ORIGINAL ARTICLE

Addressing hunger among households with children utilizing food assistance resources: an analysis of food pantry users

Jacqueline Hicks[1] · Eva Nelson[2] · Elizabeth Rhoads[1] · Alyson Codner[2] · Lok Hang Kristina Keung[1] · Jemima Mascary[1] · Jacey A. Greece[2]

Abstract

Aim Households with children have higher rates of food insecurity compared to households without children. Financial instabilities, including job loss, decreased income, and family structure changes are food insecurity risk factors. During the COVID-19 pandemic, programs were implemented to alleviate the impacts on food insecurity, but those expanded benefits were decreased in March 2023, leaving many families with economic burden.

Subject and methods This study used a cross-sectional survey administered to food pantry users across ten food pantries in Eastern Massachusetts from June to August 2018, with 279 users reporting at least one child in the household. The outcome, hunger, was assessed using a modified version of the Household Hunger Scale. Households were categorized (one child, two children, or three or more children). Mixed-effects logistic regression models assessed the relationship between hunger categories and number of children in the household.

Results This study found that having more children in the household increases the severity of hunger. Households with at least three children had 1.46 times the odds (95% CI: 1.08, 1.97) of moderate hunger and 1.85 times the odds (95% CI: 1.11, 3.07) of severe hunger compared to one-child households. Severe hunger was associated with monthly household income, with higher incomes having a protective effect for severe hunger.

Conclusion Programs and policies addressing food insecurity are critical for supporting households with children already accessing supports, so removal of benefits may impact food insecurity. A multi-pronged approach including government-funded benefits and food pantry services is most effective in alleviating food insecurity.

Significance Previous studies show that food insecurity increases with more children in the household compared to households without children, but focus less on populations already utilizing food assistance programs such as food pantries. This study examines hunger in households with children who are already at risk for food insecurity and receive food pantry services. Studying this population is essential given the recent decision by the US government to remove expanded COVID-19 benefits addressing food insecurity. Households with children experiencing food insecurity now depend upon those benefits and will be affected by their removal. These study findings can inform future resource allocation.

Keywords Hunger · Children · Food pantry · Food insecurity · Charitable food assistance

✉ Jacey A. Greece
jabloom@bu.edu

1 Department of Biostatistics, Boston University School of Public Health, 801 Massachusetts Avenue, 3rd Floor, Boston, MA 02118, USA

2 Department of Community Health Sciences, Boston University School of Public Health, 801 Massachusetts Avenue, 4th Floor, Boston, MA 02118, USA

Introduction

Recent data indicates that households with children have higher rates of food insecurity (12.5%), compared to households without children (9.4%) (Fitzpatrick et al. 2023; USDA Definitions of Food Security 2022), highlighting the need for additional examination of programs and policies that address hunger among children (Fitzpatrick et al. 2023). Hunger is an individual-level physiological condition that may result from food insecurity (USDA Definitions of Food Security 2022). In 2021, 10.2% of households in the US were food-insecure,

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which is a household-level economic and social condition resulting from limited or inadequate access to food (USDA Key Statistics and Graphs 2023b; USDA Definitions of Food Security 2022). Food insecurity disproportionately affects certain demographics in the USA including households with children, single-parent households, non-Hispanic Black households, and low-income households (Altman et al. 2022; Orihuela et al. 2023; Ullman et al. 2022).

Food insecurity causes lower consumption of fruits and vegetables, inadequate access to nutritious foods, and lower overall food intake (Marshall et al. 2022), resulting in disadvantageous diets. A nutritionally balanced diet is especially important for children's health, wellbeing and development (Eicher-Miller et al. 2023). Compared to children who are food-secure, experiencing food insecurity as a child can lead to chronic illnesses and poor health, including diabetes, obesity, asthma, and iron deficiency throughout the life course (Eicher-Miller et al. 2023; Denney et al. 2020; Insolera 2023; Morales et al. 2023). Childhood food insecurity can lead to poor mental health, challenges with academic performance, and behavioral issues (Azhar et al. 2023; Marshall et al. 2022; Orihuela et al. 2023). Developing healthy eating habits at an early age is critical for development; however, when financial constraints hinder a child's access to nutritious foods, this can negatively impact the child throughout their life (Eicher-Miller et al. 2023; Marshall et al. 2022). Policies and programs addressing these health disparities, particularly in households with children, offer a variety of nutritious foods in accordance with the U.S. Department of Agriculture (USDA) guidelines. This provides households that otherwise would not have access to affordable, healthy foods with the opportunity to obtain them.

