Fall 11-1-2015

Disaster Preparedness Education and Resource Needs for Pregnant and Post-Partum Families

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DISASTER PREPAREDNESS EDUCATION AND RESOURCE NEEDS FOR PREGNANT AND POST-PARTUM FAMILIES

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
Department of Nursing

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College of Nursing and Health Sciences

The University of Texas at Tyler
November 2015

The University of Texas at Tyler

Tyler, Texas

This is to certify that the Doctoral Dissertation of

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November 3, 2015

for the degree of Doctor of Philosophy in Nursing

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Acknowledgments

I wish to thank God who made this possible by putting the right people in my life. A special thanks to Dr. Danita Alfred who mentored and encouraged me through this journey. She and my dissertation committee, Dr. Rebecca Fountain, Dr. Susan Yarbrough, and Dr. Kirk Zinck, provided thoughtful input and support throughout my dissertation process. The nursing faculty and staff at the University of Texas at Tyler, College of Nursing have been inspiring and have encouraged me throughout my Ph.D. journey. Thank you, to Dr. Barbara Haas for coming to the SSTI conference and starting my journey. Thank you to my Uncle Lynn and Aunt Chris, David, Amanda, and all of my family who encouraged me and calmed my fears. Thank you to my friends Beth, Suzy, Sue, Dana, Shannon, and my colleagues for their support and encouragement.

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DISASTER PREPAREDNESS EDATION AND RESOURCE NEEDS FOR PREGNANT AND POST-PARTUM FAMILIES

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November 2015

Hurricane Katrina in 2005 heightened awareness of the need to educate vulnerable populations on disaster preparedness. However, little has been written specifically on the preparedness needs of the pregnant and post-partum families. Only one article explores disaster preparedness education for this population. To fill this gap,

. An interprofessional sample (n=115) rated the relevance of the educational topics and birthing kit items proposed by the panel from the previous Delphi study. The education topics were reduced to four themes that explained 66.80% of the variance and the birthing kit items were reduced to six themes that explained 70.99% of the variance.

Chapter One

Overview of the Research Study

According to a Federal Emergency Management Agency's (FEMA, 2013) report there have been at least 100 natural disasters per year in the United States since 1998. Women and their infants are notably at risk for harm. The purpose of this study was to determine what information health care professionals need to include in the content of disaster-preparedness education and what readiness supplies need to be secured for pregnant and post-partum families.

Disasters wield wide-spread destruction of the environment, economy, social and health care infrastructure; cause loss of life, and overwhelm the ability of individuals and communities to respond using their own resources (World Health Organization & International Council of Nurses (WHO & ICN, 2009). The American Congress of Obstetricians and Gynecologists (ACOG, 2012) recognizes pregnant and post-partum families as vulnerable populations who require proactive planning to ensure that their needs are met during and after a natural disaster.

Despite the passage of 10 years since Hurricane Katrina, little has been done to increase disaster preparedness for pregnant and post-partum women and their families. Identification of pertinent topics is necessary for the creation of education programs that raises awareness and preparedness for this vulnerable population.

Introduction of Articles

The portfolio includes two research manuscripts focused on disaster preparedness of this population. The first manuscript, *Essentials of Disaster Preparedness for Pregnant and Post-partum Families,* describes a two-round Delphi study undertaken to identify the educational topics and items needed for an emergency/disaster birthing kit and to rate the importance of the topics and items generated. The panel of experts (n=20/26) generated 25 education topics and 34 items for the emergency/disaster birthing kit. The Diagnostic Content Validity (DCV) scores for the education topics and birthing kit items were all greater than .5 indicating that all were of acceptable importance.

The second manuscript, *Validation of Essentials of Disaster Preparedness for Pregnant and Post-partum Families,* describes a cross-sectional survey, that was sent to a larger sample of health care professionals (n=115) to validate the 25 education topics and 33 birthing kit items identified through the consensus of the expert panel as described in the first manuscript. The factor analysis yielded four factors from the educational topic themes with significant eigenvalues (>1) and in combination explained 66.79% of the variance. Factor analysis of the birthing kit items yielded six factors with significant eigenvalues (>1) and in combination explained 70.99% of the variance. Three birthing kit items were eliminated from the list as being impractical as part of an emergency in-place birth kit to be used by non-professionals.

The goal of this portfolio was to establish a starting point for the development of brief educational topics for pregnant and post-partum families to increase their awareness of potential natural disasters and what they can do to prepare themselves. The portfolio

presents the research in the form of two manuscripts to be submitted for publication. This research provides a starting point for the development of a disaster-preparedness program for this vulnerable population.

Chapter Two

Essentials of Disaster Preparedness for Pregnant and Post-partum Families

Abstract

Problem: The United States is subject to at least 100 natural disasters per year. Pregnant and post-partum families are vulnerable populations placed at risk for harm during and following a natural disaster.

Purpose: The purpose of this research was to determine what health care professionals need to include in the content of natural disaster-preparedness education and what items were needed for an in-place birthing kit for pregnant and post-partum families.

Method: The Delphi method guided the collection of education topics and birthing kit supplies necessary for the pregnant and post-partum family to prepare for disasters. An interprofessional panel of experts provided key information pertaining to the preparedness needs of this population. A purposeful and snowball sample recruited from the disaster response team and local health care professionals in Northern Illinois responded to a pilot study and the two-round online Delphi survey.

Results: A pilot study (n=5) checked the clarity in the wording of the open-ended questions of the survey. Statements provided by 20 experts in the first round of data collection were synthesized into unique statements and organized thematically. In round two, panel members (n=17) rated the statements using a five-point rating scale. The preparedness-education topics had diagnostic content validity (DCV) scores between 0.78

to 0.96, so all topics were retained. The birthing kit items had DCV scores between 0.65 to 0.96, so all of the items were retained for further validation with the exception of a duplicated item. The results will guide disaster-preparedness education appropriate for pregnant and post-partum families.

Keywords: disaster preparedness, natural disaster, pregnant, post-partum, Delphi technique

Essentials of Disaster Preparedness for Pregnant and Post-partum Families

According to the Federal Emergency Management Agency's (FEMA, 2013a) report at least 100 natural disasters occurred in the United States per year since 1998. According to the Department of Homeland Security (2015), preparedness is "a continuous cycle of planning, organizing, training, equipping, exercising, evaluating, and taking corrective action in an effort to ensure effective coordination during incident response" (para.1). The focus of this study was to determine what topics and items need to be included in a disaster-preparedness educational offering for pregnant and post-partum families to emphasize planning for potential disasters, organizing needed resources, and raising families' awareness of their part in preparedness.

Women and their infants are notably at risk for harm due to natural disasters. Tong, Zotti, and Hsia (2011) reported that following the 1997 Red River flood in North Dakota there was an increase in pre- and post-disaster incidence of anemia (0.7 to 1.1%), acute or chronic lung disease (0.4 to 0.5%), eclampsia (0.3 to 2.1%), and uterine bleeding (0.3 to 0.4%) in mothers as well as an increase in preterm (4.2 to 4.7%) and low-birth-weight infants (8.2 to 8.9%). Callaghan et al. (2007) reported that approximately 56,000 pregnant women and 75,000 infants were directly affected by Hurricane Katrina due to lack of access to safe water and food, exposure to toxins, crowded shelter conditions, and disruption of access to health care. In addition, according to Orlando, Bernard, and Matthews (2008), after Hurricane Katrina it took rescuers four days to evacuate all of the hospitalized mothers and newborns to a safe location.

Disaster experts emphasize that there is a need to learn from disasters and translate those lessons into future preparedness at the federal, state, county, hospital, business, agency, and personal levels (Veenema, 2013; World Health Organization and International Council of Nursing [WHO & ICN], 2009). The American Congress of Obstetricians and Gynecologists (ACOG, 2012) supports disaster preparedness, recognizing that pregnant women and infants risk disproportionate harm from natural disasters due to lack of resources, limited access to medical care, and maternal-fetal/infant sensitivity to toxin exposure (ACOG, 2012; Kirsi & Kirsi, 2011). Harville, Xiong, and Buekens (2011) conducted a systematic review of 49 peer-reviewed studies of disasters and perinatal health. They found that this population was vulnerable to injury, violence, economic impact, medical disruptions, and mental distress during and after a natural disaster. Yasunari, Nozawa, Nishio, Yamamoto, and Takami (2011) provided the only study to date related to the development and testing of educational content for disaster-preparedness education for pregnant and post-partum families. Nurses play an important role in educating this vulnerable population for potential natural disasters.

The Association of Women's Health Obstetric and Neonatal Nursing (AWHONN), (2012) recommended that the role of the nurse should include education for pregnant and post-partum families, involvement with emergency planning within the hospital and community, volunteering with emergency-planning and response organizations, and incorporating emergency preparedness into nursing curricula and continuing education. Childbirth educators could also play an important role in educating pregnant and post-partum women and their families in natural disaster preparedness (DeWald & Fountain, 2006; Ewing, Buchholtz, & Rotanz, 2008; Giarratano et al., 2010).

Therefore, the purpose of this study was to determine what health care professionals needed to include in the content of natural disaster-preparedness education and recommendations for essential items for an in-place birthing kit for pregnant and post-partum families. For the purpose of this study, *essential* (n.d.) is defined to indicate items of the utmost importance: basic, indispensable, necessary.

Review of the Literature

Leaning and Guha-Sapir (2013) reported that natural disasters have steadily increased since the 1970s with a threefold increase from 2000 to 2009 compared to 1980 to 1989. Experts agree that financial and social costs will continue to rise, due to climate change, aging infrastructures, globalized supplies, and shifting demographics to high-risk areas unless substantive actions are taken to reduce losses and enhance life and property safety (FEMA, 2013b).

Effects of Disaster Events on Pregnancy Outcomes

Tong et al. (2011) reported that although numerous disaster-related studies had been conducted there were limited data on the impact of natural disasters on pregnancy outcomes. Dancause et al. (2011) found that prenatal maternal stress during the first or second trimester had moderate effects on length of gestation (OR 1.09, 95%, CI 1.03-1.16) and birth weights (OR 1.11, 95%, 1.03- 1.21) of infants born after the ice storms in January 1988 in the St. Lawrence River Valley, Quebec, Canada. Xiong et al. (2008) reported that women with high hurricane exposure (feeling their lives were in danger, having suffered injury to self or family, walking through flood waters, etc.), had more negative outcomes than those who did not have this experience. For instance, a frequency of low-birth weight of 14% versus 4.7% and a preterm birth-rate of 14%

versus 6.3%was experienced by women with high hurricane exposure. Callaghan et al. (2007) noted that pregnant and post-partum women and infants who experienced natural disaster were at risk from exposure to environmental hazards, contaminants, and psychological stress as well as complications of pregnancy, delivery, and post-partum recovery; prevention of these potential complications must be considered in disaster planning.

Educational Programs for Vulnerable Populations

Educational programs have supported successful outcomes in other vulnerable populations by offering disaster preparedness as part of patient care (Baker, Baker, & Flagg, 2012; Johnson et al., 2013). Baker et al. (2012) used a pretest/posttest research design to evaluate a short educational program on disaster preparedness for the parents of children with special needs. The researchers randomly assigned 121 families to the intervention (education only) or intervention plus (education plus personal disaster kit) incentive groups. In both groups, posttest scores were significantly higher suggesting the interventional education was successful. Following Hurricane Katrina, 94 dialysis centers were closed for longer than a week. Affecting 5,849 patients, including 148 who died within the month following the disaster (Kopp et al., 2005). Using this information and in response to the 2011Queensland floods, the Queensland Disaster Response professionals developed and implemented a plan for dialysis patient care titled Queensland Statewide Disaster Preparedness Guidelines for Dialysis Units (Johnson et al., 2013). The plan included providing the patient with education on self-reliance during a crisis, resonium A/lactulose kits and instructions for use of the kits, dietary advice sheets, dialysis patient information cards, and disaster-preparedness checklists. The plan

also included an attempt to ensure that the patients had sufficient supplies and medications for two weeks, and a system to improve dialysis patients' personal disaster preparedness and response. The plan was put to the test during Cyclone Yasi in 2011. Researchers found the education, preparation, and use of the dialysis kits successfully mitigated hyperkalemia and fluid overload. No fatalities or significant morbidity occurred following the cyclone. Other vulnerable populations have benefitted from disaster-preparedness education and this may be a benefit to the pregnant and post-partum families.

Recommendations and Research

Many organizations and authors have made recommendations for the development of programs to address disaster preparedness for pregnant and post-partum women; however, only one program has been implemented and reviewed (DeWald & Fountain, 2006; Ewing, 2008; Giarratano et al., 2010). Yasunari et al. (2011) conducted a quantitative pre-/post-evaluation using a control group (no education on disaster preparedness) and an intervention group (education on disaster preparedness) for women in their second trimesters. The researchers found that the educational program for this population was successful in reducing anxiety.

