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## Review Article

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### Abstract

**Objectives:** Mothers, particularly those who are breastfeeding, as well as their babies are often overlooked populations during natural disasters. Still, the ever-growing frequency and severity of natural disasters in the United States (US) have increased the likelihood that a breastfeeding family will experience a natural disaster. In 2019, 83% of all newborns received breastmilk, and 84% of Americans lived in an area that recently experienced a natural disaster. This scoping review aimed to identify ways to support breastfeeding women, infants, and young children during a natural disaster.

**Methods:** A search was performed using Embase, Scopus, PubMed, and CINAHL databases to identify articles published in the English language from September 2005–September 2023 according to the Joanna Briggs Institute (JBI). Each article was chosen based on noted inclusion and exclusion criteria. Data were extracted per the pre-prepared protocol.

**Results:** Ten articles were selected for the scoping review, examining key characteristics and recommendations. The authors of the included articles used varying approaches to present the information, and differing approaches to supporting breastfeeding during disasters were observed. Only 3 of the 10 articles were research studies, 3 were editorials, 2 were program descriptions or evaluations, 1 was an education article, and 1 was a report. All articles addressed women, pregnant or postpartum women, infants, and/or young children. All articles addressed hurricanes, and 1 article addressed 2 disasters: a winter storm and a hurricane.

**Conclusions:** Recommendations include the adoption of breastfeeding women, infants, and young children in disaster plans as a special population with unique needs, integration of breastfeeding support into disaster plans, and training disaster workers to support breastfeeding during disasters.

Mothers, particularly those who are breastfeeding, as well as their babies are often overlooked populations, in planning for, and during natural disasters. Still, the ever-growing frequency and severity of natural disasters in the United States (USA) have increased the likelihood that a breastfeeding family will experience a natural disaster. In 2019, 83% of all newborns received breastmilk,<sup>1</sup> and 84% of Americans have recently lived in an area that experienced a natural disaster.<sup>2</sup> Many families with young children will experience a natural disaster. Breastfeeding during a natural disaster is challenging for families yet breastfeeding remains crucial to maintaining food security.<sup>3</sup> Thus, there is a pressing need to prioritize breastfeeding support for families experiencing a natural disaster.<sup>4,5</sup>

Mothers have reported unique challenges during disasters, such as relocation, maternal or infant illness, decreased access to health care and lactation support, decreased social support, perceived low milk supply, and unsolicited handouts of infant formula and solid foods from response organizations and family members.<sup>6–8</sup> One example is from the Fort McMurray, Canada, wildfires where De Young<sup>9</sup> found that exclusive breastfeeding rates dropped from 64% to 36% during the disaster. Mothers attributed their untimed weaning to stress, diminished milk supply, and lack of access to lactation support for feeding concerns. Breastfeeding challenges during a natural disaster may result in untimed weaning or cessation of breastfeeding, thus increasing the risk of disaster-related respiratory or gastrointestinal illness.<sup>10–13</sup>

The Federal Emergency Management Agency (FEMA) recommends that disaster responders prepare for infants and toddlers to comprise about 10% of their evacuation shelter population.<sup>14</sup> Although the new FEMA Commonly Used Sheltering Items (CUSI) catalog<sup>14</sup> includes bottle-feeding items and commercial infant formula, it does not address breastfeeding. In fact, breastfeeding was not addressed in mass care protocols before August 2023.<sup>15</sup> The FEMA Critical Needs Assistance (CNA) Program provides limited support to breastfeeding mothers when the USA President grants Other Needs Assistance (ONA) for the disaster,<sup>16</sup> such as mothers being

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granted reimbursement for breastfeeding supplies like a breast pump. However, local stores may not be open or even carry lactation supplies.<sup>16</sup> For example, following Hurricane Maria in Puerto Rico in 2017, mothers could not access breastfeeding supplies because surrounding grocery stores and Women, Infants, and Children (WIC) offices were closed. Furthermore, those mothers who even had infant feeding equipment were prohibited from accessing shelter kitchens to sanitize them.<sup>16</sup> Therefore, the breastfeeding supplies provided during this event were neither usable nor practical.

In October 2023, a preliminary search of PubMed, the Cochrane Database of Systematic Reviews, and Joanna Briggs Institute (JBI) Evidence Synthesis revealed that, to date, no literature reviews have focused on breastfeeding or infant and young child feeding (IYCF) during natural disasters in the USA. Other reviews of the literature have examined disasters outside the USA; for example, Hwang et al.<sup>5</sup> reviewed IYCF during disasters in middle- and high-income countries from 2010 to 2018.<sup>5</sup> However, the review was not specific to the USA and focused on challenges and deviations from protocols to support breastfeeding during disasters. Therefore, an understanding and knowledge of support for breastfeeding women and IYCF during disasters remains lacking.

