

**EMERGENCY PREPAREDNESS EDUCATION FOR PREGNANT AND
POSTPARTUM WOMEN: A STRUCTURED REVIEW OF THE LITERATURE
AND AN ASSESSMENT OF SELECTED WEB-BASED MATERIALS**

by

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ABSTRACT

Public health emergencies and disasters have a disproportionate impact on pregnant and postpartum women and infants. Improving maternal emergency preparedness is a public health priority, and more research is needed to identify the strengths and weaknesses of various intervention approaches. The purpose of this thesis is to explore the types of emergency preparedness education available to pregnant and postpartum women. Two types of educational intervention were identified: guided learning and self-directed learning. Guided learning was defined as educator-led interventions; self-directed learning was defined as an approach that relies on the initiative of the audience to learn without the aid of a teacher. A search of the peer-reviewed published journal literature was conducted to find guided learning interventions. A sample of self-directed learning resources was assessed for readability and suitability using the Suitability Assessment of Materials. The guided learning intervention literature search found that there is a considerable lack of emergency preparedness interventions for pregnant and postpartum women in the peer-reviewed published journal literature. The assessment of a sample of self-directed learning resources found factors in need of revision for each web page, including unsuitable literacy demand and a lack of informative graphics in these materials. Better graphics, more helpful layout, and appropriate literacy demand would improve the suitability of these materials. These findings about the state of emergency preparedness education for pregnant and postpartum women guide suggestions for future research and intervention.

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PREFACE

This paper was inspired by work performed during an internship at the Allegheny County Health Department in Pittsburgh, Pennsylvania during the summer of 2013. The project was a result of collaboration between the Allegheny County Health Department programs of Emergency Preparedness & Response and Maternal & Child Health. Led by Jamie Sokol and Jennifer Fiddner, the goal of the project was to incorporate emergency preparedness messages into the curriculum used by the Allegheny County Health Department MCH Home Visiting Nurse Program and the Nurse-Family Partnership Program. The project recognized the opportunity to incorporate emergency preparedness education into the framework of the maternal and child health visiting nurse programs by inserting emergency preparedness messages into the existing curriculum. This internship experience inspired me to examine the current state of knowledge about emergency preparedness interventions for this population and to suggest a way forward.

This thesis would not have been completed without the guidance and support of my committee members Jeanette Trauth, Elizabeth Felter, and Barbara Folb. I also want to thank Amia Downes for all of her assistance and advice, and for acting as my second rater for the Suitability Assessment of Materials analysis.

1.0 INTRODUCTION

Given the threat of public health emergencies and disasters to pregnant and postpartum women and their children, there is a demonstrated need for public health emergency preparedness education for this population. Since emergency preparedness efforts exist within the context of reduced funding (1) and limited resources, finding the most effective and efficient ways of delivering these messages to at-risk populations is crucial. This paper examines the types of emergency preparedness interventions that are available to pregnant and postpartum women and whether the existing interventions sufficiently address the needs of this population. Some emergency preparedness interventions for this population involve the presence of an educator. Other interventions rely on the at-risk population to use informational materials to self-educate. Both types of intervention have the potential to improve preparedness outcomes for this population, but each method demands a thorough examination for effectiveness and appropriateness for the intended audiences. The goal of this thesis is to explore the issue of the effectiveness of existing emergency preparedness interventions for pregnant and postpartum women and to raise questions to be addressed by practitioners and researchers working in this area.

1.1 PUBLIC HEALTH EMERGENCY PREPAREDNESS

Public health emergency preparedness has been identified by the federal government as a public health priority, and is featured among the goals of the Healthy People 2020 initiative (2). The Healthy People 2020 preparedness objectives are guided by the National Health Security Strategy of the United States of America (NHSS), and include an emphasis on continuing research and practice with regard to “preincident planning that engages citizens and at-risk individuals” (2, 3). Citizen engagement is crucial for building strong, resilient communities, and national emergency preparedness and response requires participation at state, local, and individual levels. Emergency preparedness education empowers citizens and at-risk populations to increase their readiness for emergencies. This need is particularly pronounced for vulnerable populations, including pregnant and postpartum women and their children (4).

A definition of public health emergency preparedness proposed by Nelson, Lurie, et al. (2007) is, “the capability of the public health and health care systems, communities, and individuals, to prevent, protect against, quickly respond to, and recover from health emergencies, particularly those whose scale, timing, or unpredictability threatens to overwhelm routine capabilities” (5). A public health emergency may be caused by a natural disaster, a manmade event (e.g., a terrorist attack or a train derailment), or a disease outbreak. An all-hazards approach to emergency preparedness emphasizes ways to increase readiness for many hazards at once, instead of focusing on only one particular type of hazard (6). Given the limited resources available to prepare for and respond to public health emergencies, the all-hazards approach allows for more efficient utilization of resources, ensuring preparedness for both low-probability, high-impact events and high-probability, low-impact events. An all-hazards approach has long

been promoted by the federal government (7) and was reiterated recently in the Pandemic and All-Hazards Preparedness Reauthorization Act of 2013 .

Although preparedness for low-probability, high-impact events – storms like Hurricane Katrina in 2005 – is a major priority for public health organizations at the state, local, and national levels, families who have not been exposed to a high-impact event firsthand may not place a high value on emergency preparedness. An advantage of the all-hazards approach to emergency preparedness is that it can also prepare families for fairly common, low-impact events – such as brief power outages – that are disruptive at the personal level, but do not have widespread significance. Families are able to experience practical advantages to being better prepared, even if they are never faced with a widespread public health emergency or significant disaster.

Despite the advantages of family preparedness, evidence indicates that a sizeable percentage of American citizens remain unprepared or underprepared for a public health emergency. A 2007 American Public Health Association national survey found that the majority of respondents did not find the thought of a “public health crisis” to be of particular concern (8). Most respondents admitted to being unprepared for a public health crisis; this is likely related to the commonly held belief that public health crises are unlikely to occur in the area where the respondent lives (8). Of mothers with children age five and younger who responded to this survey, 58% reported not having a 3-day supply of water and only 14% of mothers with young children reported being “fairly well prepared” or “very well prepared” for a public health crisis (8). An astonishing 38% of mothers with young children reported having taken “no special steps” to prepare for an emergency situation, and mothers of young children are the least prepared of the groups surveyed on elements of preparedness such as having an emergency

supply kit, an evacuation plan, and conducting drills on how to respond in an emergency (8). Additionally, this survey was administered online, so the influence of selection bias may mean that the respondents actually have higher rates of preparedness than the general population.

The American Preparedness Project is a periodic opinion survey of the American public about topics related to terrorism, security, and emergency preparedness conducted by the National Center for Disaster Preparedness at the Columbia University Mailman School of Public Health. In recent years, the survey has found that although many Americans have a high perceived risk for exposure to a disaster, they have much lower levels of personal preparedness (9). Unsurprisingly, only 32% of those with a household income of less than \$25,000 annually report feeling “very prepared” or “prepared” for a disaster with no warning, and 47% report feeling “very prepared” or “prepared” for a disaster with warning (9). A greater percentage of those with household incomes greater than \$75,000 report feeling prepared for both types of disaster, at 49% and 65% respectively. Americans with annual household incomes below \$25,000 report lower rates of self-efficacy and higher rates of fatalism and dependency (9).