A variety of professionals and professional organizations have made recommendations for emergency birthing kits. Some common items included bulb suction, cord clamps/ties, baby hats and blankets (DeWald & Fountain, 2006; Ewing et al., 2008; Giarratano et al., 2010; Pfeiffer et al., 2008). Other items have also been recommended by various sources; however, no consensus of recommended plans have been implemented and evaluated.

Pfeiffer et al. (2008) reviewed the needs of pregnant and post-partum women with newborns during a disaster and recommended "local, state, and national agencies must prioritize the care of women and infants through policy, procedure development, training of health professionals, and supply preparation for future disasters" (p. 463). Giarratano et al. (2010) and Ewing et al. (2008) conducted reviews of the literature to collect internet resources that could act as a template for childbirth education classes for emergency preparedness for pregnant women and their families and published their findings for reference. Giarratano et al. (2010) emphasized the need to "empower childbearing women and their families" (p. 480) to reduce the risks to their lives by creating a disaster-preparedness plan for evacuation, sheltering, in-place birthing, and mental health before a disaster strikes. Dynes et al. (2011) conducted a non-experimental, descriptive design study using both quantitative and qualitative data collection techniques following a community-based educational program (Home-Based Life Saving Skills) for supporting a healthy delivery. Data were collected from 2,409 pregnant women one-year after administering the American College of Nurse-Midwives (ACNM) training sessions, Home-Based Lifesaving Skills. The results showed that the program was very successful in improving safe at-home deliveries (Dynes et al., 2011). Research findings support the need for pregnant and post-partum women with infants to be educated in disaster preparedness to improve disaster response and outcomes. However, it is not clear what elements of preparation should be included in educating this vulnerable population.

Research Design and Rationale

A Delphi design was chosen for this study. Keeney, Hasson, and McKenna (2011) and Hsu and Sanford (2007) outlined the Delphi method as follows: (a)

the selection of an expert panel and the assignment of identification numbers; (b) the construction and email distribution and collection of round-one questionnaire; (c) the synthesizing and categorization of the answers from round one and construction of round two questionnaire; (d) distribution and return of subsequent questionnaires; (e) collation and analysis of answers from subsequent questionnaires; and (f) return of findings from Delphi study to participants.

This study included two rounds of Delphi methodology using an iterative survey process and an interprofessional panel of experts to determine by consensus the content for disaster-preparedness education for pregnant and post-partum families. These two rounds were conducted with an expert panel of interprofessional experts who had responsibility for direct care, teaching, or emergency response to pregnant and post-partum families. An *expert* is defined as having or showing special skill or knowledge because of what has been taught or what has been experienced (expert, n.d.). For the purpose of this study expert will also mean someone who has a vested interest in the topic with a minimum of three-year' post-license or -certification experience and first-hand experience with the population (Keeney et al., 2011).

A Delphi survey allows the researcher to combine the elements of qualitative and quantitative research. The rationale for using the Delphi survey method is that this multiple-round research method allows a greatly dispersed interprofessional panel, experienced with pregnant and post-partum families (care, education, delivery, disaster response) to express their opinions and through repeated rounds, attempt to reach consensus on the research questions. Portney and Watkins (2009) defined a Delphi survey as a method whereby decisions on items are based on the consensus of a panel.

An electronic Delphi, such as the one used for this study, allows research to progress even when the expert panel would find it difficult or impractical to gather for face-to-face meetings. This study will help to fill in gaps in research related to the content for education on disaster-preparedness for pregnant and post-partum families.

Organizational Framework

The Delphi technique was also chosen as the organizing framework of this study to identify educational topics and birthing kit items to be included in a disaster-preparedness educational offering for pregnant and post-partum families. One purpose of the Delphi technique is to produce sustainable information to be used in decision-making; therefore, it is an appropriate organizational framework for this study (Keeney et al., 2011; Paré, Cameron, Poba-Nzaou, & Templier, 2013). There are no universal guidelines for the Delphi study and there are many modifications of this technique (Keeney et al., 2011). The Delphi technique is a preplanned, iterative research process that seeks to gain the consensus of experts on a given topic through serial surveys. One premise of the mixed-method Delphi technique is that group opinion is more valid than individual opinion (Keeney et al., 2011). This technique can also combine the qualitative and quantitative methods of research. The core of mixed method is that it combines both qualitative and quantitative methods and provides a more complete understanding of a research question than either approach alone (Creswell, 2014).

In this study, qualitative data gathered from experts, is then reduced to unique statements, and returned to the expert panel for assessment of relevance. The relevance was judged using quantitative methods that included validation of the statements using Diagnostic Content Validity (DCV) scores.

Methods

Research Questions

Research question one: What educational topics on disaster preparedness should be included in the disaster-preparedness educational material for pregnant and post-partum families?

Research question two: What essential birthing supplies should be included in an in-place disaster/emergency birth kit?

Sample and Setting

Guidelines regarding the size of an expert panel in a Delphi study vary. The group needs to be representative of the stakeholders involved in the issue but not so large that the qualitative data gathered are unmanageable (Keeney et al., 2011). Skulmoski, Hartman, and Krahn (2007) stated that if the group is homogeneous (minimum of three years' experience in their specialty), 10-15 participants may yield sufficient results. Since the study group is heterogeneous (different specialties), the goal was to attract a group of 20 professionals from different interprofessional groups involved in providing care, education, or disaster response to this vulnerable group.

The researcher recruited participants for this study through purposive and snowball sampling. Eligible participants for the Delphi survey included obstetric (OB) medical doctors, nurse midwives, child birth educators, public health nurses (working with pregnant and post-partum women), and OB registered nurses working in primary care offices with at least three years' post-licensure clinical experience. Emergency medical technicians-paramedics (EMT-P) with at least three years' experience and trained to be first responders, were also included due to their experience with emergency

birthing situations. Participants with disaster planning and experience were specifically targeted. Of the respondents, 18 of 20 had disaster training, 8 of 20 had participated in a disaster response, and 5 of 20 were active member of a disaster response team. All participants worked in a single county in the region.

The researcher contacted the health department director of a county in Northern Illinois to discuss potential stakeholders from the interprofessional members of the disaster medical systems response team in Northern Illinois. The researcher recruited other known health care professionals from the private sector as needed to complete the panel.

Twenty-six invitations to participate in round one of the survey were emailed with a return of 20 (76.9%). Respondents to round one consisted of four males (20%) and 16 females (80%) with ages ranging from 28 to 60 years old. Thirteen registered nurses, three were childbirth educators and two were lactation consultants, and seven EMT-Ps responded to the survey. The panel reported between six and 33 years' experience (see Table 2.1 for demographic information). The total number of participants adds up to greater than 20 because some had more than one license or certification. All considered their work locations to be in areas that could be affected by a natural disaster.

In round two, 20 surveys were sent to the same participants from round one with 25 education topics and 34 birthing kit items to be rated. There were 17 of 20 (85%) responses to the second survey. Round two consisted of three males (17.6%) and 14 females (82.4%) with ages ranging from 30 to 60 years old. Respondents included 12 registered nurses, two childbirth educators, one lactation consultant and five EMT-Ps with between six and 33 years' experience (see Table 2.1). Again the total adds up to.

Table 2.1 Descriptive Demographic Survey

	Delphi Study n=20
Gender	Male = 4 /Female = 16 Missing = 0
Age Range	30 – 60 (M = 44.15)
Years in Specialty Range	6 – 33 (M = 18.3)
Position*	MD = 0
	RN = 13
	Nurse Practitioner = 0
	Child Birth Educator =3
	Lactation Consultant = 3
	EMT-P = 7
	Other = 2
Do you consider your work location is in an area that could be affected by a natural disaster?	Yes = 20 (100%) No = 0 Missing = 0
	Hurricane =2 (10%)
	Tornado = 19 (95%)
	Ice Storms = 19 (95%)
Do you consider your work location is in an area that could be affected by a natural disaster?	Wildfires = 1 (5%)
	Flood = 12 (60%)
	Blizzard = 18 (90%)
	Earthquake = 9 (45%)
	Other = 5 (25%)
Disaster Training	Yes = 18 No = 2 Missing = 0
Participated in Disaster Response	Yes = 8 No = 12
Disaster Response Team member Continued on next page	Yes =5 No = 15
Should office staff discuss disaster preparedness with pregnant and post-partum families	Yes = 13 No = 3 n/a = 4
Is disaster preparedness included in prenatal classes	Yes = 0 No = 13 n/a = 7
	Northern Illinois

*some participants indicated more than one position

greater than 17 because some of the participants had more than one license or certification.

Protection of Human Subjects

Institutional Review Board (IRB) approval was obtained from the University of Texas at Tyler for a multi-part research study that included this two round Delphi (see Appendix A.1). In the email invitation for potential participants (see Appendix A.2), the researcher explained the purpose of the study, that participation was voluntary, the risks and benefits to the participant, and the participants' right to withdraw at any time. An online consent from each participant was obtained with the completion and submission of the survey. The researcher was the only one to know the identity of the survey participants. Each potential participant was assigned a random alphanumeric identifier, and all responses were stored on a password-protected flash drive in the researcher's office in a locked drawer. True anonymity cannot be guaranteed in an electronic Delphi because, although other participants do not know an individual panel member's responses, the researcher does. Thus, many researchers have used the term quasi-anonymity (Keeney et al., 2011; Rausch, 1979).

This study was quasi-anonymous. The participants may have been known to each other (purposive and snowball sampling) and to the researcher, but their responses were known only to the researcher and results were reported collectively.

Data Collection

While the need for disaster preparedness for pregnant and post-partum families is acknowledged, the specific educational topics and processes were not known at this time. The first round expert panel determined the variables for the study. Demographic

questions and broad open-ended questions made up the instrument for the first-round of this study (see Appendix B). The open-ended questions encouraged free flow of ideas

To help ensure validity, the panel members were contacted by email (Appendix B) thus avoiding the potential for face-to-face bias. The advantages of the electronic Delphi survey are the quasi-anonymity of the participants to one another's' comments, the feedback process, which allows the participants to reassess their responses without undue pressure to conform to another's responses; and a statistical representation of group responses (Hsu & Sandford, 2007).

Pilot Study. To ensure clarity of the questions, a pilot test was done with five people known to the researcher and an experienced researcher. As a result of the pilot, changes were made to the wording and formatting. The first research question originally was as follows: "What unique natural disaster preparedness information should be included in the pregnant and post-partum education material?" It was changed to "What educational topics on disaster-preparedness should be included in the pregnant and post-partum educational material?" No changes were suggested for the second research question.

Round one. Round-one included the consent, demographic questions, and two open-ended questions. The round-one survey was emailed to 26 potential participants, which included a link to a © 2014 Qualtrics Survey (see Appendix B). The survey recruitment letter contained the consent (see Appendix A.2), the demographic questions and the two qualitative questions. The round-one demographic survey gathered data about the panel participants including age, years in practice, prior experience with disaster training or response, and importance of disaster-readiness education.

Email reminders to complete the survey and questionnaire were sent out at one-week intervals after the initial email until 20 eligible participants had responded. The responses from round-one were reviewed and combined when necessary to include all unique statements, reviewed by an experienced researcher with disaster-preparedness experience, and sent back out to the expert panel to rate the importance of the education topics and birthing kit items generated in round-one.

Round two. Round two also used an email link to a new © 2014 Qualtrics survey (see Appendix C) that asked the participants who responded to round-one (n=20) to rate the importance of the responses from the first round on a scale from one to five. Email reminders were sent weekly to the respondents asking them to complete the survey.

Analysis

Round one. Demographic data were collected and analyzed to describe the characteristics of the expert panel. The data collected from the two open-ended questions were analyzed using content analysis. Utilizing Microsoft Excel software, the researcher organized the topics for education and the essential birthing kit items into unique statements. Duplicate responses were reduced to one item. In consult with the experienced researcher, similar responses were identified and a determination was made for which education topic or birthing kit item would stand alone or be incorporated into another similar topic or item. Discrepancies were discussed until agreement was reached on the educational topics and birthing kit items that were included for round-two.

Round two. The round-two survey was based on the data collected from round one. The researcher sent the education topics and birthing kit items list collated from round-one to the 20 participants who responded to round-one. Participants were asked to

rate each topic or item on a scale from one - "(not important at all)" to five - "(most important)." A mean score for each topic and item was calculated. To determine the validity, a DCV score was derived by taking each statement/item and multiplying by 1=0, 2=.025, 3=0.5, 4= 0.75, and 5=1 so that each weighted score would be no more than 1.0 (Fehring, 1987; Sparks & Lien-Gieschen, 1994; Wieck, 1996). A DCV score of 0.80 or greater indicates a statement/item of major importance. A statement or item that scored between 0.5 to 0.799 was considered of minor importance, and a score of 0.499 or less would be discarded as not important (Sparks & Kueb-Gieschen, 1994; Wieck, 1996). This information was used to determine the content of the educational topics and the contents of the disaster/emergency in-place birthing kit.

