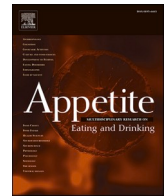




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Impacts of COVID-19 on the home food environment and eating related behaviors of families with young children based on food security status

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ABSTRACT

This mixed-methods study endeavored to expand the current understanding of how early pandemic related disruptions impacted the home food environment and parent feeding practices of families with young children.

Data for this study are taken from the Kids EAT! Study, a racially/ethnically diverse cohort of families with 2–5 year old children. Individual interviews were conducted by phone and video conference with mothers (n = 25) during August/September of 2020 and were coded using a hybrid deductive/inductive analysis approach. Parents also reported on their family's food insecurity status enabling qualitative findings to be stratified by family-level food security status.

Two overarching themes were identified related to how families in this sample describe the COVID-19 pandemic's impact on their home food environment. Themes included 1) Impacts on obtaining food for one's family, and 2) Specific changes in parent feeding practices. Findings indicated variation within each theme by family food security status. Overall, families experiencing food insecurity more frequently discussed using various coping strategies, including stocking up, rationing food, and use of supplemental food resources, to overcome challenges associated with obtaining food brought on by COVID-19. Families with food insecurity also reported having more time for home cooked meals and more frequently discussed enforcing less structure (timing of meal, place) related to meals/snacks consumed at home during the pandemic.

The impacts of the COVID-19 persist, ranging from ongoing economic challenges, inconsistent access to childcare for families, and the emergence of new, more contagious, variants. With this, interventions to address food insecurity amongst families with young children should consider how to optimize the home food environment and promote healthful parent feeding practices within the families they serve in the face of an evolving public health crisis.

1. Introduction

One consequence of the economic turmoil wrought by the novel coronavirus (COVID-19) pandemic includes a significant rise in U.S. household food insecurity. Food insecurity—defined as the disruption of food intake or eating patterns because of lack of money and/or other resources (Coleman-Jensen et al., 2019)—disproportionately impacts households with children age six or under, female heads of household, and racial minority groups (Leddy et al., 2020). National data suggests that the prevalence of food insecurity among households with children has tripled since 2019; much of this is likely attributable to economic challenges brought on by the COVID-19 pandemic (Food Insecurity Remains Elevated Across, 2021). A recent review article on food

insecurity and child development conducted by Gallegos and colleagues concluded that food insecurity impedes children from reaching their full physical, cognitive and psychosocial potential (Gallegos et al., 2021). Therefore, with the significant increases in household food insecurity comes health concerns for families across the United States (Johnson & Markowitz, 2018; Pérez-Escamilla et al., 2020). As the COVID-19 pandemic endures and economic fall-out persists, a deepened understanding of food insecurity among families with young children will aid in guiding ongoing preparedness efforts related to food assistance programming and family health promotion services in the context of future public health crises.

Public health response efforts for the COVID-19 pandemic, to date, have evolved with the rapidly changing nature of the pandemic. Initial

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public health measures implemented by the U.S. government starting in March 2020, such as social distancing and stay-at-home orders, may have played a role in shaping the home food environment (e.g., *home food availability, parent feeding practices*) and eating patterns (e.g., *meal frequency, meal size*) of young families (Adams et al., 2020; Rosenkranz & Dziewaltowski, 2008). For example, supply chain issues experienced at the start of the pandemic, which made obtaining various food items and other staple goods challenging, in addition to individual desire to limit shopping trips to reduce potential exposures to COVID-19, are suspected to have influenced factors in family food choices and eating patterns during initial stages of the pandemic (Scott & Ensaff, 2022; Snuggs & McGregor, 2021). COVID-19 related school/childcare and business disruptions ongoing over the pandemic have highlighted the importance of the home food environment as these disruptions required young children and their families to consume more meals at home (Adams et al., 2020; Hammons & Robart, 2021). For families of 2–5 year old children experiencing household food insecurity, these pandemic-related changes to the home food environment may have been particularly evident with respect to reduced accessibility and availability of childcare or other “school” based food supports which often contribute significantly to the daily diets of children from low income households (Adams et al., 2020; Dunn et al., 2020). Moreover, the financial constraints and the greater reliance on supplemental food resources experienced by families struggling with food insecurity during COVID-19 may contribute to important differences in the home food environment, compared to food secure families, that are worth further exploration given limited research in this area presently (Adams et al., 2020; Hammons & Robart, 2021; Isaacs et al., 2021; Jansen et al., 2021).

The COVID-19 pandemic also created unique stressors that may have implications for changes in parent feeding practices and subsequently child eating behaviors. Food parenting practices include a broad range of goal-directed actions and behaviors that involve what foods are made available and accessible to their child, as well as how parents feed and interact with their children around food (Loth et al., 2022a). Parent feeding practices associated with healthful dietary intake and eating patterns are often referred to as “supportive” and those found to be associated with less healthful dietary intake and maladaptive eating patterns are often referred to as “unsupportive” (Arlinghaus & Laska, 2021). Researchers have demonstrated that parental stress and depressed mood is linked to the use of less supportive food-related parenting practices, such as those practices that are more permissive or controlling in nature (Berge et al., 2020; Hughes et al., 2015). Parents may have shifted toward using permissive or controlling feeding practices at increased frequency as a result of increases in stress levels during the pandemic (Adams et al., 2020; Hammons & Robart, 2021; Loth et al., 2022a). For example, permissive feeding practices could have manifested during this time because of less structure and routine at home surrounding child meal and snack times.

