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The Social Supportive Role of Food and Meals Following Hurricane Florence

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Abstract: This study uses the Theory of Social Support to examine the impact of Hurricane Florence on the local food system during the immediate response to the disaster focusing on the social supportive nature of food and meals. Using a quick response disaster research methodology, field observations and qualitative interviews were conducted in Eastern North Carolina, in the days following Hurricane Florence in September 2018. Individuals affected by Hurricane Florence were recruited from emergency food and meal distribution sites. A codebook consisting of 66 parent and child codes based on the Theory of Social Support was applied to analyze 23 individual interviews. Sharing food with neighbors and/or relatives and utilizing post-disaster community feeding services improved the coping capacity of survivors. Results from this study contribute to the understanding of the post-disaster food environment and may help to improve food related response and recovery to meet the needs of those affected.

Keywords: food environment, food access, social support, hurricane, disaster, Hurricane Florence

1 Introduction

By their nature, disasters disrupt the normal functioning of communities, causing economic, health, and social challenges for impacted households. Disasters also exacerbate existing problems for households, such as food

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insecurity. Food insecurity is the disruption in access to adequate food, caused by lack of money or other resources (Nord, Andrews, and Carlson 2006). The United States Department of Agriculture defines low food security as “reports of reduced quality, variety, or desirability of diet. Little or no indication of reduced food intake,” and very low food security as, “reports of multiple indications of disrupted eating patterns and reduced food intake” (United States Department of Agriculture 2017). Ultimately, one is considered to experience food insecurity if they have inadequate access to food on a periodic basis, risking nutritional status deterioration (Nord, Andrews, and Carlson 2006). In the United States, approximately 11.1 percent of the population experienced food insecurity in 2018 (Coleman-Jensen, Rabbitt, and Singh 2019). Knowing the extent of food insecurity nationwide, the research team was motivated to understand more about the food-related experiences of disaster impacted households.

In September 2018, Hurricane Florence threatened the East Coast of the United States ultimately causing significant disruptions across the states of Virginia and North and South Carolina. Hurricane Florence made landfall as a Category 1 over Wrightsville Beach, North Carolina, on September 14, 2018, with wind speeds of 90 miles per hour, bringing historic rainfall amounts exceeding two feet in certain areas across the states of North and South Carolina (National Weather Service, n.d.). In New Bern, a town of approximately 29,524 in Craven County, North Carolina, Hurricane Florence brought heavy rains and storm surge of over 13 feet, damaging an estimated 4325 homes and 300 businesses, resulting in \$74.5 million in residential damages and another \$25.6 million in commercial damage (Bennett 2018).

Hurricane Florence impacted an area with food security challenges prior to the disaster. In North Carolina, 14.4 percent of residents reported experiencing food insecurity in 2017, compared to a national rate of 11.8 percent (Coleman-Jensen et al. 2018). Prior to the effects of Hurricane Florence, 15.1 percent, or 55,570 people in New Bern experienced food insecurity in 2017. Additionally, 18,340 children in New Bern experienced food insecurity, with 64.9 percent of the children receiving free or reduced school meals (Food Bank of Central and Eastern North Carolina, n.d.). Given these existing conditions, the research team made the decision to conduct a reconnaissance study in New Bern to better understand how households experienced food access and meals in a post-disaster context and the role food and meals play in the social support of individuals affected by the hurricane.

2 Literature Review

As was noted in the introduction, food insecurity is a widespread problem in the United States. Individuals experiencing food insecurity face health risks through nutritional, mental health, and behavioral pathways (Weiser et al. 2015). Through the nutritional pathway, food insecurity leads to insufficient nutrient intake leading to chronic disease risk factors like obesity (Dinour, Bergen, and Yeh 2007), high blood pressure (Seligman, Laraia, and Kushel 2010), and diabetes (Seligman et al. 2010). Through the mental health pathway, it can lead to stress, anxiety, and depression (Whitaker, Phillips, and Orzol 2006). Through the behavioral pathway, food insecurity contributes to behavior problems (Melchior et al. 2009), emotional problems (Belsky et al. 2010), and developmental delays (Rose-Jacobs et al. 2008). Food insecurity disproportionately affects low income, single headed households with children, individuals living alone, Hispanic and Black households, and households in cities (Coleman-Jensen, Rabbitt, and Singh 2019). At the household level, several factors including employment, race, ethnicity (Coleman-Jensen, Rabbitt, and Singh 2020), household income (Nord 2007), and disability status of household members (Huang, Guo, and Kim 2010) may impact the likelihood of experiencing food insecurity.