Findings

Round one

The responses from round-one (20 of 26, 76.9%) were combined into unique statements and presented in round-two. The number of items generated was 25 education topics and 34 birthing kit items.

Round two

The second-round questionnaire consisted of 25 education statements, 34 birthing kit items. The panel members, n=17 (see Table 2.1) reviewed and returned the rated statements and items. The top natural disasters listed by the respondents for this Northern Illinois County were tornado (19 of 20), ice storms (19 of 20), and blizzard (18 of 20). Eighteen stated they had previous disaster-preparedness training, eight had participated in a disaster response, and five were members of a disaster team. When asked if education was important to pregnant women, 12 of 20 (60%) stated "Yes", 3 of

20 (15%) said “No”, and 5 of 20 (25%) stated “not applicable.” When asked if disaster preparedness was included in prenatal classes 14 of 20 (70%) stated “No”, five others stated “Not applicable,” and one did not answer.

In round-two none of the 25 education topics had a DCV score of 0.499 or less, only two had scores between 0.50 and 0.799, and the lowest score was 0.78. The two topics that scored 0.78 were storing of supplies and alternate routes to the hospital/clinic for an appointment or labor. The top-rated topics with a DCV score of 0.96 were what-to-do list; how to prepare for an emergency; and, in a rural area, what to carry in the car in case of being stranded. The topic with DCV score of 0.94 was clean drinking water. The topics with DCV scores of 0.93 were first-aid kit; instructions for after the baby comes; and how to prepare for the birth of a baby.

None of the 34 birthing kit items had a DCV score of 0.499 or less, 12 of 34 (35%) had scores between 0.50 to 0.799, 22 of 34 (65%) had a score greater than 0.80. The range of scores was 0.97 to 0.64. The top-rated item with a DCV score of 0.97 was water for three days. Bulb suction and bottled water had DCV scores of 0.96. Cord clamps had a DCV score of 0.93 and old newspapers had the lowest DCV score of 0.64. The results were reviewed with an experienced researcher, and it was decided to retain all education topics and birthing kit items.

Discussion

Pregnant and post-partum families have been recognized as vulnerable populations during a disaster (ACOG, 2012; Veenema, 2013; WHO & ICN, 2009). Educational programs have proven successful in preparing other vulnerable populations for times of disaster (Baker et al., 2012; Johnson et al., 2013). Recommendations from

the literature for the creation of an educational presentation focused on health care providers and not on the family. Most of the education topics suggested by the expert panel in this study were reflected in one or more of the literature sources (see Table 2.2). However, none of these resources provided an organized or comprehensive approach to study, plan, or disseminate the needed information. The study panel suggested one new topic, car preparation (water, food, blankets) (DCV 0.96). One topic the panel did not list was the need for a copy of the prenatal record (ACOG, 2010; Giarratano et al., 2010). An additional topic not suggested by the expert panel was the importance of making prior arrangements for medical care during a time of disaster (Yasunari et al., 2011). Yasunari and colleagues recommended that pregnant families make a plan for medical care in a location away from the disaster area. This is extremely important if delivery is imminent.

Table 2.2 Educational Topics with DCV ≥ 0.9

Topic	DCV	Supported in the Literature
General disaster preparedness	0.9	AWHONN, 2012; Ewing et al., 2008; Giarratano et al., 2010; Yasunari et al., 2011
Emergency Home supplies	0.9	AWHONN, 2012; DeWald et al., 2006; Ewing et al., 2008; Yasunari et al., 2011
Post-partum care for mom	0.9	AWHONN, 2012; Emergency Preparedness for Childbirth, 2011; Giarratano et al., 2010
Basic Newborn Resuscitation	0.92	DeWald et al., 2006; Emergency Preparedness of Childbirth, 2011; Ewing et al., 2008; Giarratano et al., 2010
First Aid Kit	0.93	DeWaldet al., 2006; Giarratano et al., 2010
How to prepare for the Baby's birth	0.93	DeWald et al., 2006; Emergency Preparedness for Childbirth, 2011; Ewing et al., 2008; Giarratano et al., 2010
Instruction for how to prepare for a disaster	0.96	AWHONN, 2012; Yasunari et al., 2011
Car preparation	0.96	Suggested in the study but not mentioned in the literature

ACOG (2012) and AWHONN (2012), again focusing on the health care provider, suggest that patients be encouraged to develop items for an emergency birth kit. Table 2.3 lists the top 10 items suggested by the expert panel for the in-place emergency birth kit . One unique and clever addition to the list of supplies for the birthing kit suggested by the panel was the inclusion of a head strap flashlight (hands free) (DCV 0.85). Prior to this study, there was no organized or comprehensive list of essential birthing supply items needed for this population to prepare for a disaster.

Table 2.3 Top Ten Birthing Kit Items

Item	DCV	Support in the Literature
Infant Bulb Suction	0.96	Giarratano et al., 2010
Bottled water	0.96	Giarratano et al., 2010; Pfeiffer et al., 2008
Cord Clamps	0.93	Giarratano et al., 2010
Plastic sheeting	0.89	AWHONN, 2012; Ewing et al., 2008
Antiseptic wipes and blankets	0.88	Ewing et al., 2008; Giarratano et al., 2010
Blankets	0.88	Ewing et al., 2008; Giarratano et al., 2010
Instructional card for post-partum Hemorrhage	0.87	AWHONN, 2012; Emergency Preparedness for Childbirth, 2011
Hand sanitizer	0.86	Ewing et al., 2008
Formula, snacks for mom	0.86	Ewing et al., 2008; Giarratano et al., 2010
Breast feeding /Re-lactation	0.84	AWHONN, 2012; Emergency Preparedness of Childbirth, 2011; Ewing et al., 2008; Giarratano et al., 2010
Head strap flashlight	0.85	Suggested in the study but not mentioned in the literature

Study Strengths and Limitations

As with all research methods, this study has strengths and limitations. The strengths of this study include the use of the Delphi, a flexible methodology. The panel included only those health care professionals who provided direct care to the pregnant and post-partum families. Panel members who had disaster response experience and

training were also sought. Email surveys enhanced the anonymity and diminished the tendency to conform found in a face-to-face meeting (Iqbal & Pipon-Young, 2009; Keeney et al., 2011). Other strengths include having representatives from different specialties on the expert panel and an experienced researcher to review and validate results and decisions of the study. Attrition can be a problem in a Delphi study; however, this study had an 85% return on round two. Content validity was supported by group opinion, experts generating the variables and having the opportunity to review, add comments, and change their opinion in a subsequent questionnaire (Keeney et al., 2011). High DCV scores for the large number of educational topics (range = .78 - .96) and birthing kit items (range = .64 - .97) supported content validity.

The researcher has over 25 years' experience in maternal child nursing coupled with a review of the literature, this could create some preconceived ideas about the research and outcomes. Creswell (2014) stated that possible researcher 'bias' would need to be disclosed. To guard against bias and strengthen this study, the surveys were sent by email, the researcher did not discuss the survey with the participants, responses from the expert panel were the sole source of data used for analysis, and interpretation of the all of the data was reviewed with an experienced researcher.

Limitations of the Delphi methodology include lack of universal guidelines, attrition, anonymity, which may result in less ownership of answers, and no agreement on the size of the expert panel (Iqbal & Pipon-Young, 2009; Keeney et al., 2011). In this study, efforts were taken to minimize the effects of those limitations. The process limited the opportunity to explore the rationale of the responses. This was particularly evident by the lack of clarification of the negative response form one nurse participant in round one.

Additionally, electronic Delphi studies are not designed for sharing contextual information such as the intent for the birthing kit to be used by non-professionals with limited or no birthing experience. Without such context, some participants recommended sophisticated birthing kit items appropriate for use by professionals only. The study addressed natural disasters and is not meant to be generalized beyond this sample or to man-made disasters or terrorism events.

Recommendations

Research in nursing is meant to influence the profession through research, education, and practice. Recommendations in each of these areas are addressed.

Research

Research is advanced through replication with and without variation from the original study. A study similar to this one could include lay mid-wives, Doula's, and cultural healers, broadening the perspective for idea generation. A study to focus on similar needs could bring together a panel to study the needs of pregnant and post-partum families from different geographical areas. A geographic study could investigate responses pertinent to coastal areas versus inland areas, warmer climate versus colder climate, or evacuation versus sheltering in-place as a first response.

Education

Including disaster preparedness education for all vulnerable populations such as the pregnant and post-partum family in the nursing curriculum and health care professional training is essential to increase the knowledge of potential educators. Additionally, raising awareness and interest in this topic by presenting the findings of this

study to those already in practice supports the same goal of increasing the knowledge of potential educators.

Practice

Healthcare professionals are highly respected and when they advise or work with patients on disaster preparedness, the message may be better received than messages presented by government or media sources. Reaching out to OB physicians, nurses, and professional organizations, can have a significant impact on the pregnant and post-partum family's attention to the message of disaster preparedness. Additionally, meeting with local, state, or federal government officials to gain financial support to develop a disaster preparedness education template for pregnant and post-partum families may facilitate more timely implementation of study findings.

Conclusion

Pregnant and post-partum women and their families are recognized as vulnerable populations who require proactive planning to ensure that their needs are met during and after a disaster. Unfortunately, very few studies have been done to address how pregnant and post-partum families can prepare for natural disasters. The impact of a natural disaster on a population can be mediated by education and preparation. The purpose of this Delphi study was to determine education topics and birthing kit items for an emergency birth that health care professionals could develop into a disaster-preparedness presentation for pregnant and post-partum families. This study provides a basis for improving disaster preparedness in this population.

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Chapter Three

Validation of Essentials of Disaster Preparedness for Pregnant and Post-partum Families

Abstract

Problem: Disaster preparedness efforts have increased exponentially over the last 10 years. Experts have identified the vulnerability of the pregnant and post-partum family during and after disasters; however, there are no standard recommendations for how best to prepare this population for such events.

Purpose: The purpose of this research was to validate the disaster preparedness needs of the pregnant and post-partum family that were generated from a previous Delphi study.

Methods: A cross-sectional survey design was used to query an interprofessional sample of experts (n=115) engaged in the care, education, or emergency response to the pregnant and post-partum families. The participants were recruited in three stages through purposive and snowball sampling from the United States. Participants rated the relevance of educational topics and birthing kit items needed to prepare the pregnant and post-partum family for a disaster.

Results: Factor analysis was used to validate the essentials of disaster preparedness. Four factors from the educational topics were extracted by the analysis (a) *preparing for birth,* (b)*post-partum care and preparing the home and family for disaster,*(c) *emergency routes and communication plan,* and (d) *emergency information and sources*. The overall high

reliability (Cronbach's α = .95) supports the validity of the items comprising these factors. Six factors were extracted from the list of birthing kit items (a) *delivery supplies for the baby*, (b) *delivery supplies for the helper*, (c) *water, warmth, and feeding*, (d) *after delivery supplies*, (e) *informational cards for birth and post-partum care;* and (f) water *alternative/sanitizer*. The overall high reliability (Cronbach's α = .95) supports the validity of the items comprising these factors.

Key words: disaster preparedness, pregnant, post-partum, education

Validation of Essentials of Disaster Preparedness for Pregnant and Post-partum Families

The World Health Organization and the International Council of Nursing (WHO & ICN, 2009) stated there is no single definition of disaster but all definitions include widespread destruction of the environment, economy, social and health care infrastructure, and loss of life. By definition, disasters also, overwhelm the ability of individuals and communities to respond using their own resources. "*Natural*" is defined as something existing in nature and not made or caused by people: coming from nature, usual or expected (natural, n.d.). Ewing, Buchholtz, and Rotanz (2008) stated that disasters are natural or life-altering events that require preplanning to save the lives of women and their infants. For the purpose of this study, natural disasters were defined as geophysical events, such as earthquakes, volcanic eruptions, rock falls , landslides, or subsidence climate related events such as floods, storm surges, tsunamis, and meteorological events, such as hurricanes, tornados (cyclones), severe storms, extremes of heat or cold, drought, blizzards, or ice storms (Leaning & Guha-Sapir, 2013; Ready, 2013).

