ABSTRACT

It is the position of the Society for Nutrition Education and Behavior that for effective recovery and resilience to disasters, it is essential that impacted individuals and communities have access to safe, nutritious, and culturally and contextually appropriate foods and beverages, and receive emergency-related food and nutrition education before, during, and after a disaster. Despite the increasing number, duration, and intensity of disasters worldwide, there is relatively limited guidance for research, policy, and practice about addressing the emergency-related food and nutrition needs of affected populations. Although nutrition emergencies tend to be understudied, emerging efforts are working to advance food and nutrition security during disaster response and recovery. To help elevate the importance of emergency-related food and nutrition education before, during, and after a disaster, the Society for Nutrition Education and Behavior, which represents the unique professional interests of nutrition educators worldwide, summarizes the relevant literature and puts forth recommendations for all those who are engaged in this work in the following 4 key areas: (1) improving communication and outreach, (2) fostering community engagement and locally-driven preparedness, (3) building the evidence base and translating the evidence into action, and (4) training current professionals and the next generation of public health leaders. Altogether, before, during, and after a disaster, those who engage in this work, among other allies, can help elevate the importance of nutrition education and other strategies to promote healthy eating behaviors through research, policy, and practice.

Key Words: humanitarian emergencies, disaster, food insecurity, nutrition security

INTRODUCTION

It is the position of the Society for Nutrition Education and Behavior (SNEB) that for effective recovery from and resilience to disasters, it is essential that impacted individuals and communities have access to safe, nutritious, and culturally and contextually appropriate foods and beverages, and receive emergency-related food and nutrition education before, during, and after a disaster.

Despite the increasing number, duration, and intensity of disasters worldwide, there is relatively limited guidance for research, policy, and practice about addressing the emergency-related food and nutrition needs of affected populations.

To help elevate the importance of emergency-related food and nutrition education before, during, and after a disaster, the SNEB, which represents the unique professional interests of nutrition educators worldwide, summarizes the relevant literature and provides recommendations for research, policy, and practice.

BACKGROUND

Disasters and Inequitable Impacts

A disaster is a disruption to the built and social environment during...
which community functioning is diminished, and local response capabilities are overwhelmed. Disasters can result from rapid or slow onset hazards and can be characterized as natural, technological, conflict-based, and complex humanitarian emergencies or cascading events. Supplementary Table 1 provides examples of disaster events for each of these hazard types and provides some event examples. Globally, over the past 20 years, weather and climate-related disasters have increased in intensity and frequency and are largely attributed to rising rates of urbanization, deforestation, environmental degradation, and intensifying climate changes. Before 2000, an average of 240 annual climate-related disasters occurred globally, but since 2000, the average has increased to 341 annually, a 42% increase. Similarly, the average mortality associated with disasters increased globally from 64,900 individuals annually between 1996 and 2005 to 69,800 individuals between 2006 and 2016. Another consideration is how the loss of infrastructure (e.g., schools, homes, commercial outlets), combined with morbidity and displacement of communities as a result of a disaster, tend to be underestimated. Nevertheless, research consistently demonstrates that such losses are disproportionately experienced by households with lower incomes and by communities of color. Discriminatory policies and structures often foster the concentration of persistent poverty in distressed, disadvantaged, and disaster-prone areas. More multidisciplinary work remains to determine key infrastructural investments, optimal land use planning, and how best to incentivize the private sector to help address the inequitable impacts of disasters.

Food System Disaster Disruptions

Before, during, and after disasters, food system disruptions tend to occur simultaneously at several points across the supply chain. Disruptions include damaged farmland, halted food safety inspections (i.e., ensuring proper food temperatures of foods served postdisaster and managing disaster-associated pest control issues), transportation restrictions, port closures, retail food store closures, supply disruptions, internet outages, and other landline or mobile telecommunication issues. The food and agriculture sector tends to be one of the most impacted sectors. During the initial stages of the coronavirus disease 2019 (COVID-19) pandemic, significant changes occurred in the food supply chain in part because of considerations for worker safety. Customers who could do so increased food purchasing to limit potential COVID-19 exposure and shifted to online food shopping, with home delivery or curbside pick-up. The inability to bulk purchase food items and switch to online shopping likely exacerbated COVID-19 disparities in food insecurity among lower-income households and rural communities. A dearth of data exists regarding how transportation infrastructure and national stockpile systems could be better employed to increase access to healthy foods for disaster-prone areas.