## Purpose

This study aims to understand key characteristics of supporting women to continue breastfeeding during natural disasters, examine the range and nature of related journal articles in the literature, and investigate the relationship between geographical region and type of disaster addressed in the articles.

## Methods

This article adheres to PRISMA-ScR guidelines.<sup>17</sup> Supplementary materials, including additional details about the methodology, are detailed in the Appendix.

### Eligibility Criteria

Eligibility criteria were based on the JBI<sup>18</sup> Population, Concept, Context (PCC) framework to define the scope and guide the aim of this scoping review.

## Inclusion Criteria

### Population

Inclusion criteria comprised articles that described women who provided their breastmilk via any delivery method for their infant or young child. To simplify, infants and young children are referenced as “babies” for the remainder of this article.

### Concept

Strategies and interventions that support breastfeeding women.

### Context

Articles examining breastfeeding during presidentially declared natural disasters in the US, written in English, peer-reviewed, and

published between September 2005 (Hurricane Katrina) and September 2023.

In this scoping review, the term “disaster” indicates a presidentially declared emergency or major disaster in the US, as described in The Robert T. Stafford Disaster Relief and Emergency Assistance Act as amended, 42 USC §§ 5122,24, also known as “The Stafford Act.”<sup>19</sup>

## Exclusion Criteria

Exclusion criteria included articles with the following: (a) focus on unrelated topics; (b) published before Hurricane Katrina (September 2005); (c) the COVID-19 pandemic is the only disaster mentioned; (d) non-human; (e) non-English written; (f) conference abstracts; (g) organizational practice guidance; and (h) studies that were not directly relevant to the purpose were excluded, such as articles that focused on pregnancy or commercial infant formula feeding with only a brief mention of breastfeeding, lactation, or human milk.

## Data Collection

Two authors on October 26, 2023 searched the following 4 databases: CINAHL, Embase, PubMed, and Scopus. The keywords used in the search strategy included “Lactation” OR “Breast Pumps” OR “breastfeed\*” OR “breastmilk\*” OR “breast milk” OR “human milk” OR “lactation” AND “Humanitarian Aid” OR “Emergency Evacuation” OR “Disaster Planning” OR “Natural Disasters” OR “Disasters” OR “humanitarian emergency” OR “disaster” OR “hurricane” OR “wildfire” OR “tornado” OR “flood\*” OR “earthquake” OR “winter storm” OR “ice storm” OR “straight-line winds.” The Appendix provides the complete research design and search strategy. Results were collected and compiled using Endnote20<sup>®</sup> software.

## Selection of Studies

Once duplicates were removed using Endnote20<sup>®</sup>, 2 authors (authors 1 and 3) simultaneously and collaboratively performed a title and abstract screening of the results obtained from the search. Also, 2 reviewers screened studies in full text. For eligible studies, the full-text article was reviewed.

## Data Extraction

One author (author 1) primarily extracted data from each study, including demographic information, authors, journal, year of publication, type of article, methodology for research articles, the aim or purpose, critical characteristics of the article, population, concept, and context per JBI methodology.

## Data Management and Synthesis

The authors created a data extraction tool using Excel with the following headings under each selected article: 1) authors; 2) year; 3) title; 4) article type; 5) methodology; 6) aim or purpose; 7) key characteristics; 8) population; 9) concept; and 10) context which included the a) disaster date, b) study dates (for research studies), c) geographic location, d) specific disaster, and e) type of disaster. See Table 1 for more information.