The Problem and Purpose

The problem with disaster-preparedness education for pregnant and post-partum families is not a lack of resources but the lack of an organized and consistent approach for inclusion of disaster preparedness education materials during routine prenatal care and education. In addition, disaster-preparedness has focused on the hospital and health care professionals, especially nurses, to participate in disaster preparedness and what they should do to assist their patients/clients (DeWald & Fountain, 2006; Ewing et al., 2008;

Giarratano et al., 2010). To reduce the risks of negative outcomes from a disaster, the family must also assume responsibility for developing, practicing, and evaluating a personal disaster preparedness plan (Ewing et al., 2008; Giarratano et al., 2010; Yasunari, Nozawa, Nishio, Yamamoto, & Takami, 2011). Here in lies the gap in disaster-preparedness education for pregnant and post-partum families. The purpose of this study is to validate the essential education topics and birthing kit items that can be used as a framework for organizing prenatal education to address the unique needs of the pregnant and post-partum family.

Review of the Literature

Disaster preparedness has focused on informing and training hospitals, health care professionals, city, state and government planners; however, the one stakeholder that has been forgotten is the family. Pregnant and post-partum families need to be involved in disaster-preparedness and take accountability for increasing their safety. No one wants to have to deal with a disaster while pregnant or having just delivered, but developing an emergency plan can help inspire confidence in families' ability to handle the unexpected (Giarratano et al., 2010; Yasunari et al., 2011). The key is to provide these families with education and resources to help them cope during a potential disaster. The problem is, there is not yet an educational program that addresses this population. This study hopes to begin to fill this gap.

Recommendations for Disaster Preparedness Education

There are recommendations for how to prepare nurses and physicians to help the pregnant and post-partum families but there has not been any follow through with an action plan and evaluation. Ewing, Buchholtz, and Rotanz (2008) proposed that maternal

child health nurses learn the basics of disaster planning, engage families during childbirth education classes to prepare for a disaster, and incorporate emergency management and disaster planning into the nursing curricula but does not implement or test the suggested educational program. Giarratano et al., (2010) recognized the need for preplanning and education, suggesting that childbirth education classes could prepare families for disaster, offering a template for that education, and internet resources to assist with the development of those courses but the training is for nurses not families. The American College of Obstetricians and Gynecologists (ACOG, 2010) recommend that physicians prepare themselves to work with community planning for disaster readiness and encourage their patients to develop an evacuation plan, emergency birth kit, educate them on signs of preterm labor and birth complications, lactation, and the signs of mental distress; again suggestions, but not a definite plan for implementation. The Association of Women's Health Obstetrics and Neonatal Nurses (AWHONN, 2012) recommends nursing curricula add emergency preparedness, nurses learn to deliver care in low resource settings, and be involved in disaster management including educating the families. This focus on what health care professionals should do to prepare to take care of this vulnerable population has not been implemented and tested nor does it encourage the family to take responsibility for their safety.

Family Responsibility

Pregnant and post-partum families need to be involved in disaster preparedness and take some accountability to increase their safety during a disaster (American Red Cross, n.d.). No one wants to have to deal with a disaster while pregnant or having just delivered, but developing an emergency plan can help inspire confidence in the families

ability to handle the unexpected (Giarrratano et al., 2010; Yasunari et al., 2011). The key is to provide these families' with education and resources to help them cope during a potential disaster. At present, these recommendations have not been turned into an action plan in the form of an educational program that addresses the needs of this population. This study will begin to fill this gap.

Theoretical Framework

The theoretical framework chosen for this study was the Disaster Management Continuum (Appendix D). The World Health Organization and the International Council of Nursing [WHO & ICN], describe the Disaster Management Continuum (see Figure 3.1) as a worldwide method for addressing the phases of disaster (2009). The phases are continuous and nonlinear, and they include mitigation/prevention and preparedness, response, and recovery/rehabilitation. Mitigation is a process in the Pre-disaster Phase to prevent or minimize risks to a community function, or economic impact and to promote disease prevention in order to reduce the loss of life. An example for the pregnant woman or post-partum mother with a newborn infant would be to prepare an emergency kit or an emergency evacuation plan, and acquire a copy of appropriate medical records. The Preparedness, also in the Pre-disaster Phase, is when planning and readiness are most important; this phase includes recruiting volunteers, and planning, equipping, and educating the public. Examples of readiness preparation for pregnant and post-partum women include planning an escape route, having an emergency kit prepared with needed items, and attending prenatal birthing classes. The Response Phase encompasses all actions taken at the time a disaster strikes and the focus is more on the mobilization of responders and not the vulnerable population. The Recovery/Rehabilitation Phase begins

once all of the immediate needs are met and the focus is on restoring vital services, rebuilding, reconstruction, and sustainable development.

Figure 3.1 ICN Framework of Disaster Nursing Competencies

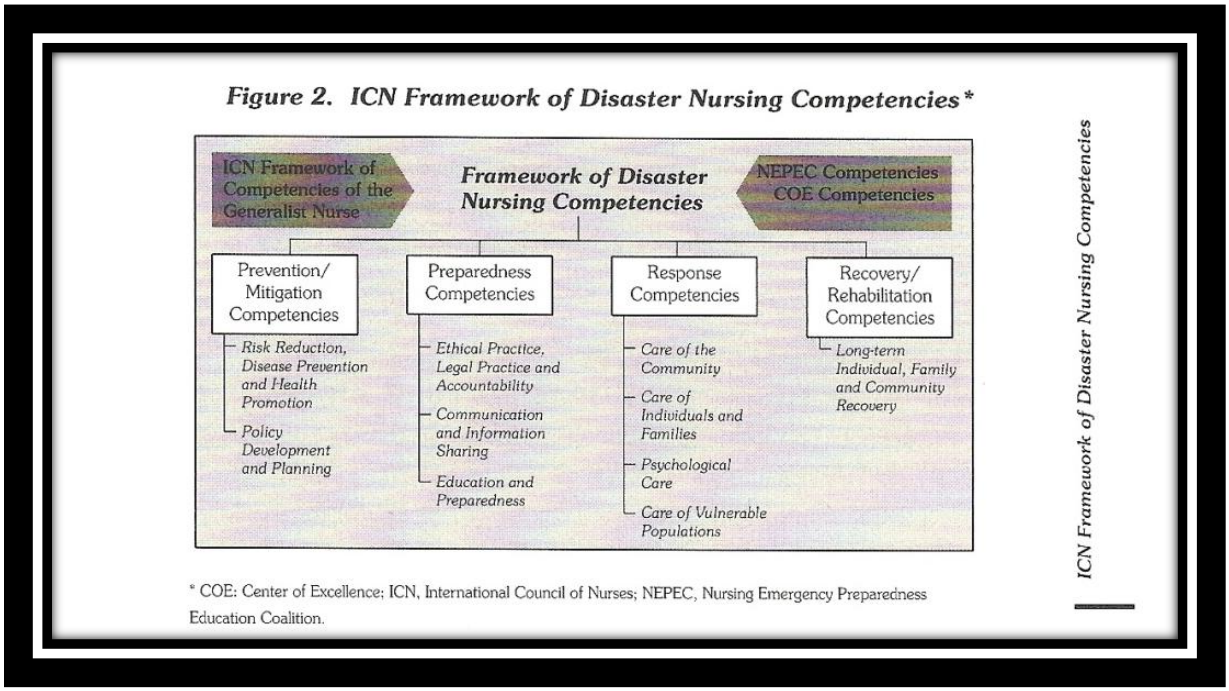

Figure 3.1 ICN Framework of Disaster Nursing Competencies. (2009). World Health Organization (WHO) and International Council of Nurses (ICN). Retrieved from http://myweb.polyu.edu.hk/~hswhocc/resource/D/2009DisasterNursingCompetencies.pdf Reprinted with permission (See Appendix D.)

Within these four phases (Pre-disaster through Recovery/Rehabilitation), ten domains were identified: (a) risk reduction, disease prevention, and health promotion (b) policy development and planning; (c) ethical practice, legal practice and accountability; (d) communication and information sharing; (e) education and preparedness; (f) care of the community; (g) care of individuals and families; (h) psychological care; (i) care of vulnerable populations; (j) long-term recovery of individuals, families, and communities. [WHO & ICN], (2009, p. 49).

The Department of Homeland Security (n.d.) defines preparedness for planners and responders as a continuous cycle of planning, organizing, training, equipping, exercising, evaluating, and taking corrective action in an effort to ensure effective coordination and response during an incident or disaster. This study will focus on the Prevention/Mitigation and Preparedness Phases (see Figure 3.1). Anticipating, educating, and informing are the keys to reducing the deadly effect of natural disasters. Unfortunately, such activities have not been given priority (Matsuura, 2005). Health care professionals are persons who by education, training, certification, or licensure are qualified to provide and engage in providing health care (Health care professional, 2013). There is an opportunity for primary health care providers, childbirth educators, and other health care professionals to assist pregnant women and post-partum women with newborn(s) to be ready should a natural disaster strike.

The Federal Emergency Management Agency (FEMA, 2008) outlines the National Response Framework to include the responsibilities of federal, state, local, and private sectors during an all-hazards response. Disaster preparedness plans include Local Emergency Management (Fire, Police, Public Health, Public Works, and Social Services) collaborating with local hospitals (administrators, department heads, nurses). Local agencies work with State Homeland Security, Emergency Management Agencies, Federal Homeland Security, and NRF (2014) to respond to major disasters (ACOG, 2010; Orlando, Danna, Giarratano, Prepas, & Johnson, 2010). The NRF recommended that individual disaster preparedness plans include being informed about the disasters in their area, making an evacuation or response plan, and building an emergency kit (NFR, 2014).

Pregnant and post-partum-women with infants should take personal accountability to prepare for a potential disaster. Yasunari et al. (2011) suggested that new mothers would want to protect themselves and their families from danger, making this an ideal time to motivate them to create a disaster plan. Health care professionals have the opportunity to educate pregnant and post-partum women with newborns to mitigate and prepare for potential disasters during prenatal classes or primary care practitioner visits.

Research Design

A cross-sectional survey design was used to validate the essential disaster preparedness information needs of the pregnant and post-partum family (see Appendix E). The survey arose from the results of a Delphi study, a technique that is a systematic process of consulting, collecting, evaluating, and tabulating the opinions of a panel of experts on a particular topic (Blackwood, Albarran, & Latour, 2011). The two-round Delphi study was used to identify 25 education topics and 33 birthing kit items that were generated and rated by a panel of experts (n=20). The topics and items retained after that survey created the foundation for this validation study.

The design of this study was a descriptive one-time survey of an expert sample of interdisciplinary professionals from the United States to determine the strength of the education topics and birthing kit items, consistency of measures, and themes for education. This was an appropriate choice of design for this study as the prior Delphi study determined the education topics and birthing kit items involved. This study's purpose was to confirm the relevance of those findings with a larger sample. The sample consisted of 115 interdisciplinary professionals from 26 to 65 years old with a wide range

of experience (4 to 44 years) which adds to the credibility of the foundational themes to be included in disaster preparedness programs for the pregnant and post-partum families.

Methods

Research Questions

There are two research questions guiding this study of disaster preparedness for pregnant and post-partum families:

1. What are the most important factors related to disaster preparedness that should be included in prenatal care education?

2. What are the essential elements of an in-place birthing kit for emergency and disaster situations?

Protection of Human Research Participants

Institutional Review Board (IRB) approval was obtained from the University of Texas at Tyler (see Appendix A.1). The IRB approval for this validation study was included as a unique study component of a larger study. The researcher included in the survey an explanation of the study, that participation was voluntary, the risks and benefits to the participant, and the participants' right to withdraw at any time. Submission of the survey served as informed consent for the study (see Appendix A.3). An IRB modification request (see Appendix A.4) was applied for and approved to expand the data collection to the entire United States.

Sample Description

There is lack of agreement on the number of participants required when completing factor analysis (Field, 2009; Mundfrom, Shaw, & Tian, 2005; Williams, Onsman, & Brown, 2010). Hair, Anderson, Tatham, and Black (1995) suggested that

sample sizes should be at least 100 participants. Comrey and Lee (2013) rated sample sizes: 50 as very poor, 100 as poor, 200 as fair, 300 as good, 500 as very good, and 1000 as excellent. Due to the specific requirements of the participants, the goal for this study was a minimum of 100 completed surveys. The Kaiser-Meyer-Olkin (KMO) > .80 and Bartlett's Test of Sphericity $p \leq .001$ provide support for the adequacy of the sample for this study (Field, 2009).

Inclusion and Exclusion Criteria

Participants (n=115) were recruited for this study through purposive and snowball sampling with a goal of at least 100 participants. The participation inclusion criteria were that they be a health care professional such as an OB/GYN medical doctor (MD), nurse practitioner (NP), physician assistant (PA), labor and delivery nurse, childbirth educator (CBE), lactation consultant (LC), nurse midwife (NMW), or emergency medical technician-paramedic (EMT-P) with a minimum of three years in their specialty, who provided care, education, or respond in an emergency to a pregnant or post-partum family. Participant surveys were excluded if the participant did not complete the survey or meet the inclusion criteria.