This study endeavored to expand the current understanding of the impacts of food insecurity on families with young children during the initial months of the COVID-19 pandemic. Specifically, we interviewed members of a cohort of racially/ethnically diverse families of young children with differing food security status with the aim of gathering greater understanding of how early pandemic related disruptions impacted their home food environment, including use of specific parent feeding practices. Identifying such impacts of COVID-19 on families with young children will aid in developing family-based health interventions that are pertinent to the home food environment and parent feeding practices especially as parents are faced with continued life disruptions (e.g., childcare/school closures, distance learning during quarantines) resultant from the enduring nature of this pandemic. Further, the qualitative methods used in this study may provide insights regarding the lived experiences and choices of families with young children during early stages of the pandemic-particularly with respect to level of household food security and navigating the continued impacts of a global public health crises on daily family life. This information is

important to understand, from a historical perspective, as we look to improve preparedness for future pandemics or other large-scale events of a disruptive nature.

2. Methods

2.1. Study participants

Participants for the current study (n = 25) were recruited from the Kids EAT! study (Loth et al., 2022b), which is a population-based cohort study of parents with at least one child aged 2–5 (n = 119) designed to deepen our understanding of parent- and family-level influences on child dietary intake and eating behaviors. This cohort was established in the fall of 2019. Families from within this cohort were invited to participate in a follow-up study, which included a survey and ten-day Ecological Momentary Assessment (EMA) protocol focused on family’s experiences during the early part of the COVID-19 pandemic. Recruitment for participation in this follow-up study occurred from March to May 2020; in total, 75 (of the original 119) parents participated (Loth et al., 2022a). Families were offered an incentive of a \$150 gift card for participation of the survey and EMA protocol. In August 2020, all parents that participated in this follow-up study (n = 75) were invited to engage in a qualitative interview (Trofholz et al., 2022). A rolling recruitment approach was used to engage participants in one-on-one interviews; this approach was chosen as it allowed our research team to balance recruitment efforts with staff availability for interviews and to reassess sample extensiveness following each interview. Batches of 10 cohort participants were randomly selected and invited by e-mail to participate in qualitative interviews. Sample extensiveness (Sobal, 2001) was judged to be adequate when recruitment of new participants provided few additional insights and theoretical saturation was reached (Strauss & Corbin, 1994). This approach resulted in a total of 25 parents participating in the qualitative interviews that resulted in the data used for the present study; two parents actively declined participation, and the remaining 48 did not schedule or engage in an interview prior to our team determining that theoretical saturation had been reached. Data collection with the final interview participant was completed in October 2020. Upon interview completion participants were provided a \$40 gift card incentive for their participation. All study protocols were approved by the [blinded] Institutional Review Board Human Subjects Committee.

Participating parents were 26.12 ± 1.27 years old on average. Most participants resided in the [blinded] metropolitan area (76%) and had an annual household income of less than \$35,000 (68%). Table 1 provides detailed demographic characteristics of the study sample, with a comparison of COVID-19 family survey sample vs. qualitative interview sample provided.

2.2. Quantitative data

Data Collection. - Participants completed the COVID-19 family survey online. All assessments were completed in English; participant English language fluency was known given their initial enrollment in the Kids EAT! cohort.

Measures. - The COVID-19 family survey was brief and focused on how the COVID-19 pandemic had impacted the family life and home food environment of participants. Food insecurity was assessed a modified version of the United States Department of Agriculture Economic Research Service (USDA ERS) short form tool for assessing food insecurity (USDA ERS - Survey Tools, 2021). Specifically, this short-form tool was modified for the current study to assess participant food security status since the start of the COVID-19 pandemic (vs. 30 day reference period) as the research team felt this reference period would be easily recalled by participants given the monumental nature of a global pandemic. For example, one item read: “Since the start of the COVID-19 outbreak (January 2020), did you ever eat less than you felt you should

Table 1
Participant demographic information.

Characteristics	Quantitative COVID-19 Family Survey (n = 75)	Qualitative Interviews (n = 25)
	Number (%) or Mean (SD)	Number (%) or Mean (SD)
Race/Ethnicity		
Asian	12 (16)	1 (4)
Black/African American	23 (31)	13 (52)
Hispanic/Latin X	19 (25)	5 (20)
Mixed Race/Other	6 (8)	3 (12)
Native American/ American Indian	2 (3)	2 (8)
White	13 (17)	1 (4)
Education		
Partial high school or less	8 (11)	1 (4)
High school graduate/ GED ^a	21 (28)	7 (28)
Partial college or specialized training	26 (35)	9 (36)
College graduate	17 (23)	6 (24)
Graduate degree	3 (4)	2 (8)
Marital Status		
Married	20 (27)	7 (28)
Committed relationship	27 (36)	6 (24)
Casually dating	2 (3)	1 (4)
Separated or divorced	3 (4)	2 (8)
Single	23 (31)	9 (36)
Household Income Level		
<\$15,000	16 (21)	6 (24)
\$15,000-\$24,999	11 (15)	3 (12)
\$25,000-\$34,999	15 (20)	8 (32)
\$35,000-\$49,999	12 (16)	3 (12)
\$50,000-\$74,999	16 (21)	4 (16)
\$75,000 or more	5 (7)	1 (4)
Household Food Security Status		
Food Secure	36 (48)	8 (32)
Food Insecure	39 (52)	17 (68)
Age (years)	27 (5)	26.12 (1.27)

^a GED = general educational degree.

because there wasn't enough money for food?". Further, the Kids EAT! COVID-19 family survey provided data for all measures outlined in Table 1. Participant demographic data (age, race/ethnicity, educational attainment, household income, and marital status) was collected via self-report on the Kids EAT! COVID-19 family survey.