**Table 1.** Data Extraction Tool

Authors	Title	Article type	Methodology	Aim or purpose	Key characteristics	Population	Concept	Context				
								Disaster date	Study dates	Geographic location	Specific Disaster	Type of Disaster
Barrett (2006) <sup>26</sup>	Breastfeeding: nature's MRE	Editorial	N/A	To describe the lack of implementation of international guidelines for feeding infants during emergencies.	Sent board-certified lactation consultants into shelters to work directly with mothers. Highlighted the importance of dedicated individuals championing breastfeeding support during emergencies. Emphasized the need for integrated interventions, acknowledging mothers' established feeding decisions.	Breastfeeding mothers	Implementation of guidelines for IYCF-E and ways to support breastfeeding	tr8/29/2005	N/A	USA Gulf Coast (Louisiana and Mississippi)	Hurricane Katrina	Hurricane (Category 4)
Callaghan et al. (2007) <sup>23</sup>	Health concerns of women and infants in times of natural disasters: Lessons learned from Hurricane Katrina	Report	N/A	To raise awareness that pregnant women and infants are a special population with unique needs"	Raised awareness concerning the unique needs of pregnant and postpartum women and infants. Provided phone counseling on disaster-related exposures and breastfeeding. Emphasized the need for disaster response strategies to incorporate the needs of this population.	Pregnant and postpartum women and infants	Special population needs, Health concerns	8/29/2005	N/A	USA Gulf Coast (Louisiana and Mississippi)	Hurricane Katrina	Hurricane (Category 4)
De Young, Fraser, Gerber-Chavez (2022) <sup>24</sup>	Maternal and infant health in disasters: Texas's high-risk landscape	Editorial	N/A	To bring attention to "maternal and infant well-being in disasters, and how to prevent harm in disasters for this specific group of the population."	Addressed the well-being of maternal and infant health in disasters. Provided recommendations including breastfeeding spaces and supplies for sanitizing bottles in emergency shelters. Highlighted issues like power outages affecting stored breastmilk.	Pregnant and lactating families	Maternal and infant well-being in disasters and how to prevent harm	8/25/2017 2/10/2021	N/A	Texas Gulf Coast Texas	Hurricane Harvey and Winter Storm Uri	Hurricane (Category 4) and winter storm
De Young, Jackson, Callands (2023) <sup>25</sup>	Maternal stress and social support during Hurricane Florence	Research	Cross-sectional, mixed-methods prospective study	To demonstrate effect of a hurricane on the experience of caregivers, specifically regarding stress and social support	Examined the effects of a hurricane on caregiver stress and social support. Reported issues like lost frozen breastmilk and separation from infants. Suggested doula and midwife support, space for breastfeeding, and preparation of feeding supplies.	Women and caregivers who already had children or were pregnant and lived in areas where Hurricane Florence made landfall	Maternal stress, social support	9/14/2019	9/21/2018 – 11/20/2018	North Carolina	Hurricane Florence	Hurricane (Category 1)
Ewing, Buchholtz, Rotanz (2008) <sup>29</sup>	Assisting pregnant women to prepare for disaster	Education	N/A	To inform maternal child health nurses about the basics of disaster planning for the populations they serve.	Informed maternal child health nurses about disaster planning for pregnant and breastfeeding women. Recommended integrating breastfeeding into disaster plans, training disaster	Pregnant and breastfeeding women	Disaster planning for MCH nurses	8/29/2005	N/A	USA Gulf Coast (Louisiana and Mississippi)	Hurricane Katrina	Hurricane (Category 4)

(Continued)

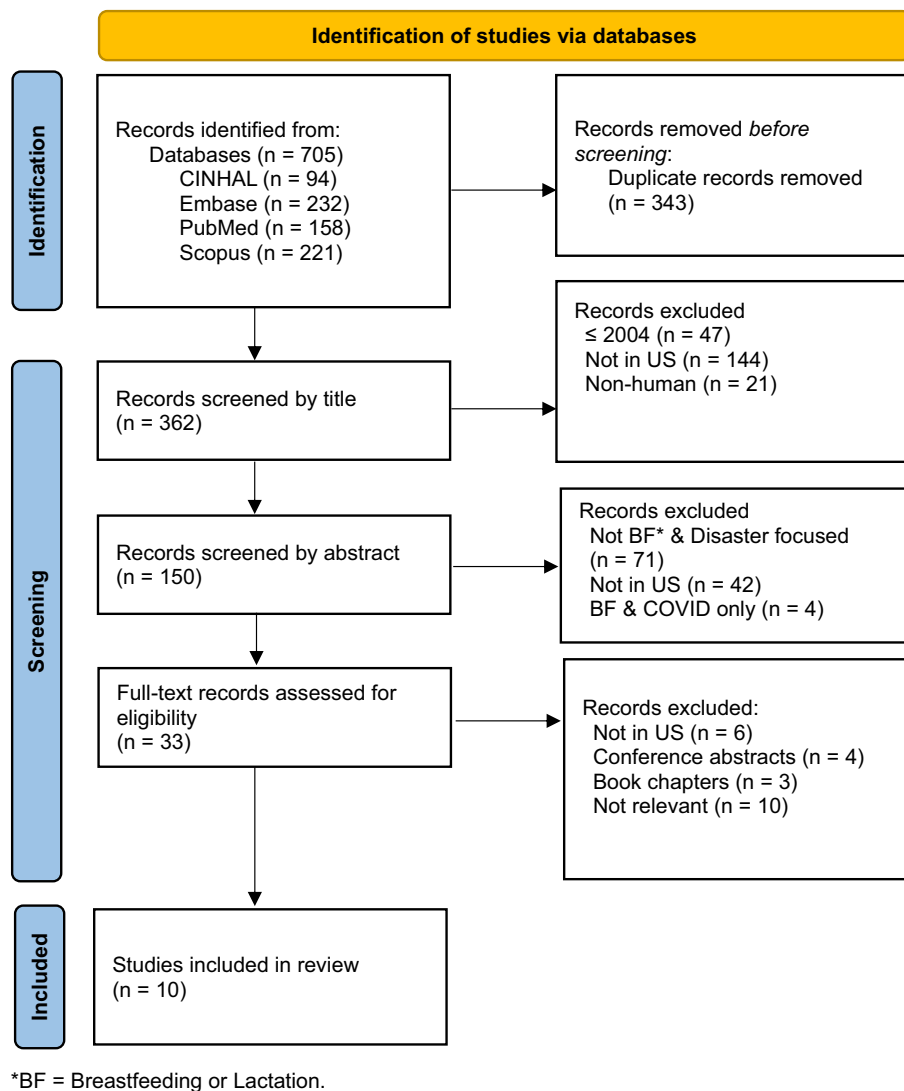
Table 1. (Continued)