The risks associated with food insecurity are compounded when communities experience disasters. Disasters, as events that disrupt normal community functioning (Wolkin et al. 2015), damage essential services (FEMA 2020), housing (Peacock et al. 2014; Tafti and Tomlinson 2019), critical infrastructure (Haigh and Amaratunga 2010), community economic stability (Sydnor et al. 2017), and household finances (Howell and Elliott 2018). These disruptions impact the local food environment, a complex adaptive system comprised of a set of autonomous and diverse actors that work in a connected and interdependent network to meet community food needs (Neff 2014; Sandstrom and Juhola 2017; Uy, Takeuchi, and Shaw 2011; WorldLink 2021). When there is a community level disruption in one area of the system, ripple effects permeate throughout the system and linkages between actors are vulnerable to disruption at multiple points, for example: growing and harvesting may be negatively impacted by flood or drought; transport may be interrupted when infrastructure is damaged or supply chains are disrupted; and the sale and consumption of food may fluctuate with unusual patterns in supply and demand (Handmer and Maynard 2021; Lombardo and Ryan 2013; Neff 2014; WorldLink 2021).

To date, disaster impacts on the food environment and food insecurity have been examined in only a few disasters in the US, all of them hurricanes.

A study in the wake of Hurricane Katrina (2005) showed that 5 years post-event, 23 percent of households reported experiencing continued food insecurity (Clay et al. 2018). Following Hurricane Harvey (2017), non-white, renter, and displaced individuals were found to have increased risk for experiencing food insecurity (Fitzpatrick et al. 2020). During Hurricane Florence (2018), impacts on the local food environment were observed from farmers producing food supplies, through the retail food environment, to families putting food on the table (Clay 2019). While limited research has investigated a disaster context, evidence from the public health and medical literature shows that in a non-disaster context social support plays a critical role in physical and mental health outcomes and can help overcome issues associated with food insecurity.

Social support includes both the structure of an individual's social life, such as existence of familial ties, and the explicit functions those relationships serve, such as emotional support (Uchino 2006; Uchino et al. 2018). Structural and functional support are thought to influence morbidity via two pathways, behavioral processes or the facilitation of healthy behaviors such as eating healthy and psychological processes including appraisals, emotions, moods, and feelings of control on morbidity. Social support theory proposes that a lack of positive social relationships leads to negative psychological states, such as anxiety and depression, which may directly affect physiological processes and disease states (Berkman et al. 2000; Broadhead et al. 1983; Cobb 1976; Cohen and Wills 1985; Matthias et al. 2021; Sturgeon and Zautra 2016). Conversely, positive social relationships are associated with better physical and mental health. For example, individuals who report higher levels of social support are more likely to report lower levels of pain (Montoya et al. 2004; Younger et al. 2010). Findings from additional studies show that, independent of age and gender, individuals who reported having fewer friends and relatives and/or seeing them infrequently had higher mortality rates than individuals who had more frequent social contacts (Berkman and Syme 1979; Uchino 2009; Uhing et al. 2021). Individuals with higher levels of interpersonal and community level interaction are also more likely to report fewer poor mental health days (Goetz, Davlasheridze, and Han 2015). With regards to mental health, direct associations between increased social support and improved mental health outcomes, such as lessened anxiety and depression, have been found (Barrera 1981; Billings and Moos 1981; Liu et al. 2017; Miller and Ingham 1976).

Research also shows that social support can improve outcomes following disasters. Social networks play an important role in reducing post-disaster psychological distress consequences for individuals impacted by disasters; however, networks are also susceptible to disruption due to disaster exposure (Kaniasty and Norris 2004; Kilpatrick et al. 2007; Lowe, Chan, and Rhodes 2010;

Martins et al. 2018). Temporary, long-term, and permanent displacement due to housing loss, job loss, or community changes following disaster can result in physical separation from social networks thus slowing the recovery process (Hunt et al. 2019; Khunwishit and McEntire 2012; Morris and Deterding 2016; Moradi et al. 2020; Norris et al. 2002; Norris et al. 2008; Reissman et al. 2006; Uscher-Pines et al. 2009; Weems et al. 2007). Studies of disaster outcomes for individuals with mobility impairments, limited transportation access, and living alone show that social support may be a critical buffer for food insecurity following disasters (Ahluwalia, Dodds, and Baligh 1998; Frongillo, Valois, and Wolfe 2003; Locher et al. 2005; Pierce, Sheehan, and Ferris 2002; Tremethick 1997).

