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Research Brief

Family Food Insecurity, Food Acquisition, and Eating Behavior Over 6 Months Into the COVID-19 Pandemic

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ABSTRACT

Objectives: Describe coronavirus disease 2019 (COVID-19)-related employment and food acquisition changes for food-secure and food-insecure households. Examine associations between food insecurity, parent employment, food preparation, and food acquisition because of COVID-19.

Methods: A nationally representative cross-sectional survey with parents (N = 1,000) in Fall 2020. Measures included sociodemographics, food retail regulations, food insecurity, frequency of meals, changes in parent employment, food preparation, and food acquisition because of COVID-19.

Results: Parents that reported recent food insecurity were more likely to report COVID-19-related employment changes (eg, job loss, reduced hours) and food acquisition changes. Food insecurity was modestly associated with more frequent in-person restaurant dining (B = 0.12, t(999) = 4.02, P < 0.001), more frequent restaurant delivery (B = 0.13, t(999) = 4.30, P < 0.001), less frequent homecooked meals (B = −0.14, t(999) = 4.56, P < 0.001) but was not associated with take-out (B = 0.02, t(999) = 0.62, P = 0.54).

Conclusions and Implications: Food insecurity was associated with employment changes, parent food acquisition, and children’s consumption of homecooked and restaurant meals during COVID-19. Future work could explore resources that help parents acquire affordable, nutritious food.

Key Words: food insecurity, food acquisition, family eating behaviors, COVID-19 (J Nutr Educ Behav. 2022;54:660–669.)

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INTRODUCTION

In early 2020, the coronavirus disease 2019 (COVID-19) pandemic had a drastic impact on individuals, families, and society, including disruptions to food access. Food production and supply were affected by the spread of illness among employees and food retail closures, which led to staple food shortages throughout the US.1 Millions lost their jobs or had reduced hours and wages, further constraining economic food access at an individual level.2 Unemployment affected families with children, particularly working mothers, as many were employed in sectors impacted by early shutdowns or were forced to step away from work because of a lack of reliable child care.3 Physical access to food was unstable and felt unsafe to many, with 75% of people reporting they were afraid to venture to the grocery store in May of 2020.4 Online grocery shopping was perceived as too expensive or completely unavailable at times because of unprecedented demand.5 Alongside these disruptions to food access in the US, hunger and food insecurity reached high levels.6–8 Researchers reported extraordinary increases in food insecurity in the first 6 months of the pandemic, anywhere from 32% to 80% higher than in the previous years,6–8 and rates reportedly tripled in households with children.9 Although a significant portion of the public was affected by food insecurity at the beginning of the pandemic, we know less about food insecurity after the initial lockdowns, including how experiencing food insecurity may have influenced family food purchasing and consumption in the longer term. In April and May, 2020, 1 research group found increases in the presence of nonperishable, processed snack foods in food-insecure households.6 In June, 2020, another group reported adults experiencing food insecurity consumed fewer fruits and vegetables per day and fewer fruits received as too expensive or completely unavailable at times because of unprecedented demand.5

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and vegetables overall than food-secure adults.10

Before the pandemic, families spent more than half of their food budget on foods away from home.11 Although higher-income families spend more dollars on away from home foods, families with incomes below the federal poverty level also report obtaining food away from home 4 times per week on average,11 and researchers find the consumption of food away from home is high regardless of food security status.12 In addition, food insecurity has been associated with more frequent fast-food intake and poorer dietary quality in adults and children, largely attributed to psychosocial stressors stemming from economic hardship, lack of access to nutritious foods, and unique time and financial constraints experienced by families with lower income.13,14 There is a need for information on the association between food insecurity and parents’ food acquisition behaviors, children’s restaurant dining frequency (eg, in-person, take-out, delivery), and meals consumed at home more than 6 months into the COVID-19 pandemic, as restrictions began to loosen and more food retail was available to families again.