Authors	Title	Article type	Methodology	Aim or purpose	Key characteristics	Population	Concept	Context				
								Disaster date	Study dates	Geographic location	Specific Disaster	Type of Disaster
					workers, and reviewing breastfeeding techniques with mothers.							
Heinig (2005) <sup>38</sup>	Hope in the darkest days: Breastfeeding support in emergencies	Editorial	N/A	To help readers realize that support of breastfeeding is an essential part of any large-scale emergency plan.	Emphasized the essential role of breastfeeding support in emergency plans. Encouraged mother-baby, skin-to-skin contact, access to health care professionals that are skilled in breastfeeding support, appropriate distribution of relief supplies, and dispelling myths about breastfeeding during disasters.	Breastfeeding and bottle-feeding mothers	Include breastfeeding in emergency plans	8/29/2005	N/A	USA Gulf Coast (Louisiana and Mississippi)	Hurricane Katrina	Hurricane (Category 4)
Quinn et al. (2008) <sup>27</sup>	Addressing concerns of pregnant and lactating women after the 2005 hurricanes: The OTIS response	Program description/evaluation	N/A	To describe OTIS's response after the 2005 hurricanes, the challenges encountered in implementing the response, and lessons learned that might be useful to improve the response to the unique needs of this special population after any disaster or public health emergency.	Described the OTIS response, including a toll-free hotline for hurricane-related inquiries about pregnancy and breastfeeding. Highlighted the need for rapid information dissemination and integrating concerns of pregnant and lactating women into emergency plans.	Pregnant and breastfeeding women and health care providers	Breastfeeding support during emergencies Toll-free national phone routing system for hurricane-related inquiries about pregnancy and breastfeeding	8/29/2005	N/A	USA Gulf Coast (Louisiana and Mississippi)	Hurricane Katrina	Hurricane (Category 4)
Richter, Flowers (2008) <sup>22</sup>	Gendered dimensions of disaster care: Critical distinctions in female psychosocial needs, triage, pain assessment, and care	Research	Qualitative Survey	To highlight and identify key gender-specific issues in disasters including the following: socially constructed gender risk factors; gender and posttraumatic stress; women and pain (presentation and sensitivity); and post-disaster support and services, especially in the arenas of obstetrics and gynecology (breastfeeding, menstruation, contraception, rape, and sexually transmitted diseases [STDs]). The research also includes a brief, anonymous survey of	Highlighted gender-specific issues in disasters, including breastfeeding concerns after exposure to contaminated flood waters. Recommended private breastfeeding areas, breastfeeding supplies, and lactation consultants on-site.	Adult female Hurricane Katrina evacuees	Distinction of female-specific disaster support and service needs	8/29/2005 9/7/2005	June-August 2007	USA Gulf Coast (Louisiana and Mississippi)	Hurricane Katrina Hurricanes Rita and Wilma	Hurricane (Category 4)

(Continued)

Table 1. (Continued)

Authors	Title	Article type	Methodology	Aim or purpose	Key characteristics	Population	Concept	Context				
								Disaster date	Study dates	Geographic location	Specific Disaster	Type of Disaster
				50 adult female Hurricane Katrina evacuees that queried women on their usage of post-disaster health and counseling services.								
Santaballa Mora (2018) <sup>16</sup>	Challenges of infant and child feeding in emergencies: The Puerto Rico experience	Program description/evaluation	N/A	To describe an innovative, equity-focused, community-based model to support lactation, relactation, safer formula preparation, and complementary feeding during emergencies.	Described community-based lactation support models. Emphasized the need for outreach, equity-focused services, and free or low-cost accessible lactation clinics.	Women and children under age 5	Implementation of lactation clinics and support groups	9/6/2017 9/20/2017	N/A	Puerto Rico	Hurricanes Irma and Maria	Hurricane (Category 5- Maria and Category 4 - Irma)
Scott et al. (2022) <sup>5</sup>	Barriers and opportunities for the MCH workforce to support hurricane preparedness, response, and recovery in Florida.	Research	Qualitative - Focus groups	To evaluate the impacts of Hurricane Irma, Maria, and Michael on systems of care serving pregnant women, infants, and children with special health care needs in Florida." To characterize and identify gaps in community preparedness and recovery in relation to the needs of pregnant women, infants, and families during the 2017 and 2018 hurricane season.	Evaluated impacts on care systems for pregnant women, infants, and children with special health care needs. Recommended preparations for manual breastmilk expression, safe storage methods, and encouraging breastfeeding during disaster response and recovery.	People that experienced a recent major hurricane and identified as parent or pregnant women at the time of the storm, the participant volunteered or had been employed as part of hurricane response efforts, or the participant worked with parents and pregnant women in an area that was impacted by a major hurricane.	Impact on systems of care gaps in community preparedness and recovery	9/6/2017 9/20/2017 10/10/2018	Not provided	Florida	Hurricanes Irma, Maria, and Michael	Hurricane (Category 5- Maria and Michael; Category 4 - Irma)