Studies focused specifically on the mediating role of social support between disaster distress and mental health outcomes found higher social support to mediate both anxiety and depression (Park et al. 2021). Similar studies also found a lack of social support to be associated with increased depression and anxiety amongst residents impacted by disasters (Bei et al. 2013; Park 2019). This suggests that a focus on social support may help reduce the negative impacts of disasters on the mental health of impacted individuals. Though studies have focused on the impacts of physical and mental health after disaster, studies examining a broad age range, the impact of congregate meals as a form of social support, and how social support and community meal provision after a community level disruption such as a disaster are all notably absent in the literature.

2.1 Theoretical Foundation

One highly influential and widely used social support theory is the social support buffering model (Cohen and Wills 1985). The buffering model (Figure 1)

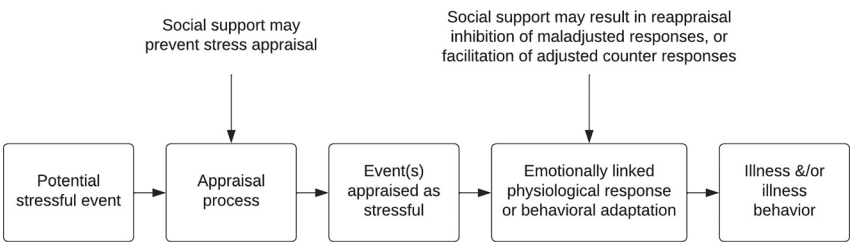


Figure 1: The theory of social support: social support and the buffering hypothesis (Cohen and Wills 1985).

suggests that stress manifests when one appraises a situation as threatening or demanding. Stress appraisal characteristics include negative affect, elevation of physiological response, and behavioral adaptations. Stress may induce physical health outcomes, such as neuroendocrine immune system functioning and influence health-related behavioral patterns such as cigarette smoking, alcohol use, or failure of self-care. The model suggests that social support may intervene at two different points in the causal relationship between stress and illness, first between the occurrence of the stressful event and the stress reaction, and second between the experience of stress and the onset of the pathological outcome. These interventions suggest that social support may either: 1) provide the necessary resources to either redefine the potential harm posed by the situation or bolster one's perceived ability to cope with the demands, preventing a stress appraisal, or 2) reduce or eliminate the stress reaction or directly influence physiological processes.

This model suggests that social support may lessen or alleviate the impact of stress on an individual's physical and/or mental state by providing a solution to the problem or by making individuals less reactive to stress by reducing the perceived severity or importance of the situation. As a buffer to stress in the aftermath of disasters, social support may play an important role in lessening the impacts of disaster events or increasing the ability to cope with a range of disruptions such as housing damage, missed work or school, reduced availability of critical lifelines like water and electricity, or displacement. The present study sought to investigate the question: How do food or meals provide social support for individuals affected by a hurricane? To address this question, we examined the social supportive role of food among individuals in the days immediately following Hurricane Florence in New Bern, North Carolina, in 2018 through the lens of Social Support Theory and the Buffering Hypothesis (Cohen and Wills 1985).

3 Materials and Methods

Data were collected using a quick response reconnaissance disaster research methodology, which aims to have researchers present to observe and identify key issues relevant to the specific event, people, and place, as the event is unfolding (Stallings 2007). A 4-member reconnaissance team including the Principal Investigator and three graduate students experienced in conducting interviews in disaster settings arrived in New Bern, North Carolina, on September 19, 2018. Just-in-time training on the interview guides were completed via Zoom and in-person after arriving in the field.

