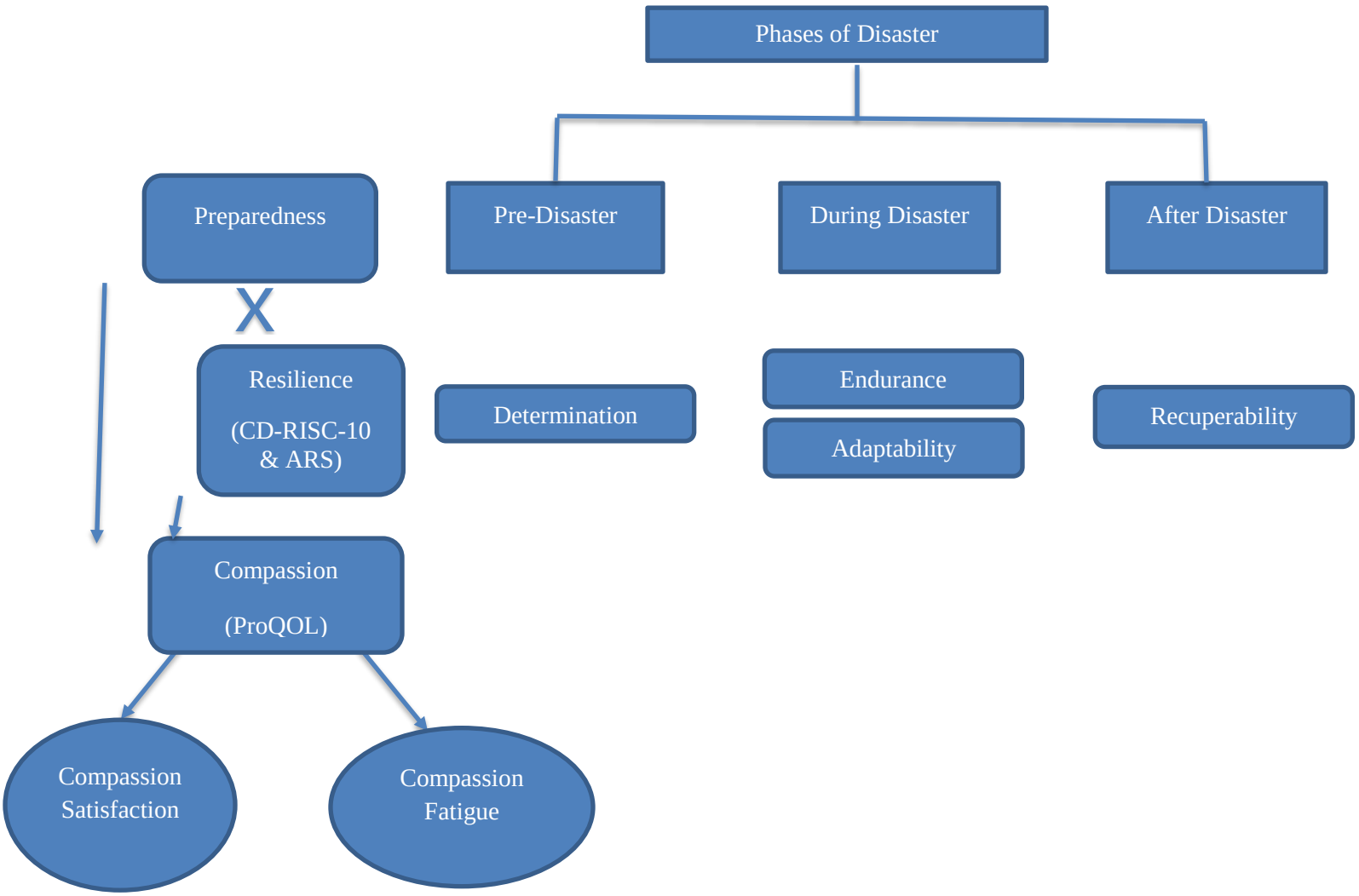

Figure 1: Theoretical Framework

Based on Taormina's (2015) Adult Resilience Theory and Veenema's disaster model (WHO & ICN, 2009)

Appendix B. Demographic Information and Preparedness Form

1. Age: _____
2. Gender: M F
3. Marital Status: Married/Life-partner Divorced Single Widowed
4. Do you have children: Yes No If yes, what is the age of the youngest child at home? _____
5. Highest level of nursing education level: LVN, Associate Degree RN, Bachelor's Degree RN, Master's Degree, Doctorate
6. Specialty Area: Med-surg ICU ER Pedi/OB School Nurse Community Health Home Health Hospice Other: (Please specify) _____
7. Do you have previous disaster work experience? Yes No
8. What was your role in this disaster? Worked at the same facility you were employed Worked in a triage area/mobile clinic Worked in relief effort Other: (Please specify)
9. What is your usual nursing role: staff, mid-management, upper management, other (specify)

For the following questions, answer on a scale of 1-5 how prepared you felt in each situation with 1 being not prepared at all to 5 being completely prepared.

