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Food insecurity among households with children during the early months of the COVID-19 pandemic

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Abstract

Understanding impacts of the COVID-19 pandemic among households with children is necessary to design appropriate public health responses that protect food and nutrition security. The objective of this research was to understand predictors of food insecurity during the COVID-19 pandemic among households with at least one child (<18

See authors' details on next page.

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years), including whether foods reported as out-of-stock were associated with the likelihood of food insecurity. An online survey using validated measures and open-ended questions was distributed to a convenience sample in five states—Louisiana, Montana, North Carolina, Oregon, and West Virginia—during the early months of the COVID-19 pandemic (April through September of 2020). Predictors of food insecurity (race/ethnicity, age, marital status, education, federal nutrition assistance program participation, number of adults and children in the household, rurality, and missing foods when shopping) among households with children during the COVID-19 pandemic were modeled using logistic regression ($p < 0.05$, *a priori*). To further illuminate household experiences during this time, two researchers independently coded open-ended survey question data using inductive and deductive approaches to construct themes. Households with children had increased odds of experiencing food insecurity during the COVID-19 pandemic if they had the following characteristics: Hispanic ethnicity; age between 25 and 44 years; additional adult household members; economic hardship; SNAP/WIC participation; being widowed, divorced, or separated; and reporting foods not available when shopping. Participants described mainly negative changes to dietary patterns and practices as a result of the COVID-19 pandemic. They also described food security challenges and ideas for improving food security. Consistent with other data collected and analyzed dur-

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ing the height of the COVID-19 pandemic, this study contributes findings that emphasize the need for enhanced public health responses and emergency preparedness measures that protect food and nutrition security. Because of the increased short- and long-term consequences including exposure to adverse circumstances, impaired learning, risks to mental health, and poor health outcomes, ensuring an adequate food supply is especially important for households with children.

Keywords
COVID-19, Pandemic, Food Insecurity, Food Access, Social Inequality, Households with Children

Introduction

Efforts to improve food security in the United States (U.S.) were undermined in 2020 when the novel coronavirus SARS-CoV-2 (COVID-19) caused a pandemic. Food insecurity—a deficiency in "access by all people at all times to enough food for an active, healthy life" (Bickel et al., 2000)—is estimated to affect 15 million Americans, including over 10% of U.S. children aged 0–17 years (Ullmann et al., 2022). Families living with food insecurity experience chronic anxiety, stress, and food insufficiency, which are tied to adverse health outcomes such as type 2 diabetes, hypertension, coronary heart disease, depression, and mental health challenges (Berkowitz et al., 2018; Coleman-Jensen et al., 2022; Garcia et al., 2018). Food insecurity among children is associated with adverse behavioral and academic outcomes as well as immediate and long-term risks for poor health (Perez-Escamilla & de Toledo Vianna, 2012).

Between 2015 and 2019, 9.4% of U.S. households with fewer than three children and 13.0% of households with three or more children were food insecure (Ullmann et al., 2022). In March 2020, at the start of the COVID-19 pandemic, one national survey among adults with incomes less than 250% of the federal poverty level reported that 44% of these households were food insecure, including 48% of Black households, 52% of Hispanic households, and 54% of households with children (Wolfson & Leung, 2020). Food supply issues also occurred as a result of the COVID-19 pandemic (Byker Shanks et al., 2020), with families reporting increased stress from numerous factors that influence food access and dietary patterns such as sudden loss of employment, empty store shelves, physical isolation, and more time spent at home alone or with dependents (Grocke-Dewey et al., 2021; Parker et al., 2020; Patrick et al., 2020).

To avoid or mitigate the deleterious impacts of public health disasters, it is important to understand how the challenges of the COVID-19 pandemic influenced food and nutrition security and well-being, especially among U.S. households with children, who may be more vulnerable to impacts of disaster situations. For this report, we analyzed quantitative data to model factors associated with an increased likelihood of food insecurity and qualitative data to explore food- and nutrition-related experiences among households with at least one child under the age of 18 years during the early phase of the COVID-19 pandemic. We were also interested in the potential impact or experiential differences among households with children based on location (urban or rural).