Recruitment of participants took place at locations providing a range of disaster assistance including food and prepared meals across New Bern. After receiving food or a meal, individuals were invited to participate in an interview about their experiences with Hurricane Florence. After completing the informed consent process and obtaining written consent, interviews were conducted at food distribution sites in a comfortable location for the participant. Participation was voluntary and no compensation was provided to study participants. All interviews were recorded. The field team completed study recruitment for approximately 10-h each day for the 6 days of fieldwork, a common duration for capturing the *gestalt* of the event, the primary goal of quick response reconnaissance (Barsky, Joseph, and Torres 2006; Neal 2004; Nelan, Wachtendorf, and Penta 2018; Penta, DeYoung, and Yoder-Bontrager 2016; Rodriguez et al. 2006). During the six days of fieldwork, the reconnaissance team interviewed 23 affected individuals. All study participants were homeowners and reported experiencing at least one disaster prior to Hurricane Florence. Individuals age 18 years and older were eligible to participate, with over half of participants reporting being over 45 years old. Over half the sample reported Black race (54 percent) and one-third reported non-Hispanic White race (33 percent). Three-quarters of the sample were female and most reported dependents in the home.

Interviewers followed a brief semi-structured interview guide that asked survivors about their experiences during the hurricane, property damage, communications, and experiences with food and meals including the impact of the disaster on eating experience, such as when, where, and with whom they were eating, and access to preferred and medically necessary foods. These questions were important for understanding how social support in the form of shared meals or meal provision may alleviate stress or provide an opportunity for shared coping. Being mindful of competing priorities of individuals in a post-disaster context, interviews were intentionally kept brief and interviewers used their judgment about the number of probes appropriate during each interview. At the end of the interview, participants completed a brief survey about demographic characteristics. The study was submitted for expedited review and was approved by the [omitted for review] Institutional Review Board.

Interviews were professionally transcribed. Thematic analysis was used to identify themes and patterns in a data set (Patton 2002). The data collection team began analysis by reading the transcripts to familiarize with the data and begin to assess potential patterns. In second step of analysis, the data collection team collectively developed a codebook based on Social Support Theory (Cohen and Wills 1985) and, using a common disaster research methodological approach, a single coder experienced in qualitative analysis deductively coded all interviews (Binder, Baker, and Barile 2015; Nelan, Wachtendorf, and Penta 2018; Welton-Mitchell et al. 2018) using Dedoose, a web-based application for mixed methods data analysis (Dedoose 2016).

The codebook was divided into three categories (Table 1): Potential Stressors, Social Support, and Emotionally Linked Behavioral Adaptation. Attaching a code to a piece of text allows the researchers to classify and sort data (Patton 2002). While grouping together similar data under broad themes, the researchers completed a third step of descriptive coding to provide an index of topics or categories discussed by participants and to identify short phrases and quotes in the interviewees' own words (Saldana and Omasta 2017). This process allowed the researchers to, for example, not only note the presence of a stressor in the interviews, but also capture the source of the stressor, such as damage to their home or changes in food availability (Miles, Huberman, and Saldana 2014). In total, the codebook contained 66 codes and subcodes. While the theoretical model suggests the absence of social support may lead to illness or illness behavior, the present study did not collect health outcome data due to the quick response study design and therefore did not examine the effect of social support on health outcomes.

Table 1: Themes from qualitative analysis.

Themes	Subcodes
Potential stressors	
Stressors	Stressors created by the disaster event: damage to home, property, or community; changes food availability and accessibility; changes in eating and nutrition
Stress appraisal	Positive (appreciative) or negative (stress, trauma)
Social support	
Social support – functional	
Perceived support	The feeling that support was available
Received support	Actual provision of support by another individual
Emotional support	Expressions of comfort and caring
Sense of belonging	Feelings related to sense of belonging and place
Tangible provisions of material support	Provision of food, money, or household goods by another individual
Informational support	The provision of information, advice, or guidance
Social support – structural	
Marital status	Partnership in daily life
Social networks	Frequency of social contacts, size, and density of network
Social integration	Participation in a broad range of social relationships, active engagement in social activity, a sense of communality, and identification with one's social roles
Social isolation	Living alone
Emotionally linked behavioral adaptation	
Coping	Positive coping activities (eating together, volunteering) and negative coping activities (not eating enough)

Both functional and structural social supports were examined in the analysis of interview transcripts as outlined in Table 1. Functional social support was most common, referring to the functions provided or perceived to be available from social relationships. Structural support refers to the interconnection among different social ties and roles. These two types of support are closely connected in that individuals received functional support in the context of structural support connections (Prati and Pietrantonio 2010; Sarason, Sarason, and Pierce 1990; Hwang et al. 2014). To examine stress appraisal processes and emotionally linked behavioral adaptations, or coping mechanisms, positive and negative affect and positive and negative coping codes were included in the deductive codebook and are discussed in the subsequent stressors and social support sections.