The percentage of children living in food-insecure households increases with the number of children in the household (Azhar et al. 2023; Ullman et al. 2022). In 2019 and 2020, children in households with fewer than three children were less likely to experience food insecurity (9.4%), compared to households with three or more children (13.0%) (Ullman et al. 2022). Food insecurity among children is highest in non-Hispanic Black (18.8%) and Hispanic (15.7%) households, compared to non-Hispanic White households (6.5%) (Altman et al. 2022; Azhar et al. 2023; Ullman et al. 2022). Household composition also impacts food insecurity; children living in a household with one parent are more likely to experience food insecurity (19.9%) compared to households with other family structures, including two-parent households or households with three or more adults (7.7%) (Ullman et al. 2022). Accordingly, national safety net programs based on eligibility status (defined by income level) prioritize resources for households without dual parent income and other child support.

Financial instabilities, including job loss, lower income, and changes in family structure (Leete and Bania 2010), are other risk factors for food insecurity and poor dietary quality (Eicher-Miller et al. 2023; Denney et al. 2020). Even if people are aware of the components of a healthy diet, low income can still result in inadequate food access (Eicher-Miller et al. 2023) and difficulty affording a balanced diet (Despard et al. 2020).

Recognizing that the COVID-19 pandemic exacerbated economic hardships, the government expanded access to safety net programs during this time including Emergency Allotments (EA) (CBPP 2023a b) and expansion of the Supplemental Nutrition Assistance Program (SNAP) (Mande and Flaherty 2023). However, in early 2023, state and federal governments removed these resources with limited advanced warning for those utilizing benefits (Azhar et al. 2023; Sullivan 2023), resulting in difficulty accessing healthy foods (CBPP 2023a, b).

There are various US food assistance programs on the local, state, and national levels to address food insecurity among demographics most impacted. Administered by the USDA, SNAP is the largest federal nutrition program providing financial assistance to low-income individuals and households (SNAP 2018) based on monthly income and household size (CBPP 2023a, b). SNAP has been proven successful and sustainable when accessible to those who need it (Azhar et al. 2023; Keith-Jennings et al. 2019; Marshall et al. 2022), with studies showing a relationship between SNAP participation and reduced spending on health care, fewer missed school days due to illness, and families not having to choose between food and other basic necessities such as housing, electricity, and healthcare (Keith-Jennings et al. 2019; Mande and Flaherty 2023). Children enrolled in SNAP have better health outcomes, such as being less likely to be underweight, reduced low-birth weight in newborns, and lower risk of adulthood obesity and heart disease compared to those who were eligible but not enrolled (Keith-Jennings et al. 2019; Mande and Flaherty 2023).

In addition, the Women, Infants, and Children (WIC) program provides nutritious foods, education, and health screenings for pregnant women, infants, and children under 5 years old (Food Assistance 2023). Free or reduced-price breakfasts, lunches, or snacks at school or during the summer also help children experiencing food insecurity (USDA SFSP 2021). The National School Lunch Program (NSLP) and School Breakfast Program (SBP) provide nutritionally balanced, low-cost or free meals to students during each school day (USDA NSLP 2017; USDA SBP 2017). While less well-attended, the Summer Food Service Program (SFSP) is offered in under-resourced, low-income areas to supplement food access when school is not in session (USDA SFSP 2021). These programs, aimed to alleviate food insecurity among school-aged children, improve dietary quality and reduce childhood obesity, infant mortality, and healthcare costs (Mande and Flaherty 2023).

Governmental programs are often underutilized depending on accessibility (Fong et al. 2016); however, to fill this gap, local soup kitchens, food pantries, and homeless shelters provide additional support. Food pantries are organizations that provide cooked food and/or groceries to their clients, who are individuals or households experiencing food insecurity (Bryant and Follett 2022). In 2020, approximately one in four US households experiencing food insecurity reported using food pantry services and food banks, which stock the pantries (Jia et al. 2023).