The aims of this analysis were to (1) identify whether COVID-19 related changes (eg, changes in employment such as temporary or permanent job loss or reduced work hours or wages; food acquisition changes) were different between food-secure and food-insecure households and (2) to evaluate whether household food insecurity was associated with parents’ food acquisition behaviors and children’s eating behaviors more than 6 months into the COVID-19 pandemic, adjusting for sociodemographic characteristics. Although some studies have been published detailing the immediate impacts of COVID-19 on food insecurity or family food purchasing and eating behavior, the present study allows us to examine whether family life changes persisted into the Fall of 2020, how these factors may be associated with 1 another, and potential implications for family food-related behaviors in the longer term.

METHODS
Participants
Procedures and descriptive statistics from the overarching study have been previously published.15 Participants were recruited from the Harris Poll Online opt-in panel (https://theharrispoll.com/), and survey data were collected in October of 2020 from parents across the US. Participants met inclusion criteria if they had reliable internet access and were English-speaking, aged ≥ 18 years, and a parent or legal guardian of a child aged between 4 and 8 years. The main study was financially supported by a grant awarded to the last author that focused on restaurant behaviors in children aged 4–8 years, the age group that typically orders from a children’s restaurant menu. The final sample consisted of 1,000 parents of children aged 4–8 years residing in the US.

Procedures
The study was approved and deemed exempt according to 45 CFR Part 46.104 by the University at Buffalo Institutional Review Board. Eligible parents were sent a password-protected link to participate in the survey. Participants completed one 61-item questionnaire. Analyses were conducted using SPSS (version 27.0, IBM Corp). Cases were weighted with a sampling weight variable that incorporated 2019 US Census Bureau Current Population Survey data on parents’ age, sex, race and ethnicity, education, income, region, marital status, household size, and the number of children aged < 18 years to ensure the results were nationally representative. The weights were re-distributed, not scaled, to maintain the sample size for analysis.

Measures
Parents were asked to report their age, marital status, 2019 household income before taxes, current employment status, the highest level of education, and race/ethnicity.15 Race was self-reported by parents, and options included Arab/West Asian, Black or African American, Chinese, Filipino, Japanese, Korean, Mixed Race, Native American or Alaskan Native, Other Asian, Pacific Islander, Some Other Race, South Asian and White. Ethnicity was self-reported by parents and included Hispanic, Latinx, or Spanish origin and not Hispanic, Latinx, or Spanish origin. Race/ethnicity was dummy-coded into 5 groups to improve statistical power: Asian, Black, Hispanic, Other, and White.

To measure food insecurity, participants were asked (1) how often in the prior 2 months they worried whether the food would run out before they got money to buy more and (2) whether the food that they bought just did not last and did not have money to get more. Participants responded with often, sometimes, or never. Participants were considered food insecure if they indicated often or sometimes to 1 or both items; participants were considered food secure if they indicated never to both items. A validation study found that these 2 items are most frequently indicated by families experiencing food insecurity.16 This item was adapted from the original 12-month time frame to a 2-month time frame to capture food insecurity in recent months during COVID-19. Cronbach’s alpha in the present sample was 0.84.15

We administered items on work- and food-related changes because of COVID-19 from the National Institute of Health’s Environmental influences on Child Health Outcomes survey and adapted the questionnaire to add additional food acquisition behaviors of interest (eg, online grocery shopping, farm shares) that were not included in the Environmental influences on Child Health Outcomes questionnaire.17 Participants supplied yes/no responses on whether they had experienced work- related changes because of COVID-19 (eg, permanent or temporary job loss, new job, reduced work hours). Parents were also asked since the COVID-19 pandemic began how often their participation in the following activities changed: prepare homecooked meals, eat restaurant take-out/delivery, online grocery shop, in-person grocery shop, go to farmers’ market, and use a farm share. Response options were more often, no change, less often, or not applicable.
Parents were asked about current COVID-19 food retail restrictions in their town (eg, restaurants can offer take-out or delivery only, in-person dining at restaurants is allowed, but only outdoors, in-person dining at restaurants is allowed outdoors and indoors, but at limited capacity, in-person dining at restaurants is allowed outdoors and indoors at full capacity). Given that people cannot dine in person if in-person dining is legally restricted in their town, a take-out only variable was created with responses dichotomized, such that restaurants can offer take-out or delivery only was dummy-coded as 1, and all other responses were dummy-coded as 0.