Methods

A 52-item Qualtrics survey was created using validated measures and open-ended questions to assess impacts of the COVID-19 pandemic on nutrition, physical activity, and mental health. A convenience sample was recruited among five states (Louisiana, Montana, North Carolina, Oregon, and West Virginia), representing co-author locations and diversity in state populations and politics. Local partners, such as food pantries and public health organizations, helped to distribute survey links when applicable. Incentives for participation varied by site. Over 4,000 adults aged 18 years or older completed the survey during the early months of the COVID-19 pandemic between April 2020 and September 2020. Two published articles used this dataset to examine the impact of the COVID-19 pandemic on mental health and physical activity (Grocke-Dewey et al., 2021) and the varied nutrition practices of food-secure and food-insecure households (Byker Shanks et al., 2022).

Among the overall sample, food insecurity was reported to rise from 16% to 23% upon the onset of the COVID-19 pandemic, and households with

children were more likely to experience food insecurity (Byker Shanks et al., 2022). Because of this finding, the present investigation combined quantitative and qualitative survey data (e.g., from open-ended questions) among 1,235 households reporting at least one child under the age of 18 years. The quantitative data provided information about predictors of food insecurity, and we used the qualitative data to explore food- and nutrition-related experiences. This research was determined to be exempt from needing Institutional Review Board oversight. Details about measurement regarding the variables of interest in this study are described below. More details about this research can be found elsewhere (Byker Shanks et al., 2022; Grocke-Dewey et al., 2021).

Food Security

The six-item short form of the U.S. Department of Agriculture Economic Research Service's (USDA ERS's) Household Food Security Survey Module (Bickel et al., 2000) was used to measure household food security during the COVID-19 pandemic. To reduce participant burden amid other survey items (Byker Shanks et al., 2022; Grocke-Dewey et al., 2021), this scale was chosen over longer scale options (Bickel et al., 2000). While the six-item short form does not capture the most severe instances of food insecurity, it can be used to indicate household risk for child hunger (Bickel et al., 2000).

Predictors of Food Security Likelihood

Potential predictors of food insecurity were chosen based on historical knowledge of U.S. factors that have often influenced food insecurity (Coleman-Jensen et al., 2022): sociodemographic information (race/ethnicity, age, marital status, and education); participation in the USDA Supplemental Nutrition Assistance Program (SNAP) or Special Supplemental Nutrition Assistance Program for Women, Infants, and Children (WIC); the number of adults and children living in the household; and rurality. To determine rurality, zip codes were matched to rural-urban commuting area codes (RUCA; USDA ERS, 2010); RUCA values from 1 to 3 were considered urban, and RUCA codes 4–10 were considered rural. Given the food supply and access barriers that resulted from the COVID-19 pandemic (Byker Shanks et al., 2020), responses to a survey question asking whether all foods that were needed were available when shopping (yes or no) was included as a predictor variable to model the impacts of a limited food supply among this sample, all else constant.

Qualitative Data

Open-ended survey questions on the full survey spanned a variety of broad topic areas to understand the diverse impacts of the COVID-19 pandemic on health behavior (Byker Shanks et al., 2022; Grocke-Dewey et al., 2021). Although many questions did not necessarily ask about food and nutrition security specifically (Table 1), many participants responded to these open-ended questions with information about food, nutrition, or the related topic of financial insecurity (Coleman-Jensen et al., 2022). Additionally, responses to an open-ended qualitative question, "What foods were not available [when you shopped]?" were reviewed. Food and/or beverage products noted as missing were counted, and a descriptive analysis (described below) was utilized to understand food supply challenges experienced among families during this time.

Data Analysis

Predictive Model

"Often true" or "sometimes true" affirmative responses to the USDA household food security questions were tallied. Those who responded affirmatively to two or more questions were marked as food insecure, while those who responded "never true" to five or more questions were considered food secure. Missing responses were not included. Logistic regression was used to model the association between the chosen predictor variables and the odds of experiencing food insecurity among households with children during the COVID-19 pandemic ($p < 0.05$, *a priori*).