**Figure 1.** The PRISMA flowchart illustrates the step-by-step process that led to the identification of eligible articles.

## Results

Ten studies met all inclusion criteria and were void of all exclusion criteria (Figure 1). Of the 10 articles, 3 were original research, 3 were editorials, 2 were program evaluations, 1 was an educational article, and 1 was a report. Two of the 3 research articles were qualitative, and 1 was a mixed-methods study.

Nine articles described disasters that occurred in the continental USA and 1 that occurred in a USA territory: the USA Gulf Coast (7), Atlantic Coast (2), and the Atlantic Ocean (1) that impacted Puerto Rico, a USA territory. All articles addressed hurricanes, and 1 article addressed 2 disasters: a winter storm and a hurricane.

Please see Table 1 for a detailed description of the 10 reviewed articles.

### Summary of Findings

The following 5 recommendations were identified from the 10 articles: 1) awareness of unique needs, 2) integration of breastfeeding support into disaster planning and response, 3) provision of resources and safe spaces, 4) direct support and education, and 5) social support and mental health.

## Discussion

Five themes of recommendations were identified from the 10 articles: 1) promote awareness of the unique needs of breastfeeding women, 2) integrate breastfeeding support into disaster planning and response, 3) provide resources and safe spaces, 4) offer direct support and breastfeeding education, and 5) offer social and mental health support. Specifically, integrated interventions that acknowledge mothers' established feeding decisions are needed as well as a rapid response with breastfeeding education and assistance, such as assisting and educating people about breastfeeding. All 10 articles noted that deviation from recommended guidelines resulted from poor communication, coordination, resource allocation, and responders' knowledge or willingness to follow the guidelines.

### Promote Awareness of the Unique Needs of Breastfeeding Women

A critical theme identified in the review, consistent with the USA Department of Health and Human Services (HHS) Maternal-Child Health (MCH) Emergencies Planning toolkit<sup>20</sup> and the Centers for Disease Control and Prevention's (CDC) guidance of Infant and



Young Child Feeding in Emergencies (IYCF-E),<sup>21</sup> is the need to raise awareness for and meet the unique and specific needs of breastfeeding women and infants and emphasize the need for disaster response strategies to address these needs. Several authors stressed the importance of stockpiling provisions for this unique population in emergency shelters.<sup>22–26</sup> De Young et al. found that responses based on infant feeding centered on concern about their ability to continue breastfeeding or the loss of frozen breastmilk. However, 1 respondent shared positive emotions in that they did not have to worry about feeding her baby, and the potential to feed her toddler breastmilk if needed. Women differ in responses to pain and stress, confounded by post-partum hormonal changes. In addition, women may perceive more pain with a heightened negative emotional state, however, less pain than male counterparts if in a severe fight or flight arousal state.<sup>22</sup>

### ***Integrate Breastfeeding Support into Disaster Planning and Response***

All 10 articles identified the importance of incorporating breastfeeding support into broader disaster response plans. A lesson learned after Hurricane Katrina was the need for disaster response strategies to incorporate the needs of pregnant and postpartum women and infants.<sup>23</sup> The lack of knowledge related to breastfeeding and common misconceptions concerning breastfeeding during and after the hurricane or natural disaster was a significant problem.<sup>26</sup> Therefore, integrated interventions that acknowledge mothers' established feeding decisions were needed as well as a rapid response with breastfeeding education and assistance, such as assisting and educating people about breastfeeding.<sup>26</sup>

The Organization of Teratology Information Specialists (OTIS) and the National Center on Birth Defects and Developmental Disabilities (NCBDDD) at the CDC partnered to educate breastfeeding women and health care professionals on the effect of exposure to toxins during and after the 2005 hurricanes, including creating a toll-free hotline for hurricane-related inquiries concerning pregnancy and breastfeeding.<sup>27</sup> This experience highlighted the need for rapid information dissemination and integrating concerns of breastfeeding women into emergency plans.<sup>27</sup> Scott et al.<sup>8</sup> evaluated the impacts of Hurricane Irma, Maria, and Michael on care systems for breastfeeding dyads and recommended disaster organizations assist mothers with safe breastmilk collection and storage methods.