Parents were asked how often their child(ren) consumed meals from a restaurant over the past 2 months in different contexts (eg, in-person, take-out, delivery). Options were never, once a month or less, 2–3 times per month, once a week, 2–3 times per week, and ≥ 4 times per week. Parents were instructed to include food acquired from fast-food restaurants (eg, McDonald’s), sit-down restaurants (eg, Applebee’s), and local restaurants (eg, local coffee shops or pizza places). Parents were also asked how often meals were cooked and prepared at home during the past week (0–1 times per week, 2–3 times, 4–5 times, ≥ 5 times). Parents were also asked about current food insecurity and their history of food insecurity. Parents were asked how often meals were prepared at home was also asked how often meals were prepared at home.

Separate multivariate linear regression models were prespecified with food insecurity, key sociodemographic variables (eg, parent education, race/ethnicity, income, marital status, and employment status), and food retail restriction as independent variables. In-person restaurant consumption, restaurant take-out consumption, restaurant delivery consumption, and meals prepared at home were dependent variables examined in 4 separate multivariable linear regression models. Plots showed that the distribution of residuals did not violate assumptions of normality. The backward deletion was used, such that final models only included independent variables that were statistically significant predictors of the indicated outcome; alpha for deletion was set at P < 0.01, such that individual predictors with P > 0.01 were removed from the models to reduce the risk of type 1 error. All cases were weighted in all analyses to ensure results were nationally representative of parents with children 4–8 years old living in the US.

RESULTS

Participant Characteristics

Parents were 55% female (n = 548), 83% married (n = 827), 63% employed full-time (n = 632), 43% with a bachelor’s degree or higher (n = 434), 11% Asian (n = 105), 12% Black (n = 124), 8% other racial groups (n = 77), 69% White (n = 693), and 22% Hispanic (n = 216). Sixteen percent of participants lived in the Midwest (n = 160), 27% in the North East (n = 266), 37% in the South (n = 373), 19% in the West (n = 192), and 9 people did not provide their zip code. Participants’ mean age was 39 years, and 59% of participants had a household income below $100,000 per year (n = 591). 69% of parents met the criteria for food insecurity within the prior 2 months based on the 2-item screener (n = 690). In the previous 2 months, 66% of parents reported that they often or sometimes felt they might run out of food and would not have money to purchase more (n = 661) and 56% reported that the food they purchased did not last and they did not have money to purchase more (n = 563).

Parents’ COVID-Specific Employment Changes and Food Insecurity

Parents reporting food insecurity were more likely to report COVID-19-specific job changes than food-secure parents for all employment related variables. Parents experiencing food insecurity were more likely to have experienced permanent job loss (χ² = 36.80, P < 0.001), temporary job loss (χ² = 42.30, P < 0.001), starting a new job (χ² = 40.23, P < 0.001), having reduced work hours (χ² = 72.97, P < 0.001), working remotely (χ² = 14.62, P < 0.001), having increased work hours (χ² = 14.62, P < 0.001), working a job that presented a risk of COVID (χ² = 27.97, P < 0.001), having to lay off employees (χ² = 42.46, P < 0.001), and other work effects not mentioned (χ² = 19.12, P < 0.001) than food-secure parents. Frequencies of COVID-19-related employment changes by group can be found in Table 1.