These surveys underscore the importance of education of vulnerable populations, especially low-income mothers, to improve self-efficacy and knowledge about the risks of public health emergencies and disasters. A 2010 study by Olympia et al. found that few families were in compliance with national preparedness recommendations (10). This same study also noted better preparedness outcomes among families whose primary care physician had discussed preparedness with them. This study lends support to the idea that primary care physicians may have a responsibility to educate their patients about emergency preparedness. The question of who is responsible for citizen emergency preparedness is a subject of some disagreement.

In the aftermath of Hurricane Katrina, the news media focused most heavily on the role of the government in preparing for disasters like Katrina (11). This media focus perpetuates beliefs that the federal government is primarily responsible for emergency preparedness, and downplays the importance of emergency preparedness at the state, local, and individual levels. This news media coverage distorts reality and creates an incorrect public perception that the federal government has the capacity to respond quickly enough to mitigate the effects of a major disaster. News coverage rarely discussed the accountability of individuals or families in the face of such disasters (11). Although government at all levels has a major responsibility for emergency preparedness, disasters by definition have the capacity to overwhelm these resources. Sadly, in the case of a serious public health emergency or disaster, those individuals whose plan is to wait for help from the government may find that help arrives too late, if it ever arrives at all. For this reason, it is crucial that citizens – especially those in at-risk groups – take steps to prepare themselves and their families with information and supplies to help mitigate the effects of public health emergencies and disasters.

1.1.1 Public Health Emergencies: Impact on Pregnant & Postpartum Women

In 2009, the pregnancy rate for U.S. women was 102.1 per 1000 women between the ages of 15 and 44 (12). In 2012, the birth rate was estimated as 63.0 per 1000 women 15-44 (12). This population of pregnant women and infants face unique threats during public health emergencies. During times of disaster, the risk for pregnancy complications (e.g., prematurity and low birth weight) increases; this risk is exacerbated by factors like high stress and insufficient drinking water and nourishment (13, 14). Public health emergencies may cause disruption of the healthcare system, and in some emergencies, pregnant women may be left without prenatal care

or birthing assistance. There is interest in training women in birthing procedures if they are unable to access medical assistance during childbirth (15, 16). This birth training is intended as a last resort option, and is not intended to replace normal medical assistance in childbirth. Infant feeding is another challenge for this population, especially among those who formula feed.

In addition to the immediate impacts of disasters on the health of mothers and children, there has been interest in exploring the impact of maternal disaster-related stress on child development in the long term, as well as the long-term effects of disasters on the mental health of mothers (17-21). Hurricane Katrina demonstrated the vulnerability of pregnant women and infants during disasters, and underscored the importance of emergency preparedness, especially for already underserved, low-income populations (14).

The Women and Infants Services Package (WISP) was published in April 2007 and includes guidelines for ensuring that the various health needs of pregnant and postpartum women and infants are met in the case of a public health emergency (22). It is the product of the National Working Group for Women and Infant Needs in Emergencies in the United States, which includes representatives from organizations such as the White Ribbon Alliance For Safe Motherhood, March of Dimes, the National Association of County and City Health Officials (NACCHO), the American College of Nurse Midwives, Centers for Disease Control and Prevention, and others. WISP outlines many preparedness recommendations for assisting women and infants; its major objectives are [1] to identify national, state, and local organizations and individuals responsible for implementing the WISP guidelines and advocating for the care of pregnant women and infants, [2] to prevent excess maternal and infant mortality and morbidity, and [3] to collect, analyze, and apply information to improve maternal and infant health care programs (22).

1.1.2 Information Needs and Information-Seeking Behavior

The information-seeking behavior of low-income pregnant and postpartum women in the United States is a subject of great relevance to this analysis. And although there are a variety of educational resources available to improve emergency readiness at the individual level, the appropriateness of these resources for a population of low-income pregnant and postpartum women is undemonstrated.

Given the primacy of the Internet as a source of information for many Americans, it comes as no surprise that there are many websites and web pages devoted to educating the public about emergency preparedness. Some governmental organizations, nonprofit organizations, and professional organizations produce emergency preparedness websites aimed at the public. These sites provide a source of factual information for literate information-seekers; many of these websites require substantial literacy for comprehension (23). Friedman et al. note that websites from sources generally considered to be more credible – nonprofit and government websites – are also written in the most difficult language (23). These sites may not be helpful to pregnant or postpartum women with low literacy—women who may be at the greatest risk of adverse outcomes in the instance of a public health emergency or disaster.

There is evidence to suggest that low-income pregnant women rely heavily on interpersonal sources for pregnancy-related information. A 2013 study conducted by Song et al. of the information needs and information-seeking behavior of women enrolled in a subsidized prenatal care program found that interpersonal sources of information were most frequently used for acquiring health and pregnancy-related information (24). Interpersonal sources of information include family, friends, and healthcare providers, and information provided in the context of social support is influential for the study population of low-income pregnant women.

The format of an informational website does not lend itself to interactivity or interpersonal communication; members of the public who require more interactive learning and the ability to ask questions may not benefit from this learning format.

Song et al. also found that the Internet was the least-used source of information among the low-income pregnant women enrolled in their study (24). Promoting websites as a source of preparedness information for pregnant and postpartum women assumes that this population has: [1] Internet access, [2] the skills and motivation to find relevant emergency preparedness information, [3] sufficient literacy to understand the written information, and [4] the resources necessary to act on the preparedness recommendations.

Evidence suggests that some groups of individuals are less likely to actively seek out health-related information than others (25). Factors such as income and education level appear to influence this information seeking behavior, with lower income and educational attainment corresponding to lower rates of information seeking behavior. Boyd and associates (2012) found that low-income women considering H1N1 vaccination for themselves and their children preferred the presence of a trusted professional (e.g., a doctor) to answer questions and explain relevant information to help with their decision-making process (26). This population stated a preference for guidance and assistance in their decision-making process regarding vaccination, and it is therefore likely that low-income pregnant and postpartum women – the women most at risk for adverse outcomes in the case of a public health emergency – would benefit from a guided learning approach to emergency preparedness involving the presence of a professional.

The strategy of creating educational resources, like preparedness-themed websites, without first raising awareness of the importance of emergency preparedness in a way that is suitable for pregnant and postpartum women is counterproductive. Even if resources are both

readable and suitable for the intended audience, the success of such an intervention requires that the target audience engage in information-seeking behavior, and this is by no means an assured outcome. Using an audience-centered approach to emergency preparedness education can help to ensure that emergency preparedness messages reach those pregnant and postpartum women at the greatest risk of adverse outcomes in the case of a public health emergency. An audience-centered approach takes into account the demographic profile, knowledge, attitudes, and values of the intended recipient of information.

It is important to balance the desire to give ‘ideal’ recommendations with the acknowledgment of the existing beliefs, perceptions, and practices of the target audience. For example, some emergency preparedness educational efforts aim to promote breastfeeding as an ideal emergency preparedness measure. Although breastfeeding might be the simplest way to feed an infant in the aftermath of a disaster, preparedness recommendations need to be sensitive to the needs of the population. If an educational initiative solely promotes breastfeeding or characterizes breastfeeding as the only manageable option for infant feeding in the face of disaster, this has the potential to alienate formula-feeding mothers and move them further from self-efficacy. There are many barriers to breastfeeding (27); educators must find ways to make preparedness for formula-fed infants more manageable rather than repeat messages about the importance of breastfeeding.