All 10 articles noted that deviation from recommended federal guidelines resulted from poor communication, coordination, resource allocation, and responders' knowledge or willingness to follow guidelines. Similar factors were reported in an audit of Australian policies<sup>28</sup> regarding breastfeeding in disasters. Callaghan et al.<sup>23</sup> emphasized the importance of raising awareness about pregnant and postpartum women's and infants' unique needs. Barrett et al.<sup>26</sup> likewise emphasized the need for integrated interventions that acknowledged mothers' established feeding decisions. Ewing et al.,<sup>29</sup> further recommended that healthcare providers engage with emergency management agencies to gain insights into disaster plans, serve on advisory boards, and empower the public by fostering informed participation in emergency preparedness efforts.

### ***Provide Resources and Safe Spaces***

Another critical theme highlighted was ensuring that emergency shelters have appropriate safe spaces for breastfeeding and the accompanying necessary supplies. DeYoung et al.<sup>24</sup> addressed the well-being of this population during disasters, recommending

designated safe spaces, providing supplies for sanitizing breastmilk expression and feeding in emergency shelters, and establishing plans to safeguard previously stored breastmilk.

Richter and Flowers<sup>22</sup> highlighted gender-specific issues in disasters, including breastfeeding concerns after exposure to contaminated flood waters. They recommended private breastfeeding areas, breastfeeding supplies, and on-site lactation consultants.<sup>22</sup> Santaballa Mora<sup>16</sup> described community-based lactation support models, emphasizing the need for outreach, equity-focused services, and free or low-cost accessible lactation clinics.

The articles reviewed advised against the uncoordinated and unsolicited distribution of breastmilk substitutes. The distribution of breastmilk substitutes after the Florida hurricanes resulted in significant consequences. The short-term relief donations were quickly gone, so babies began to be fed water or half-strength formula.<sup>23,25,27</sup> Previously, Hurricane Katrina left contaminated water, amplifying the scarcity of formula as the powdered and concentrated formula could not be mixed for consumption. DeYoung et al.<sup>3,9,25</sup> found that exclusively breastfed infants were more likely to receive formula, and formula-fed infants were more likely to begin complementary foods during evacuation.

Administration of breastmilk substitutes such as formula means that milk is not removed at that feeding. To maintain lactation, a mother must breastfeed or pump breastmilk regardless of the context. When the milk is not expressed, the breast tissues receive the message that milk is unnecessary. Expressing milk using a manual or electric breast pump or hand expression technique stimulates more milk supply.<sup>30</sup> Mothers who need additional assistance should be referred to a lactation consultant.<sup>30</sup> Disaster responders can make provisions to maintain breastfeeding by offering a private space to feed and care for the baby<sup>22</sup> and facilitating access to lactation providers and supplies.<sup>24</sup> In addition, responders can prepare mothers for manual expression of milk. Supporting breastfeeding allows formula allocation to babies whose mothers cannot breastfeed fully and safe methods for mixing and storing formula and breastmilk.<sup>8</sup> Partnerships with maternal-child and lactation providers and organizations are essential to allocate resources such as breastmilk substitutes appropriate for the baby's age and the dyad's situation.<sup>21</sup>

### ***Offer Direct Support and Breastfeeding Education***

All articles included and highlighted the need for lactation support. In the wake of Hurricane Katrina, health and education organizations distributed breastfeeding information and assistance, including board-certified lactation consultants, into shelters to work directly with mothers, emphasizing the importance of dedicated individuals championing breastfeeding support during emergencies.<sup>26</sup> For example, OTIS and CDC provided phone counseling to breastfeeding mothers and health care providers about disaster-related exposures and breastfeeding during Hurricane Katrina.<sup>27</sup>

However, WIC was not a practical resource in the aftermath of Hurricane Maria in Puerto Rico,<sup>16</sup> as its offices were closed for weeks. Moreover, Hurricane Maria disaster responders reported that WIC was neither designed nor funded to address the nutritional needs of disaster victims and, therefore, was confined to its then program context.<sup>31</sup>

### ***Offer Social and Mental Health Support***

Several studies emphasized the need for social support and mental health. De Young et al.<sup>25</sup> examined the effects of a hurricane on caregiver stress and social support, reporting issues like lost frozen

breastmilk and separations from infants. They suggested offering doula and midwife support, specifying spaces for breastfeeding, and adequately preparing feeding supplies.