Parent Food Acquisition Behaviors by Food Security Status

Parent-reported food acquisition changes since COVID-19 differed by food security status. For example, although 49% of parents in both food-insecure and food-secure households reported more frequent online grocery shopping since the start of the pandemic, the food-insecure group had a higher proportion of parents reporting that they use online grocery shopping less often since March of 2020 as compared with food-secure parents who reported a higher proportion of no change responses (χ² = 40.52, P < 0.001). Findings were similar for farmers’ market (χ² = 33.30, P < 0.001) and farm share use (χ² = 60.49, P < 0.001), with some food-insecure parents reporting more frequent use, some reporting less frequent use, or farmers’ markets were not applicable to them. In contrast, food-secure parents were more likely to report no change. Food-insecure parents as a group had a higher...
proportion of respondents who indicated their families ate home-cooked meals ($\chi^2 = 38.87, P < 0.001$) and take-out or delivery ($\chi^2 = 20.59, P < 0.001$) more often and less often since the start of the pandemic, whereas food-secure parents were more likely to report no changes because of COVID-19. Food-secure parents shopped in person at grocery stores more often since the pandemic, whereas food-secure parents reported less frequent restaurant delivery. 

In the model predicting children’s in-person dining (Table 4), Asian race [B = −0.08, t(999) = 2.78, P = 0.006], parent employment status [B = 0.16, t(999) = 4.62, P < 0.001], household income [B = 0.16, t(999) = 4.80, P < 0.001], and food insecurity [B = 0.12, t(999) = 4.02, P < 0.001] explained 10% of the variance in the frequency of children’s in-person restaurant dining [$r^2 = 0.10$, $F(1, 993) = 5.44$, $P = 0.02$], such that living in a household with at least 1 parent employed, higher income, and food insecurity over the past 2 months were each associated with more frequent in-person dining for children, whereas Asian parents reported less frequent in-person dining for children.

In the model predicting the frequency that children had food delivered to their home from a restaurant (Table 5), Asian race [B = −0.11, t(999) = 3.67, P < 0.001], parent education [B = 0.15, t(999) = 4.03, P < 0.001], household income [B = 0.15, t(999) = 3.86, P < 0.001], and food insecurity [B = 0.13, t(999) = 4.30, P < 0.001] accounted for 9% of the variance in children’s consumption of restaurant delivery [$r^2 = 0.09$, $F(1, 993) = 5.62$, $P = 0.02$]. Asian parents reported less frequent restaurant delivery, whereas families with higher income, higher education, and greater food insecurity over the past 2 months reported more frequent restaurant delivery.

The adjusted model of children’s restaurant take-out consumption was significant overall [$r^2 = 0.05$, $F(1, 995) = 6.21$, $P = 0.01$], but food insecurity was not a statistically significant predictor of the frequency that children had take-out from restaurants [B = 0.02, t(999) = 0.62, $P = 0.54$]. Higher parent education [B = 0.11, t(999) = 2.78, P = 0.005] and income [B = 0.13, t(999) = 3.42, P = 0.001] were associated with more frequent take-out consumption and accounted for 5% of the variance in children’s take-out consumption (Table 6).

### DISCUSSION

The basic elements of a food-secure society are availability (eg, adequate food supply), economic and physical access (eg, income, food retail environment), biologically sufficient nutrients in the available food, and stability in each of these dimensions. The COVID-19 pandemic arguably destabilized each component of food security in the Spring of 2020, and our findings suggest that many families may have continued to experience the effects of early shutdowns, food shortages, and employment challenges throughout the Fall of 2020. These continued effects may be associated with how

### Table 1. Parents’ COVID-Related Employment Changes and Household Food Insecurity Since March, 2020

| Employment Changes | Food Insecure | Food Secure | P | χ²<sup>α</sup> |
|--------------------|---------------|-------------|---|------------|
| Permanent job loss | 125 (18)      | 12 (4)      | 0.001 | 36.80 |
| Temporary job loss | 173 (25)      | 23 (7)      | 0.001 | 42.30 |
| Started a new job  | 128 (19)      | 11 (4)      | 0.001 | 40.23 |
| Reduced work hours | 325 (47)      | 58 (19)     | 0.001 | 72.97 |
| Remote work since  | 287 (42)      | 90 (29)     | 0.001 | 14.62 |
| Increased work hours | 196 (28)   | 53 (17)     | 0.001 | 14.62 |
| Job present risk of COVID | 241 (35) | 57 (18) | 0.001 | 27.97 |
| Had to lay off employees | 143 (21) | 14 (5) | 0.001 | 42.46 |
| Other work affects since | 301 (44) | 90 (29) | 0.001 | 19.12 |