Foods Reported Out of Stock

Food and beverage items reported not available when shopping were counted by category: fruits and vegetables; grains or grain alternatives (includ-

Table 1. Open-Ended Survey Questions Used to Explore Household Experiences with Food and Nutrition Security [a]

- Please describe the reasons that maintaining healthy relationships with those family members that live with you has or has not been challenging for you.
- Please describe the reasons that maintaining healthy relationships with family, friends, co-workers and your community has or has not been challenging for you.
- If you are feeling more stressed and/or anxious since the COVID-19 pandemic began, can you explain a little more about the source of your stress and/or anxiety?
- Do you intend to continue these positive/negative health behavior changes after the stay-at-home directive is lifted? Why or why not?
- Is there anything policy or decision makers could do to help make it easier for you and your family to be physically and mentally healthy during the COVID-19 pandemic? Please think about how your life could be improved and make as specific recommendations as possible.
- Is there anything else you would like to share with us in terms of how your life, or your health-related behaviors, have been impacted, or have changed, since the beginning of COVID-19?

[a] Responses were included for qualitative analysis in the present study if relevant to food or nutrition security.

ing yeast, with the assumption it was desired for bread-making); protein (meats, fish, eggs); plant-based protein; dairy or dairy alternatives; condiments and basic ingredients; combination foods and miscellaneous items; water; and other discretionary products (alcohol, candies, etc.). The counting and categorization process was completed independently by one author (NP) and reviewed by an external research associate; discrepancies were reconciled by the lead author. Food items reported missing were compared between households with children located in urban versus rural areas, with slight differences observed for protein (25% versus 21%, respectively) and vegetable (8% versus 12%, respectively) products. Given small differences, results were combined during the analysis stage and are presented descriptively as a proportion of the total number of foods/beverages reported missing.

Qualitative Analysis

A combined deductive and inductive coding approach was used (Lichtman, 2014), based on field knowledge regarding factors that have historically influenced U.S. food security (Coleman-Jensen et al., 2022) and concepts derived from open-ended survey responses, respectively. Two researchers created and tested a codebook (BH, NP) prior to distributing it to the wider coding team (LA, CBS, AHM, LHM, DH, TEP, JS). Participant responses were independently coded among two researchers; NP independently coded all responses with second, independent coding responsibilities split among the wider team. Agreement regarding discrepancies was reached among researchers through discussion. Codes were sorted to present the major ideas or themes in relation to food insecurity and dietary patterns during the early months of the COVID-19 pandemic. Theme prominence was compared between urban and rural households with children during the analysis stage and was combined for reporting given no observed differences between urban and rural households with children.

Results

Data from 1,235 survey respondents who reported having at least one child less than 18 years old residing in the household during the COVID-19 pandemic were included in this study.

Predictive Model

Predictors of food insecurity among households with children in this sample are shown in Table 2. Those reporting Hispanic ethnicity were 4.28 times more likely to report food insecurity compared to non-Hispanic, white respondents ($p < 0.01$). Age

was also a predictor of food insecurity; specifically, participants aged between 24 and 34 years and 35 and 44 years were 7.14 ($p < 0.01$) and 6.06 ($p < 0.05$) times more likely to report food insecurity, respectively, compared to those aged 65 and older. Marriage was associated with a reduced likelihood of food insecurity (odds ratio [OR] 0.57; $p < 0.01$), while those who reported being widowed, divorced, or separated were 2.45 times more likely to experience food insecurity ($p < 0.01$). Further, with each additional adult household member, odds for food insecurity increased (OR 1.37, $p < 0.05$). Economic hardship during the COVID-19 pandemic was associated with 4.93 times higher odds of food insecurity ($p < 0.01$); SNAP/WIC enrollment was also associated with increased odds for food insecurity (OR 3.93, $p < 0.01$). Last, food being unavailable when shopping was linked with 2.42 times higher odds of experiencing food insecurity ($p < 0.01$). Urbanicity, the number of children in the household, or education level did not predict food insecurity (Table 2, next page).