10. Before the Hurricane hit, how prepared were you to deal with the impact personally (includes home and family)?
    1 2 3 4 5

11. Before the Hurricane hit, how prepared were you to deal with impact professionally (includes work and work role)?

    1 2 3 4 5

12. As you worked during the Hurricane, did you feel adequately prepared and have what you needed to care for yourself and your family?

    1 2 3 4 5

13. As you worked during the Hurricane, did you feel prepared and have what you needed to perform your job?

    1 2 3 4 5

14. When you were able to go back home after the Hurricane, did you feel you were prepared for what you faced in your personal and home life?

1 2 3 4 5

15. When you were able to return to work after the Hurricane, did you feel you were prepared to resume your professional duties? (includes situational and emotional preparedness)

1 2 3 4 5

Appendix C. Adult Personal Resilience Scale

Answer the following questions about yourself in the period immediately following your work in a disaster. Answer using these guidelines:

1 = strongly disagree
2 = moderately disagree
3 = slightly disagree
4 = not sure / undecided
5 = slightly agree
6 = moderately agree
7 = strongly agree

Determination	
Once I set a goal, I am determined to achieve it.	1 2 3 4 5 6 7
I persevere at the things I decide, despite difficulties.	1 2 3 4 5 6 7
Being determined is an important part of my character.	1 2 3 4 5 6 7
I keep trying for the things I want until I reach them.	1 2 3 4 5 6 7
It is in my nature to be persevering.	1 2 3 4 5 6 7
Endurance	
I am able to live through difficult times.	1 2 3 4 5 6 7
I can withstand difficult situations.	1 2 3 4 5 6 7
I can endure the problems that life brings.	1 2 3 4 5 6 7
I can survive even the hardest of times.	1 2 3 4 5 6 7
I can endure even when I am attacked.	1 2 3 4 5 6 7
Adaptability	
I have the ability to adapt to difficult situations.	1 2 3 4 5 6 7
I can change to fit into many kinds of circumstances.	1 2 3 4 5 6 7
I can find ways to adapt to unexpected conditions.	1 2 3 4 5 6 7
I am well able to adjust to problems that confront me.	1 2 3 4 5 6 7

I am very flexible when my environment changes.	1 7	2	3	4	5	6
Recuperability						
I recuperate even from things that hit me hard.	1 7	2	3	4	5	6
I recover from any misfortune that happens to me.	1 7	2	3	4	5	6
I am able to bounce back from any kind of adversity.	1 7	2	3	4	5	6
I always resume my life regardless of the type of setback.	1 7	2	3	4	5	6
I can recover from any type of problem.	1 7	2	3	4	5	6

Used with permission (Taormina, 2015).

Appendix D. Connor-Davidson Resilience Scale-10 (CD-RISC-10)

For each item please mark an "x" in the box below that best indicates how much you agree with the following statements as they apply to you after you worked in a disaster setting. If a particular situation has not occurred, answer according to how you think you would have felt.

	Not true at all (0)	Rarely true (1)	Sometimes true (2)	Often true (3)	True nearly all the time (4)
I am able to adapt when changes occur.					
I can deal with whatever comes my way.					
I try to see the humorous side of things when I am faced with problems.					
Having to cope with stress can make me stronger.					
I tend to bounce back after illness, injury, or other hardships.					
I believe I can achieve my goals, even if there are obstacles.					
Under pressure, I stay focused and think clearly.					
I am not easily discouraged by failure.					
I think of myself as a strong person when dealing with life's challenges and difficulties.					
I am able to handle unpleasant or painful feelings like sadness, fear, and anger.					

Used with permission (Davidson & Connor, 2018).

Appendix E. Professional Quality of Life Scale Version 5

When you help people, you have direct contact with their lives. As you may have found, your compassion for those you help can affect you in positive and negative ways. Below are some questions about your experiences, both positive and negative, as a nurse. Consider each of the following questions about you and your experience working in a disaster. Select the number that honestly reflects how frequently you experienced these things in the 30 days following your work in the disaster.

	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very Often (5)
I am preoccupied with more than one person I help.					
I get satisfaction from being able to help people.					
I jump or am startled by unexpected sounds.					
I feel invigorated after working with those I help.					
I find it difficult to separate my personal life from my life as a nurse.					
I think that I might have been affected by the traumatic stress of those I help.					
Because of nursing, I have felt "on edge" about various things.					
I like my work as a nurse.					
I feel depressed because of the traumatic experiences of the people I help.					
I feel as though I am experiencing the trauma of someone I have helped.					
I am pleased with how I am able to keep up with nursing techniques and protocols.					
My work makes me feel satisfied.					
I have happy thoughts and feelings about those I help and how I could help them.					
I believe I can make a difference through my work.					
I avoid certain activities or situations because they remind me of frightening experiences of the people I help.					
I am proud of what I can do to help.					
As a result of nursing, I have intrusive, frightening thoughts.					