**Note:** Values are n (%).

**α:** Pearson’s chi-square test of independence; α was set at $P < 0.01$ to reduce the risk of type 1 error.
parents acquire food and feed their families. Parents reporting recent food insecurity were more likely to report changes in employment and use online grocery shopping, farmers’ markets, and farm shares less frequently since March of 2020 than food-secure participants. Food insecurity had a modest association with more frequent in-person restaurant meals, more frequent restaurant delivery meals, and less frequent meals cooked at home for children in the Fall of 2020. On the whole, food insecurity should be considered as 1 part of the multidimensional social determinants of eating behavior and health that continue to be exacerbated by the pandemic, such as economic stability, access to quality education and health care, the neighborhood and built environment, and social and community context.\textsuperscript{21,22}

In this analysis, parents who experienced employment changes because of COVID-19 were more likely to report they experienced food insecurity over the past 2 months. Across all participants, 14% had permanently lost their job, 20% had temporarily lost their job, and 38% had reduced work hours because of COVID-19, which are significant economic hurdles that may have impacted parents’ ability to afford and reliably acquire food. Concurrently, many children were still learning virtually throughout the school week in the Fall of 2020. As described in a previous manuscript, most of our sample (84%) reported that they or another adult in their household had been responsible for teaching or instructing their child since the pandemic began.\textsuperscript{15} Having to provide full-time education to young children without the support of a school system or reliable child care while also trying to balance work or secure new employment has been reported as a time-management challenge for many parents.\textsuperscript{25} The instability in the broader food environment coupled with unprecedented economic and time pressures were significant constraints to parents’ food acquisition and children’s eating behaviors,\textsuperscript{6–8} and our findings suggest this continued past the acute effects of the initial pandemic closures into October of 2020 when this study took place.

Food-insecure families reported more frequent meals away from home, and less frequent homecooked meals than food-secure families, which mirrors results from quantitative and qualitative studies that took place from March, 2020 through May, 2020.\textsuperscript{6–10} Previous studies have highlighted the unique factors associated with purchasing food away from home before the pandemic, such as variable work schedules, time pressures, food environments, and psychological stressors, that differentially impact households experiencing food insecurity, and our results suggest these factors may have been exacerbated by COVID-19 related challenges (eg, permanent and temporary job loss, changing jobs, reduced work hours for some, and increased work hours for others).\textsuperscript{24–26} A large portion (69%) of this study population reported they were food insecure between August and October of 2020, suggesting that many families continued to experience food insecurity after stay-at-home orders ended and most food retail operations had reopened. The 2-item screener in this study focused on food affordability; parents’ worries about money and food running out before there were funds to buy more. Researchers have identified other potential predictors of food insecurity and meal choices in the Spring of 2020, such as participants experiencing discrimination, lack of COVID-19 safety enforcement by local retailers, increased food prices, challenges with locating food pantries, limited store hours, store closures, and stores not having the products families wanted to eat.\textsuperscript{27,28} It is possible that parents who reported food insecurity in our study also reported eating restaurant meals more frequently as their families’ preferred foods were unavailable or too expensive at their local grocer.