The sample (n=115) (see Table 3.1) consisted of four males, 108 females and three that did not disclose gender, ages ranged from 26 to 65 years-old. The sample was composed of one physician (0.8%), 110 registered nurses (95.6%), and four EMT-Ps (3.6%) with experience that ranged from three to 44 years in their specialties. When asked if they considered their work to be located in an area of potential natural disaster 110, answered "Yes."

Table 3.1: Descriptive Validation Survey

	Validation n=115
Gender	Male = 4 / Female = 108 Missing = 3
Age Range	26 – 65 (M = 47.15)
Years in Specialty Range	3 – 44 (M = 19.59)
Position*	MD = 1
	RN = 98
Position* (continued)	Nurse Practitioner =7
	Child Birth Educator =9
	Lactation Consultant = 13
	EMT-P = 4
	Other = 16
Do you consider your work location is in an area that could be affected by a natural disaster?	Yes = 110 (95.7%) No = 4 (3.5%) Missing = 1
`	Hurricane =23 (20%)
	Tornado = 92 (80%)
	Ice Storms = 86 (74.8%)
	Wildfires = 13 (11.3%)
	Flood = 67 (58.3%)
	Blizzard = 56 (48.7%)
	Earthquake = 34 (29.6%)
	Other = 5 (4.3%)
Disaster Training	Yes = 88 No = 26 Missing = 1
Participated in Disaster Response	Yes = 27 No = 88
Disaster Response Team member	Yes =16 No = 99
Should office staff discuss disaster preparedness with pregnant and post-partum families	Yes = 63 No = 28 n/a = 23
Is disaster preparedness included in prenatal classes	Yes = 8 No = 76 n/a = 30
	United States

*some participants indicated more than one position

Responses to the survey came from 25 states with Illinois (38.3%) and Texas (27.8%) having the most respondents. The sample responded that tornadoes (80%), ice storms (74.8%), floods (58.3%), blizzards (48.7%), earthquakes (29.6%), hurricanes (20%), wildfires (11.3%), and other (4.3%) were potential hazards in their areas. A majority (76.5%) of the participants had disaster training; however, only 23.4% have participated in a disaster response and only 13.9% were members of a disaster team. When asked if disaster preparedness was important to discuss with patients 54.8% responded "Yes" but only 7% included topics on disaster preparedness in their education for this population.

Data Collection

Data collection for this study began at the end of April 2015. The initial surveys were sent to all hospitals and clinics in the Northern Illinois area followed by several reminders. However, when after several months, the number of qualified participants was still low (n=47), the survey was extended to every state in the Midwest. Letters were sent to all of the Illinois members of the Academy of Certified Birth Educators, email surveys were sent to the International Childbirth Educators Association, the Illinois Association of Women's Health and Neonatal Nurses, Illinois EMT-P Association, and a Facebook Labor and Delivery Nurses website. In one final push to get participants, the survey was opened to anyone in the United States who met the eligibility criteria (see Appendix A.4). Professional networks were used to distribute the survey to eligible participants using the snowball technique. From the first and second survey emails, 87 completed surveys were received, and, from the third email, 42 completed surveys were

received. Of the 129 completed surveys, 115 participants met the eligibility criteria. See Table 3.2 for the summary of data collection and sample recruitment.

Table 3.2 Summary of Sample Recruitment

	April–May	June–July	August–September	Total
Survey IL	39			87 Original and second push
Second push All of Midwest		48		
Final Push All of U.S.			42	42 Final push
				115/129 met criteria

Findings

Factor Analysis of Educational Topics

Ratings of the relevance of educational topics from the 115 participants were used in a factor analysis. A principle component analysis (PCA) was conducted on 25 educational topics with orthogonal rotation (Varimax). The Kaiser-Meyer-Olkin (KMO) verified the adequacy of the sample for this analysis, KMO=0.89. Field (2009) indicates that a KMO this close to 1.00 should yield distinct and reliable factors. All of the KMO values for individual educational topics were > 0.8, which is well above the acceptable limit of 0.5 (Field, 2009; Portney & Watkins, 2000). Bartlett's test of *sphericity* X^2 (300) =1933.76, $p \leq 0.001$, indicated that it was suitable to continue with the factor analysis. An initial analysis was run to obtain eigenvalues for each of the factors in the data. Four factors had eigenvalues greater than Kaiser's criterion of one and in combination; explained 66.79% of the variance (see Appendix F). The scree plot had a point of

inflection after the fourth factor that would justify including these four factors. Factor analysis revealed four themes, which were labeled, (a) preparing for birth and post-partum care (Cronbach's alpha = .93), (b) preparing home and family for disaster (Cronbach's alpha = .92), (c) emergency routes and communication plan (Cronbach's alpha = .84), and (d) emergency information sources (only one topic). Collectively all 25 educational topics on the survey had a high reliability, Cronbach's alpha = .95.

Factor Analysis of Birthing Kit Items

The researcher conducted a PCA on the 33 birthing kit items for the in-place disaster/emergency birth kit with orthogonal rotation (Varimax). The KMO measure verified the sampling adequacy for analysis, KMO = 0.87, indicating a high potential for distinct and reliable factors (Field, 2009). All KMO values for individual factors were > 0.7, which is above the acceptable value of 0.5 (Field, 2009). An initial analysis was run to obtain eigenvalues for each of the factors in the data. Six factors had an eigenvalue greater than Kaiser's criterion of one and in combination explained 70.99% of the variance (see Appendix G). The scree plot had a point of inflection between factors four and five and six and seven. Given the eigenvalues and the rotated component matrix six factors were retained. Factor analysis of the resulting data revealed six themes, (a) delivery supplies for baby (Cronbach's alpha = .87), (b) delivery supplies for helper (Cronbach's alpha =.90), (c) water, warmth and feeding (Cronbach's alpha = .73), (d) after delivery supplies (Cronbach's alpha = .72), (e) informational cards for birth and post-partum care (Cronbach's alpha = .89), and (f)water alternative/sanitizer (Cronbach's alpha = .75). Collectively all 33 birthing kit items on the survey had a high reliability, Cronbach's alpha = .95.

Of the 33 birthing kit items factored into six themes, three items were removed from the list because they were considered very costly and impractical for non-professional use. The three items were, an intramuscular injection kit of oxytocin, an infant resuscitation bag, and an intravenous kit and fluids. The remaining 30 items would need to be reviewed in a future study or meeting with a panel of experts and the number of recommended items for the birthing kits would need to be reduced to be manageable and cost-effective.

Discussion of Findings

Education

There is a gap in the literature concerning programs that have been implemented to encourage disaster-preparedness for pregnant and post-partum families. DeWald and Fountain (2006) and Giarratano et al. (2010) encouraged childbirth educators to include disaster preparedness and emergency childbirth instruction in their classes. Ewing et al., (2008) stated that health care providers, maternal child nurses, and childbirth educators need to be informed about basic disaster planning for the population they serve.

Yasunari et al. (2011) created and tested an educational program in Japan that included six topics: (1) the importance of preparedness, (2) contact methods with families in times of disaster, (3) receiving medical examination in times of disaster, (4) evacuation sites and routes in times of disaster, (5) items to prepare in case of emergency, and (6) preparing for safety inside a home. The current study reflected similar topics to those in the study by Yasunari et al.(2011).

Educating families about preparation for birth and post-partum care during a disaster raises awareness regarding the importance of family preparedness. Through

education, families know what steps to take for disaster preparation of the home and family. Preplanning emergency evacuation routes and communication plans help families to think through any issues that might occur in the event of a real disaster evacuation.

Birthing Kit

The birthing kit items factored out into six themes. The items in the delivery supplies for the baby that were reflected in the literature included cord clamps, bulb suction, and source of warmth (DeWald et al., 2006; Emergency Preparedness for Childbirth, 2011; Ewing et al., 2008). The second theme, delivery supplies for the helper, were waterproof pads and a container for the placenta, were also found in the literature (DeWald et al., 2006; Ewing et al., 2008). Other items reflected in the literature were water, warmth, and feeding items: water for mom and formula preparation, appropriate clothes, and feeding instructions (Association of Women's Health Obstetrics and Neonatal Nurses [AWHONN], 2012; Emergency Preparedness of Childbirth, 2011; Giarratano et al., 2010). After delivery supplies were also reflected in the literature: OB pads, snacks for mom, and diapers (Pfeiffer et al., 2008; AWHONN, 2012), informational cards (AWHONN, 2012; Emergency Preparedness of Childbirth, 2011), and water alternative (Emergency Preparedness of Childbirth, 2011). Many suggestions were made by the experts of this study for birthing kit supplies; however, this extensive list would need to be further investigated to reduce the items to an essential in-place emergency birthing kit.

Study Strengths

External validity was supported in this study because of the diversity of the sample, with different geographic areas, specialties, ages, years in the field, and life

experiences represented (Keeney et al., 2011). General validation of the educational topics and birthing kit items generated in a previous Delphi study supports the 25 educational topics and 33 birthing kit items that reduced to four educational topic themes and six birthing kit item themes through factor analysis. These findings can be the foundation for an educational program. The l educational topics internal consistency reliability (α= .95) was high for an initial survey. Also, a KMO value of .89 and a significant ($p \leq .001$) Bartlett's Test of Sphericity showed that the sample was adequate for factor analysis. The birthing kit items internal consistency reliability (α=.95) was also high for an initial survey. A KMO value of .87 and a significant ($p \leq .001$) Bartlett's Test of Sphericity indicated that the sample was adequate for factor analysis.

Good participation (n=115) in this study created a consensus of four educational topic themes and six birthing kit item themes and is a strength of this study. The email approach allowed a broader sample to have input into the survey questions.

Study Limitations

The email approach may be considered strength but may also be considered a weakness of the study because concerns arise as to the ownership or seriousness of the participants' answers to the survey. The imbalance in the participants' professions RN's (n=110), MD (n=1,) and EMT-P (n=4) may also be considered a limitation. However, the RN is the health care professional seen by the patient most often and has the greatest ability to implement disaster preparedness activities.

Recommendations

Nursing is a practice discipline, learned through education, and guided by evidence. Therefore, relevance to this discipline is addressed in recommendations for research, education, and practice.

Research

The findings of this study should be used to plan and test the effectiveness of an educational intervention on disaster preparedness for the pregnant and post-partum family in the United States. Measuring knowledge, intention to prepare, and actual preparedness will provide evidence for future programs targeting pregnant and post-partum families. The study should be compared to the findings presented by Yasunari and colleagues (2011). Such comparisons help to build the evidence for future practice. Conducting research that includes the perspectives of alternative birth attendants and midwives could increase disaster preparedness for more families. Reaching out to this group of care providers might result in recommendations for education, supplies, or relevant cultural practices that should be included in disaster preparedness efforts.

Education

The findings of the educational needs of the population should be incorporated into professional education at the pre-licensure, post licensure and advanced practice levels for nurses and other providers. The study findings should also be used to prepare programs for educational outreach with disaster preparedness professionals, health care providers, and the target population.

Practice

Dissemination of the findings is an important obligation of the researcher. Presentations at professional conferences for nurses, emergency/first responders, and disaster preparedness planners will assist in updating other audiences. These professionals are in a position to incorporate the research findings in their respective areas of practice. It is also essential to discuss findings with key disaster preparedness government personnel at the local, state, and federal level who have authority to disseminate information, influence policy decisions, fund application of findings, and support future research.

Conclusions

This study validated the 25 disaster preparedness educational topics and 33 birthing kit items generated in a previous Delphi study of the needs of pregnant and post-partum families. The factor analysis revealed four education topic themes (a) *preparing for birth and post-partum care,* (b) *preparing home and family,* (c) *emergency routes* and (d) *communication, and emergency information sources*. Six themes for birthing kit items were also revealed through factor analysis, (a) *delivery supplies for baby,* (b) *delivery supplies for helper,* (c) *water, warmth and feeding,* (d) *after delivery supplies,* (e) *informational cards for birth and post-partum care,* and (f) *water alternative/sanitizer*. These themes provide a basis for the development of educational offerings to prepare pregnant and post-partum families for disaster and have filled a gap in the care of pregnant and post-partum families.

This study identified an opportunity for health promotion (prevention/mitigation) through the recognition of potential natural disasters and identification of educational

topics and birthing kit item themes for health care professionals to develop into educational offerings. These themes can be further developed into educational offerings and preparation checklists (Preparedness/Communication- see Figure 3.1) for pregnant and post-partum families. Continued work on the educational topics and in-place birth kit could lead to the development of instructional cards to help with an emergency birth, post-partum care, breastfeeding, and a list of supplies to have on hand for these vulnerable families during a time of natural disaster or threat of a natural disaster.

The findings of this research can be used to generate a product that educators can use to raise awareness and improve the health and safety of vulnerable families during a disaster. Nurses most surely can play a very valuable role in the education and preparation for disasters in this vulnerable population.