Data Analysis. – Participant food security status was determined from participant responses to the USDA short-form tool for assessing food insecurity. For the current study, participants were categorized as “food insecure” if they responded affirmatively (yes/often true/sometimes true) to any items within the USDA short form tool; the decision to use this cut-point was made as we were interested in understanding how the experience of experiencing any degree of food insecurity compared to experiencing food security during this specific time period. Descriptive statistics (i.e., frequencies, percentages, and standard deviations) were calculated to describe the study sample. All quantitative data analysis was completed using Microsoft Excel.

2.3. Qualitative data

Data Collection. – The research team carrying out one-on-one parent interviews was made up of one faculty member (Initials Blinded), one research staff member (Initials Blinded), and two graduate research assistants (Initials Blinded). Prior to data collection, study team meetings led by the faculty member were held to train the three research staff in qualitative data collection methods and standardized interview protocols (Crabtree et al., 1999; Krueger, 2014). This step was completed to ensure the reliability and consistency of the data collected via interviews (Braun & Clarke, 2013). Two of the three research staff had also completed formal coursework in qualitative research methods. One member of the research staff acted as the lead data collector; this person had previously received training in key informant interviews practices and conducting focus groups and had experience conducting qualitative research with a variety of populations. This individual provided support and mentorship to the other two staff throughout the process, touching base with the faculty lead as necessary.

A semi-structured interview guide was utilized, and questions covered a variety of topics related to the impacts of COVID-19 on families with young children. Interview questions pertaining to the current analysis (Table 2) of the impacts of COVID-19 on the home food environment and parent feeding practices of families with young children across food security status were developed by experts in the field of public health, including individuals with backgrounds in food insecurity, nutrition, children and families. Further, interview questions were reviewed by a convenience sample made up of members of our broad research team/lab that were also parents of young children; parent reviewers were able to provide perspectives on the length of time it would take to engage in an interview, as well as the appropriateness of COVID-19 related questions and follow-up prompts for parents with children of similar ages to our study population. Feedback from reviewers was incorporated into the final interview script prior to data collection.

The one-on-one interviews were semi-structured in nature. Probing techniques were used to elicit greater depth to responses from participants when necessary. Interviews were conducted virtually via phone (n = 1) or videoconferencing using the Zoom application (n = 24). They varied from 30 to 60 min in length. Interviews were audio-recorded and verbal consent was obtained from participants prior to interview commencement.

To facilitate reflexivity and rigor, the team of interviewers debriefed at regular intervals – every five interviews -throughout the data

Table 2
Semi-structured interview guide.

Parents of young children balance many things-including work, care for your children and other family members, and household responsibilities - in this next set of questions I am going to ask you to think about each of these responsibilities separately and talk with me about how COVID-19 has changed or impacted each of these various responsibilities and how you have navigated these changes.
1) Now, I would like you to think about other home or family responsibilities during this COVID19 pandemic. Have your home or family responsibilities been impacted by the COVID19 pandemic? How so?
2) What are some support services for families that you feel have helped you to manage household and family responsibilities during this time?
3) What are support services that are lacking that would help you to better navigate your household and family responsibilities?
<i>I am interested in learning more about how feeding your family has worked since the COVID-19 pandemic has started</i>
4) Tell me about any ways your ability to get the food you need to feed your family has changed as a result of COVID 19.
5) Tell me a little bit about how feeding your family has worked since the pandemic of COVID-19. Specifically, I am interested in anything that has changed with regard to the types or amounts of foods you or your child(ren) are eating or any changes to rules or routines at home?
6) Has your family had the opportunity to and chosen to participate in any of the school meals being offered to children during this time?
7) Has your family sought out any other public assistance or food distribution programs during this time?

collection period. Initial reactions to the interviews, unexpected responses, and emerging themes were discussed. Participants' reactions to questions and probes were also discussed. Field notes were shared and discussed during these debriefs as well.

Data Analysis. - Audio-recorded interviews with parents (n = 25) were transcribed verbatim and coded with NVivo software (version 10, QSR International Pty Ltd, Burlington, MA, 2014) using a hybrid deductive/inductive analysis approach. This methodology allowed coders to identify themes using broad a priori categories (*deductive*) while also allowing unique themes to emerge from the qualitative data (*inductive*)²⁶. Therefore, while the interview questions helped guide theme development, participant responses to questions could cut across themes. Two study staff coded the first five interviews together line-by-line to establish an initial coding tree. Each additional transcript was coded independently by both coders; meetings were held regularly to discuss new themes that may have arisen and to reach consensus on coding choices. Both coders discussed interview coding until 100% agreement was reached. After all interviews were coded, two additional rounds of coding were conducted to: (1) identify over-arching themes, (2) identify sub-themes in the identified over-arching themes, and (3) to ensure saturation of themes had been reached.