Food Availability, Accessibility, and Affordability Challenges

Disasters limit the ability of survivors to access sufficient, safe, and nutritious foods and beverages. These challenges are even more problematic for communities that face inequitable access to retail food outlets and safe drinking water before a disaster. Even if a retail food outlet is accessible, culturally and contextually appropriate foods and beverages might not be available or affordable. Culturally appropriate takes into consideration if the foods provided meet the diverse tastes and needs on the basis of their cultural identity; for example, people who identify with Muslim or Jewish religious traditions may want foods that are Halal or Kosher, respectively. Contextually appropriate takes into consideration factors such as whether the food available requires kitchen equipment or hot running water, both often constrained in disaster contexts. The types of foods that households can access, prepare, or store in their own home or in temporary housing options usually shifts in the short or long term with different levels of vehicle, public transit, or property damage, including disruptions to a safe water supply.

Another consideration is that retail food outlets often lose power or experience damage during disasters that may limit or delay their ability to source and sell food and/or accept federal nutrition assistance through electronic benefits transfer cards. During and immediately after a disaster, limited access to the internet and cellular mobile data can hinder providing up-to-date information about food distribution opportunities, among other emergency resources. Eating behaviors tend to change when preparing for, living through, and recovering from a disaster, which can be fatal. For example, because of supply chain disruptions or other factors, the use of homemade infant formula often increases during disasters, and this is problematic because it could be life-threatening for infants. Increasingly, local efforts are aimed at developing comprehensive plans to foster resilient food systems in the face of increasing disasters.

Food and Nutrition Insecurity

Food insecurity often increases before, during, and after disasters. Evidence also indicates how facing food insecurity during a disaster increases the severity of other adverse health consequences such as diabetes and hypertension. Furthermore, individuals and households that face lengthy disaster-related repercussions are usually struggling with other significant emotional and financial strains from the disaster, including but not limited to housing or vehicle loss, moving multiple times, managing job disruption or loss, displacement from social supports or networks, and coping with years of uncertainty. More work remains at national, community, household, and individual levels to improve monitoring and surveillance of food and nutrition security before, during, and after disasters. During the early stages of the COVID-19 pandemic, a variety of innovative strategies were employed to estimate food...
insecurity. Building on these innovations, more work is underway to advance our understanding of not just what foods are provided during disasters but, more importantly, the nutritional quality of foods provided and consumed and how these foods relate to individual, household, and community diet-related health outcomes. Multi-disciplinary approaches could also help advance the state of the science of the intersections of mental health, food and nutrition security, and diet-related diseases and disparities.

Disaster Response and Recovery

A variety of laws, policies, and other strategic planning documents guide a national government’s disaster response and recovery. For example, Supplementary Table 2 provides an overview of disaster response and recovery governing authorities in the US. Local governments usually are responsible for emergency response and coordinate as needed with higher levels of government, non-government organizations, the private sector, and the public. Evolving laws, policies, and programmatic approaches have shaped emergency-related food and nutrition education before, during, and after a disaster, especially during the recent COVID-19 pandemic. Evidence indicates navigating the disaster assistance landscape can be a source of stress for affected individuals and communities. Notwithstanding, there are limited studies on the effectiveness of food-related disaster response to address the needs of communities to better inform policies, programs, and outreach strategies, especially in the US.