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Chapter Four

Summary of Work and Recommendations

There is very little research into disaster preparedness for pregnant and post-partum families. Research of disaster-preparedness education of other vulnerable populations has reported that education was successful (Baker, M., Baker, L., & Flagg, 2012; Johnson, Hayes, Gray, Hawley, Hole, & Mantha, 2013). There seems to be a consensus that disaster-preparedness education is an important topic; however, with busy schedules and not enough time to get everything done, development of a program has not been given priority. An expert panel, starting with no preconceived suggestions made recommendations from which educational materials can be developed. A larger sample validated the findings by reducing the topics and items into themes. The educational offerings that can be developed from these themes will help pregnant and post-partum families be better prepared for natural disasters in their geographic areas.

Essentials of Disaster Preparedness for Pregnant and Post-partum Families reports a consensus of experts (n=20) in identifying 25 educational topics and 34 items for an emergency in-place birth kit. Participants were a diverse, interdisciplinary panel chosen from Northern Illinois to increase study reliability. Round-two diagnostic content validity (DCV) values were strong, ranging from 0.78 to 0.96 on the educational topics and from 0.64 to 0.97 for the birthing kit items, so none of the topics or items were eliminated. These results demonstrated consensus among the expert panel. One birthing

kit item was duplicated and was removed. The list of 25 educational topics and 33 birthing kit items generated by the study were used as the basis of the second manuscript.

A second study, *Essentials of Disaster Preparedness for Pregnant and Post-partum Families*, reports the survey of a larger interdisciplinary sample to validate the list of 25 educational topics and 33 birthing kit items produced from the previous Delphi study. A diverse sample of participants (n=115) from the United States was recruited using a purposive and snowball sampling technique. The educational topic portion of the survey has a Cronbach's alpha (α) of .95, a KMO of 0.89, and a significant Bartlett's Test of Sphericity ($p \leq .001$) all indicating a strong internal consistency and an adequate sample for factor analysis (Field, 2009). The birthing kit items portion of the survey has a Cronbach's alpha of .95, a KMO of 0.87, and a significant Bartlett's Test of Sphericity ($p \leq .001$) all indicating a strong internal consistency and an adequate sample for factor analysis (Field, 2009).

The factor analysis yielded four educational themes (see Appendix F) with eigenvalues greater than 1.0, which represented 66.79% of the variance. The first theme *preparing for birth and post-partum care*, represented 24.73% of the variance and the topics within the themes had a reliability of $\alpha = .93$. The second theme, *preparing home and family*, represented 22.12% of the variance and the topics within this theme had a reliability of $\alpha = .92$. The third theme, *emergency routes and communication plan*, represented 12.89% of the variance and the topics within this theme had a reliability of $\alpha = .84$. The fourth theme, *emergency information sources*, represented 7.05% of the variance with only one topic within the theme.

Factor analysis yielded six birthing kit item themes (see Appendix G) with eigenvalues greater than 1.0, which represented 70.91% of the variance. The first item theme, *delivery supplies for the baby,* represented 18.86% of the variance and the items within the theme had a reliability of α =.87. The second item theme, *supplies for the helper*, represented 18.76% of the variance and the items within the theme had a reliability of α =.90. The third item theme, *water, warmth and feeding,* represented 10.4% of the variance and the items within the theme had a reliability of α =.73. The fourth item theme, *after delivery supplies,* represented 9.34 % of the variance and the items within the theme had a reliability of α = .72. The fifth theme, *informational cards for birth and post-partum care,* represented 7.85% of the variance and the items within the theme had a reliability score of α = .89. The sixth theme, *water alternative,* represented 5.78% of the variance and the items within the theme had a reliability of α = .75.

Recommendations

The missing stakeholder in disaster preparedness, the family, needs to be included in the disaster preparedness planning. This research supports development of disaster preparedness educational programs targeting the pregnant and post-partum family. Validation of the 25 educational topics provides the guide for nurses to develop needed training. The topics must be flexible, concise, and accurate so that they can be adapted to regional and cultural differences. Handouts with pictures serve to illustrate delivery techniques and possible complications, such as recognizing post-partum hemorrhage or difficult deliveries, and breast-feeding or relactation. Making the families more aware of natural disasters and what they can do to prepare by giving them education and handouts

could increase their safety and resourcefulness during a disaster. A family disaster checklist to keep family and home safe would also be beneficial. Yasunari and colleagues (2011) suggested that pregnant women are most receptive to this education when they see that disaster may affect their family.

The supplies for the in-place emergency birth kit for the family needs to be reviewed through the lens of the family. What on the list do they most likely have and what can they afford. It will be important for nurses to help families to prioritize those items that are most essential while keeping the cost reasonable. It is critical for this information to be shared with voluntary and governmental agencies at the local, state, and national level. The agencies should be approached for assistance in preparing disaster-birthing kits for families that cannot afford to assemble the necessary supplies. Additionally these same agencies should be approached for assistance in continuing this research through grant funding and targeted appeals for disaster preparedness for the pregnant and post-partum family.

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Appendices

Appendix A.1: IRB Approval

THE UNIVERSITY OF TEXAS AT TYLER
3900 University Blvd. • Tyler, TX 75799 • 903.565.5774 • FAX: 903.565.5858

Office of Research and Technology Transfer

Institutional Review Board

December 15, 2014

Dear Ms. Erickson-Bonner,

Your request to conduct the study: *Disaster Preparedness for Pregnant and Post-partum Women: A Delphi Study*, IRB# F2014-46, has been approved by The University of Texas at Tyler Institutional Review Board under expedited review. This approval includes the written informed consent that is attached to this letter, and your assurance of participant knowledge of the following prior to study participation: this is a research study; participation is completely voluntary with no obligations to continue participating, and with no adverse consequences for non-participation; and assurance of confidentiality of their data.

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:

- This approval is for one year, as of the date of the approval letter
- **The Progress Report form must be completed for projects extending past one year.** Your protocol will automatically expire on the one year anniversary of this letter if a Progress Report is not submitted, per HHS Regulations **prior** to that date (45 CFR 46.108(b) and 109(e): http://www.hhs.gov/ohrp/policy/contrev0107.html
- 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**

Appendix A.2: Recruitment E-mail and Informed Consent, Delphi Study

Disaster Preparedness Education and Resource Needs for the Pregnant and Post-partum Families

Dear Colleague,

You are being asked to participate in a study of disaster preparedness for pregnant and post-partum women. The reasons for this study include:

- To determine the content of disaster preparedness educational presentations for pregnant and post-partum women.
- To determine the contents of a disaster/emergency in-place birth kit.

What is Expected of You:

- Completion of an anonymous online demographic survey
- Giving your expert input to the research questions in round one (30-60 minutes)
- Completion of the round two survey (30-60 minutes)

Potential Benefits:

- To identify topics on disaster preparedness to guide educational content for pregnant and post-partum women
- To identify essential items for a disaster/emergency in-place birthing kit.
- Potential to reduce risk and improve outcomes for pregnant and post-partum women with infants in a disaster.

Risks:

- There are no serious risks to participating in this study.
- As a result of taking the survey, you might recognize that you are not personally and/or professionally prepared for an emergency or disaster. This recognition may cause you discomfort. It could also stimulate you to take action.

Confidentiality:

No responses that you make will be identifiable in any way. The survey is distributed and data is housed on Qualtrics, an on line survey program contracted by the University of Texas at Tyler. The researchers at the University of Texas at Tyler will maintain the surveys, analyze date, and report results in a group format.

The researchers retain the right to use and publish non-identifiable data. All data will be stored on password protected and encrypted computers. The only access to this Qualtrics survey is Dr. Danita Alfred and the researcher. If requested, the Chair of the Institutional Review Board may review data as part of their routine compliance monitoring.

Participation & Withdrawal:

Your participation is voluntary. You are free to choose to not participate, or to cease participating at any time without any undue consequences.

Appendix A.2: Recruitment E-mail and Informed Consent Delphi Study (continued)

Appendix A.2: Recruitment E-mail and Informed Consent, Delphi Study (Continued)

Questions about the Study:
This study has been approved by the University of Texas at Tyler Institutional Review Board (IRB): *Disaster Preparedness for Pregnant and Post-partum Women: A Delphi Study*, IRB # F2014-46.
If there are any questions regarding your rights as a research participant, you may contact the chair of the University of Texas at Tyler IRB committee at research@uttyler.edu

If you have questions or concerns during the time of your participation in the study, or after its completion or you would like to receive a copy of the final aggregation results of this study, please contact:

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Giving of Consent
I have read this consent form and I understand what is being requested of me as a participant in this study.
Consent is implied by the completion and submission of the survey.
Link to Qualtrics survey will go here

Appendix A.3: Recruitment and Informed Consent, Validation Study

Disaster Preparedness for Pregnant and Post-partum Women: A Delphi Study

Dear Colleague,

You are being asked to participate in a study of disaster preparedness for pregnant and post-partum women. The reasons for this study include:

 To determine the content of disaster preparedness educational presentations for pregnant and post-partum women.
 To determine the contents of a disaster/emergency in-place birth kit.

What is Expected of You:
 Completion of an anonymous online survey (10 minutes

Potential Benefits:
 To identify topics on disaster preparedness to guide educational content for pregnant and post-partum women
 To identify essential items for a disaster/emergency in-place birthing kit.
 Potential to reduce risk and improve outcomes for pregnant and post-partum women with infants in a disaster.

Risks:
 There are no serious risks to participating in this study.
 As a result of taking the survey, you might recognize that you are not personally and/or professionally prepared for an emergency or disaster. This recognition may cause you discomfort. It could also stimulate you to take action.

Confidentiality:
No responses that you make will be identifiable in any way. The survey is distributed and data is housed on Qualtrics, an on line survey program contracted by the University of Texas at Tyler. The researchers at the University of Texas at Tyler will maintain the surveys, analyze date, and report results in a group format.

The researchers retain the right to use and publish non-identifiable data. All data will be stored on password protected and encrypted computers. The only access to this Qualtrics survey is Dr. Danita Alfred and the researcher. If requested, the Chair of the Institutional Review Board may review data as part of their routine compliance monitoring.

Participation & Withdrawal:
Your participation is voluntary. You are free to choose to not participate, or to cease participating at any time without any undue consequences.

Questions about the Study:
This study has been approved by the University of Texas at Tyler Institutional Review Board (IRB).

Appendix A.3: Recruitment and Informed Consent Validation Study (continued)

Appendix A.3: Recruitment and Informed Consent, Validation Study (Continued)

If there are any questions regarding your rights as a research participant, you may contact the chair of the University of Texas at Tyler IRB committee at research@uttyler.edu

If you have questions or concerns during the time of your participation in the study, or after its completion or you would like to receive a copy of the final aggregation results of this study, please contact:

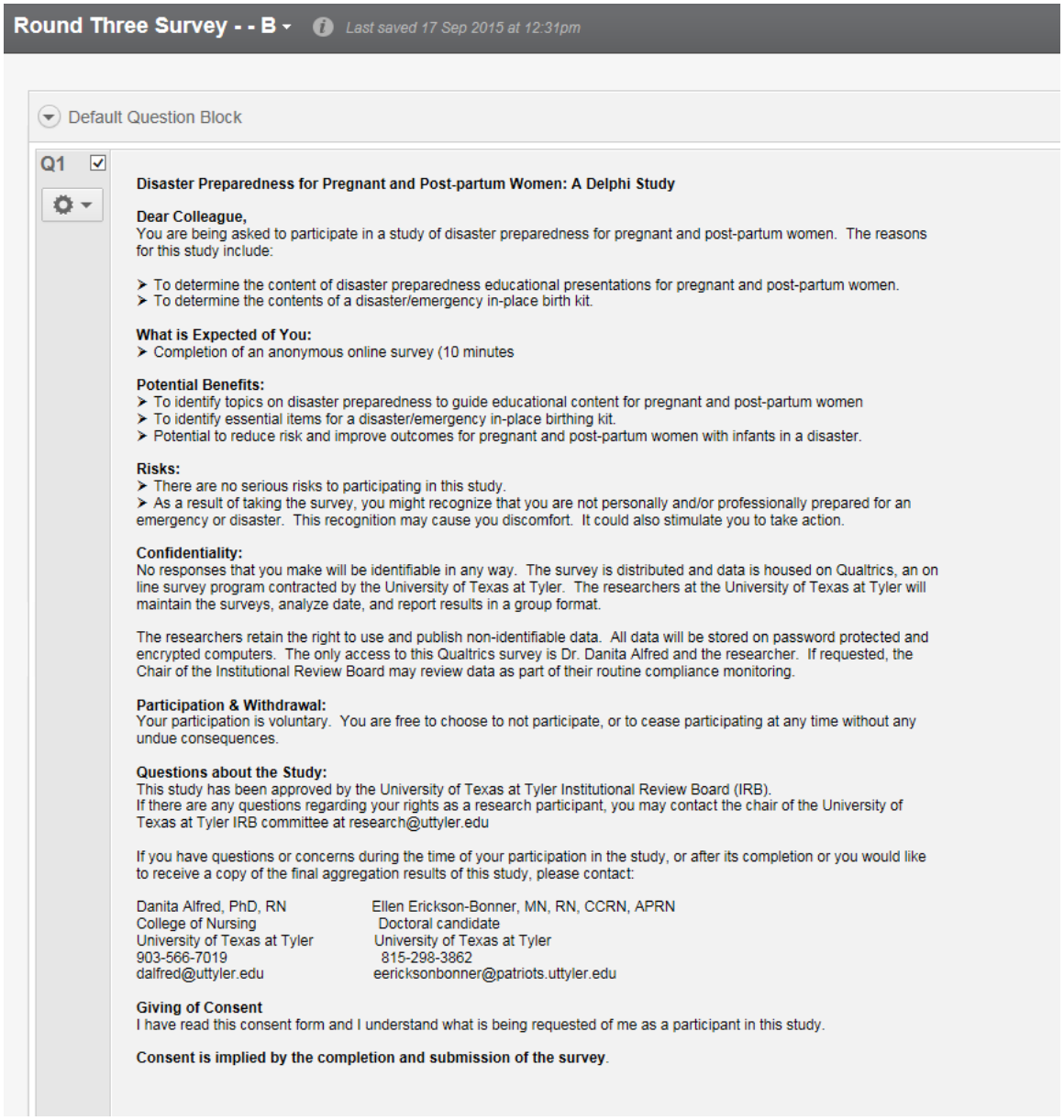
Danita Alfred, PhD, RN
College of Nursing
University of Texas at Tyler
903-566-7019
dalfred@uttyler.edu