4 Results

Below, we organize our results based on the Social Support Theory. During interviews, participants were asked about their experience with Hurricane Florence, including any property damage, their experience accessing food, and changes in food sources to capture stressors resulting from the storm. Fifteen stressors were identified in the transcripts, ranging from temporarily losing electricity to complete loss of their homes, all related to damages to property and effects on community and household food access due to the storm. Many stressors were interrelated, for example, house damage affected food access. Interviewees also described the social support their community provided and how food served as an impetus for that support in a number of ways. Like with stressors, coping activities were inherently linked to stressors and social supports, so results associated with coping activities appear in line with what interviewees were responding to with coping activities.

4.1 Stressors

4.1.1 Damages to Home, Property, and Community

Many participants reported that this storm exceeded expectations and caused the worst damage they had seen in their community.

Our house was damaged, and it is a two story so two floors damaged. We lived in an area where we never flooded before, we've been in the house 15 years and this was our first year of such

major ... So we did have major damage during ...everything thrown away. Everything, yeah. Gutted. Everything, family living room, laundry area, bedroom, living room, kitchen, all of that. (Participant (P) 1: Demographics not provided by participant)

The general impression was that damage was widespread and that the community was struggling to respond.

I've been around in this town for a long time with hurricanes and everything. This one here, I think, was probably the worst that's been here. There's a lot of structure damage. There's a lot of landscape that's got to be done, trees down, and all that. A lot of flooding. People's got floors and sheet rock ... A lot of people just lost their homes all together. (P2: Male, age 45–64)

While some participants reported that their homes were unrepairable, many reported the loss of kitchen or food stores and having to gut their homes due to substantial flooding damage to lower floors or damage to their roofs.

The air-conditioned unit and food and stuff in the garage, lawnmowers and all that stuff, all that stuff damaged. I got some shingle blew off the top and that got to be repaired and yard has got to be clean all clean up and all that stuff. And different things, different things has got to be done and everything and people in the neighborhood is helping, trying to as much as they can but the whole thing is a mess, trash and everything. (P3: Male, age 65+)

There's black mold already growing in the ceiling and the walls are actually, you can see the walls starting to, mold growing on the walls. Hair coming out of the wall. Inside of the living room the floor has begun to buckle. Inside of the dining room it's buckled. My refrigerator is gone. The stove is gone. Everything in the, the microwave even has mold in it and I'm like how? There's no food in it. Everything is just like ugh. (P4: Female, age 26–35)

These experiences highlight the widespread physical losses experienced by the residents of New Bern after Hurricane Florence.

Beyond damage, several survivors discussed how the storm disrupted services they typically relied upon. Losing electricity was the most commonly reported stressor, ranging from a few days to still being without electricity at the time of the interview between 5- and 11-days post-landfall. The loss of electricity also led to several related issues. For example, a number of participants reported that the extended power outage resulted in food spoilage and the need to “gut” the contents of refrigerators and freezers.

Interviewer: Okay. And did you have electricity?

(P5: Female, age 45–64): No. No. Two days.

Interviewer: Two days?

(P5: Female, age 45–64): Yeah. That's why it lost everything of my food.

And the electricity of course went out. That's why I had to dispose of everything in my refrigerator.

Another common issue was losing vehicles and access to public transportation. Due to the flooding, participants lost their vehicles and struggled to acquire replacement transportation. Others suggested that continual flooding of roads and damage to roads and bridges led them to feel isolated and have issues acquiring resources they needed, including food.

They had no food. Just the little bit that they did have and then that was quickly deteriorating because of lack of power. So that became an issue because they had small kids. It's just kind of one of those things. (P6: Female, age 45–64)

Some of them can't get out to get food, so transportation is a barrier for getting food. Also, one of the other issues is some of them are in such strategic rural areas like outside of the city that they can't get to food. You know, even though I was away, I had calls all week where people were, you know, in little towns where they were surrounded by water and couldn't get out or they just didn't have the access right then for food. (P14: Female, age 45–64)

4.2 Changes in Food Availability, Accessibility, and Nutrition

Participants reported food shortages both before and after the storm. Grocery stores experienced shortages before Hurricane Florence arrived meaning customers were unable to purchase staple foods and water to prepare for the storm.

