The Use of Charitable Food Assistance Among Low-Income Households in the United States

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ABSTRACT

Background About 11% of US households are food insecure, and many of those households seek charitable food assistance (CFA). However, little is understood about the nutritional composition of the diets of households receiving CFA, or the relationship between CFA and Supplemental Nutrition Assistance Program (SNAP) usage among low-income households.

Objective The aim of the study was to compare the nutritional quality of foods obtained by CFA clients to those of similar nonclients. Furthermore, the study examined the timing of CFA use relative to the timing of SNAP use among CFA clients during the week.

Design/participants Analyses were conducted using 2012 US Department of Agriculture National Household Food Acquisition and Purchase Survey (FoodAPS), which collected data for 4826 households' food acquisitions during a 7-day survey week. Sixty-seven households reported using CFAs during the survey week.

Main outcomes measure The nutritional quality of food was measured by the ratios between food acquisition quantities and the US Department of Agriculture Thrifty Food Plan consumption recommendations. The date of SNAP use was compared with that of CFA use for CFA clients who were also SNAP recipients.

Statistical analyses performed Propensity score matching was utilized to construct a matching sample of CFA clients and nonclients. *T* tests were used to compare the means of variables.

Results CFA clients were more likely to be food insecure (48% vs 28%, *P* < .001) and less likely to have access to a car (61.2% vs 84.8%, *P* < .001) than CFA nonclients. CFAs represent an important source of foods for CFA clients, taking up 28% of their total food at home acquisitions. CFA clients obtained more nonstarchy vegetables than matched nonclients. Furthermore, among the 45% of CFA clients who also participated in SNAP, the majority (52.4%) of them used SNAP benefits within 10 days of SNAP benefits distribution while most (67.9%) of those households used CFAs starting on day 11 or later after SNAP benefits were allocated.

Conclusions CFAs provide a substantial portion of the diets of their clients and, in particular, for foods that constitute components of healthy diets. For the proportion of CFA clients who received SNAP, this study finds evidence that CFA clients relied more on CFAs when their SNAP benefits were likely to run low.
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ALMOST 50 MILLION PEOPLE ARE FOOD INSECURE IN the United States.[1] An extensive literature has emerged regarding the causes and consequences of food insecurity.[2,3] Both public and private food assistance programs serve as important mechanisms to tackle the problem of hunger and food insecurity in the United States. The majority of food assistance to the poor is provided by the public sector.[4] For example, Supplemental Nutrition Assistance Program (SNAP), National School Lunch Program (NSLP), School Breakfast Program (SBP), and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) served 40.0, 29.7, 14.7, and 6.9 million people, respectively, with benefits totaling 82 billion dollars in 2018.[5-7] These public food assistance programs have been shown to effectively reduce food insecurity.[8-10] The private sector also plays a valuable supplementary role in reducing food insecurity. Of particular note is Feeding America, the umbrella organization for food banks in the United States. These food banks provide food through agencies (primarily

food pantries) that supply groceries for clients to prepare and consume at home but they also include agencies giving food through other venues, such as soup kitchens, after-school snacks, home-delivered grocery/meals programs, and senior brown bags.[4] The Feeding America network is estimated to serve as many as 46.5 million people each year, or 1 in 7 people in the United States.[11]

Understanding the use of charitable food assistance (CFA) by low-income households is critical to designing effective antihunger programs. However, limited research analyzes this question. The existing studies on the characteristics and dietary quality of CFA clients utilize data from surveying clients at food pantries without a comparison group of observationally similar nonclients.[12-16] Moreover, these studies focus on foods obtained by CFA clients through CFAs, and limited information is available for foods acquired through other venues such as superstores, supermarkets, and convenience stores. Thus, it is difficult to compare the importance of different shopping locations for CFA users. Lastly, due to lack of data on both the timing of CFA use and SNAP benefits, existing research is limited in studying the relationship between private and public food assistance programs. In particular, for those who use both CFA and SNAP, it is interesting to explore whether households use the food assistance programs at the same time or in different periods. If CFAs and SNAP are used at the same time, then CFAs may exacerbate the "SNAP benefit cycle"—rapid depletion of SNAP benefits and lower intake of calories and food security toward the end of the month. On the contrary, if households use CFAs when SNAP benefits decline, it suggests CFAs are an important source of nutrition that complements the use of SNAP for households at risk for food insecurity.