Data on participant food security status were merged with the qualitative interview data during the final part of the data analysis process. Specifically, after the completion of coding, codes and themes were stratified by two quantitatively informed groups based on participant food security status; “food secure” (n = 8) and “food insecure” (n = 17) using a stratified NVivo coding matrix. This process allowed for comparisons of codes, initial theme ideas, and sub-themes to be made across the two food security status groups. See Fig. 1 for a flow diagram of the data collection process and analysis timeline.

3. Results

Two overarching themes were identified related to how families in the sample describe the COVID-19 pandemic's impact on the home food environment and parent feeding practices. These themes included 1) Impacts on obtaining food for one's family, and 2) Changes in parent feeding practices. Within each of these overarching themes both

similarities and differences emerged by family food security status. Below, is a description of each overarching theme (*bolded and italicized*) and sub-theme (*italicized and underlined*). Subthemes unique to a specific food security status are described separately (see Fig. 2). Quotes from participants are included to exemplify each theme and subtheme. Any identifying information has been removed from the quotes to protect participant confidentiality. Table 3 depicts overarching themes, sub-themes, and exemplar quotes by food security status.

3.1. Overarching theme #1: impacts on obtaining food for One's family

Greater than half of all participants (n = 14) reported changes to grocery shopping trips due to the pandemic. Participants discussed finding grocery shopping, especially early in the COVID-19 pandemic [Spring 2020], stressful with new rules in place and needing to shop at multiple stores to find everything their families needed. One parent shared,

“Food shopping has just been different, because there's a lot of different rules for each store, and it just made the whole process a lot more stressful.” (Interview 14, Black)

Parents from both groups of families (n = 5) also expressed changes to grocery shopping due to concerns about bringing their children to the store. For example,

“I dedicate one day out of the week that I know there's someone like who will be there with the kids, and I don't have to go out with them, and at a specific time where there's not going to be a lot of people at the store.” (Interview 5, Mixed Race)

Another parent discussed feeling judged when shopping with her children as a motivator in changing how she shopped saying,

“I've been using delivery services, because it's hard to bring kids into the store, because they want to run around, and they don't want to sit in the cart. And I just feel like people also like look at you – I mean, especially in the beginning, they're just looking at you like, “Why are you bringing your child to the store?” I just feel like you're judged for that.” (Interview 19, Mixed Race)

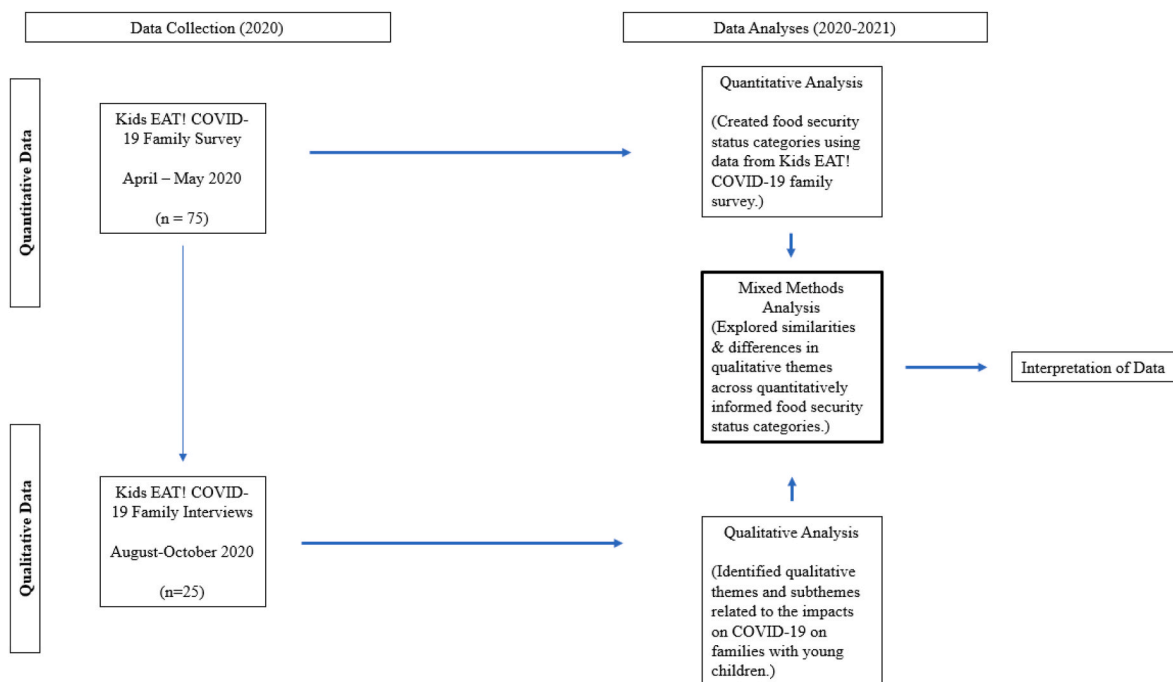


Fig. 1. Flow diagram of the kids EAT! Data collection process and analysis timeline.