During the 2017 Florida hurricanes, responders and mothers reported needs such as additional assistance with other children and financial and safe housing accommodations.<sup>8</sup> Scott et al.<sup>8</sup> described the aftermath of the 2017 Florida hurricane season as a mental health and housing crisis, with mothers experiencing additional stressors in the care of the household and their other children. They highlighted that supporting outside stressors, such as offering childcare and social and mental health services,<sup>8,21</sup> allows the mother greater focus on feeding the baby and mitigates a drop in milk supply. Rural areas were noted to have lapses in childcare, schools, and health care, and an increased need for mental health services which was proportionate to challenges in long-term recovery.<sup>8</sup>

### Limitations

The COVID-19 pandemic declared in March 2020 presents a unique confounding variable of mothers who experienced a disaster within a disaster. A rapid abundance of literature regarding the COVID-19 pandemic and breastfeeding emerged, but much of this content focused on protocols for COVID-19-positive breastfeeding mothers, breastfeeding hotlines, and other support services. Therefore, this scoping review will exclude literature on the pandemic without a co-occurring natural disaster.

The author of this literature review used the term “disaster” versus “emergencies,” as the latter produced an overabundance of unrelated articles referring to medical emergencies. Similar terms, including “humanitarian emergency,” “US,” “lactation,” and “human milk,” were replaced accordingly and returned no additional results.

This review does not address other public health emergencies, such as the Ebola and Zika virus, but instead focuses on disasters declared by the President of the USA as an emergency or major disaster, which accordingly releases funding from FEMA.<sup>19</sup> The term “disaster” is used as an encompassing term for emergencies and major disasters for this study and has been previously defined. The COVID-19 pandemic changed the landscape of presidential disaster declarations and has been the only USA Federal biological disaster declared<sup>32</sup> as of June 25, 2024.

The search strategy yielded only 10 publications addressing the association of breastfeeding, disasters, and the USA or USA Territories, limiting the ability to establish conclusive links between these variables. Although multiple databases were searched in addition to a hand search, some studies may have been missed.

Relevant data may be missing, and only published articles in peer-reviewed journals were included. However, the inclusion of several databases, references of the included articles, and sensitive search strategies were selected to increase the discoverability of eligible articles.

### Discussion

This scoping review mapped diverse articles, from editorials to project descriptions and research studies. The interpretation of breastfeeding support amid a natural disaster is often confounded by geographic location and resources. Therefore, it is both novel and necessary to include editorials and project

descriptions to identify critical knowledge gaps and begin to reconcile seemingly conflicting data (e.g., women need breastfeeding support versus women who do not need breastfeeding support) by setting a context to parse the articles that directly address a specific disaster.

This review has several strengths. First, the scoping review approach included studies spanning the spectrum of published data available from editorials to research studies. Editorials and opinion articles can deeply influence popular opinion and clinical judgment regarding the concept of supporting breastfeeding women during natural disasters. Therefore, expanding this review to include both editorials and research studies provides a new perspective on the topic, acknowledges that basic studies impact clinical care and shape mothers’ and responders’ attitudes, and addresses limitations specific to IYCF during emergencies within the context of articles in peer-reviewed journals. Current articles examining IYCF-E are often retrospective and confounded by available resources and the management of infant feeding. Adequate breastfeeding support is associated with improved breastfeeding rates; therefore, interpretation of the potential effects of natural disasters on breastfeeding women is challenging. Finally, despite the intense attention the topic has received, the critical dimension of breastfeeding during natural disasters in the USA is often not addressed. Therefore, incorporating data from various articles into this review emphasizing breastfeeding support was warranted.

The factors that support women continuing to breastfeed during disasters vary by maternal and infant characteristics, including maternal health, infant age, and geographical location. As the designs of our selected articles were primarily editorials or program descriptions, there is ample opportunity for further exploration and investigation to further our understanding of breastfeeding during disasters. By conducting this scoping review, important insights into studying breastfeeding amid disasters were gained, including breastfeeding practices, maternal and infant demographics, disaster conditions, and available approaches to identifying factors (supportive/barriers) that may influence breastfeeding during disasters.

### Prior Reviews of the Literature including Counties outside the US

Hwang, Iellamo, and Ververs<sup>5</sup> conducted a scoping literature review focusing on infant feeding during disasters in middle- and high-income countries from 2010 to 2018. They reviewed 30 articles and found that organizations establishing programs to support infant feeding during emergencies faced challenges, including deviating from preexisting guidance documents on IYCF-E protocols. Other challenges included accepting donated infant formula and untargeted distribution of formula. Many disaster responders were also unfamiliar with protocols. Mothers encountered barriers to breastfeeding during disasters, such as a lack of privacy and suitable spaces for breastfeeding, limited fluid, energy intake, stress, and exhaustion. Despite existing guidelines, these challenges for responders and barriers for mothers persist. The team study concluded a lack of preparedness and response capacity in middle- and high-income countries, emphasizing the need for governments and aid organizations to adapt guidelines and establish policies and programs to support infant feeding during emergencies.