Ellen Erickson-Bonner, MN, RN, CCRN, APRN
Doctoral candidate
University of Texas at Tyler
815-298-3862
eericksonbonner@patriots.uttyler.edu

Giving of Consent
I have read this consent form and I understand what is being requested of me as a participant in this study.

Consent is implied by the completion and submission of the survey.

Appendix A.4: Recruitment Letter and Informed Consent, Validation Expanded



Round Three Survey - - B Last saved 17 Sep 2015 at 12:31pm

Default Question Block

Q1

Disaster Preparedness for Pregnant and Post-partum Women: A Delphi Study

Dear Colleague,
You are being asked to participate in a study of disaster preparedness for pregnant and post-partum women. The reasons for this study include:

- To determine the content of disaster preparedness educational presentations for pregnant and post-partum women.
- To determine the contents of a disaster/emergency in-place birth kit.

What is Expected of You:
- Completion of an anonymous online survey (10 minutes

Potential Benefits:
- To identify topics on disaster preparedness to guide educational content for pregnant and post-partum women
- To identify essential items for a disaster/emergency in-place birthing kit.
- Potential to reduce risk and improve outcomes for pregnant and post-partum women with infants in a disaster.

Risks:
- There are no serious risks to participating in this study.
- As a result of taking the survey, you might recognize that you are not personally and/or professionally prepared for an emergency or disaster. This recognition may cause you discomfort. It could also stimulate you to take action.

Confidentiality:
No responses that you make will be identifiable in any way. The survey is distributed and data is housed on Qualtrics, an on line survey program contracted by the University of Texas at Tyler. The researchers at the University of Texas at Tyler will maintain the surveys, analyze date, and report results in a group format.

The researchers retain the right to use and publish non-identifiable data. All data will be stored on password protected and encrypted computers. The only access to this Qualtrics survey is Dr. Danita Alfred and the researcher. If requested, the Chair of the Institutional Review Board may review data as part of their routine compliance monitoring.

Participation & Withdrawal:
Your participation is voluntary. You are free to choose to not participate, or to cease participating at any time without any undue consequences.

Questions about the Study:
This study has been approved by the University of Texas at Tyler Institutional Review Board (IRB).
If there are any questions regarding your rights as a research participant, you may contact the chair of the University of Texas at Tyler IRB committee at research@uttyler.edu

If you have questions or concerns during the time of your participation in the study, or after its completion or you would like to receive a copy of the final aggregation results of this study, please contact:

Danita Alfred, PhD, RN
College of Nursing
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Ellen Erickson-Bonner, MN, RN, CCRN, APRN
Doctoral candidate
University of Texas at Tyler
815-298-3862
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Giving of Consent
I have read this consent form and I understand what is being requested of me as a participant in this study.

Consent is implied by the completion and submission of the survey.

Appendix B: Round One Survey

Round One Disaster Preparedness Survey -

Q1 Gender

- ❍ Male (1)
- ❍ Female (2)

Q2 Age (in years)

Q3 Position

- ❑ Physician (1)
- ❑ Registered Nurse (2)
- ❑ Nurse Practitioner (3)
- ❑ Physician Assistant (4)
- ❑ Child Birth Educator (5)
- ❑ Lactation Consultant (6)
- ❑ EMT-P (7)
- ❑ Other (8)

Q4 Years in your specialty

Q5 Do you consider your work location is in an area that could be affected by a natural disaster?

- ❍ Yes (1)
- ❍ No (2)

Appendix B: Round One Survey (Continued)

Q6 List potential natural disaster in your area

- ❑ Hurricane (1)
- ❑ Tornado (2)
- ❑ Ice Storms (3)
- ❑ Wildfires (4)
- ❑ Flood (5)
- ❑ Blizzard (6)
- ❑ Earthquake (7)
- ❑ Other (8)

Q7 Have you participated in disaster preparedness training?

- ❍ Yes (1)
- ❍ No (2)

Q8 Have you participated in a disaster response in Winnebago county?

- ❍ Yes (1)
- ❍ No (2)

Q9 Are you a member of a disaster response team?

- ❍ Yes (1)
- ❍ No (2)

Q10 If providing health care or education to pregnant or post-partum women with infants and their families: Do you think it is important for you or your office staff to discuss disaster preparedness plans with your patients?

- ❍ Yes (1)
- ❍ No (2)
- ❍ N/A (3)

Appendix B: Round One Survey (Continued)

Q11 Do you currently have disaster preparedness included in prenatal classes or appointments?

- ❍ Yes (1)
- ❍ No (2)
- ❍ N/A (3)

Q12 What educational topics on disaster preparedness should be included in the pregnant and post-partum educational material?

Q13 What essential birthing supplies should be included in an in-place disaster/emergency birth kit?

Q14 Please enter your preferred email for survey and survey results. Thank you for participating !

Appendix C: Round Two Survey

Q1 The statements below were compiled from the round one participants. Please answer all questions. Rate the following statements from "Not important at all" (1) to "Very important" (5).

Q2 Click to write the question text

	Not important at all point 1	Not very important point 2	Neutral point 3	Important point 4	Very important point 5
1. Emergency information sources (radio announcements, where to go in case of disaster)	❍	❍	❍	❍	❍
2Emergency supplies for the home (building a preparedness kit)	❍	❍	❍	❍	❍
3. What to do list and how to prepare yourself and your family for an emergency. (basic supplies, radio, phone, chargers, etc..)	❍	❍	❍	❍	❍
4. Medication lists)	❍	❍	❍	❍	❍
5. Storing of supplies	❍	❍	❍	❍	❍
6. Clean drinking water	❍	❍	❍	❍	❍
7. Back up radio and batteries	❍	❍	❍	❍	❍
8. First aid kit	❍	❍	❍	❍	❍
9. In a rural area what items to carry in the car in case of being stranded (water, blankets, water, snacks)	❍	❍	❍	❍	❍
10. Basic birth kit (ideas for contents in question #2)	❍	❍	❍	❍	❍

Appendix C: Round Two Survey (Continued)

	Not important at all point 1	Not very important point 2	Neutral point 3	Important point 4	Very important point 5
11. Safe Sheltering: Proper air circulation and dust particulate management	❍	❍	❍	❍	❍
12. Emergency response plan: Alternate routes to the hospital/clinic for an appointment or labor	❍	❍	❍	❍	❍
13. Communication plan: family/support person numbers	❍	❍	❍	❍	❍
14. Communication plan: primary care /OB office or clinic numbers (14)	❍	❍	❍	❍	❍
15. Communication plan: emergency responder numbers	❍	❍	❍	❍	❍
16. Education: Instructions for after the baby comes (use of bulb syringe, feeding, diapering)	❍	❍	❍	❍	❍
17. Breast feeding (starting /re-starting) possible contaminants to breast milk	❍	❍	❍	❍	❍
18.Formula use/supplementation if needed (mixing, storage, clean water)	❍	❍	❍	❍	❍
19. How to prepare for the birth of the baby	❍	❍	❍	❍	❍
20. Basic newborn resuscitation (drying, bulb suction, stimulation)	❍	❍	❍	❍	❍

Appendix C: Round Two Survey (Continued)

	Not important at all point 1	Not very important point 2	Neutral point 3	Important point 4	Very important point 5
21.Emergency/Response: Birth complications and interventions with visual clues (shoulder dystocia {upright position, squatting}, nuchal cord {recognize and release}	❍	❍	❍	❍	❍
22. Emergency: How to care for a pregnant woman and post-partum female during a disaster	❍	❍	❍	❍	❍
23.Emergency/Response: Post-partum hemorrhage recognition (pictures), fundal message, Breast Feeding, Nipple stimulation	❍	❍	❍	❍	❍
24. How to care for yourself and the baby until help arrives	❍	❍	❍	❍	❍
25. Importance of being clean	❍	❍	❍	❍	❍

Appendix C: Round Two Survey (Continued)

Q5 The items below were compiled from the round one participants. Please answer all questions.

Rate the following items from "Not important at all" (1) to "Very important" (5).

Q6 Click to write the question text

	Not important at all point 1	Not very important point 2	Neutral point 3	Important point 4	Very important point 5
1. Card with birthing instructions (what to expect, common complications and interventions)	❍	❍	❍	❍	❍
2. Card with ways to stop post-partum hemorrhage natural ways (fundal message, breast feeding)	❍	❍	❍	❍	❍
3. Antiseptic wipes	❍	❍	❍	❍	❍
4. Hand sanitizer	❍	❍	❍	❍	❍
5. Head strap flashlight	❍	❍	❍	❍	❍
6. Chux pads	❍	❍	❍	❍	❍
7. Drapes	❍	❍	❍	❍	❍
8. Garbage bags or plastic sheeting fluid barrier	❍	❍	❍	❍	❍
9. Clean bowl/plastic bucket for placenta	❍	❍	❍	❍	❍

Appendix C: Round Two Survey (Continued)					
	Not important at all point 1	Not very important point 2	Neutral point 3	Important point 4	Very important point 5
10. Old newspapers	❍	❍	❍	❍	❍
11. OB sanitary pads	❍	❍	❍	❍	❍
12. Stethoscope	❍	❍	❍	❍	❍
13. Safety glasses	❍	❍	❍	❍	❍
14. A coverall	❍	❍	❍	❍	❍
15. Clean bowl/plastic bucket for placenta	❍	❍	❍	❍	❍
15. Towels	❍	❍	❍	❍	❍
16. Blankets	❍	❍	❍	❍	❍
17. Bulb suction	❍	❍	❍	❍	❍
18. Cord clamp x2, sterile string	❍	❍	❍	❍	❍
20. 2- sterile hemostats	❍	❍	❍	❍	❍
21. Infant ambu bag	❍	❍	❍	❍	❍
22. Diapers	❍	❍	❍	❍	❍
23. Newborn hat & clothes	❍	❍	❍	❍	❍
24. Tin foil to keep infant warm	❍	❍	❍	❍	❍
25. Bottled water	❍	❍	❍	❍	❍

Appendix C: Round Two Survey (Continued)					
	Not important at all point 1	Not very important point 2	Neutral point 3	Important point 4	Very important point 5
26. Water for at least three days	❍	❍	❍	❍	❍
27. Formula, bottles, and sterile	❍	❍	❍	❍	❍
28. Breast feeding instructions	❍	❍	❍	❍	❍
29. Biohazard bags /garbage bags	❍	❍	❍	❍	❍
30. Snacks for mom	❍	❍	❍	❍	❍
31. IM injection kit of oxytocin	❍	❍	❍	❍	❍
32. Stand-alone heating pad	❍	❍	❍	❍	❍
33. IV kit & fluids	❍	❍	❍	❍	❍
34. Emergency OB delivery kit similar to ambulance kits or commercially available	❍	❍	❍	❍	❍

Please place your email address here: Thank you for your participation :0)

Appendix D: Permission to Use Figure 3.1

Dear Ellen,
Thank you for your request. We are pleased to provide permission for you to use the ICN Framework of Disaster Nursing Competencies in your dissertation research. Please ensure that the ICN copyright is included.