The US avoided an increase in food insecurity during the pandemic in part by food pantries providing support and the government expanding SNAP benefits and other federal programs (Feeding America 2021; CBPP 2023a, b). Despite the demonstrated efficacy of EA, the government announced in February 2023 that this financial assistance would end the following month (Azhar et al. 2023; CBPP 2023a, b). Between the reduction in services and the short notice given to SNAP beneficiaries, food hardship is expected to increase as a result (CBPP 2023a, b) and disproportionately affect certain populations. Because emergency food assistance programs support non-Hispanic Black and Hispanic households the most, these populations are at even greater risk for food insecurity as the emergency assistance is reduced (Azhar et al. 2023; Urban Institute 2022).

Due to long-term impacts of food insecurity on children, intervening during childhood leads to healthier populations. While local and national programs and policies are in place to increase access to healthy food, it is essential to understand the determinants of food insecurity among households with children, so limited resources can be better utilized to support those in need and to tailor interventions to address health disparities.

To that end, this study examines hunger in households with children that utilize food pantries in Eastern Massachusetts. Focusing on food pantry users permits investigation into a population already experiencing food insecurity and utilizing services and programs to address it, and already at risk. Additionally, understanding hunger among households with children, especially given the recent reduction of federal and state food assistance programs and benefits (Fitzpatrick et al. 2023), which has placed a greater burden on other resources, such as food pantries (Zack et al. 2021), can inform resource allocation efforts in the future.

Methods

Study sample and data collection

A cross-sectional survey was administered to food pantry users who visited one of the ten food pantries in partnership with The Greater Boston Food Bank (GBFB) across Eastern Massachusetts from June 2018 through August 2018. Pantries that served at least 1,000 people per month in 2017 were selected, but participation across pantries differed greatly. Food pantry clients who visited a selected pantry site were eligible for the study if they 1) were at least 18 years old or older, 2) were physically and mentally capable of completing the survey, 3) spoke English or Spanish, and 4) were not planning on moving within the next 3 months. 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 Institutional Review Board (study #H-37567). Participants provided informed consent per the Institutional Review Board-approved protocol for human subjects research.

Verbal informed consent was obtained from all subjects, and was formally recorded with 825 eligible participants agreeing to participate in the study. To compensate them for their time, each participant was given a $10 gift card. The 15-minute survey was either interviewer-administered or self-administered on a tablet, based on the individual's preference, and included questions on demographics, household characteristics, use of food-assistance programs, household economic hardship, and hunger (Codner et al. 2023). Only participants who indicated they had at least one child in their household ($n=279$) were included in the final analytic sample.

Measures

The hunger outcome was assessed using a modified version of the validated Household Hunger Scale (HHS), which has been used in cross-cultural settings for the monitoring and evaluation of hunger and among high-need populations in the US (Ballard et al. 2011; Deitchler et al. 2010, 2011; Coates et al. 2007; Weiser et al. 2009) and is therefore appropriate to administer to food pantry clients who represent a high need population of diverse cultural backgrounds with known food insecurity. The HHS is a shortened version of the Household Food Insecurity Access Scale, and provides a means of measuring hunger quickly in food pantries, which are often time-constrained, fast-paced environments. Per HHS protocol, a hunger indicator score was created by summing the scores of the three questions on the HHS (Ballard et al. 2011; Deitchler et al. 2010, 2011; Coates et al. 2007). The hunger indicator score was further categorized into an ordinal outcome as: little to no hunger in the household (score = 0–1), moderate hunger in the household (score = 2–3), and severe hunger in the household (score = 4–6) (Ballard et al. 2011; Codner et al. 2023; Deitchler et al. 2010, 2011; Coates et al. 2007).