2.0 METHODS

The purpose of this thesis was to answer the following research questions:

1. Are there emergency preparedness interventions for pregnant and postpartum women published in the peer-reviewed journal literature?
2. In the absence of emergency preparedness guided learning interventions in the peer-reviewed literature, are the self-directed learning resources available to pregnant and postpartum women suitable?
3. What recommendations should be made for future preparedness educational interventions for this population?

Answers to these questions are important for guiding the development of appropriate, effective emergency preparedness interventions for pregnant and postpartum women.

In order to address the first research question, I conducted a search for emergency preparedness educational interventions that address the needs of pregnant and postpartum women. “Educational intervention” was defined as any type of program designed to educate about the topic of emergency preparedness for pregnant and postpartum women. Interventions selected were those with any or all of the following goals: [1] increasing knowledge at the individual level about the risks of public health emergencies to pregnant and postpartum women, [2] increasing knowledge at the individual level about the risks of public health emergencies to infants (birth to 24 months), [3] increasing readiness for emergencies by encouraging pregnant

and postpartum women to create emergency plans and gather emergency supplies, and [4] increasing social support to improve resilience of pregnant and postpartum women in preparation for public health emergencies.

The only interventions included were those aimed at increasing knowledge at the *individual* level; this is a practice encouraged by the Healthy People 2020 goal of engaging citizens and at-risk individuals in emergency preparedness planning (2). The chosen interventions are distinct from those aimed at improving readiness among employees of organizations or institutions responsible for public health emergency preparedness (such as health departments, hospitals, etc.). Improving readiness at the institutional level, though a key element of any comprehensive preparedness strategy, does not focus specifically on empowering at-risk populations.

A review of the literature was conducted to identify existing public health emergency preparedness educational initiatives targeted at pregnant and postpartum women as well as articles containing recommendations for the implementation of such programs. The search was limited to programs developed after the occurrence of Hurricane Katrina (September 2005 and onward). Hurricane Katrina was a critical turning point for emergency preparedness in the United States, and demonstrated the particular vulnerability of pregnant and postpartum women during public health emergencies. The goal of this review was to examine the types of emergency preparedness education available to pregnant and postpartum women found in the peer-reviewed literature.

The review began with a search of the published literature on the topic. This search yielded one study that met the criteria outlined above for an emergency preparedness educational intervention for pregnant and postpartum women. Due to the low yield, the literature search

criteria were adjusted to include articles that were related to preparedness educational interventions or made recommendations for the implementation of such interventions, but did not detail the implementation of an actual intervention study.

After searching for interventions in the published literature, I assessed other resources available to educate this population. This helped to answer the second and third research questions. I selected a sample of emergency preparedness web pages aimed at pregnant and postpartum women that were produced by the Centers for Disease Control and Prevention and assessed them for readability and suitability. I selected this sample to represent the best of the resources available online, and assumed that these are the type of websites that health departments, medical professionals, and other maternal and child health educators would recommend to clients as reliable sources of information. Women may have access to other educational resources; these could include pamphlets, social media, and interpersonal sources of information. This paper does not address these resources, because the quality and availability of these information sources vary considerably. Determining an appropriate sample of such resources was beyond the scope of this thesis.

2.2 GUIDED LEARNING INTERVENTIONS

Educator-led interventions were grouped under the umbrella of “guided learning.” These interventions take an interactive approach to teaching emergency preparedness, involving the presence of an instructor who may tailor the educational material to the audience, answer questions, and address concerns. A literature search was conducted to find instances of interactive emergency preparedness education targeted at pregnant and postpartum women. The

search was limited to English-language, peer-reviewed journal articles. The databases used for the search were PubMed, Scopus, and CINAHL (Ebsco), and the search terms used are outlined in Table 1. Table 2 outlines the search strategy used for each database.

Table 1. Literature Search Terms

Maternal and child health	Emergency preparedness
Maternal	Emergency preparedness
Pregnant women	Disaster preparedness
Pregnancy	All-hazards preparedness
Postpartum	Civil defense
Postpartum period	
Infants	
Neonatal	

Table 2. Search Strategy

	PubMed Query (March 20, 2014)
1.	((("all hazards" AND preparedness)) OR (((("Disasters"[Mesh] AND "preparedness"[all fields])) OR ("civil defense"[MeSH Terms] OR "civil defense"[All Fields] OR "emergency preparedness"[All Fields])))
2.	((((infants) OR ((neonatal) OR (((("postpartum period"[MeSH Terms] OR "postpartum"[All Fields])) OR (maternal) OR ((pregnancy) OR ("pregnant women"[MeSH Terms] OR "pregnant women"[All Fields]))))))))
3.	1 and 2
4.	3 and Filters: Publication date from 2005/09/01

Table 2. Continued

Scopus Query (March 20, 2014)	
1.	(((((TITLE-ABS-KEY(pregnant)) OR (TITLE-ABS-KEY(infants)) OR (neonatal)) OR (TITLE-ABS-KEY(postpartum))) OR (TITLE-ABS-KEY(pregnancy))) OR (TITLE-ABS-KEY(maternal)))
2.	(TITLE-ABS-KEY(disaster AND preparedness)) OR (TITLE-ABS-KEY(emergency AND preparedness)) OR (TITLE-ABS-KEY(all-hazards AND preparedness))
3.	1 and 2
4.	3 and (LIMIT-TO(PUBYEAR,2014) OR LIMIT-TO(PUBYEAR,2013) OR LIMIT-TO(PUBYEAR,2012) OR LIMIT-TO(PUBYEAR,2011) OR LIMIT-TO(PUBYEAR,2010) OR LIMIT-TO(PUBYEAR,2009) OR LIMIT-TO(PUBYEAR,2008) OR LIMIT-TO(PUBYEAR,2007) OR LIMIT-TO(PUBYEAR,2006) OR LIMIT-TO(PUBYEAR,2005))

CINAHL Query (March 20, 2014)	
1.	Pregnant OR pregnancy OR postpartum OR maternal OR infants OR neonatal
2.	Disaster preparedness OR emergency preparedness OR all-hazards preparedness
3.	1 and 2
4.	3 and Limiters - Published Date: 20050101-20131231

Articles were excluded that focused solely on educating healthcare providers and other professionals about emergency preparedness rather than educating pregnant and postpartum women directly. Articles were excluded that focused primarily on emergency and disaster response, rather than emergency and disaster preparedness. Interventions chosen for inclusion were those with the following activities:

1. Educating pregnant and postpartum women about how public health emergencies can affect pregnant and postpartum women and their infants (birth to 24 months)
2. Encouraging pregnant and postpartum women to create emergency plans and gather emergency supplies to increase emergency readiness

These search terms and inclusion criteria revealed one study that outlined a guided learning intervention for emergency preparedness education for pregnant and postpartum women. This reveals a gap in the preparedness and maternal and child health education literature. Although more emergency preparedness guided educational interventions for this population likely exist outside of the published literature, these interventions were unavailable for assessment. For this reason, I also chose to expand the search to examine articles that made recommendations and proposed guidelines for the planning and implementation of the types of preparedness educational interventions outlined above.