Well, a lot of the shelves in the grocery store actually were empty. I mean days before the storm even came, when people heard this was a category four and that we might be without power for two weeks or more things went off the shelves very quickly. Every day you'd go in and you would try to find the bread and the milk, and... everything kept flying off the shelves and as it went on it just would get worse and worse. There would be no water, there would be no bread, no milk. The canned goods were going. And then, the grocery stores would try to restock the next day, you'd go back in and it would be the same scenario, you'd really pretty much have to stand there when the bread truck was there to get bread. (P7: Female, age 45–64)

Shortages worsened after the storm due to store closures.

And then, after the storm, one day one grocery store opened, the next day after, the second day after the storm two grocery stores opened, and still you were having the same thing... What I noticed is people were, the panicked looks on people's faces going in trying to find the food and the bread... I've never seen anything like that. Because it's like I've got to get something to eat, I've got to get food or whatever, especially the people that didn't have generators and have the means of trying to cook food with a grill or whatever they seemed a little more panicked

than the rest of the people..., when Publix opened they were cooking chickens and people waited, and waited, and waited in long lines just to try to get a box of chicken to take home. (P7: Female, age 45–64)

It's been very difficult. For the people that could afford it before the storm, the shelves were really bare. So going in to try and get anything...water, bread, even any fresh produce or meats... it's very slim, even...we're almost a week, maybe two weeks after the storm and it's still having difficulty finding any food at stores. (P8: Female, age 26–35)

Another stressor affecting the ability to obtain food after the storm was transportation. Damage to community infrastructure that led many individuals to seek out community food distribution provided by local churches and organizations, food trucks and restaurants, and national organizations. Some of these entities even delivered hot meals directly to homes, which was invaluable assistance for individuals experiencing transportation issues.

While food served as a positive coping mechanism for many survivors, changes in eating behavior was the most commonly reported negative coping mechanism reported in the interviews. Participants, while often prefacing with their gratitude for having access to any food, mentioned that the variety of food distributed at community meals and available in local grocery stores, was not part of their normal diet.

I have tried to go to the grocery store. The grocery stores ... Everything except canned foods and stuff had been removed from the shelves because, of course, they were without power for five days also. There was no dairy, no frozen-type foods or any of that for ... probably just now getting it back into our grocery stores. (P13: Female, age 65+)

We lost all our food...it's been kinda rough 'cause all the stores still don't have a lot of food. There's a high demand, so it's kinda just getting what you can to just tide you over so to speak. Not many options...you just gotta do what you gotta do. (P9: Female, age 26–35)

Some survivors reported that they were eating lower quality food or eating less due to stress accumulated from the storm and subsequent relocations.

I haven't really had much of an appetite. With all of the stress and the relocating, and here and there, and the uncertainty of what tomorrow's going to bring or what we're going to do, I haven't had much of an appetite. Usually if I do get hungry, it's kind of just eat something to get something on my stomach and satisfy it, and then move on and work on something else. There's a lot of things on your mind other than necessarily eating right now. (P8: Female, age 26–35)

As noted above, others lost electricity, which ruined food. In some cases, participants suggested that they lacked the funds to replace that food and had to wait on food assistance to arrive to eat. Others explained they were working for other community members for money to purchase food.

I just didn't have nothing, and then a friend came. Called me and asked me if I wanted to clean up his yard over here on [street name omitted] street and I made \$20. I went and bought a loaf of bread, a pack of bologna, some coffee, sugar. Anyway, I guess that was close enough. But that was something to eat. (P5: Female, age 45–64)

Following the devastation of Hurricane Florence, these participant accounts reflect the significant disruption in food access and eating. Primary contributors of stress reported by participants range from home and property damage, to food loss and spoilage, to barriers in transportation, ability to purchase food, and uncertainty about food in the future. Thus, many people resorted to utilizing food distribution and community meals to meet their dietary needs.

4.3 Social Support

The Theory of Social Support suggests that social support acts as a buffer when individuals face a potential stressor and/or when stress is appraised. Many participants described how social support manifested in the wake of Hurricane Florence, as the social network within their neighborhood served as a source of meals during a time when food was not available. Several participants described how they would share meals with neighbors, often checking on each other to ensure they were fed. Others reported on the vital help provided by neighbors in the form of hot meals. Most participants interviewed reported that they previously had or currently were accepting food via community food distribution, community meal services, or disaster relief aid highlighting food availability challenges. For some participants, responding organizations were their only source of food. Participants noted that this shared food was a “blessing”, showing signs of positive coping. Many participants reported they were sharing more meals with neighbors and community members than they normally would. This change highlights a communal feature to meeting food needs after disaster exposure.