The sociodemographic variables examined were age, gender, working status, after-tax household monthly income, number of children in the household, use of

school food assistance programs in the past 30 days, and SNAP use in the past 30 days. Working status was categorized as full-time (≥ 35 hours per week), part-time (< 35 hours per week), and not working, which included unemployed, homemaker, retired, disabled, and other. After-tax household monthly income was based on the following categories: $2000 or more, $1500 to $1999, $1000 to $1499, $500 to $999, and less than $500. Due to small sample sizes for the income categories $2000 to $2499 ($n = 27$, 8.7%), $2000 to $2999 ($n = 9$, 2.9%), and $3000 or more ($n = 15$, 4.9%) were combined into the category $2000 or more. The number of children less than 18 years old in the household was recategorized from a continuous variable into a categorical variable indicating one (39.8%), two (31.5%), and three or more (28.7%) children in the household. Since only 11 households (3.9%) had five or more children, the threshold was determined to be three or more children, in order to have evenly distributed categories as well as align with previous research examining three or more children in the household (Ullman et al. 2022). The binary school food assistance use variable was created using self-reported participation indicated on the survey in response to the question how the household obtained food in the past 30 days, with participants reporting obtaining food for children in at least one of the following programs: "free or reduced-price breakfasts at school"; "free or reduced-price lunches at school"; "backpack food program"; and/or "participation in after-school meal or snack program".

Data analysis

Frequencies and percentages are presented for categorical variables and means and standard deviations for continuous variables. Pearson's chi-square and Fisher's exact tests were used to examine associations between baseline characteristics and hunger. Logistic mixed-effects models were used, given that demographics of pantry users differed greatly by food-pantry site, specifically by educational attainment, race, and age. These models were adjusted for food-pantry site as a random effect, while all other covariates were controlled for as fixed effects. The distribution of variables was examined across all missing data patterns to diagnose the missing data mechanism. No relationship was found between the absence of the data and the values, indicating that the data were missing completely at random (MCAR). The analytic sample represents participants who gave responses to all questions under investigation. P-values were considered statistically significant at an alpha level of 0.05. All analyses were performed using SAS® software version 9.4 (SAS Institute Inc., Cary, NC, USA).

Results

Participant characteristics

Of the 279 participants, the average age of participants was 44 years old [STD (standard deviation) = 11.82], with 26.67% aged 30–39 and 26.52% aged 40–49. Most food-pantry clients were female (83.51%), and the largest group had exactly one child in the household (39.78%). Approximately half (54.48%) did not work, while 21.15% worked full time (≥ 35 hours per week) and 24.37% worked part-time (< 35 hours per week). Participant monthly income was roughly evenly distributed across all income categories, with the highest frequency income category being $500 to $999 per month (26.88%). More than half of participants were enrolled in SNAP (58.06%) and used food school programs (57.71%). Roughly half (55.91%) experienced little to no hunger, 24.37% experienced moderated hunger, and 19.71% experienced severe hunger (Table 1). There were 111 households with one child in the house and of those, 64 (57.7%) had little to no hunger, 26 (23.4%) had moderate, and 21 (18.9%) had severe hunger. Of the 88 households with two children, 51 (57.9%) had little to no hunger, 24 (27.3%) had moderate, and 13 (14.8%) had severe hunger. Finally, of the 80 households with three or more children, 41 (51.3%) had little to no hunger, 18 (22.5%) had moderate, and 21 (26.3%) had severe hunger.

Adjusted mixed-effect models

Logistic mixed-effect models adjusting for covariates are shown in Table 2. Several variables were associated with only moderate hunger, including gender and working status. Females have 2.49 (95% CI = 1.13, 5.48) times the odds of having moderate hunger compared to males, after adjusting for using school food-assistance programs, number of children, SNAP eligibility, occupation, income, and age. Those who work part-time have 0.52 (95% CI = 0.28, 0.97) times the odds of having moderate hunger compared to those who do not work. Although not significant, participation in SNAP and school food assistance programs was shown to be largely protective, indicating that these programs help reduce hunger for those who are already utilizing food-assistance programs.