2.3 SELF-DIRECTED LEARNING RESOURCES

Self-directed approaches rely on the initiative of the audience to learn without the aid of a teacher, and assume that the target audience will seek out and understand the information needed to answer their questions or to address their concerns. These usually take the form of websites or print materials. For this research, only free, easily accessed web-based resources were considered. I chose to evaluate the readability and suitability of a sample of web pages produced by the Centers for Disease Control and Prevention (CDC) focused on emergency preparedness for pregnant and postpartum women.

As the lead public health agency of the United States, the CDC is tasked with the mission of protecting the population and preventing disease. A key part of the CDC mission statement is, “Whether diseases start at home or abroad, are chronic or acute, curable or preventable, human error or deliberate attack, CDC fights disease and supports communities *and citizens* to do the same” [italics added for emphasis] (28). The mission statement indicates that one fundamental

objective of the CDC is to educate citizens in ways that empower them to prevent disease. According to survey data gathered by The American Preparedness Project, other than relying on a personal doctor, the Centers for Disease Control and Prevention (CDC) is cited as the most trusted and persuasive source of information about public health emergencies (9). For this reason, I chose to examine a sample of emergency preparedness educational web pages targeted at pregnant and postpartum women produced by the CDC.

These are the type of web pages to which public health educators and medical professionals would likely direct their clients or patients. I wanted to assess the usability of these sites, because in the absence of a formal intervention, they may be the best resources available to pregnant and postpartum women trying to learn about emergency preparedness. Although the selected web pages include some general emergency preparedness information, all pages were directed toward “pregnant women” or “parents of young infants” or “new mothers.” Some of the pages follow the all-hazards approach to preparedness, while other pages offer information about specific types of emergencies and disasters.

I assessed readability using the Flesch Reading Ease (FRE) test and the Flesch-Kincaid Grade Level (F-K) formula. The Flesch Reading Ease scale rates the readability of textual material between 0 and 100, and the score is calculated based on sentence length and number of syllables per word. Higher scores indicate text that is easier to read and lower scores indicate more difficult material. The Flesch-Kincaid Grade Level translates the readability score to a U.S. grade level. The Flesch Reading Ease and Flesch-Kincaid Grade Level formulas are commonly used to evaluate the readability of health education materials, and have been used to evaluate similar resources for maternal populations, such as online pediatric patient educational materials

(29). They provide a good approximation of the literacy level necessary for comprehension of materials.

To use these readability measures, I entered the text from the relevant web pages into Microsoft Word 2011, and used the embedded reading level tool within Microsoft Word to calculate the readability scores of each page. A limitation of using the Flesch-Kincaid Grade Level formula within Microsoft Word is that the tool only displays grade level results up to grade 12. This limitation is acceptable given the purpose of the readability examination, since any grade level exceeding 12 would be deemed equally inappropriate for general audiences, as a common recommendation for reading level is the 6th to 7th grade (30). It has been suggested that the Flesch-Kincaid Grade Level scores may give lower grade level scores than some other readability assessment tools, so our scores may overestimate the readability of some materials (30). Although this is a potential limitation of using the Flesch Reading Ease and Flesch-Kincaid Grade Level tools, they remain acceptable tools for estimating readability of materials.

I assessed suitability using the Suitability Assessment of Materials (SAM) tool (31). This tool has been used by researchers to evaluate educational materials on a range of health topics, including online emergency preparedness resources (23). The SAM tool requires an assessment of reading grade level. For this assessment, we used the Flesch-Kincaid Grade Level results obtained using Microsoft Word as detailed in the readability assessment above.

The SAM rates materials on factors including [1] content, [2] literacy demand, [3] graphics, [4] layout and typography, [5] learning stimulation and motivation, and [6] cultural appropriateness. Materials are given a score of 0 if they are not suitable, a score of 1 if they are adequate, a score of 2 if they are superior, or are marked as not applicable. The total suitability scores are based on the sum of the points received divided by the total number of possible points

and multiplied by 100. Interpretation of the final SAM scores is as follows: 70-100% is superior material, 40-69% is adequate material, and 0-39% is not suitable material. The SAM evaluation criteria are listed in Table 3.

After the final SAM scores were calculated, I calculated the Cohen's Kappa statistic for all of the SAM scores. With 22 SAM criteria for five web pages, there were 110 scores assigned by each rater. The kappa statistic corrects for chance agreement between two raters and is a measure of inter-rater reliability. A kappa value between .61 and .80 is considered a substantial level of agreement; a kappa value between .81 and .99 is considered a nearly perfect level of agreement (32).

Table 3. Suitability Assessment of Materials Evaluation Criteria

Content	Purpose Content Scope Summary
Literacy Demand	Reading grade level Active voice Vocabulary Context Road signs
Graphics	Cover graphic Illustration type Illustration relevance Lists, tables, etc. explained Captions for graphics
Layout and Typography	Layout Typography Subheads
Learning Stimulation and Motivation	Interaction Behaviors modeled and specific Motivation and self-efficacy
Cultural Appropriateness	Logic, language, experience Cultural images

Prior to undertaking data analysis, two raters independently scored two sample government health-focused web pages on an unrelated topic as a pilot test to practice using the SAM tool and to test the similarity of rating technique. Discrepancies in scoring technique were resolved through discussion. The two raters then scored a sample of five CDC web pages about the topic of emergency preparedness for pregnant and postpartum women. The web pages assessed are listed in Table 4.

Table 4. Websites Reviewed Using the Suitability Assessment of Materials (SAM)

Pilot Test Websites
Mammograms Fact Sheet http://www.womenshealth.gov/publications/our-publications/fact-sheet/mammograms.html
Breast Cancer Prevention http://www.cancer.gov/cancertopics/pdq/prevention/breast/Patient/page3
Sample Websites
Information for Pregnant Women – Fact Sheet http://emergency.cdc.gov/disasters/pregnantfactsheet.asp
What Should Pregnant Women Know About 2009 H1N1 Flu (Swine Flu)? http://www.cdc.gov/h1n1flu/guidance/pregnant.htm
Effects of Disasters on Pregnant Women: Environmental Exposures http://www.cdc.gov/ncbddd/disasters/environmental.html
Wildfires: Information for Pregnant Women and Parents of Young Infants http://www.cdc.gov/reproductivehealth/emergency/WildFires.htm
Effects of Disasters on Pregnant Women: Infections http://www.cdc.gov/ncbddd/disasters/infections.html

3.0 RESULTS

The guided learning intervention literature search and the self-directed learning resources assessment provided answers to the research questions outlined earlier.

- Q1: Are there emergency preparedness interventions for pregnant and postpartum women published in the peer-reviewed journal literature?

A1: There is only one published intervention study that met the search criteria. There are other articles that make recommendations for preparedness educational interventions for this population. More research is needed to examine the role of formal educational

- Q2: In the absence of emergency preparedness guided learning interventions in the peer-reviewed literature, are the self-directed learning resources available to pregnant and postpartum women suitable?