Our study and findings have limitations. Although we can infer directionality because of the time frames included in the questions (eg, since the COVID-19 pandemic began and in the past 2 months), these data were collected at 1 point in time and therefore cannot discern a temporal pathway between food insecurity and food acquisition behaviors or

| Food Acquisition and Eating Behaviors | Food Secure | Food Insecure | \(\chi^2\) | \(P\) |
|--------------------------------------|-------------|--------------|-----------|------|
| In-person grocery shopping           | 139 (48)    | 57 (18)      | 16.93     | 0.001|
| Online grocery shopping              | 343 (49)    | 90 (20)      | 40.52     | <0.001|
| Farmers market                       | 156 (23)    | 35 (11)      | 33.20     | <0.001|
| Farm share use                       | 156 (23)    | 35 (11)      | 60.49     | <0.001|
| COVID-19 indicates coronavirus disease 2019; NA, not applicable. | | | | |

\(^a\)Pearson’s chi-squared test of independence; \(^b\)\(P\) < 0.01 to reduce the risk of type 1 error.

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| Online grocery shopping              | 343 (49)    | 90 (20)      | 40.52     | <0.001|
| Farmers market                       | 156 (23)    | 35 (11)      | 33.20     | <0.001|
| Farm share use                       | 156 (23)    | 35 (11)      | 60.49     | <0.001|
| COVID-19 indicates coronavirus disease 2019; NA, not applicable. | | | | |

\(^a\)Pearson’s chi-squared test of independence; \(^b\)\(P\) < 0.01 to reduce the risk of type 1 error.

Table 2. Parents’ Food Acquisition Behaviors and Family Eating Behaviors Since the Start of the COVID-19 Pandemic by Food Security Status.

\(^a\)Pearson’s chi-squared test of independence; \(^a\)\(P\) < 0.01 to reduce the risk of type 1 error.
employment changes and food insecurity. In addition, using an online-only survey excludes individuals without consistent access to the internet. Currently, about 80% of households with an income < $50,000 have access to the internet; however, there are persistent gaps in the quality of service, especially in low-income neighborhoods. Furthermore, although our sample skews slightly higher income, 44% of study participants had a household income < $75,000, which is near to the US median income of $67,521 at the time of the survey and sampling weights were applied to all analyses to make our findings more generalizable to the US population of parents as a whole.

Another limitation of the present study is the lack of data on the nutritional quality of meals cooked at home and consumed in restaurants;
however, we can deduce some patterns based on prior literature. Previous research suggests that consuming fast-food and full-service restaurant meals more frequently are associated with poorer nutritional quality and higher caloric intake than more frequent consumption of meals cooked at home.\textsuperscript{31−33} Although consumption of food away from home remains high among all income levels, sociodemographic disparities have been reported in the nutritional quality of food away from home, such that people with lower income tend to consume foods away from home that are more calorically dense and lacking in essential nutrients than people who are financially secure.\textsuperscript{33,34} These disparities likely

Table 5. Household Food Insecurity, Sociodemographics, and Frequency of Children’s Restaurant Delivery (n = 1,000)

| Predictor               | Univariate Regression | Multiple Regression | Multiple Regression |
|-------------------------|-----------------------|---------------------|---------------------|
|                         | Simple Associations   | Model One (All)     | Final Model (P ≤ 0.01) |
| Retail restrictions     | B SE P                | B SE P              | B SE P              |
| Take-out only           | 0.036 0.032 0.251     | −0.023 0.031 0.460  | −         |
| Sociodemographics       |                       |                     |                     |
| Employment status       | 0.174 0.031 < 0.001   | 0.029 0.035 0.410   | −         |
| Marital status          | −0.112 0.031 < 0.001  | −0.019 0.033 0.564  | −         |
| Education               | 0.240 0.031 < 0.001   | 0.153 0.040 < 0.001 | 0.154 0.038 < 0.001 |
| Household income        | 0.237 0.031 < 0.001   | 0.140 0.042 0.001   | 0.148 0.038 < 0.001 |
| Asian race              | −0.112 0.031 < 0.001  | −0.103 0.031 0.001  | −0.111 0.030 < 0.001 |
| Black race              | 0.038 0.032 0.230     | 0.068 0.032 0.034   | −         |
| Hispanic/Latinx         | −0.053 0.032 0.095    | −0.021 0.032 0.527  | −         |
| Food insecurity         | 0.103 0.031 0.001     | 0.128 0.031 < 0.001 | 0.130 0.030 < 0.001 |