Severe hunger was associated with monthly household income. Those who have a monthly income of more than $2000 have 0.42 times the odds of severe hunger (95% CI: 0.17, 0.99) compared to those who have a monthly income of less than $500 a month. A household making $2000 or more a month was found to be significantly protective against severe hunger but not moderate hunger. We

Table 1 Hunger study participant characteristics by hunger level, food pantry users in ten food pantries in Eastern Massachusetts, June 2018–August 2018, $n = 279$ [a]

	Overall N = 279	Little to no hunger N = 156	Moderate hunger N = 68	Severe hunger N = 55	
Variable	N (%)	N (%)	N (%)	N (%)	P
Age [mean (STD)]	43.57 (11.8)				
18 to < 30	32 (11.47)	14 (8.97)	11 (16.18)	7 (12.73)	0.35
30 to < 40	80 (26.67)	52 (33.33)	16 (23.53)	12 (21.82)	
40 to < 50	74 (26.52)	39 (25.00)	16 (23.53)	19 (34.55)	
50 to < 60	65 (23.30)	38 (24.36)	14 (20.59)	13 (23.64)	
60 to < 65	17 (6.09)	9 (5.77)	6 (8.82)	2 (3.64)	
65 and older	11 (3.94)	4 (2.56)	5 (7.35)	2 (3.64)	
Gender					0.14
Male	46 (16.49)	29 (18.59)	6 (8.82)	11 (20.00)	
Female	233 (83.51)	127 (81.41)	62 (91.18)	44 (80.00)	
Work status					0.11
Full-time (≥ 35 h)	59 (21.15)	42 (26.92)	9 (13.24)	8 (14.55)	
Part-time (< 35 h)	68 (24.37)	34 (21.79)	20 (29.41)	14 (25.45)	
Not working	152 (54.48)	80 (51.28)	39 (57.35)	33 (60.00)	
Monthly household income					0.23
$2,000 or more	45 (16.13)	31 (19.87)	8 (11.76)	6 (10.91)	
$1500 to $1999	48 (17.20)	31 (19.87)	8 (11.76)	9 (16.36)	
$1000 to $1499	59 (21.15)	32 (20.51)	13 (19.12)	14 (25.45)	
$500 to $999	75 (26.88)	35 (22.44)	26 (38.24)	14 (25.45)	
Less than $500	52 (18.64)	27 (17.31)	13 (19.12)	12 (21.82)	
Number of children in household					0.44
1	111 (39.78)	64 (41.03)	26 (38.24)	21 (38.18)	
2	88 (31.54)	51 (32.69)	24 (35.29)	13 (23.64)	
≥ 3	80 (28.67)	41 (26.28)	18 (26.47)	21 (38.18)	
School food assistance use in the past 30 days	161 (57.71)	92 (58.97)	36 (52.94)	33 (60.00)	0.65
SNAP school food assistance use in the past 30 days	162 (58.06)	90 (57.69)	45 (66.18)	27 (49.09)	0.16

[a] Analyses were conducted using frequencies and Pearson's chi-square statistical test significance = 0.05 indicated by an [*]. Hunger categories were defined as little to no hunger in the household (HHS score = 0–1), moderate hunger in the household (HHS score = 2–3), and severe hunger in the household (HHS score = 4–6) according to the HHS score

observed that as monthly income increased, the odds of severe hunger decreased. Working part-time (< 35 hours a week) is protective against moderate hunger, as working part-time had 0.52 times the odds of moderate hunger (95% CI: 0.28, 0.97) compared to not working.

Pantry users who had at least three children in the household had 1.46 times the odds of moderate hunger (95% CI: 1.08, 1.97) compared to those with only one child. This association was attenuated for severe hunger, with OR = 1.85 (95% CI: 1.11, 3.07). Having three or more children significantly increases the odds of both moderate and severe hunger. Neither moderate nor severe hunger had a statistically significant association with school food-assistance use or SNAP assistance use in the past 30 days.

Discussion

This study aimed to understand how hunger specifically impacts families who already need services addressing food insecurity, to inform future intervention efforts. The analysis showed that food pantry users with three or more children in the household had higher odds of moderate hunger compared to one child, which is consistent with other studies showing that food insecurity increases with more children in the household (Azhar et al. 2023; Ullman et al. 2022). Additionally, the finding that monthly household income was significantly associated with severe hunger is consistent with other studies showing that income is

Table 2 Adjusted mixed effects models assessing associations between characteristics and ordinal hunger in food pantry users in ten pantries in Eastern Massachusetts, $n = 279$ [b]