Foods Not Available When Shopping Among Households with Children

Participants ($n = 942$; 76% of the households with children sample) reported 3,104 food items as not available when shopping during the early months of the COVID-19 pandemic (Table 3). Grains were reported out-of-stock most often, followed by protein products, dairy products, and vegetables.

Qualitative Results

Open-ended survey responses about food and nutrition from 563 participants residing in households with children (46% of the sample) were analyzed for this study, given topic areas focused on food and nutrition security and/or financial insecurity. Shared experiences were grouped into three main categories or theme. They are described below based on prominence or the number of times described (i.e., themes shown/described first were the most prominent ideas): (a) changes in dietary patterns and practices due to the COVID-19 pandemic; (b) challenges to food security; and (c) solutions to food insecurity. Exemplary quotes are used to illustrate experiences among those residing in households with children.

Changes in Dietary Patterns and Practices due to the COVID-19 Pandemic. Positive and negative changes to dietary patterns and practices were described; however, less healthy changes were emphasized most frequently. Increased feelings of stress and uncertainty or boredom and ease of access to less healthy foods and beverages were described as contributing to dietary changes because of the COVID-19 pandemic. Among many, these experiences contributed to more

Table 3. Foods Not Available When Shopping During the Early Months of the COVID-19 Pandemic ($n = 942$ respondents with at least one child less than 18 years of age) [a]

Food and Beverage Products	Percent [b]
Grains (e.g., bread, grains, gluten-free alternatives)	32%
Protein (e.g., meat, fish, eggs)	23%
Dairy (e.g., milk and milk alternatives, cheese, butter)	12%
Vegetables (fresh, canned, frozen)	10%
Combination Foods (e.g., canned or boxed goods, frozen meals, soups)	7%
Fruit (fresh, canned, frozen)	6%
Condiments and Basic Ingredients (e.g., spices, sauces, sugar, oils)	6%
Plant-Based Protein (e.g., beans/legumes, tofu, vegetarian alternatives)	3%
Water	1%
Other Discretionary Products (e.g., alcohol, candy, chips, sodas)	1%

[a] Percentages represent the number of reported food products out-of-stock by category divided by the total number of items reported missing ($n = 3,104$)
[b] All values are rounded to the nearest integer.

Table 2. Food Insecurity Predictors among United States Households with Children During the Early Months of the COVID-19 Pandemic (*n* = 1,235 survey respondents)

	Predictor Variable	Odds Ratio	95% Confidence Limits		*P*-value[a]
Urbanicity[b]	Urban vs. Rural	1.24	0.91	1.69	0.18
Race/ethnicity	**Hispanic vs. Non-Hispanic White**	**4.28**	**1.90**	**9.65**	**0.01**
	Non-Hispanic Black vs. Non-Hispanic White	1.60	0.84	3.05	0.80
	Multiracial vs. Non-Hispanic White	1.44	0.66	3.14	0.59
	Other race vs. Non-Hispanic White	1.54	0.71	3.38	0.74
Age category	18–24 years vs. 65+ years old	3.43	0.32	36.92	0.92
	25–34 years vs. 65+ years old	**7.14**	**0.74**	**68.38**	**0.01**
	35–44 years vs. 65+ years old	**6.06**	**0.64**	**57.27**	**0.03**
	45–54 years vs. 65+ years old	3.65	0.39	34.45	0.93
	55–64 years vs. 65+ years old	3.80	0.38	38.38	0.85
Marital status	Living with a partner, but not married vs. Single or never married, and not living with a partner	0.62	0.30	1.31	0.05
	Married vs. Single or never married, and not living with a partner	**0.57**	**0.31**	**1.05**	**<0.01**
	Widowed, divorced, or separated, and not living with a partner vs. Single or never married, and not living with a partner	**2.45**	**1.15**	**5.22**	**<0.01**
Number of adults living in household	**Per additional adult household member**	**1.37**	**1.14**	**1.63**	**<0.01**
Number of children living in household	Per additional child household member	0.95	0.82	1.10	0.48
Economic hardship	**Experienced one or more economic hardships during COVID-19 vs. No economic hardships during COVID-19**	**4.30**	**3.15**	**5.87**	**<0.01**
WIC and/or SNAP participant during COVID-19	**Yes vs. No**	**3.93**	**2.55**	**6.06**	**<0.01**
Highest level of education	Completed 2-year junior or community college or trade school vs. Completed 4-year college or university or higher	2.06	1.33	3.20	0.50
	Completed high school or high school equivalent (GED) vs. Completed 4-year college or university or higher	1.95	1.07	3.57	0.45
	Less than high school or high school equivalent (GED) vs. Completed 4-year college or university or higher	12.11	1.20	122.73	0.10
	Some college, but no degree vs. Completed 4-year college or university or higher	2.03	1.33	3.09	0.46
Were all foods you needed available when you shopped?	**No vs. Yes**	**2.42**	**1.55**	**3.77**	**<0.01**