2 0.10 (P < 0.001) 0.09 (P = 0.02)

Note: The first column provides univariate (eg, simple) associations between the indicated variable and the outcome. Column 2 is the multivariate linear regression model with food insecurity and all sociodemographics predicting the outcome. Column 3 is the final model, which removes independent variables using backward deletion. Alpha for deletion was set at P < 0.01, such that predictors with P > 0.01 were removed from the final model to reduce the risk of type 1 error.

Table 6. Household Food Insecurity, Sociodemographics, and Frequency of Children’s Restaurant Take-out (n = 1,000)

| Predictor               | Univariate Regression | Multiple Regression | Multiple Regression |
|-------------------------|-----------------------|---------------------|---------------------|
|                         | Simple Associations   | Model One (All)     | Final Model (P ≤ 0.01) |
| Retail restrictions     | B SE P                | B SE P              | B SE P              |
| Take-out only           | 0.004 0.032 0.912     | −0.026 0.032 0.411  | −         |
| Sociodemographics       |                       |                     |                     |
| Employment status       | 0.074 0.032 0.019     | −0.050 0.036 0.163  | −         |
| Marital status          | −0.108 0.031 0.001    | −0.033 0.034 0.336  | −         |
| Education               | 0.192 0.031 < 0.001   | 0.124 0.041 0.003   | 0.109 0.039 0.005  |
| Household income        | 0.202 0.031 < 0.001   | 0.146 0.043 0.001   | 0.134 0.039 0.001  |
| Asian race              | −0.083 0.032 0.008    | −0.077 0.032 0.017  | −         |
| Black race              | 0.027 0.032 0.395     | 0.062 0.033 0.060   | −         |
| Hispanic/Latinx         | −0.052 0.032 0.100    | −0.012 0.033 0.714  | −         |
| Food insecurity         | −0.011 0.032 0.721    | 0.020 0.032 0.535   | −         |

2 0.05 (P < 0.001) 0.05 (P = 0.01)

Note: The first column provides univariate (eg, simple) associations between the indicated variable and the outcome. Column 2 is the multivariate linear regression model with food insecurity and all sociodemographics predicting the outcome. Column 3 is the final model, which removes independent variables using backward deletion. Alpha for deletion was set at P < 0.01, such that predictors with P > 0.01 were removed from the final model to reduce the risk of type 1 error.
stem from systemic differences in the nutritional quality of the foods and beverages promised and available for purchase at restaurants in under-resourced communities.35

Our results suggest that experiencing food insecurity within the past 2 months was modestly associated with parents’ food purchases and children’s eating behaviors in our sample. Our understanding of food insecurity in the aftermath of the pandemic would benefit from additional qualitative research and more nuanced quantitative questions exploring different dimensions of food security and how those experiences may interact with other social and behavioral determinants of health to influence food acquisition dietary quality over time.

**IMPLICATIONS FOR RESEARCH AND PRACTICE**

There are a number of avenues to explore to reduce the burden of food insecurity and support parents in identifying and procuring affordable, nutritious food for their families throughout the pandemic. Given that income and food insecurity are associated with the quality of food consumed away from home, instead of restricting access to an important food source, future work could explore how to improve the quality of low-cost restaurant meals and convenience foods by implementing national sodium and sugar reduction initiatives.36 Nutrition practitioners and researchers could also partner with restaurants to make balanced choices more accessible by providing healthier side dishes, replacing sugar-sweetened beverages, and serving appropriately sized meals on children’s menus.