Variable	Moderate hunger vs little to no hunger		Severe hunger vs little to no hunger	
	Odds ratio (95% CI)	P	Odds ratio (95% CI)	P
Age	1.01 (0.99, 1.04)	0.37	0.99 (0.97, 1.03)	0.90
Gender				
Male	Ref		Ref	
Female	2.49 (1.13, 5.48)	0.02[*]	0.93 (0.56, 1.53)	0.77
Work status				
Full-time (≥ 35 h)	1.23 (0.57, 2.65)	0.59	0.45 (0.19, 1.06)	0.07
Part-time (< 35 h)	0.52 (0.28, 0.97)	0.04	0.91 (0.42, 1.97)	0.80
Not working	Ref		Ref	
Monthly household income				
$2000 or more	0.72 (0.18, 2.94)	0.64	0.41 (0.17, 0.99)	0.047
$1500 to $1999	0.64 (0.35, 1.19)	0.16	0.74 (0.39, 1.40)	0.35
$1000 to $1499	0.62 (0.24, 1.57)	0.31	1.10 (0.45, 2.68)	0.84
$500 to $999	1.51 (0.80, 2.87)	0.21	1.03 (0.44, 2.41)	0.94
Less than $500	Ref		Ref	
Number of children in household				
1	Ref		Ref	
2	1.34 (0.46, 3.90)	0.59	0.84 (0.38, 1.85)	0.67
≥ 3	1.46 (1.08, 1.97)	0.01[*]	1.85 (1.11, 3.07)	0.02[*]
School food assistance use in the past 30 days	0.70 (0.33, 1.46)	0.34	0.88 (0.44, 1.78)	0.73
SNAP school food assistance use in the past 30 days	1.10 (0.41, 2.89)	0.85	0.44 (0.15, 1.30)	0.14

[b] Analyses were conducted using frequencies and Pearson's chi-square statistical test significance = 0.05, indicated by an [*]. Hunger categories were defined as little to no hunger in the household (HHS score = 0–1), moderate hunger in the household (HHS score = 2–3), and severe hunger in the household (HHS score = 4–6) according to the HHS score. Age categories were created based on pre-established age definitions from the US Census. Income categories were created based on open-ended responses for annual/monthly income. Number of children in the household size categories was created based on the open-ended responses of number of people in household less than 18 years of age

a risk factor for food insecurity (Eicher-Miller et al. 2023; Denney et al. 2020; Leete and Bania 2010).

Food insecurity decreased among households with children in 2021, mainly due to the efficacy of the expansion of food assistance programs implemented by the government (Hales and Coleman-Jensen 2022). In March 2020, the federal government enacted Emergency Allotments (EA), which increased SNAP benefits and kept 4.2 million Americans out of poverty during the COVID-19 pandemic (CBPP 2023a, b). As of March 2023, the government ended EA, reducing monthly SNAP benefits by on average $90 per person (CBPP 2023a, b; Sullivan 2023). Household composition and size determine how much money will be lost with the elimination of EA, and households with children will lose on average $223 monthly (CBPP 2023a, b). The 1-month notice prior to ending EA, recent reduction in food-assistance programs, and rising cost of food may cause increased food insecurity among SNAP recipients (Azhar et al. 2023; Sullivan 2023) many of them being households with children.

Although EA resulted from the pandemic, it is clear that additional assistance is essential to address food insecurity, particularly in households with school-aged children. Without programs and resources such as those provided by EA, food insecurity among households with children likely would have increased during the pandemic. Therefore, it is critical that the government and community-based organizations (CBO) continue to develop and implement policies and programs to ensure that the positive trend of reduction in food insecurity in households with children (Hales and Coleman-Jensen 2022) will continue in the future, with consideration that a combination of services will be most effective (Table 3; Zack et al. 2021).

Safety-net programs that have historically been useful during previous economic recessions should be maintained post-emergency and even expanded (Azhar et al. 2023). Based on the findings, this study highlights the need for additional comprehensive approaches to address hunger in children (Table 3). With the decision to end EA, clear communication is needed for households about how much benefit money they will lose, and indicating other ways they can acquire sufficient food (CBPP: SNAP Eligibility 2023; Table 3). While this study was conducted before the pandemic, the findings are applicable given that it examined a population that was already food-insecure and utilizing resources to obtain food. The pandemic exacerbated existing disparities in food insecurity, which will persist post-pandemic, particularly if emergency efforts are removed or if safety-net programs are not expanded. This is particularly problematic for households with children that are historically at a greater risk for food insecurity due to long-term negative health consequences (Fitzpatrick et al. 2023).