Overarching Themes:

- 1) Impacts on Obtaining Food for One's Family
- 2) Changes in Parent Feeding Practices

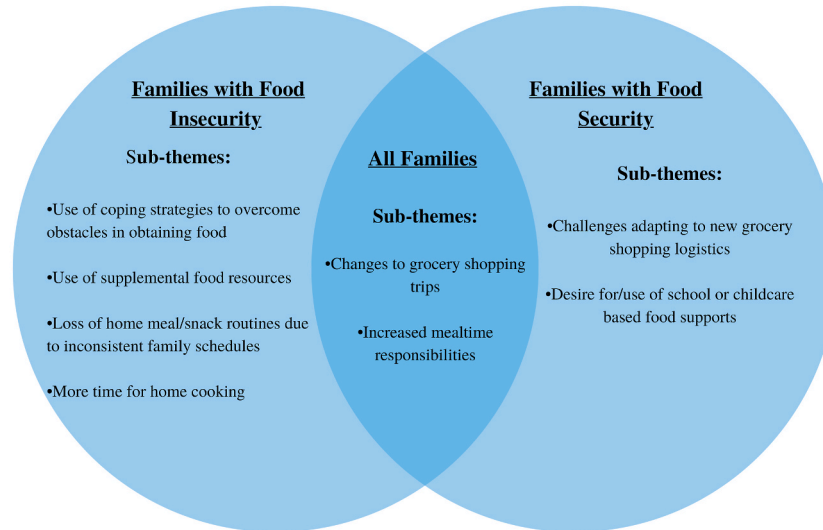


Fig. 2. Identified overarching themes and subthemes by food security status.

3.2. Families with food security. -

Related to the overarching theme of obtaining food during this time period, multiple families ($n = 4$) with food security expressed experiencing challenges adapting to new grocery shopping logistics. To this end, one mother noted,

“It was hard, because a lot of things — like a lot of stores didn’t have — their shelves were clean. If you went into some of the stores in my community, you couldn’t find a lot of things that you wanted to have, so you just had to settle for what was on the shelves.” (Interview 13, Black, Food Secure)

Several ($n = 3$) of the families with food security discussed desire for or use of school/childcare-based food supports to minimize grocery shopping trips or reduce at home meal responsibilities with one participant sharing,

“... what actually did help was the school sending out like the free lunches. So that helped not having to go grocery shopping.” (Interview 14, Black, Food Secure).

3.3. Families with food insecurity. -

Several families with food insecurity ($n = 6$) discussed successful use of specific coping strategies to overcome obstacles in obtaining food for their families during this time. Specific strategies employed by families with food insecurity included stocking-up on food when they had the financial means, buying foods for multiple uses, and completing grocery shopping at “off” hours. For example,

“I would end up stocking up or just grabbing one or two extra of like pasta sauce or something, because I know we end up using it quite often ... So just making sure that I either stocked up – if I had the money to stock up ...” (Interview 26, Hispanic/Latinx, Food Insecure)

One participant shared that they would visit grocery stores early in an effort to make sure a wide selection of food would still be available to them.

“A lot of places run out of things quickly, so it’s like you have to try to get out early enough to catch the grocery stores, wherever you need to go to get food.” (Interview 18, Black, Food Insecure)

Many families with food insecurity also discussed use of supplemental food resources such as the Special Supplemental Nutrition Program for Women, Infants and Children [WIC ($n = 4$)], the Supplemental Nutrition Assistance Program [SNAP ($n = 8$)], and community food supports ($n = 8$) (e.g., food shelves, food drives) as an additional strategy used to obtain food during the pandemic beyond the grocery store. Many participants noted appreciation for the assistance that these supplemental food resources provided for their families with one mother remarking,

“Well, it helps keep food on the table consistently to where I don’t have to worry about spending the cash and I can worry about spending my cash elsewhere with things that we need for our house or bills.” (Interview 9, Mixed Race, Food Insecure)

Regarding community food supports – over a quarter ($n = 3$) of food insecure families experiencing food insecurity commented on feeling that food shelves were a particularly helpful resource noting,

“You know, there’s a lot of them [food shelves] and I get food, and so I’m able to cook healthy foods for my family, because, you know, they offer fruits, vegetables, and it’s really helpful.” (Interview 4, Hispanic/Latinx, Food Insecure).

Families experiencing food insecurity expressed both positive ($n = 4$) and negative sentiments ($n = 2$) surrounding the ease of obtaining food via community food supports. For example, one participant with a positive experience stated,

“You just pull up, and they have like an iPad or something like that, like a tablet that puts your name and your number in, and they just load your vehicle up, and you pull off.” (Interview 18, Black, Food Insecure)

Negative sentiments from families with food insecurity specifically noted increased popularity of food shelves during this time and, consequently, many running out of food or having limited food available. To this end, one family stated,

“The line was just super long, and by the time they got to us, they like told us that “Well if you guys want to wait, but we’re out of food. There’s only

Table 3
Overarching qualitative themes and sub-themes among all families and across quantitatively informed categories of household food security status.