The Table highlights a variety of messages previously developed for disaster-affected individuals, households, and communities regarding more general food and nutrition-related issues. Less attention has been given to culturally, linguistically, and contextually (eg, homelessness and special needs) relevant messages about accessing food-related disaster assistance. Often, nutrition educators are important

<table>
<thead>
<tr>
<th>Table. Food and Nutrition Considerations When Preparing for, Living Through, and Recovering From a Disaster</th>
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<tbody>
<tr>
<td><strong>Considerations</strong></td>
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<tr>
<td><strong>Preparing for a disaster</strong></td>
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<tr>
<td>Keep appliance thermometers in the refrigerator and freezer to ensure temperatures remain food safe during a power outage (40 °F or lower in the refrigerator, 0 °F or lower in the freezer)</td>
</tr>
<tr>
<td>Freeze water in 1-quart plastic storage bags or small containers before a storm so they can be used in the refrigerator or freezer to keep things cold in the event of a power outage</td>
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<tr>
<td>Freeze refrigerated items that you will not need immediately to help keep them at a safe temperature longer, and group foods together in the freezer so they help keep each other cold</td>
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<tr>
<td>Have coolers on hand to keep refrigerator food cold if the power will be out for &gt; 4 h, and know where you can get dry ice or block ice</td>
</tr>
<tr>
<td>Maintain a few days’ worths of ready-to-eat foods that do not require cooking or cooling, including foods and beverages that meet the needs of infants (eg, infant formula, stored breastmilk), family members on special diets, and any pets</td>
</tr>
<tr>
<td>Consider canning or dehydrating foods to extend perishability following proper food safety precautions</td>
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<tr>
<td>Consider low-tech communications such as radio</td>
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<tr>
<td>Maintain a safe drinking supply (1 gallon of water per day for each person and each pet)</td>
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<tr>
<td>Use food-grade water storage containers to store water and use proper precautions to store water</td>
</tr>
<tr>
<td>Maintain a supply of hand sanitizer, disinfectant wipes, and bleach</td>
</tr>
<tr>
<td>Invest in or have ready camping equipment, grills (charcoal if needed), and other alternative ways to heat foods and beverages</td>
</tr>
<tr>
<td>Prepare to evacuate with a “go bag” that has ample water and snacks, including snacks for any pets</td>
</tr>
<tr>
<td>Maintain shelf-stable foods and beverages in a cool, dry, and dark place, ideally in a temperate ranging from 40–70 °F and away from any ranges or refrigerator exhausts or petroleum products such as gasoline or paints and protected from rodents or insects</td>
</tr>
<tr>
<td>Maintain proper cooking and eating utensils, including can opener</td>
</tr>
</tbody>
</table>

**Living through a disaster**

Limit opening the refrigerator and freezer to keep the coldness in

Place meat and poultry in plastic bags and away from other foods to prevent cross-contamination of thawing juices

Use dry or block ice or freeze water bags to keep the refrigerator as cold as possible during an extended power outage

Do not eat any food or drink water from flood-affected areas

Inspect canned foods for any damage, and do not consume if a can has any dents, rust, or punctures

Check expiration dates on any canned or packaged foods

**Recovery from a disaster**

Check the temperature inside of your refrigerator and freezer

Discard any perishable food that has been above 40 °F for > 2 h

Throw out any food or beverage that has an unusual odor, color, or texture or feels warm to the touch, but never taste a food to decide if it is safe

Check for ice crystals; Food in your freezer that is partially or completely thawed may be safely refrozen if it still contains ice crystals or is ≤ 40 °F

When in doubt, throw it out

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This compilation was extracted from a variety of resources about disaster preparedness, including but not limited to resources available from the US Department of Homeland Security Federal Emergency Management Agency, US Department of Health and Human Services, and the US Department of Agriculture.
partners in disaster-related food assistance work.\textsuperscript{99–104} For example, in the US state cooperative extension systems, nutrition educators have a long history of helping translate food and nutrition messages into practical applications and connecting people—often those living in historically underserved communities—with information and capacity building.\textsuperscript{99}

In addition to direct education, one COVID-19 analysis of early communications regarding school closures emphasized the need for model language for emergency declarations and school closure announcements, among other written and oral communications, that recognize the important role that schools (and child care centers) play in ensuring daily access to nutritious, safe meals for children.\textsuperscript{98} Others recommend developing disaster management plans and training that includes sectors caring for individuals in crucial life stages, such as schools, child care centers, and nursing homes.\textsuperscript{31,105–113} These approaches help ensure that food and nutrition-related disaster response is integrated into disaster management planning throughout a disaster cycle, including the communication and outreach strategies.