A2: There are self-directed learning resources intended to address the preparedness needs of pregnant and postpartum women. A sample of CDC resources was selected for examination, and four of the five resources examined were considered only adequate. One resource was considered not suitable. None of the resources examined were considered superior. If these resources are some of the best available to pregnant and postpartum women, more work is needed to improve the suitability of self-directed learning resources, especially for audiences with low literacy and low incomes.

- Q3: What recommendations should be made for future preparedness educational interventions for this population?

A3: Self-directed learning resources may be insufficient for certain subpopulations. More guided learning intervention studies should be conducted and assessed for effectiveness. Baseline data should be gathered before interventions to establish a causal link between the educational intervention and the preparedness outcomes. Further research must be published to inform future intervention.

3.1 GUIDED LEARNING INTERVENTION LITERATURE SEARCH

The search results of the peer-reviewed literature included educational interventions targeted at health professionals focused on improving knowledge about emergency preparedness for pregnant and postpartum women, but only those articles that specifically mentioned educating the at-risk population were included. Only one intervention was found to meet the criteria of a guided learning intervention as outlined above. Figure 1 shows the Prisma Flow Diagram for the literature search.

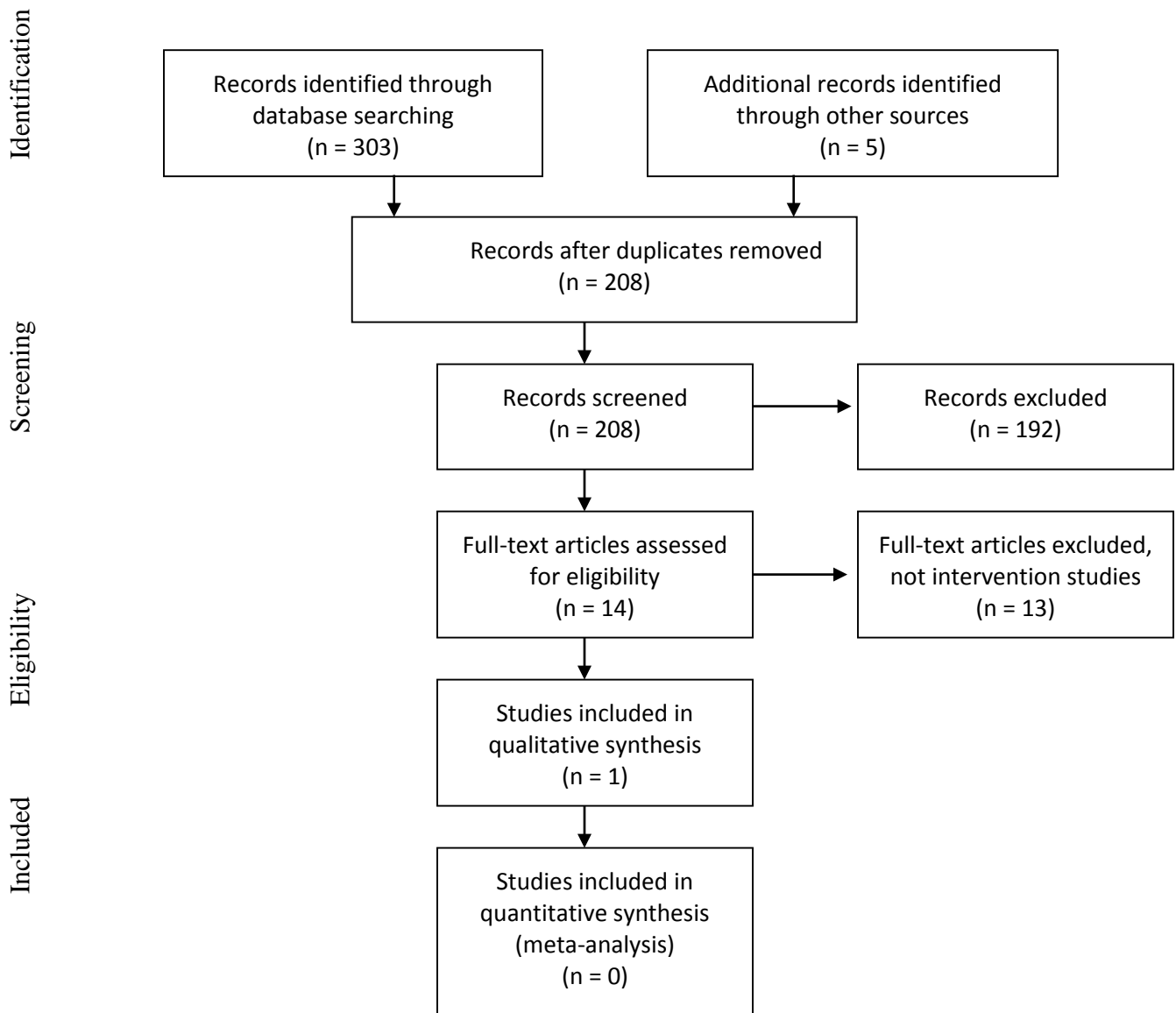


Figure 1. Prisma Flow Diagram



The one intervention study located in the published literature was conducted in Japan. It compared outcomes among a group of women who attended an educational program delivered by nurses intended to teach women about disaster preparedness and a control group that did not attend (33). For the sake of a more homogeneous study population, the effect of the program was only evaluated in first-time mothers who reported no previous disaster experience. This study found that modifying awareness of preparedness topics was a surer outcome than behavior modification (33), and that it is easier to increase knowledge about emergency preparedness than to impact preparedness behaviors. The researchers recommend finding and addressing the underlying barriers to preparedness behavioral change and encourage further research focused on behavior modification for this population. They also note that the nurses found the time demands of the educational intervention substantial, and recommend finding ways to more easily integrate such a curriculum into the schedule of the nurses and to ensure that they fully appreciated the importance of emergency preparedness education for this population.

Some of the search results did not outline specific programs, but rather gave guidelines for the creation of educational interventions targeted at pregnant and postpartum women. Given that only one article detailed the implementation of a preparedness educational program for pregnant and postpartum women, general articles examining recommendations for the creation of preparedness educational interventions for pregnant and postpartum women were also examined.

Incorporating emergency preparedness education into the childbirth education process is a frequently recommended approach to improving preparedness outcomes via education for pregnant and postpartum women (16, 34, 35). This includes both preparedness for emergency childbirth without medical assistance and general emergency preparedness information. DeWald and Fountain (2006) recommend that childbirth educators incorporate topics such as emergency

childbirth, breastfeeding (including relactation), CPR and first aid classes, disaster response kits, and the effects of toxin exposure during pregnancy (34). Ewing et al. (2008) recommend that educators include information about emergency childbirth, breastfeeding, emergency supplies and planning, and improving social support networks to assist during an emergency (16).

Giarratano et al. (2010) discuss the role of childbirth educators in raising awareness of the responsibility of individuals to ensure family preparedness in the case of emergencies (35). They note that childbirth educators have the ability to empower women to prepare for disasters, and that incorporating preparedness education into prenatal classes may be particularly useful for reaching this population. Their recommendations include educating families about preparedness measures for both an evacuation situation and a shelter-in-place scenario, and reiterate the concern for emergency birth planning (35). Importantly, given the potential mental health impacts of public health emergencies and disasters, the recommendations include a discussion of the mitigation of mental health-related effects of disaster through prior identification of stress-reduction techniques and social support networks.