Quantitative Categories	Qualitative Themes		
	Overarching Themes	Sub-themes	Exemplar Quotes
Food Security Status			
All Families (n = 25)	Obtaining food for one's family	Changes to grocery shopping trips	So now I have to wait for my spouse to be home, and so one thing I've noticed is that the stores are always full. I don't know if it's because there's a lot of people at home. They're always full, so I end up shopping once a week.
	Changes to parental feeding practices	Increased mealtime responsibilities	And then, again, making sure that they eat throughout the day and cleaning after them and working. So it's like different duties. I'm one person performing like multiple duties, I guess.
Families with Food Security (n = 8)	Obtaining food for one's family	Challenges adapting to new grocery shopping logistics	Food shopping has just been different, because there's a lot of different rules for each store, and it just made the whole process a lot more stressful.
		Desire for/use of school/childcare food supports	... I know that schools were doing food and stuff, but I asked kind of about it, and I was just kind of treated liked, "Well, you don't need this. Oh, this is for people not like you." N/A
Families with Food Insecurity (n = 17)	Changes to parental feeding practices	No unique subthemes emerged for families with food security.	
	Obtaining food for one's family	Using of coping strategies to overcome obstacles in obtaining food	A lot of places run out of things quickly, so it's like you have to try to get out early enough to catch the grocery stores, wherever you need to go to get food.
		Use of supplemental food resources	I only use WIC and that's it. I've been using that since my daughter was born, so that's really helpful too, because I can buy milk and stuff.
	Changes to parental feeding practices	Loss of home meal/snack routines due to inconsistent family schedules	But right now, because they're at home like 24/7 and every single time they're not going to be sitting down and eating, it's more

Table 3 (continued)

Food Security Status	Qualitative Themes		
	Overarching Themes	Sub-themes	Exemplar Quotes
		More time for home cooking	relaxed and less mealtime And I always cook from scratch. Like I made my own meals. I don't eat like frozen food and stuff, so everything - I feel like I've just been able to cook a little bit more than before when I was working full time.

milk and eggs. I'm not even a hundred percent sure if there's even going to be enough for when it's your turn." So when it was that time we just drove off. ". (Interview 26, Hispanic/Latinx, Food Insecure)

Like the supplemental food resources outlined above, some families (n = 2) with food insecurity expressed barriers in accessing school and/or childcare based food supports during the pandemic. Barriers described by families included transportation, food unavailability, and administrative issues. When talking about these barriers one mother shared,

"... the way they was doing that at first wasn't helpful, because you had to go to them and pick it up, and I didn't have a car at the time. So it was like we would have to have been walking really far, catching a bus with three kids, and then I was big and pregnant, and then trying to carry all the boxes back. So that wasn't ideal at all." (Interview 22, Black, Food Insecure)

3.4. Overarching theme #2: changes in parent feeding practices –

Roughly half of all families (n = 12) touched on experiencing *increased mealtime responsibilities* throughout the day during the pandemic. Several participants discussed feeling that these responsibilities made for more chores at home with one mother remarking,

"I guess I would say because we're home all the time, like obviously it's messier, I need to clean more, I need more food. You know, I have to provide three meals a day now." (Interview 8, Hispanic/Latinx)

Among some families (n = 4) increased mealtime responsibilities were tied to the loss of meal supports commonly provided in schools and childcare settings. One mother expressed,

"So instead of eating just the breakfast and lunch at school and then having a snack before they came home, now all of that was being eaten at home. And, of course, they're at home and they're around-the food is right in the kitchen, so they want more snacks throughout the day, and they want to get off their eating schedule." (Interview 22, Black).

Several families (n = 4) noted that the greater degree of parental oversight brought on by the pandemic (i.e., they are now present at all meals and snacks) prompted their decision to purchase and serve healthier food choices at meal and snack times. One mother shared,

"I give them more fruits and vegetables than I used to, because somehow — I guess, because they're always around, so I make sure I watch what they eat instead of them being at home after school and I give them a snack and it's just like a snack. But now I know what they eat and when they have their lunch, and I make sure they eat mostly fruits and vegetables for snacks ... " (Interview 5, Mixed Race)

3.5. Families with food security. -

No unique subthemes related to changes in parent feeding practices emerged for families with food security.

3.6. Families with food insecurity. -

With the impacts of school and childcare closures, a few (n = 3) families experiencing food insecurity touched on noticing *loss of home meal/snack routines due to inconsistent family schedules*. For example, one participant commented that,

"They'll have breakfast, lunch, and then they'll have a snack at school [before the pandemic]. But here, it's like there's no-we kind of just wake up and we just go about our [day] – if we're hungry, we'll eat in the morning, and then if we're hungry again, we eat again." (Interview 9, Mixed Race, Food Insecure)

Additionally, nearly one third of families with food insecurity (n = 6) highlighted having *more time for home cooking* during the pandemic. Parents generally attributed this to stay-at-home orders and seemed to feel this was a positive aspect of the pandemic related disruptions. To this end, one mother shared,

"I feel like I've just been able to cook a little bit more than before when I was working full time. But, yeah, so it's been – in that part, I think it's been good". (Interview 4, Hispanic/Latinx, Food Insecure)

Another mother discussed new cooking experiences during the pandemic saying,

"Since this has started, I – personally, I have been having to learn how to cook more meals. I'm not the best cook or anything, but like since we've done this, I've been learning how to cook." (Interview 7, Mixed Race, Food Insecure).