My neighbor across the street, she had I guess some money or whatever. She went to the Piggly Wiggly on [street name omitted] street that was opened up even though they took significant damage. She went there and she got some chicken legs, and some mashed potatoes, and green beans. Came back and cooked in her house. That's how I was able to eat, see to a neighbor. Through a neighbor. (P10: Female, age 45–64)

While participants were describing New Bern as ‘cut off’ and not having the food necessary to serve the community, they consistently described the community as coming together for people who were hungry:

...some how, some way it's all been adding up. You'd be shocked, the people that you wouldn't think that would help you on a normal basis have been helping, and vice versa. Everyone's been paying it forward so somehow, someway even though it's been a lack of food in the neighborhood, everyone has been making sure everyone eats. Even if we said, hey y'all I got this much meat that's starting to go bad and we all light up a grill and we all put in together, at least everyone is eating. (P4: Female, age 26–35)

In some cases, participants described these community meals as improving their eating patterns. Rather than eating alone in their homes, several participants noted that eating meals with others positively influenced their outlook on the storm.

A negative that has turned into something positive...It made a big impact, especially when you think about it like people lost a lot, people gained a lot as well. (P11: Male age 26–35)

Sharing food within the neighborhood supplied functional support in the form of meals to some, while creating a stronger network and structural support for others. Participants described the strengthening of structural social ties when eating with others, even while experiencing changes in eating habits ranging from types of foods to where meals were taking place. According to Social Support Theory, the structural and functional impact of social support perceived and received by participants may have prevented the stress appraisal in many participants, which may further reduce the risk for illness. Shared meals were not just an opportunity to meet nutritional needs, but also to receive social support through talking with others in a collective processing of the ongoing disaster experience.

Because, well, all three of sisters are diabetic. So, we choose not to eat the bun of the hamburger, just the hamburger diced up. And things like that... So what we started doing was just talking to each other through it. You know, you not need that bun. The top or the bottom. This is the way I eat mine. Open faced. So, its been a whole lot better. Because having that kind of decision to make and sticking to it, is a lot harder when you're by yourself. (P12: Female, age 45–64)

I'd come down here and visit, talk with everybody, try to keep everything off of my mind, but it's hard. Because everyone you meet, you ask them "how did you make out?" and people tell you "I've lost everything" and they say "what about you?" I say, "Well, I just lost electricity," "oh, well, you're lucky." I don't like to hear that, but I can't help it. I'm just more fortunate...See... I'm more worried about what other people don't have. I said the Lord will take care of me. And my cousin keeps saying "You have to go somewhere" I said "Well, I'm worried about other people." (P10: Female, age 45–64)

This participant described how interactions with people in her network and discussions of the impacts of Hurricane Florence made her feel some survivor's guilt.

5 Discussion

Hurricane Florence – *a potentially stressful event* – affected the community of study. When a potentially stressful event occurs, a *stress appraisal process* takes place (Cohen and Wills 1985). In describing their appraisal of the potentially stressful event, participants identified 15 stressors related to the disaster and changes in food and meals in the days immediately following the storm. Our interviews revealed a number of ways food or meals provided social support for individuals affected by Hurricane Florence. Study participants described several responses and adaptive behaviors to stress created by the storm related to food and preparing or finding meals and social support from familial, neighborhood, and community social ties including sharing food to meet dietary needs, utilizing community feeding services, and feeling socially supported in other ways beyond nutrition. These findings are discussed here in the context of existing social support and disaster literature.

Aligned with Social Support Theory, respondents described functional support in the form of food sharing and community meals, as well as structural support from familial, neighborhood, and community social ties (Cohen and Wills 1985). These two types of supports may influence health through two paths, behaviorally and psychologically. Behavioral processes observed among participants in the sharing of food to meet dietary needs, such as in the case of the three sisters with diabetes. Respondents demonstrated psychological processes as well, describing community feeding as a time and place for talking with others coping with similar stressors.