Gribble and Berry (2011) outline the different preparedness requirements for women who breastfeed, women who formula feed using ready-to-use liquid infant formula, and women who use powdered infant formula (36). Their findings suggest that infant caregivers in developed countries are not sufficiently aware of the challenges and expense of formula feeding in a disaster scenario. They recommend that emergency management officials promote breastfeeding as the most reliable form of feeding during a disaster and strongly oppose educational messages that imply that storing some extra formula is sufficient preparation for formula-fed infants. Rather, they give detailed instructions for safely feeding formula-fed infants during a disaster scenario. They outline the suggested supplies for breastfed infants and those using either ready-

to-use or powdered infant formula, and the supply lists highlight the extra labor and costs associated with safe, hygienic formula feeding; this article encourages educators to detail these challenges when working with formula-feeding mothers (36).

Determining the baseline level of preparedness in a particular population subgroup may be a useful step toward adjusting preparedness educational efforts for this audience. Zilversmit et al. (2014) inserted a question into the Pregnancy Risk Assessment Monitoring System (PRAMS), a large survey that collects self-reported behavioral information, about whether postpartum women in Arkansas had emergency plans (37). Among the surveyed population, just under half reported having an emergency plan (37). The survey did not address the quality of the emergency plan, but merely noted the presence of one. This is a potentially useful finding, as it demonstrates the behavioral intention to become more prepared, and may indicate which women in the at-risk population might be most receptive to emergency preparedness messages.

3.2 SELF-DIRECTED LEARNING RESOURCES ASSESSMENT

The results of the SAM scoring are outlined in Table 5. Four of the five sites were given a score of “adequate” and one site was scored as “not suitable.” None of the sites received a score of superior. Despite some variation between raters in the values assigned to individual evaluation criteria, raters agreed on the final SAM score suitability categories. “What Should Pregnant Women Know About 2009 H1N1 Flu (Swine Flu)?” site had the highest scores overall, and was the closest to receiving a “superior” score. The other “adequate” scores were on the lower end of the range, suggesting more substantial changes would be needed before they could be considered “superior” materials.

Table 5. SAM Scores

Information for Pregnant Women – Fact Sheet	ADEQUATE (50.0%, 55.5%)
What Should Pregnant Women Know About 2009 H1N1 Flu (Swine Flu)?	ADEQUATE (58.3%, 66.7%)
Effects of Disasters on Pregnant Women: Environmental Exposures	ADEQUATE (46.9%, 41.2%)
Wildfires: Information for Pregnant Women and Parents of Young Infants	ADEQUATE (55.5%, 47.2%)
Effects of Disasters on Pregnant Women: Infections	NOT SUITABLE (31.2%, 19.4%)

In addition to the final SAM scores, I conducted a second analysis to account for the inter-rater reliability of the SAM analysis. The Cohen’s Kappa value of all of the raters’ SAM scores for each web page is .768, a substantial score for inter-rater reliability. The major scoring differences occurred in categories where raters disagreed about the applicability of a particular criterion and whether it should be assigned a score of zero or “not applicable.”

There was discussion between raters about whether results for certain evaluation criteria should receive a score of “not applicable” or a zero. There are differences of opinion regarding which elements of communication pieces are considered “not applicable” versus necessary but absent. For example, according to the SAM tool, a cover graphic that “has none of the superior

criteria” should be given a score of zero. In the absence of a cover graphic, one rater chose to score as “not applicable,” since there was no graphic to meet any of the superior criteria. The other rater, though, justified a score of zero with the reasoning that a missing cover graphic – by virtue of its absence – has none of the superior criteria.

In most instances, a summary or review of the web page information was determined to be unnecessary, since most of the web pages were brief. In these cases a summary was considered not applicable. Furthermore, the appropriateness of cultural images was generally considered not applicable, since the web pages did not contain representations of a particular culture.

A superior score for subheadings required that (1) lists be grouped under descriptive subheadings and (2) no more than five items are presented without a subheading. An adequate score required that no more than seven items be presented without a subheading. For the purpose of the analysis, raters defined an “item” as an independent thought capable of standing alone as a sentence. So, for example, bullet points that outlined detailed descriptions of different symptoms of a particular infection would be considered separate items, while a simple bulleted list of symptoms would be considered one item. Each sentence in a paragraph was considered a separate item.

The SAM scoring criteria for Typography indicates that a score of “adequate” requires that two of the relevant required factors are present. A score of “superior” requires the presence of four factors. The way the criteria are written may be considered ambiguous, so an “adequate” score was assigned to materials with two *or three* required factors.

Another area of uncertainty in the SAM evaluation process was the interpretation of the layout criteria that seemed applicable only to print materials. For example, factors such as “high

contrast between type and paper” are not relevant to web-based materials. Raters chose to reinterpret this particular factor as “high contrast between type and background,” since the factor was easily applied to digital sources with only a minor adjustment. Other factors were less applicable to web-based materials, though, such as the factor requiring a “nongloss or low-gloss surface” for the printed material. These layout factors related to printed material were not considered applicable and did not contribute to the scores calculated for the layout category.

The SAM provides an approximation of the overall suitability of materials for a particular audience. The content was one of the strongest aspects of the sample of CDC web pages assessed. Graphics tended to be a weak area for the web pages, as very few pages contained relevant, captioned graphics.

4.0 DISCUSSION

4.1 GUIDED LEARNING INTERVENTIONS

Given that a search of the peer-reviewed journal articles on the topic of emergency preparedness educational interventions for pregnant and postpartum women reveals only one published intervention study (conducted in Japan), I am led to ask why there are so few intervention studies in the published literature. It has been over eight years since Hurricane Katrina's devastating landfall, yet there is not a single published intervention study on emergency preparedness education for pregnant and postpartum women in the United States. Without expanding research into emergency preparedness interventions for pregnant and postpartum women, there will be insufficient data about the best ways to enhance the emergency readiness of this population.

The absence of guided learning intervention studies in the published literature is notable. This gap in the literature may be the result of limited funding to implement such programs. It may relate to a belief that preparing at-risk individuals for public health emergencies is not as high of a priority as preparing medical professionals and institutions. Or, the lack of intervention literature may emerge from an attitude that attempting to increase preparedness and effect behavior change among at-risk populations is too difficult. Regardless of the reasons for the absence, without a published record of the successes or failures of guided learning interventions, there is little guidance for those attempting to implement such programs.

Nevertheless, the literature suggests that guided learning interventions are a viable approach to increasing the preparedness of pregnant and postpartum women. Using childbirth education classes as a delivery mechanism for preparedness messages is one example of a guided learning approach recommended in the literature (34, 35). This approach is supported by the 2013 study conducted by Song et al. about the information-seeking behavior of low-income women that found that interpersonal sources of information were preferred for acquiring health and pregnancy-related information (24). The interactivity of guided learning interventions is advantageous, and is supported by the work done by Boyd et al. that found that low-income women considering H1N1 vaccination for themselves and their children desired the assistance of a trusted professional to inform their decision-making process (26). The ability to ask questions and receive helpful feedback can assist women in developing self-efficacy and acting on preparedness recommendations. Additionally, incorporating an emergency preparedness component into existing educational programs targeted at pregnant and postpartum women may be a way to reach these at-risk populations without the expenditure of significant additional resources.