4. Discussion

This study explored how COVID-19 impacted the home food environment and parent feeding practices of families with young children and sought to understand differences in impact by food security status. Two important themes emerged: 1) impacts on obtaining food for one's family, and 2) changes in parent feeding practices, with important similarities and differences between food secure and food insecure families. Overall, findings indicate that COVID-19 impacted the home food environment and feeding practices of all parents in the sample to some degree. That said, those families in our sample experiencing food insecurity more frequently discussed how COVID-19 directly impacted their ability to obtain food as well as their use of specific parent feeding practices.

Families facing food insecurity frequently discussed using various coping strategies (*i.e.*, *stocking up*, *rationing food*, *use of community food resources etc.*) to overcome many of the challenges to obtaining food that were brought on by COVID-19. Importantly, these families overwhelmingly talked about the use of supplemental food resources as a common way in which they obtained food during the early months of the pandemic. Some families reported ease in utilizing these resources while others reported significant barriers. These findings stress the importance of federal food assistance programs for families with young children and underscore the need to improve ease of participation for families as they continue to navigate food insecurity and the financial uncertainties brought on by the pandemic. For example, this could entail continuation – or expansion-of programmatic flexibilities/waivers authorized by federal nutrition assistance programs during the pandemic (Dunn et al., 2020). Given ongoing efforts throughout the pandemic to make nutrition assistance programs accessible to families in need it will also be important for future research to build understanding of any populations that were not adequately served by these increased efforts and to

understand why these families were missed. Understanding what types of resources were most helpful and for whom, as well as identification of families who were underserved during this time will be crucial information in future pandemic preparedness efforts.

In the current study, parents with food insecurity reported having more time for home cooked meals. Greater frequency of home cooked meals and family meals have been associated with higher dietary quality in children (Fertig et al., 2019; Fulkerson et al., 2008; Hammons & Fiese, 2011; Mills et al., 2017; Wolfson & Bleich, 2015). It may be that families with food insecurity experienced more changes in their daily schedules (*e.g.*, *changes in employment status*) that facilitated greater ease in home cooking compared to families with food security. Indeed, more time spent at home, increased flexibility in working hours, and the opportunity to work from home have been identified by participants in other studies as factors that contributed to some positive changes in eating patterns and food preparation approaches that have been observed during the COVID-19 pandemic (Koletzko et al., 2021; Sarda et al., 2022). For example, a rapid response online survey conducted within an existing cohort study of young adults living in the U.S. found that participants ate more family meals per week during COVID-19, as compared to prior to the pandemic (Berge et al., 2021). A mixed-methods study conducted in the U.K. observed increased family meal frequency during the pandemic as well as parental/caregiver reports of increased sense of importance of family involvement in meal preparation (Snuggs & McGregor, 2021). Additional studies conducted in Europe during lockdown measures drew similar conclusions with respect to increases in the preparation of home cooked meals and time spent cooking with children (Di Renzo et al., 2020; Philippe et al., 2021). Unfortunately, the observed differences in time for home cooked meals by food security status found within the current sample might indicate that the increase in time flexibility which allowed families with food insecurity to prepare more home cooked meals was a result of loss of employment, a reduction in work hours, and/or the inability to work due to lack of child care remote work not being an option (*e.g.*, retail jobs) all factors which are in turn contributing to loss in income and increased risk for food insecurity. Public health professionals and policy makers should seek to understand how they can support families in sustaining these positive changes to the home food environment brought on by COVID-19, including more home cooked meals, family meals, and positive parental-child interactions, while insuring families have access to ample low cost, healthful food to feed their family. For example, making healthy meal kits available to families through food pantries could help support sustained home cooking and consumption of healthful family meals among families with food insecurity. Childcare or school nutrition programs may be able to build on a similar model during summer or holiday breaks. Further, it is important to acknowledge that the COVID-19 pandemic highlighted and exacerbated existing gender inequities in time spent engaged in childcare and domestic housework, such as meal planning and preparation (Collins et al., 2021; Craig & Churchill, 2021; Farré et al., 2022; Fortier, 2020; Philippe et al., 2022). For example, a research study examining French parents' experiences regarding changes in eating and cooking behaviors during the COVID-19 lockdown found that the majority of both mothers' and fathers' interviewed appreciated having more time to plan, prepare and eat meals together, however it was almost exclusively mothers' who reported a perceived burden related to preparing additional meals and coming up with new recipes during lockdown (Philippe et al., 2022). Public health interventions with the goal of increasing quantity or quality of family meals should work to prioritize the health and well-being of all family members and avoid exacerbating existing gender disparities by placing undue pressure on mothers.