Kind regards,

Cristina Santos
Information Coordinator
International Council of Nurses
3, place Jean-Marteau
1201 Geneva
Switzerland
Tel: +4122 908-01-00
Fax: +4122 908-01-01
E-mail: icn@icn.ch
Web site: www.icn.ch

The International Council of Nurses (ICN) is a federation of more than 130 national nurses associations representing the millions of nurses worldwide. Operated by nurses and leading nursing internationally, ICN works to ensure quality nursing care for all and sound health policies globally.

ICN Conference and CNR: *Global Citizen, Global Nursing*

Seoul, Republic of Korea, 19-23 June 2015, www.icn2015.com

Appendix E: Validation Survey

Round Three Disaster Preparedness Survey -

Q1 Round Three: Disaster Preparedness Survey Demographics and Questions. This survey in intended to validate the emergency/disaster training and preparedness essentials for the pregnant and post-partum families. I appreciate your willingness to complete the survey and estimate that it will take about 10 minutes to complete. Thank you for your time.

Q2 Gender

- ❍ Male (1)
- ❍ Female (2)

Q3 Age (in years)

Q4 Position: Select all that apply

- ❑ Physician (1)
- ❑ Registered Nurse (2)
- ❑ Nurse Practitioner (3)
- ❑ Physician Assistant (4)
- ❑ Child Birth Educator (5)
- ❑ Lactation Consultant (6)
- ❑ EMT-P (7)
- ❑ Other (8)

Q5 Other: Please enter your position or n/a if your position is listed above

Q6 Years in your specialty

Q7 Do you consider your work location is in an area that could be affected by a natural disaster?

- ❍ Yes (1)
- ❍ No (2)

Appendix E: Validation Survey (Continued)

Q8 List potential natural disaster in your area. Select all that apply

- ❑ Hurricane (1)
- ❑ Tornado (2)
- ❑ Ice Storms (3)
- ❑ Wildfires (4)
- ❑ Flood (5)
- ❑ Blizzard (6)
- ❑ Earthquake (7)
- ❑ Other (8)

Q9 Have you participated in disaster preparedness training?

- ❍ Yes (1)
- ❍ No (2)

Q10 Have you participated in a disaster response in Illinois?

- ❍ Yes (1)
- ❍ No (2)

Q11 Are you a member of a disaster response team ?

- ❍ Yes (1)
- ❍ No (2)

Q12 Do you think it is important for you or your office staff to discuss disaster preparedness plans with your patients?

- ❍ Yes (1)
- ❍ No (2)
- ❍ N/A (3)

Appendix E: Validation Survey (Continued)

Q13 Do you include emergency/disaster preparedness information in your prenatal classes and/or appointments?

- ❍ Yes (1)
- ❍ No (2)
- ❍ N/A (3)

Q14 What county/state do you work? Please fill in your answer below

Appendix E: Validation Survey (Continued)

Q15 Rate the following statements related to emergency/disaster preparedness for the pregnant and post-partum family from "Not important at all" (1) to "Very important" (5).

	Not important at all 1	Not very important 2	Neutral 3	Important 4	Very important 5
1. Preparedness: Emergency information sources (radio announcements, where to go in case of disaster)	❍	❍	❍	❍	❍
2. Preparedness: Emergency supplies for the home (building a preparedness kit)	❍	❍	❍	❍	❍
3. Preparedness: What to do list and how to prepare yourself and your family for an emergency. (basic supplies, radio, phone, chargers, etc..)	❍	❍	❍	❍	❍
4. Preparedness: Medication lists	❍	❍	❍	❍	❍
5. Preparedness: Storing of supplies	❍	❍	❍	❍	❍
6. Preparedness: Clean drinking water	❍	❍	❍	❍	❍
7. Preparedness: Back up radio and batteries	❍	❍	❍	❍	❍
8. Preparedness: First aid kit	❍	❍	❍	❍	❍

Appendix E: Validation Survey (Continued)					
	Not important at all 1	Not very important 2	Neutral 3	Important 4	Very important 5
	❍	❍	❍	❍	❍
9. Preparedness: In a rural area what items to carry in the car in case of being stranded (water, blankets, water, snacks)	❍	❍	❍	❍	❍
10. Preparedness: Basic birth kit (ideas for contents in question #2)	❍	❍	❍	❍	❍
11. Safe Sheltering: Proper air circulation and dust particulate management	❍	❍	❍	❍	❍
12. Emergency response plan: Alternate routes to the hospital/clinic for an appointment or labor	❍	❍	❍	❍	❍
13. Communication plan: family/support person numbers	❍	❍	❍	❍	❍
14. Communication plan: primary care /OB office or clinic numbers	❍	❍	❍	❍	❍
15. Communication plan: emergency responder numbers	❍	❍	❍	❍	❍
16. Education: Instructions for after the baby comes (use of bulb syringe, feeding, diapering)	❍	❍	❍	❍	❍

Appendix E: Validation Survey (Continued)					
	Not important at all 1	Not very important 2	Neutral 3	Important 4	Very important 5
17. Education: Breast feeding (starting /re-starting) possible contaminants to breast milk	❍	❍	❍	❍	❍
18. Education: Formula use/supplementation if needed (mixing, storage, clean water)	❍	❍	❍	❍	❍
19. Education: How to prepare for the birth of the baby (19)	❍	❍	❍	❍	❍
20. Emergency: Basic newborn resuscitation (drying, bulb suction, stimulation)	❍	❍	❍	❍	❍
21. Emergency/Response: Birth complications and interventions with visual clues (shoulder dystocia {upright position, squatting}, nuchal cord {recognize and release}, breech)	❍	❍	❍	❍	❍
22. Emergency: How to care for a pregnant woman and post-partum female during a disaster	❍	❍	❍	❍	❍

Appendix E: Validation Survey (Continued)					
	Not important at all 1	Not very important 2	Neutral 3	Important 4	Very important 5
23. Emergency/Response: Post-partum hemorrhage recognition (pictures), fundal message, Breast Feeding, Nipple stimulation	❍	❍	❍	❍	❍
24. Education/Response: How to care for yourself and the baby until help arrives	❍	❍	❍	❍	❍
25. Education: Importance of being clean	❍	❍	❍	❍	❍

Q16 Rate the following birthing items related to emergency/disaster preparedness for the pregnant and post-partum family from "Not important at all" (1) to "Very important" (5).

	Not important at all 1	Not very important 2	Neutral 3	Important 4	Very important 5
1. Card with birthing instructions (what to expect, common complications and interventions	❍	❍	❍	❍	❍

Appendix E: Validation Survey (Continued)					
	Not important at all 1	Not very important 2	Neutral 3	Important 4	Very important 5
2. Card with ways to stop post-partum hemorrhage natural ways (fundal message, breast feeding)	❍	❍	❍	❍	❍
3. Antiseptic wipes	❍	❍	❍	❍	❍
4. Hand sanitizer	❍	❍	❍	❍	❍
5. Head strap flashlight	❍	❍	❍	❍	❍
6. Chux pads	❍	❍	❍	❍	❍
7. Drapes	❍	❍	❍	❍	❍
8. Garbage bags or plastic sheeting fluid barrier	❍	❍	❍	❍	❍
9. Clean bowl/plastic bucket for placenta	❍	❍	❍	❍	❍
10. Old newspapers	❍	❍	❍	❍	❍
11. OB sanitary pads	❍	❍	❍	❍	❍
12. Stethoscope	❍	❍	❍	❍	❍
13. Safety glasses	❍	❍	❍	❍	❍
14. A coverall	❍	❍	❍	❍	❍
15. Towels	❍	❍	❍	❍	❍
16. Blankets	❍	❍	❍	❍	❍
17. Bulb suction	❍	❍	❍	❍	❍

Appendix E: Validation Survey (Continued)					
	Not important at all 1	Not very important 2	Neutral 3	Important 4	Very important 5
18. Cord clamp x2, sterile string	❍	❍	❍	❍	❍
19. 2- sterile hemostats	❍	❍	❍	❍	❍
20. Infant ambu bag	❍	❍	❍	❍	❍
21. Diapers	❍	❍	❍	❍	❍
22. Newborn hat & clothes	❍	❍	❍	❍	❍
23. Tin foil to keep infant warm	❍	❍	❍	❍	❍
24. Bottled water	❍	❍	❍	❍	❍
25. Water for at least three days	❍	❍	❍	❍	❍
26. Formula, bottles, and sterile	❍	❍	❍	❍	❍
27. Breast feeding instructions	❍	❍	❍	❍	❍
28. Bio-hazard bags /garbage bags	❍	❍	❍	❍	❍
29. Snacks for mom	❍	❍	❍	❍	❍
31. IM injection kit of oxytocin	❍	❍	❍	❍	❍
31. Stand-alone heating pad	❍	❍	❍	❍	❍
32. IV kit & fluids	❍	❍	❍	❍	❍

Appendix E: Validation Survey (Continued)					
	Not important at all 1	Not very important 2	Neutral 3	Important 4	Very important 5
33. Emergency OB delivery kit similar	❍	❍	❍	❍	❍

Please place your email address here: Thank you for your participation.

Please add any comments here. If no comments please place n/a

Appendix F: Educational Topics

Table F.1 Educational Topics: Total Variance Explained

	Initial Eigenvalues			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12.027	48.109	48.109	6.183	24.733	24.733
2	2.196	8.785	56.894	5.531	22.124	46.857
3	1.265	5.061	61.956	3.222	12.888	59.745
4	1.210	4.838	66.794	1.762	7.048	66.794
5	.939	3.757	70.550			

Table F.2 Four Educational Topic Themes

Theme	**Cronbach's Alpha per Theme**	**Topic Numbers included in Theme**
Preparing for birth and post-partum care	.93	23, 20, 21, 24, 22, 18, 19, 16, 10, 17, 25
Preparing home and Family	.92	7, 4, 3, 5, 6, 2, 11, 8, 12, 9
Emergency Routes and Communication Plan	.84	15, 14, 13
Emergency Information Sources	Only one topic	1

Appendix G: Birthing Kits

Table G.1 Birthing Kit Items: Total Variance Explained

	Initial Eigenvalues			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	14.100	42.728	42.728	6.224	18.862	18.862
2	3.140	9.516	52.244	6.190	18.757	37.619
3	1.925	5.833	58.077	3.434	10.406	48.025
4	1.885	5.713	63.790	3.083	9.343	57.368
5	1.313	3.979	67.769	2.591	7.853	65.220
6	1.065	3.228	70.997	1.906	5.777	70.997
7	.931	2.820	73.817			

Table G.2 Six Birthing Kit–Item Themes

Theme	**Cronbach's Alpha per Theme**	**Topic Numbers included in Theme**
Delivery supplies	.87	19, 33, 12, 18, 28, 9, 6, 7, 23, 31, 21, 15, 8, 17, 10
Delivery supplies for helper	.90	5, 14, 13,
Water, warmth & feeding support	.73	25, 16, 26, 29, 24, 27
After delivery supplies	.72	11, 21, 22
Information cards for birth and post-partum	.89	1, 2
Water alternative/sanitizer	.75	3, 4

Biographical Sketch

NAME Ellen A. Erickson-Bonner		POSITION TITLE Assistant Professor Saint Anthony College of Nursing Rockford, IL	
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
College of Charleston, Charleston , SC	Bachelor of Science	1977	Psychology
Pensacola State College, Pensacola, FL	Associate Degree of Nursing	1986	Nursing
Emory University, Atlanta, GA	Master of Nursing	1990	Nursing
University of Texas at Tyler	Doctor of Philosophy	2015	Nursing

A. Positions

Time	University/College/Employer	Position
2010- present	Saint Anthony College of Nursing, Rockford, IL	Assistant Professor
2006-2009	Saint Anthony College of Nursing, Rockford, IL	Instructor
2006- present	OSF Saint Anthony Medical Center, Rockford, IL	PRN RN OB/L&D/Nursery Float Pool ICU-CCU
2005-2006	Rockford Memorial Hospital, Rockford, IL	NNP-BC NICU
2003-2005	Winnebago County Health Department, Rockford, IL	RN NNP-BC Pediatric Immunization Clinic and well-baby checks
1990-2003	Children's Health Care of Atlanta, Egleston campus	Registered Nurse III, Sibley Heart Center Cardiac ICU
1998-2002	Children's Health Care of Atlanta, SRCMC campus	Clinical Nurse Specialist, Critical Care Services

Biographical Sketch (Continued)

B. Professional Memberships

Sigma Theta Tau International, Phi Omicron chapter 493 Vice President
Association of Women's Health Obstetrics and Neonatal Nurses (AWHONN)
American Association of Critical Care Nurses