Food availability was also a common theme. Participants commonly described a lack of food availability as the storm approached and worsening of food availability after landfall and continuing throughout the research period. Some participants detailed their experiences of looking for dinner for hours or having difficulty a week after the storm finding enough food. This did not align with what the field team observed during fieldwork and raised important questions surrounding community needs, food availability, and utilization patterns. In addition to the individual interviews analyzed and presented in this manuscript, the field team completed organizational interviews with individuals working in food-related response, observed community food and meal distribution operations, and assessed the price, quality, and availability of food in the community (Clay 2019). One potential explanation for this misalignment is that, while there was a good supply of food available, the specific types of foods that disaster affected individuals were seeking were not readily available. For example, if a household sustained significant damage to

their home and kitchen or did not have electricity, they might be looking for prepared foods or foods that were easy to prepare without appliances or refrigeration. Understanding the types of foods most useful for individuals coping with different types of disaster impacts could inform improved emergency food response efforts.

Using a convenience sample recruited from food and prepared meal distribution sites did not provide a representative sample, rather a sample intentionally saturated with survivors with food needs following Hurricane Florence. While non-representativeness is limiting, this is an important population to study for understanding the role of food and meals following disasters and is therefore appropriate for this study. The research team also did not know about the food security status of study participants prior to the hurricane, which may influence post-disaster food needs and experiences. Given that post-event functioning is often an exacerbation of pre-event functioning, an understanding of pre-event functioning would help contextualize the data and understand the magnitude of Florence's effects. Likewise, data collection occurred in the week immediately after the storm, providing a snapshot of the response effort in New Bern. By arriving in the field quickly, the research team was able to capture features of the event and key issues related to food and meals that would have been difficult to retrieve after the disaster (Wu 2020). While interviews were necessarily brief with limited use of probes to be mindful of participant burden, future longitudinal studies could capture interdependencies inherent in the complex adaptive system that makes up the post-disaster food environment and allow for more expansive interviews that document how the post-disaster food environment evolves over time.

Based on the experiences of study participants, these data support the idea that prepared foods may be paramount for individuals that had home damage, possibly to their kitchen facilities, or that are dedicating time to competing priorities related to the disaster such as mucking out their homes and removing debris. The interview guide did not include probes to ask about prepared, packaged, and fresh foods and future research examining the role of prepared and ready-to-eat foods for meeting food needs in a post-disaster context would advance the science in this area. Additional research exploring alignment between available food and food needs in the immediate aftermath of a disaster event will help to ensure emergency food services and preparedness plans for emergency food provision are useful for the disaster recovery context. Further, examining the availability of food and purchasing behavior of individuals across the disaster lifecycle could shed additional light on the types of food preferred or most used from pre-event through stabilization of supply and demand.

Given the unpredictability of many hazard types, new methods would be useful for capturing this data such as grocery purchasing inventories maintained by stores and purchasing data tracked by companies such as Nielsen to track the movement of goods in and out of a disaster affected community through the retail environment (Nielsen 2020a, 2020b).

Further research on the nutritional consequences of disaster disruption is important to describe the health consequences of diet changes resulting from disaster exposure. The timing of the interviews conducted in this study may have contributed to a lack of nutritional concerns expressed by study participants. As discussed above, during the immediate response period, there may have been competing priorities taking precedence and as the community begins to stabilize and move into the long-term recovery phase, priorities and concerns may shift. Recovery planning with meaningful engagement of food safety net organizations would improve food response and security in future disaster events (Hamideh 2020).

The themes identified in this analysis highlight that disaster response efforts that go beyond dropping into a community and providing food or meals in the short-term and focus on promoting social interactions centered on food can bolster social support and buffer stress during the immediate aftermath of a disaster. Structural support in the form of sharing food among social networks demonstrated social support in this sample following Hurricane Florence. Emergency managers, voluntary organizations, and other response organizations should work to establish programs to promote this behavioral response could increase this form of social support in disaster-impacted communities. Placing food at the center of social interactions in a post-disaster setting can let disaster-affected individuals know that they are not alone, serve as a place for information and resource sharing, and provide important nutrition. A feed-a-friend or community dinner program funded by state or federal disaster funding could support communities with resources to access and prepare meals to help meet individual and community needs while fostering social support. Bolstering functional support could include working with local chefs, restaurants, or food trucks to offer a community meal in each neighborhood at regular intervals appropriate to the disaster phase. This could also help bolster the local economy and jumpstart recovery efforts for local businesses. During the immediate response period, three meals per day in impacted neighborhoods may be appropriate. As the neighborhood moves into longer-term recovery, a weekly meal to bring people together to share a meal could shift from functional support to structural support where the benefit is the shared time together to cope with the ongoing stress of long-term recovery.

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