Key preparedness topics for this population have been outlined in the literature (16, 33, 34, 36, 38). These topics should be considered for inclusion in potential interventions. Evaluating the readiness of women prior to the intervention is useful for establishing baseline population preparedness and evaluating the impact of any educational intervention (37). Future guided learning interventions should pay careful attention to evaluation and measure the impact of particular interventions on desired preparedness outcomes.

One limitation of the guided learning intervention literature search is that only peer-reviewed journal articles were examined. There may be many more guided learning interventions

that focus on emergency preparedness for pregnant and postpartum women that are not accessible by searching the published literature. Although an analysis of these unpublished guided learning interventions would undoubtedly include useful information and helpful program recommendations, the fact that the published literature is so sparse means that this is an area ripe for further research.

4.2 SELF-DIRECTED LEARNING RESOURCES

The information about disasters for pregnant women and parents of infants contained in the sample of emergency preparedness web pages was varied. Although most of the web pages were considered “adequate” according to the SAM analysis, none of the web pages received a score of superior overall. For an at-risk, low-literacy population unlikely to seek preparedness information, these “adequate” web pages are almost certainly insufficient. Even if the information contained in these web pages is true and useful, if the information is not presented in a way that is suitable for the intended audience, then the effort is unlikely to improve preparedness outcomes for this population.

The Suitability Assessment of Materials has notable limitations. One limitation of the tool is that the rating process is vulnerable to a degree of subjectivity. For example, the decision about whether a factor should be considered “not applicable” or given a score of zero is rooted in the rater’s belief of whether the factor should be required for inclusion in the communication material being assessed. If a particular factor, such as the cover graphic, is not present, raters may either decide that the factor does not apply to the particular communication material (because it is a web page, for example, and web pages don’t necessarily have a “cover”) or raters

may decide that the lack of a cover graphic (which they may define as a graphic near the top of the web page) is inappropriate and give this factor a score of zero. Differences in the SAM scores of the web pages evaluated above reflect some of the subjectivity of the tool.

Another limitation of the SAM is that there is not always a very clear connection between the factor being assessed and the rationale for its importance. For example, the way in which the material being assessed affects motivation and self-efficacy is measured by seeing how the topics are subdivided into smaller parts. The superior criteria for this topic reads, “Complex topics are subdivided into small parts so that readers may experience small successes in understanding or problem solving, leading to self-efficacy.” Although improved understanding of a topic has a generally positive effect on self-efficacy, it does not inevitably lead to self-efficacy. And the notion that simply dividing complex topics into smaller parts improves understanding thereby improving self-efficacy is overstated. Despite its limitations, the SAM analysis provides an approximation of the suitability of written materials.

The SAM scores highlight particular communication weaknesses that can be targeted for improvement. One particularly weak area for the sample CDC web pages was the graphics category. The sample web pages rarely provided sufficient graphics, and the graphics they contained were uncaptioned. Strong graphics are important for reaching many audiences, but for a low-literacy population they are all the more essential. The web pages fared better in the content and literacy demand categories of the SAM analysis, but there was room for improvement in all categories.

After assessing the sample of CDC preparedness web pages that address the hazards of public health emergencies to pregnant and postpartum women, my strongest criticism is that these pages lack sufficient audience segmentation. Some of the preparedness information seemed

to be aimed at healthcare providers and public health professionals, while other information was more appropriate for regular citizens. Some of the web pages were written in plain language and at a reading grade level appropriate for people with low literacy; other web pages, especially the web page entitled “Effects of Disasters on Pregnant Women: Infections,” were written at a high reading grade level with very difficult vocabulary. Even if the all of the information provided in these CDC preparedness web pages is relevant and useful, without adopting an audience-centered approach that prioritizes communication for those at the highest risk for adverse outcomes during an emergency or disaster, the web pages will not meaningfully improve preparedness outcomes for this population.

It is also important to remember that these self-directed learning resources take for granted the fact that members of this population will be interested in the topic of preparedness and have the resources necessary to access the information (e.g., Internet access). The assumption is that women will either seek out this preparedness information on their own or will be directed toward these resources by someone like a health professional. Neither of these outcomes can be guaranteed, but they can be made more likely by an intervention that seeks to increase public and professional awareness of the risks associated with public health emergencies for pregnant women, postpartum women, and infants.

4.3 CONSIDERATIONS FOR FUTURE INTERVENTION

Although there is scant evidence that either approach alone will have a meaningful impact on preparedness outcomes for this population, a combination of guided learning and self-directed learning should be considered for future preparedness interventions for pregnant and postpartum

women. The process of creating educational materials for both types of intervention will benefit from stakeholder participation in the message creation process and appropriate audience segmentation. Suitability of intervention materials must be considered, and materials should be audience tested. The SAM analysis has revealed a recurring weakness in the graphical representations of preparedness information. An increased focus on visual communication may help to reach communities with low literacy skills.

Any intervention study intended to evaluate the effectiveness of a preparedness guided learning intervention must first establish baseline preparedness for the population under study. This will necessitate further work like that of Zilversmit et al. that examined the prevalence of emergency plans among postpartum women (37). Research should gather more detailed data than the Zilversmit study did, measuring not only the presence of an emergency plan, but also the mother's level of knowledge about the hazards of public health emergencies and the best way to mitigate the associated risks for herself and her family. It would also be very helpful to examine attitudes, intentions, and beliefs about the importance of emergency preparedness within the population of interest.

Intervention studies with rigorous evaluation are desperately needed to move the field of maternal and child health preparedness forward. Measuring behavior change (or a shift in behavioral intention) associated with these interventions will allow us to evaluate their effectiveness and to improve upon them. Both the unpublished literature and the peer-reviewed published literature contain suggestions for what to include in an educational program for this population; the next step is the implementation and evaluation of a program that includes some of these suggestions and may reveal the strengths and weakness of a particular approach.

4.4 LIMITATIONS

There are several limitations of this thesis. One limitation is that the only emergency preparedness interventions examined in the literature search were those that targeted pregnant and postpartum women specifically. More general “family” preparedness interventions were not examined in the literature review. Additionally, by limiting the search to peer-reviewed journal articles, the review excluded other potentially useful resources, such as conference proceedings and other types of publication.

Another limitation of this thesis is that the sample of self-directed educational resources assessed was small. Although this sample was selected strategically, it only represents a fraction of the potential resources available to a particular woman. Furthermore, the Suitability Assessment of Materials, though a useful tool, has a set of limitations outlined in Section 4.2.

4.5 PUBLIC HEALTH SIGNIFICANCE

By directing preparedness efforts toward pregnant and postpartum women, we may reduce mortality and morbidity associated with public health emergencies. Furthermore, by targeting preparedness education early – during pregnancy or a child’s infancy – interventions may improve a family’s outcomes in the long-term due to the arrival of a new context for behavior change (39). A new child brings many changes for a woman – with appropriate intervention, one of these changes may be a shift of the family’s orientation toward emergency preparedness.