Due to the increased risk of food insecurity among households with children, programs that specifically support this demographic are essential (Azhar et al. 2023; Fitzpatrick et al. 2023). Schools are one setting to provide food for children experiencing food insecurity. NSLP and SBP are examples of programs that provide food for school-aged children, and WIC fills the gap for children who are too young for those school-based programs and their mothers (Table 3). When children were not physically in school

Table 3 Potential policy and program interventions to address determinants of food insecurity among households with children

Determinants of food insecurity among households with children	Study findings	Policy and program interventions
More children in household	When there are three or more children in the house, the odds of moderate and severe hunger is higher than for those with one child in the house. The same is true for households with two children	• School food benefits programs (free breakfast and lunch programs at school, summer meal programs) • Expansion of WIC benefits (Azhar et al. 2023) • Outreach toward households with one parent to increase awareness of programs and provide support with applying for benefits programs
Low income	As monthly income increased, the odds of severe hunger decreased	• Expansion of SNAP benefits (Azhar et al. 2023) • Outreach to ensure that households that are eligible for SNAP are aware and know how to apply for benefits (CBPP: SNAP Eligibility 2023)
Nutritionally unbalanced diet	60% of participants with severe hunger and 53% with moderate hunger reported using a school-based meal-assistance program	• Provide healthy meals at schools (Kinsey et al. 2020) • Food pantries provide nutritional meals for clients (Azhar et al. 2023)
Loss of food program benefits	58.06% of food pantry users at baseline use SNAP assistance programs	• Federal and state governments do not take away expanded food-benefit programs from COVID (Azhar et al. 2023) • Government provide funding to CBO and food pantries to support households that may have lost funding or are ineligible (Azhar et al. 2023) • Government, community-based organizations, food pantries, and other stakeholders provide clear communication about how to check how much funding the household will lose, referrals to other modes for getting food such as food pantries, and information about other programs people might be eligible for, such as WIC (CBPP 2023a, b) • Offering meals in school parking lots or along bus routes, distributing shelf-stable products, and providing food for adults in households (Kinsey et al. 2020)

during the pandemic, some programs found other ways to ensure children still had access, such as offering meals in school parking lots or along bus routes, distributing shelf-stable products, and providing food for adults in households (Kinsey et al. 2020).

While food pantries are an effective way to fill the gap in food coverage that government programs leave (Winkler et al. 2022), they are utilized by only one in four U.S. households experiencing food insecurity (Jia et al. 2023). Food pantries face challenges providing enough nutritious food for their clients, maintaining adequate staffing to run the food pantry, and keeping up with increasing demand for food (Azhar et al. 2023; Bazerghi et al. 2016; Morales et al. 2023). Food pantries are often underutilized due to lack of knowledge about their accessibility, long lines, stigma, and low-quality food (Fong et al. 2016). Accordingly, food pantries should focus on providing nutritional foods for their clients, recruiting volunteers, and applying for grants to support assistance efforts. To assist food pantries, federal and state governments should increase funding for CBOs to support them providing nutritious foods for clients (Azhar et al. 2023).

This study illustrates that the odds of hunger, both moderate and severe, increases with more children in the household, and that low monthly income is significantly associated with severe hunger among households with children. Understanding the associations between households with children and hunger severity can inform programs and policies that alleviate food insecurity. Investigations into other food sources such as bodegas, grocery stores, and farmer's markets could provide more information about participants' nutritional health and food quantity. Because participation in food-assistance programs, including government benefits and food pantries, has potential to be the most effective in reducing hunger for households with children, it is important to expand those types of interventions in the future.

Declarations

Ethics approval 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 Institutional Review Board (study #H-37567).

Consent to participate Participants provided informed consent per the Institutional Review Board-approved protocol for human subjects research.

Consent for publication Not applicable.

Conflicts of interest The authors declare that they have no conflict of interest.

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