Policymakers could also prioritize funds for programs that mitigate food insecurity and promote family health, such as financial assistance with food security programs, free or low-cost transportation to food retailers, and financial support for online grocery delivery costs.8 In a recent study, extra cash assistance for those unemployed because of COVID-19 had a protective effect against hunger for some, with those who received larger unemployment benefits reporting lower rates of food insecurity during the pandemic.37 Educators and practitioners could also explore how to make online grocery shopping, farmers’ markets, farm shares, and homecooked meals accessible to more people experiencing food insecurity. Practitioners could also consider implementing a 2-item food insecurity screener and food assistance referral program into their practice.38 Routine food insecurity screening and follow-up referral phone calls, emails, or fact sheets may help parents identify supplementary resources and new locations to acquire food.38 The US Department of Agriculture has multiple pilot programs underway that allow people to use government benefits for online grocery shopping.39 In addition, the US Department of Agriculture has

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**Table 7. Suggested Strategies for Helping Parents Experiencing Food Insecurity Procure Nutritious Food**

| Increase Alternative Food Retail Outlets and Access | Increase Financial Assistance Programs and Financial Incentives | Improve the Nutritional Quality of Quick and Affordable Foods |
|-----------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|
| Increase access to alternative food retailers: online grocery shopping, farmers’ markets, mobile markets, and farm shares8 | Provide financial incentives for online grocery delivery costs or free grocery delivery for those using or eligible for food assistance programs (eg, WIC, SNAP)8 | Enact policy changes that improve the nutritional quality of restaurant meals, preprepared meals, and convenience foods (eg, lobby for policies that require the reformulation of ingredients and nutritional standards)35 |
| Promote alternative food retail outlets and food assistance programs (eg, Increase promotion of Double Up Food Bucks and online grocery shopping with no delivery costs for SNAP and WIC recipients)8 | Continue increased cash assistance payments (eg, WIC, SNAP, TANF)8 | Study food retail interventions that improve the nutritional quality of restaurant meals, preprepared meals, and convenience foods (eg, partner with restaurateurs to reformulate ingredients, promote healthier menu choices, provide sugar-sweetened beverage alternatives)36,44 |
| Provide financial incentives for transportation to the grocery store8 | Invest in alternative financial assistance programs, such as community mutual aid35 | SNAP indicates Supplemental Nutrition Assistance Program; TANF, Temporary Assistance for Needy Families; WIC, Special Supplementation Nutrition Program for Women, Infants, and Children. |

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funded Double Up Food Bucks since 2009, a program that allows Supplemental Nutrition Assistance Program and Special Supplementation Nutrition Program for Women, Infants, and Children recipients to double their benefits if purchasing fruits and vegetables at a farmers market or participating grocery store. Although these programs are available and have benefited participants, there are still millions of benefit recipients unable to participate or unaware of their eligibility.41

Nutrition educators to promote and adapt these programs to reach more food-insecure families. Nutrition educators could create maps of local retailers in which people can use Double Up Food Bucks, teach clients how to use online grocery platforms to identify which nutritious products are available using their benefits, and assist clients with setting up grocery delivery using Supplemental Nutrition Assistance Program and Special Supplementation Nutrition Program for Women, Infants, and Children benefits online. Table 7 summarizes some strategies outlined herein that may help parents reliably procure nutritious food for their families.

Our findings support an association between food insecurity, COVID-19-related employment changes, parent food acquisition behaviors, and children’s consumption of home-cooked and restaurant meals. The high rates of food insecurity throughout the COVID-19 pandemic and the potential association between food insecurity and restaurant consumption identified in our study could be explored in conjunction with contextual factors other research groups have identified (eg, store closures, shortages of preferred foods, etc). This would help inform the best paths forward for alleviating food insecurity and encouraging healthy eating. The associations could be confirmed and further explored in longitudinal and quasi-experimental studies and contextualized with qualitative studies. If we aim to alleviate hunger and improve child health, it is a priority to find and fund solutions that help parents reliably secure affordable, nutritious foods for their families, particularly during unique periods in which food insecurity is extremely high.

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