I have thoughts that I am a “success” as a nurse.					
I can’t recall important parts of my work with trauma victims.					
I am happy that I chose to do this work.					

Public Domain. (Stamm, 2010).

Appendix F. Qualitative Preparedness Questions

1. When you think about personal preparedness **prior to** a hurricane, what does that preparedness entail?

_____

2. When you think about personal preparedness for you and/or your family **during** a hurricane, what does that preparedness entail?

_____

3. When you think about personal preparedness upon return home **after** a hurricane, what does that preparedness entail?

_____

4. When you think about being professionally prepared **prior** a hurricane, what does that preparedness entail?

_____

5. When you think about preparedness to perform at work **during** a hurricane, what does that preparedness entail?

_____

6. When you think about preparedness to resume work **following** a hurricane, what does that preparedness entail?

_____

7. Do you believe the Likert scale questions captured how you felt about being prepared to deal with the hurricane and all the issues surrounding it?

_____

8. Is there anything else you feel would be beneficial to include?

_____

Appendix G. Informed Consent

THE UNIVERSITY OF TEXAS AT TYLER

Informed Consent (Online, Anonymous) to Participate in Research

Institutional Review Board #F2018-18

Approval Date: October 1, 2018

You are being invited to participate in a study to determine what role preparedness and resilience (the ability to bounce back from adversity) plays in the nurse's personal and professional life after working in a hurricane disaster or in a hurricane disaster relief effort. This will help expand the body of knowledge related to disaster nursing and provide insight into how nurses recover from working during such a traumatic event.

Your participation is completely voluntary, and if you begin participation and choose to not complete it, you are free to not continue without any adverse consequences.

If you agree to be in this study, we will ask you to do the following things:

If you agree to be in this study, we will ask you to do the following things:

* Participate voluntarily

* Complete a confidential online survey that will talk about resilience and how you view your professional life

* Agree to communicate with the researcher if more information is needed.

Risks: We know of no known risks to this study, other than becoming a little tired of answering the questions, or you may even become a little stressed or distressed when answering some of the questions. You are free to take a break and return to the survey to finish it, or, you can discontinue participation without any problems.

Benefits: While completing the survey may not benefit you individually, you will be helping researchers understand how working in a disaster affects nurses.

Understanding what helps nurses to cope and recover from working in such adverse conditions can help the profession be better prepared to deal with the adversity that comes with working in a disaster situation.

If I have any questions concerning my participation in this project, I will contact the principal researcher: Julie George (936-208-9418) or email jgeorge@uttyler.edu

If I have any questions concerning my rights as a research subject, I will contact Dr. Gloria Duke, Chair of the IRB, at (903) 566-7023, gduke@uttyler.edu,

I have read and understood what has been explained to me. If I choose to participate in this study, I will click “Yes” in the box below and proceed to the survey. If I choose to not participate, I will click “No” in the box.

Yes, I choose to participate in this study.

No, I choose to not participate in this study.

Appendix H. IRB Approval

October 4, 2018

Dear Ms. George,

Your request to conduct the study: The role of resilience and preparedness in nurses working in hurricane disasters, IRB # Fall 2018-18 has been approved by The University of Texas at Tyler Institutional Review Board as a study exempt from further IRB review. This approval includes a waiver of signed, written informed consent. In addition, please ensure that any research assistants are knowledgeable about research ethics and confidentiality, and any co-investigators have completed human protection training within the past three years 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:

- 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.

- Exempt with signed waiver of consent

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 I. Biographical Sketch

NAME Julie George	POSITION TITLE Doctoral Candidate, The University of Texas at Tyler Clinical Instructor- The University of Texas at Tyler-Palestine Campus		
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Texas A&M University, College Station, TX	BS Applied Exercise Science	08/2000	Exercise Science
The University of Texas at Tyler, Tyler, TX	BSN	05/2002	Nursing
The University of Texas at Tyler, Tyler, TX	MSN	05/2008	Nursing Education
The University of Texas at Tyler, Tyler, TX	PhD	05/2019	Nursing

Positions:

2012-Present	Clinical Instructor, The University of Texas at Tyler-Palestine Campus
2010-2012	Nursing Instructor, Angelina College, Lufkin, TX
2009-2010	Clinical Instructor, The University of Texas at Tyler-Palestine Campus
2008-2009	Adjunct Faculty, Arkansas State University, Jonesboro, AR
2007-2009	Staff RN, St. Bernard's Hospital, Jonesboro, AR
2005-2007	Community Educator/Immunization Program Director, Cherokee County Health Dept., Rusk, TX
2003-2005	Staff RN/Charge Nurse, ICU, Parkview Regional Hospital, Mexia, TX
2002-2003	Staff RN, Trinity Mother Frances Hospital, Tyler, TX

Professional Memberships:

Sigma Theta Tau
Texas Nurses Association/American Nurses Association