[a] P-values correspond to Wald Chi-square test statistics using logistic regression.
[b] As defined by rural urban commuting area (RUCA) codes (USDA ERS, 2010).
Bolded text indicates significance at *a priori* threshold ($p<0.05$).

alcohol consumption ("I will probably continue drinking 1–2 alcoholic drinks a day until I have more secure finances and childcare" [rural Montana]), increased meal or snacking frequency (e.g., "I have been eating more and more often" [urban West Virginia]), or a shift toward more convenient food options like fast food or takeout ("Fast food was easier when I did not feel like cooking" [rural Oregon]). These changes were described as potentially lingering: "Unfortunately comfort eating is not something I have managed to 'kick' even after the isolation lift" (urban Louisiana).

Alternatively, some participants described healthier dietary patterns or practices because of the COVID-19 pandemic. More time and ability to cook at home, prioritize health, or establish home gardens were described as contributing factors: "Just cutting out the daily running around from work, school, etc., has given me more free time to cook" (urban Louisiana). Those having more flexibility regarding time and resources described saving money ("Saving money on eating out, wasting less" [rural Montana]). They also described weight loss despite challenges:

> Our family has bonded more through the turmoil. We cook and bake together now, and we all exercise daily (even my 15-year-old daughter who didn't exercise before). She has lost 10 pounds through this ordeal, but she did suffer with anxiety and depression in the beginning of the [stay-at-home] order. (urban Louisiana)

A small number of participants described other experiences that suggested changes in dietary patterns and practices due to the COVID-19 pandemic. The complexity of navigating multiple responsibilities related to food and caregiving were described: "Stress level can still be high due to everything falling on my shoulders. Trying to work from home, caring for children, cooking, cleaning, and just everyday chores have increased" (rural West Virginia). Also, some reported changes to food-shopping practices: "Grocery shopping takes much longer and the environment is more stressful. We go less often and buy more" (urban West Virginia).

Challenges to Food Security. Income and finances, either in general or in relation to food insecurity, were the most common challenge among households with children during the early months of the COVID-19 pandemic. A participant from rural Oregon described having "little to no money, bills overdue, no money for food, gas money to get to and from work." Financial impacts were linked to apprehensions about providing for the household ("Loss of job wondering how to pay bills. Feeding my children" [rural Montana]") and were noted as one of several concerns ("Mentally we are all stressed. Less income, less food, scared we will get sick, no one to talk to" [urban North Carolina]).

Other issues that contravened food security included food supply interruptions and food access challenges. For example, empty store shelves ("Slightly anxious about reduced number of food items available for purchase" [urban West Virginia]; "Stressed we would not be able to find what we needed in the grocery store" [rural Montana]) and higher prices ("Our grocery bill has gone up considerably" [urban, West Virginia]) were reported. Limited food store access was also described: "Only having one grocery store in the community was a big barrier throughout this COVID situation" (rural North Carolina). However, a few respondents described being buffered from these challenges: "I am very lucky that I have not been financially impacted. At the same time, I feel that my efforts to build up savings enough to cover 3–4 months expenses gives me a great sense of comfort" (urban West Virginia).