In today’s environment of uncertainty and insecurity related to climate change and geopolitical conflict, improving emergency preparedness is more significant to the health of the

public than ever before. Climate change, in combination with population increase, will stress the capacity of the government to respond to public health emergencies and disasters. The potential for more high intensity storm impacts and temperature extremes in North America is real (40). Although personal emergency preparedness is only one facet of national security and public health preparedness, it deserves more research and attention. This thesis explores the state of public health emergency preparedness education for an especially at-risk group with the ultimate goal of improving preparedness outcomes for this population.

5.0 CONCLUSIONS

The goal of this thesis was to explore the issue of the effectiveness of existing emergency preparedness interventions for pregnant and postpartum women and to raise questions to be addressed in future research and practice. An examination of the types of emergency preparedness interventions available to pregnant and postpartum women revealed a gap in the published literature about educational intervention studies for this population and a lack of evaluation in existing preparedness resources. More research is needed to understand the strengths and weaknesses of each educational intervention approach, and to ensure the effectiveness and efficiency of future interventions.

The stakes are high. Public health emergencies and disasters are inevitable, and we have an opportunity to mitigate the effects of these events by improving the readiness of American citizens. We know that pregnant women, new mothers, and infants face unique challenges during such events and should be provided with educational resources that address their specific needs *prior* to the occurrence of an emergency. In order to justify the expense of these important preparedness efforts, research must be done to support the effectiveness and efficiency of preparedness intervention. As public health emergencies and disasters will continue to play an important role in shaping the health and wellness of American citizens, so must we continue to empower citizens to improve their emergency preparedness to mitigate the effects of such events.

APPENDIX: SUITABILITY ASSESSMENT OF MATERIALS SCORES

Included in this Appendix are the raw Suitability Assessment of Materials scores for both raters. In each table, column A is a record of the scores assigned by Amia Downes and column B is a record of the scores assigned by Brianna McDonough. These raw scores offer insight into some of the criteria in which the SAM tool relies on factors that may leave room for subjectivity or factor scoring variation between raters. Scores of 70-100% indicate superior material, scores of 40-69% indicate adequate material, and scores of 0-39% indicate not suitable material.

1. INFORMATION FOR PREGNANT WOMEN – FACT SHEET

	A	B
Content		
Purpose	1	2
Content	2	2
Scope	2	2
Summary	N/A	N/A
Literacy Demand		
Reading grade level	1	1
Active voice	1	2
Vocabulary	2	2
Context	0	0
Road signs	2	2
Graphics		
Cover graphic	0	0
Illustration type	N/A	N/A
Illustration relevance	0	0
Lists, tables, etc. explained	N/A	N/A
Captions for graphics	0	0
Layout and Typography		
Layout	1	1
Typography	1	1
Subheads	0	0
Learning Stimulation/Motivation		
Interaction	0	0
Behaviors modeled/specific	2	2
Motivation/self-efficacy	2	2
Cultural Appropriateness		
Logic, language, experience	1	1
Cultural images	N/A	N/A
Points earned	18	20
Total possible points	36	36
Score	50.0%	55.5%
	Adequate	Adequate

2. WHAT SHOULD PREGNANT WOMEN KNOW ABOUT 2009 H1N1 FLU (SWINE FLU)?

	A	B
Content		
Purpose	2	2
Content	1	1
Scope	2	2
Summary	N/A	N/A
Literacy Demand		
Reading grade level	1	1
Active voice	2	2
Vocabulary	1	1
Context	1	2
Road signs	2	2
Graphics		
Cover graphic	1	1
Illustration type	N/A	N/A
Illustration relevance	0	0
Lists, tables, etc. explained	N/A	N/A
Captions for graphics	0	0
Layout and Typography		
Layout	1	1
Typography	1	1
Subheads	1	1
Learning Stimulation/Motivation		
Interaction	1	1
Behaviors modeled/specific	1	2
Motivation/self-efficacy	2	2
Cultural Appropriateness		
Logic, language, experience	1	2
Cultural images	N/A	N/A
Points earned	21	24
Total possible points	36	36
Score	58.3%	66.7%
	Adequate	Adequate

3. EFFECTS OF DISASTERS ON PREGNANT WOMEN: ENVIRONMENTAL EXPOSURES

	A	B
Content		
Purpose	1	1
Content	0	1
Scope	2	1
Summary	N/A	N/A
Literacy Demand		
Reading grade level	0	0
Active voice	1	1
Vocabulary	1	1
Context	2	2
Road signs	2	2
Graphics		
Cover graphic	N/A	0
Illustration type	N/A	N/A
Illustration relevance	0	0
Lists, tables, etc. explained	N/A	N/A
Captions for graphics	N/A	N/A
Layout and Typography		
Layout	1	1
Typography	1	1
Subheads	2	1
Learning Stimulation/Motivation		
Interaction	0	0
Behaviors modeled/specific	0	0
Motivation/self-efficacy	2	2
Cultural Appropriateness		
Logic, language, experience	0	0
Cultural images	N/A	N/A
Points earned	15	14
Total possible points	32	34
Score	46.9%	41.2%
	Adequate	Adequate

4. WILDFIRES: INFORMATION FOR PREGNANT WOMEN AND PARENTS OF YOUNG INFANTS

	A	B
Content		
Purpose	2	2
Content	2	2
Scope	2	2
Summary	N/A	N/A
Literacy Demand		
Reading grade level	1	1
Active voice	2	1
Vocabulary	1	2
Context	0	0
Road signs	2	2
Graphics		
Cover graphic	1	1
Illustration type	N/A	N/A
Illustration relevance	0	0
Lists, tables, etc. explained	N/A	N/A
Captions for graphics	0	0
Layout and Typography		
Layout	1	1
Typography	1	1
Subheads	0	0
Learning Stimulation/Motivation		
Interaction	0	0
Behaviors modeled/specific	1	1
Motivation/self-efficacy	2	0
Cultural Appropriateness		
Logic, language, experience	2	1
Cultural images	N/A	N/A
Points earned	20	17
Total possible points	36	36
Score	55.5%	47.2%
	Adequate	Adequate

5. EFFECTS OF DISASTERS ON PREGNANT WOMEN: INFECTIONS

	A	B
Content		
Purpose	1	1
Content	0	0
Scope	1	0
Summary	N/A	0
Literacy Demand		
Reading grade level	0	0
Active voice	0	1
Vocabulary	0	0
Context	2	0
Road signs	2	2
Graphics		
Cover graphic	N/A	0
Illustration type	N/A	N/A
Illustration relevance	0	0
Lists, tables, etc. explained	N/A	N/A
Captions for graphics	N/A	N/A
Layout and Typography		
Layout	1	1
Typography	1	1
Subheads	0	0
Learning Stimulation/Motivation		
Interaction	0	0
Behaviors modeled/specific	0	0
Motivation/self-efficacy	2	1
Cultural Appropriateness		
Logic, language, experience	0	0
Cultural images	N/A	N/A
Points earned	10	7
Total possible points	32	36
Score	31.2%	19.4%
	Not Suitable	Not Suitable

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