In 2014, the World Health Organization conducted an expert consensus on best practices for guidance and assistance during disasters that emphasized the importance of building communication capacity, maintaining lists of locally trusted sources of information, maintaining email listservs of employees, international media outlet contacts, and government and nongovernmental organization contacts that can be used to rapidly disseminate information; among others.\textsuperscript{114} In the US, the National Academies of Sciences, Engineering, and Medicine hosted a variety of workshops, particularly during the COVID-19 pandemic, to advance the state of the science related to disaster response and recovery.\textsuperscript{115} The Nutrition and Obesity Policy Research and Evaluation Network, supported by the Centers for Disease Control and Prevention, Division of Physical Activity, Nutrition and Obesity, collaborated with Healthy Eating Research, a national program of the Robert Wood Johnson Foundation, on a COVID-19 Food and Nutrition Working Group.\textsuperscript{116} This working group has grown to >700 members, with liaisons to >40 collaborating organizations, including SNEB.\textsuperscript{78} The Healthy Eating Research Nutrition and Obesity Policy Research and Evaluation Network COVID-19 Food and Nutrition Working Group has published >40 peer-reviewed scientific articles, perspectives, or legislative updates and advised decision-makers at the federal, tribal, US territorial, state, and local levels.

RECOMMENDATIONS FOR RESEARCH, POLICY, AND PRACTICE

To help elevate the importance of emergency-related food and nutrition education before, during, and after a disaster, this position paper now puts forth recommendations for all those who are engaged in this work in the following key areas.

Improving Communication and Outreach

Identify and disseminate best practices for emergency-related food and nutrition communication and outreach that take into consideration cultural, linguistic, and contextual (eg, homelessness and special needs) factors. For example, not everyone has the means or ability to purchase and store a 3-day supply of food and water. A critical initial step could be examining how to best leverage existing nutrition education and promotion resources to develop, implement, evaluate, and disseminate best practices for improving the importance of food and nutrition security before, during, and after disasters. This examination could include, as 1 example, a deeper dive into existing as well as recommended communication and outreach related to infant feeding strategies before, during, and after disasters. More research on these approaches will ensure mothers can access safe spaces for infant feeding in all forms while avoiding any unintended consequences for deterring breastfeeding during disasters or encouraging the use of potentially fatal homemade infant formula. In addition to nutrition education and promotion resources, future work could focus on developing communication and outreach plans at various levels of government that better integrate the importance of emergency-related food and nutrition strategies in anticipation of, during, and post-disaster.

Fostering Community Engagement and Locally-Driven Preparedness

Examine how to best cultivate the idea of connected and resilient communities and a culture of preparedness by compiling the needs and assets of the communities (ie, inventories of who in the community has a generator, where to get safe water if the water supply is disrupted, and where large freezers are to store food, etc).\textsuperscript{37,40,117} This work includes building local capacity in personnel and equipment, among other resources, to foster more resilient food systems. Community-based disaster preparedness initiatives have been underway and are somewhat successful, but the nutritional needs of communities at risk of disasters could be more explicitly emphasized within these initiatives.\textsuperscript{73,118–123} Moreover, modified health impact assessments that include food and nutrition indicators for before, during, and after disasters could help support community-driven approaches to emergency preparedness. Without question, infrastructure that helps communities develop, implement, evaluate, disseminate, and sustain evidence-based multidisciplinary, multisector, and multijurisdictional approaches to food system resilience planning or disaster mitigation planning will help.\textsuperscript{121}

Building the Evidence Base and Translating Evidence into Action

Develop, implement, evaluate, and disseminate culturally, linguistically, and contextually appropriate strategies to better monitor, understand, and effectively address food and nutrition insecurity within disaster preparation and recovery contexts.
CONCLUSIONS

Disasters are increasing in frequency, duration, and intensity and often disrupt food systems and increase food insecurity with inequity impacts. Although nutrition emergencies tend to be understudied, emerging efforts are working to advance food and nutrition security during disaster response and recovery. Before, during, and after a disaster, those who engage in this work, among other allies, can help elevate the importance of nutrition education and other strategies to promote healthy eating behaviors through research, policy, and practice.

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SUPPLEMENTARY DATA

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jneb.2024.04.008.

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