Another notable theme that appeared among families with food insecurity relates to less structure (*timing of meal, place*) surrounding meals/snacks consumed at home during the pandemic. This finding aligns with the existing literature exploring changes to parental feeding practices during the COVID-19 pandemic (Adams et al., 2020; Philippe

et al., 2021; Adams et al.,). For example, a study by Philippe et al. reported significant decreases in the structure of meals among families included in the study sample (Philippe et al., 2021). Philippe et al. also found significant trends toward more permissive, child centric and pleasure-oriented feeding practices (Philippe et al., 2021). Notably, family food insecurity status has been linked to the use of such feeding practices prior to COVID-19 (Kuyper et al., 2009) (Schuler et al., 2020). These findings are concerning given extant literature findings that permissive parent feeding practices are related to suboptimal dietary intake and/or weight status outcomes for children (Couch et al., 2014; Hennessy et al., 2012; Mou et al., 2021). Public health professionals should consider how they can support families experiencing food insecurity to reconnect with more structured feeding practices known to be associated with healthful outcomes for children. To this end, the provision of resources and materials through programs such as SNAP Education (SNAP-ED) or the Expanded Food and Nutrition Education Program (EFNEP) that help parents with establishing schedules, meal planning, and child involvement in meal planning and shopping activities may be helpful not only during- and as we begin to emerge from-the ongoing COVID-19 pandemic, but in the context of preparedness for future pandemics or other similar situations.

Families with food security indicated they were challenged and stressed out by the new logistics of grocery shopping brought on by COVID-19 (e.g., *safety measures/rules adopted by grocery stores including distancing, different store hours, masking requirements*). Notably, families experiencing food insecurity discussed these challenges less frequently during interviews. It might be that prior to the pandemic, food secure families were used to being able to obtain whatever foods they wanted or needed with relative ease, making the new challenges associated with food shopping brought on by the pandemic a considerable change from the norm for these families. Research conducted prior to the pandemic suggests that families with food insecurity are more familiar with needing to “make do” with available food items, stock up on items when they are available and on sale (Mabli, 2014), and have already become familiar with a routine of shopping at multiple stores to find the lowest price points (Cannuscio et al., 2013), potentially making the transition to some of these new pandemic related challenges less daunting. Indeed, the current study, as well as research by Niles and colleagues conducted early on in the pandemic found that individuals and families experiencing food insecurity were significantly more likely to implement coping strategies related to accessing and obtaining food as compared to individuals from food secure households (Niles et al., 2020). Relatedly, a study of food insecurity found that many SNAP participants are adept at comparing food pricing across stores, shopping frequently and at multiple stores, and making food purchases around availability and sale pricing (Mabli, 2014). Recognizing the potential nutrition implications of such shopping behaviors/skills, several studies have assessed the benefits of nutrition education within federal food assistance programs and found positive results with respect to improved diet quality and greater use of health promoting food acquisition behaviors (Kaiser et al., 2015; Walker & Lee, 2020). It may be helpful to consider how similar types of education can be shared with more general audiences (i.e., *families with food security*) in the face of future public health emergencies or other periods of significant, unexpected life disruptions.

Results from this novel mixed-method study support and extend present research on the impacts of COVID-19 on the home food environment and parent feeding practices of families with young children (Adams et al., 2020; Philippe et al., 2021; Adams et al., ; Carroll et al., 2020). The present study achieved this by providing detail rich, in-depth information on factors that distinguish how these impacts have been felt based on familial food security status. An additional strength of this study is use of a racially, ethnically diverse sample. With that said, it should be noted that the number of participants included within each food security status group was small and from one geographic area. Further, the prevalence of families with food insecurity was greater in our interview sample than in the full Kids EAT! cohort study. Reasons for

this difference are unknown. While participants were randomly recruited for the current study, it may be that those parents from food insecure households had more flexible schedules due to changes experienced in the COVID-19 pandemic, allowing them to participate in a qualitative interview. Findings should be interpreted with these limitations in mind.

This study employed a mixed-methods approach to understand the impacts of COVID-19 on the home food environment and parent feeding practices among families of young children. Findings from this study highlight specific similarities and differences observed among families with young children with respect to COVID-19 related impacts in obtaining food and household feeding practices based on family food security status. The present study offers important insights regarding how pandemic related disruptions impacted the home food environment and parent feeding practices of families with young children in the context of their household food security status. Insights gleaned from the present study can be used to inform the efforts of public health professionals, policymakers, and clinicians looking to support families of young children in their health and nutrition as they continue to face pandemic related disruptions given the enduring and rapidly evolving nature of this ongoing public health crisis. For example, public health professionals and policy makers can continue to work to evaluate and improve programs and policies that provide access to healthy meals for families, especially those families that are food insecure. Clinicians can support these same families by forging pediatric primary care-community partnerships with food assistance organizations or by screening young children and their families for household food insecurity. Recognizing that families with food security also expressed desire for community resources these partnerships could also be leveraged to address any food access concerns and help connect all families to available community resources in which they may be eligible. Importantly, food insecurity is a complex problem that has largely come about as a result of social policies and structures. While the provision of food to families through food assistance programs currently plays a key role in supporting families facing food insecurity, food relief programs are not sustainable, nor is the provision of food to families the ultimate answer to ending food insecurity. It is imperative that researchers, public health advocates and policymakers work together with individuals and communities to identify opportunities to deepen our understanding of how to best address root causes of food insecurity.

Ethical standards disclosure

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by The University of Minnesota Institutional Review Board. Written or verbal consent was obtained from all subjects. Written consent was obtained and formally recorded. Verbal consent was witnessed and formally recorded.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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