Solutions to Food Insecurity. Some participants shared ideas for supporting their communities and families during the COVID-19 pandemic. The increased need for federal benefits, food, and financial support for struggling families, including support for childcare, were often described. A participant from rural Montana stated,

> My town started offering free lunches and breakfast delivered by bus every day and it has been unbelievably helpful as a single mom with 3 kids. It often includes fresh fruit and milk and has reduced my grocery budget greatly.

The need for both public health protections to reduce the likelihood of COVID-19 transmission in food retail settings as well as a need for virtual food education materials were mentioned less frequently.

Discussion

Adding to a growing collection of research describing how the COVID-19 pandemic impacted food security, this study used data from five diverse states to explore food insecurity experiences among households with children during the early months of the COVID-19 pandemic. Results of the predictive model correspond with and amplify what is currently known about U.S. food insecurity (Coleman-Jensen et al., 2022) during the early period of the COVID-19 pandemic. Especially underscored are the challenges experienced among Hispanic-headed households with children, which is consistent with other data collected during the early months of the COVID-19 pandemic (Schanzenbach & Pitts, 2020). This observation provides further rationale for culturally and linguistically tailored food and nutrition insecurity responses for Hispanic populations, which has been discussed previously (Rodriguez et al., 2021). Novel findings of our analysis indicate food supply challenges as an additional predictor of food insecurity among households with children in the early months of the COVID-19 pandemic. As such, surveilling food supply interruptions alongside financial barriers to accessing food (Bickel et al., 2000) should be a priority to inform rapid responses. Based on the results of this research, a pragmatic new measure, developed to assess one of the core pillars of food insecurity (availability), is recommended for future application to gather geographically and culturally appropriate perceptions on available foods during public health disaster situations (Calloway et al., 2023).

This study also used qualitative responses to explore food- and nutrition-related experiences during the early months of the COVID-19 pandemic among households with children. First, data reporting out-of-stock food items helped to contextualize the quantitative findings. Grain, protein, dairy, and vegetable products were most often reported as unavailable when shopping during the early months of the pandemic. Additional exploration of the absence of these foods would support understanding of how reduced availability impacted household purchasing and dietary patterns. Similar to our findings, there have been reports of fewer fresh fruit and vegetable purchases (Parker et al., 2021) and reduced food intake among populations experiencing food insecurity (Byker Shanks et al., 2022). These findings generate the need for additional research to ascertain the extent to which limitations in the food supply influenced the intake of fresh fruit and vegetables and other nutritious foods. For children in particular, limited access to protein and dairy sources could have measurable adverse health impacts (Moreno et al., 2015), especially when compounded by the inability to access a balanced diet with other nutrient-dense foods such as grains and vegetables (Perez-Escamilla & de Toledo Vianna, 2012).

Second, the qualitative findings provide insight into the lived experiences and coping strategies used by some families with children during the early months of the pandemic. Many respondents reported using less healthy foods or beverages as a coping mechanism for heightened stress and anxiety. Our findings reflect those reported elsewhere regarding heightened food insecurity and financial and relationship stress due to reduced income, higher expenses, and stay-at-home orders (Adams et al., 2020; Elliott et al., 2021), along with high rates of depression and anxiety (Coulthard et al., 2021; Czeisler et al., 2020; Grocke-Dewey et al., 2021) or disordered eating practices (i.e., restricting or binging; Coulthard et al., 2021; Phillipou et al., 2020). Results point to the pandemic's negative toll on mental health and dietary practices, which warrants further investigation. Further investigation is especially necessary for households with children, given the link between adverse childhood experiences and heighted risk for chronic health conditions, addiction, poor quality of life, and shortened life expectancy (Crandall et al., 2019). While some households with children in our sample were also able to make potentially healthier changes (Carroll et al., 2020) by gardening and preparing foods at home, this reality is likely because of a steady financial state despite challenges created by the COVID-19 pandemic (Byker Shanks et al., 2022).