## Current Recommendations and Operationalization Guidelines

The United Nations Office for Disaster Risk Reduction (UNDRR)<sup>33</sup> conveys the critical importance of a multi-hazards disaster risk management approach whereby understanding and acting on disaster risk and building resilience instead of enacting a single-event response approach. The team further calls for strategic objectives aiming for quality risk information and analysis and collaborative action and advocacy-oriented approaches to disaster risk reduction between all levels of government and stakeholders. As such, numerous organizations individually offer guidance for disaster responders and disaster response organizations to facilitate an environment that protects, promotes, and supports breastfeeding during natural or human-induced emergencies.<sup>10,34–36</sup>

Toolkits, such as the CDC IYCF-E Toolkit<sup>21</sup> and the HHS MCH Emergency Planning Toolkit<sup>20</sup> along with official organizational statements and fact sheets,<sup>10</sup> provide guidance on supporting breastfeeding during emergencies.<sup>20</sup> However, how to incorporate these recommendations into practice is left to both the reader's interpretation and available resources. Little evidence exists on how these recommendations have impacted breastfeeding during a disaster. Currently, there are no empirical studies that directly link natural disasters in the USA to breastfeeding outcomes. Of the 3 research studies, 1 qualitative study aimed to identify gender-specific issues, including breastfeeding, during disasters and queried women on their usage of post-disaster health and counseling services;<sup>22</sup> the other qualitative study used focus groups to evaluate systems of care and gaps in community preparedness concerning pregnant women, infants, and families during the 2017–2018 hurricane system;<sup>8</sup> and 1 mixed-method study investigated caregiver stress and social support.<sup>25</sup>

## Implications

The 10 articles reviewed in this scoping review described disaster responses that did not meet national or international guidelines and recommendations for breastfeeding during a disaster. Despite the recommendations listed above, the findings from our review reflect that mothers still face barriers due to disaster response organizations' lack of attention to the population, lack of planning, lack of resources, and limited capacity to support breastfeeding dyads.

Support for breastfeeding dyads should include an all-hazards plan that provides for a connection to trained social, health, and lactation providers. An all-hazards approach still necessitates just-in-time assessments and communication regarding the nuances of the disaster. A breastfeeding mother may encounter a contaminated water supply; flood water; mold; and air pollutants such as chemicals, radiation, or biological exposure. Although many details are specific to the circumstance, general health and wellness needs should remain.

Significant gaps in best practice guidelines contribute to a disjointed approach in managing breastfeeding dyads. To offer timely, coordinated support, response agencies should partner with organizations that thoroughly understand the needs of breastfeeding dyads. Organizations such as OTIS; federal assistance programs such as WIC; and maternal-child, evidenced-based home visitation programs such as the Nurse-Family Partnership and Healthy Families America can help support disaster response efforts for breastfeeding dyads. These programs have the infrastructure and

resources to lead the coordinated distribution of infant care and lactation supplies, lactation support providers, breastmilk substitutes, and connect mothers and babies to social resources.

Breastmilk is the safest form of nutrition for babies in a disaster.<sup>10,21</sup> A mother's milk should be available to infants whenever feasible. However, challenges faced lead to a negative impact on breastfeeding and untimed weaning. National and international policies on breastfeeding in emergencies, however, can mitigate these challenges.<sup>10,21,28,34,37</sup> Still, numerous deviations frequently occur, leading to poor access to skilled lactation support; poorly targeted humanitarian aid; and uncoordinated donation and distribution of human breastmilk substitutes,<sup>38</sup> which includes commercial infant formula and complementary food.<sup>16</sup> This review highlights mothers' challenges while breastfeeding or providing breastmilk to their infant amid a disaster in the USA.

## Conclusion

Breastfeeding support during disasters is not a new concept, yet it remains simultaneously relevant clinically while failing to be addressed in practice adequately. This scoping review sought to encompass a wide variety of articles to identify the existing literature within the context of governmentally declared natural disasters in the USA. This study identified several knowledge gaps; therefore, future studies need to be conducted to improve breastfeeding and infant feeding outcomes. Future researchers should consider studying the impact of breastfeeding during disasters and collect influential external variables, which require careful consideration when developing protocols related to breastfeeding support, milk collection, handling, storage, and administration of human milk. Evaluation at all lactation stages is recommended, as this will inform our understanding of ways to support breastfeeding women with babies of multiple ages and breastfeeding types, from exclusive to token breastfeeding.

Improved breastfeeding support requires informed discussions grounded in evidence-based practice and shared among health care providers, emergency managers, and the media. Further, embracing breastfeeding as essential for food and health security is vital. Integrating measures to protect, promote, and support breastfeeding across emergency response and health care policies is critical for ensuring effective disaster management and preparedness strategies.

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