Program and Policy Implications

This study used a triangulation of methods that illustrate the food insecurity challenges experienced among households with children across several states. Based on the findings of this study, and our knowledge of general lessons learned over the past few years, we discuss policy avenues to support families with children during public health disasters such as the COVID-19 pandemic. These include: a) limiting disruptions across the food supply chain; b) passing federal financial and food aid legislation in a timely manner; and c) ensuring adequate access to mental health services. Although several public health practice and policy approaches have worked to curb the negative impacts of the COVID-19 pandemic among families (described below), current data suggests families are still struggling with rising food insecurity given the expiration of supportive COVID-19 policies and rising inflation (Waxman et al., 2022). As such, our results provide critical insight into supports needed for families with children.

Early in the pandemic, supply and demand disruptions limited availability in the food environment (Byker Shanks et al., 2020). Farmers and ranchers, as well as hog and poultry processing plants, were hindered in production capacity due to concerns over worker safety (Behsudi & McCrimmon, 2020; Dyal et al., 2020). Shoppers also turned to "panic buying" to secure enough household food items (Knoll, 2020). Our data indicates these realities likely contributed to heightened food insecurity and a reduced availability of critical nutrients for households with children. The U.S. is familiar with providing food and financial support to families immediately following natural disasters (e.g., hurricanes, floods, fires, and tornadoes). However, the response to the COVID-19 pandemic was challenged by social distancing requirements and stay-at-home orders that limited the ability to both get and distribute food. For example, some participants in this study reported general anxiety about accessing food and changes to shopping patterns, in addition to a reduced food supply. A rapid response plan for addressing local, regional, and national supply chain distribution challenges is a critical consideration for the future (Byker Shanks et al., 2020) and should be designed specifically to meet the nutritional needs of households with children.

Given heightened food and financial insecurity, other important strategies for a disaster such as the COVID-19 pandemic include passage of responsive policies like the Families First Coronavirus Response Act (FFCR; 2020), The Coronavirus Aid, Relief, and Economic Security Act (The CARES Act; 2020), Pandemic Electronic Benefits Transfer (P-EBT; USDA Food and Nutrition Service, 2020), and the expansion of the SNAP Online Purchasing Pilot (Foster et al., 2021), which all helped families. With these, however, state governments and employers experienced complications as they sought to understand legislation that aimed to support families during the COVID-19 pandemic. For future strategies, it will be important to prioritize swifter enactment, accompanied by heightened clarification. Investigations to show the extent to which these policies aided low-income households with children in achieving food, nutrition, and financial security are warranted. Last, this study found that stress and anxiety were linked to changes to food-related practices. It is important to note that mental health providers specializing in disordered eating may be difficult to access during periods of increased demand due to a limited number of professionals trained in this area (Crowther, 2021). This is problamatic and should be a point of investigation for enhancing policy strategies that support families during public health disaster situations, given the interconnected nature of food, mental health, and well-being (Byker Shanks et al., 2022; Grocke-Dewey et al., 2021).

Limitations

There are several limitations of this study that should be considered. Using an online survey format excluded those without reliable internet access, although a mobile device could have been used. This method of data collection was prioritized during a time when in-person recruitment was less possible. Also, while the convenience sampling in partnership with community partners in varied state settings helped to overcome data collection challenges during this time, the use of convenience sampling introduces bias into the sample. Results cannot be generalized to reflect

the experiences of all U.S. households with children in these locations. The timeframe of our study, which was cross-sectional and took place during the early months of the COVID-19 pandemic is also a limitation. The results may not reflect the situations of households with children at later points when federal aid increased to better support families.

Last, while we limit our analysis to households reporting at least one child during the COVID-19 pandemic, we cannot draw conclusions about how children were impacted by reported challenges. Use of the abbreviated USDA food security scale could only indicate heightened risk for child hunger among households reporting food insecurity (Bickel et al., 2000). Our quantitative analysis indicated having additional adults in the households was predictive of food insecurity, while having additional children was not. Adult household members are likely to restrict food intake to protect child food security (Bickel et al., 2000), and this may explain our findings. This exploratory investigation used both quantitative and qualitative data to identify vulnerabilities among households with children. Future research and practice evidence is required to fully understand the impact of public health disasters to inform emergency preparedness startategies that mitigate impact, particularly among child populations.

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