This study fills gaps in this literature by using the 2012 US Department of Agriculture (USDA) National Household Food Acquisition and Purchase Survey (FoodAPS),[17] which collected comprehensive data of households' daily food purchases and acquisitions over a week for both CFA clients and nonclients. With these data, the nutritional quality of foods obtained by CFA clients and nonclients is compared based on a nationally representative sample of households. FoodAPS provides data on foods obtained from all venues including CFAs, supermarkets, small to medium stores (eg, convenience stores and corner groceries), and public food assistance programs, as well as the date of each food acquisition event. With information provided by the FoodAPS, the current study investigates the following objectives: (1) to compare the nutritional quality of foods between CFA clients and similar nonclients in a given week and (2) to examine the relationship between the timing of the use of SNAP and CFA by low-income households.

METHODS

Study Design and Population

The USDA FoodAPS was utilized to compare the nutritional quality of foods obtained by CFA clients and nonclients across different venues. FoodAPS is a nationally representative survey of American households that collected comprehensive data about household food purchases and acquisitions during a 7-day survey week from April 2012 to January 2013. The interview weeks were randomly selected by the FoodAPS team and equally distributed over the

RESEARCH SNAPSHOT

Research Questions: What is the nutritional quality of foods obtained by charitable food assistance (CFA) clients compared with those of similar nonclients in a given week? What is the relationship between the timing of use of CFA and the Supplemental Nutrition Assistance Program (SNAP) among CFA clients during the week?

Key Findings: CFAs provide a substantial portion of the diets of their clients and, in particular, for foods that constitute components of healthy diets. This is of particular importance since the use of CFAs rises when the use of SNAP benefits declines.

month. Detailed information was collected about foods purchased or otherwise acquired for consumption at home and away from home, including foods acquired through federal food and nutrition assistance programs, such as SNAP, WIC, NSLP, and SBP along with CFA programs like food pantries and soup kitchens. The FoodAPS included nationally representative data from 4826 households, including SNAP households, low-income households not participating in SNAP, and households ineligible for SNAP. Both SNAP households and low-income households not participating in SNAP were oversampled in FoodAPS.

The current study uses data from 4316 households. Out of the 4826 survey households in total, 510 households were dropped due to missing key matching variables or missing food at home quantity information. Because quantities of foods consumed away from home for each individual food group were not reported in the FoodAPS, only food-at-home (FAH) purchases/acquisition data were included.

CFA clients included households who had obtained foods from the CFA programs during the 7-day interview period. Correspondingly, CFA nonclients consist of households who had not used any kind of CFA programs during the survey period. As a result, 67 CFA clients and 4249 CFA nonclients were incorporated and analyzed in the study. Households who had used CFA in other weeks of the month but not in the interview week were not included in the group of CFA clients due to lack of information on what they obtained from CFAs in other times.

CFA clients and matched nonclients had a similar proportion of their foods excluded. On average, 23% and 29% of CFA clients' and matched nonclients' total calorie acquisition were from foods consumed away from home, respectively, and were omitted in the study ($P = .228$). In addition, 29% or 677 food items out of 2340 total FAH items obtained by CFA clients were excluded due to missing quantities. Similarly, 32% or 620 items out of 1927 total FAH items acquired by CFA nonclients were excluded due to the same reason. The food categories with most missing quantity information were similar between CFA clients and matched nonclients, which were variable weight items such as deli foods (eg, chicken legs and yeast bread) and produce (eg, mixed vegetables and cucumber).

FoodAPS also collected a wide array of sociodemographic variables of the households and household primary grocery shoppers including age, sex, race/ethnicity, education,

household size, income, food security status, access to vehicle, and primary stores for shopping. A waiver of consent from the Internal Review Board at University of Illinois at Urbana-Champaign was utilized to obtain the data.

Outcome Variables

The primary outcome variable of this study was the ratio between the USDA Thrifty Food Plan (TFP) recommended pounds of consumption and the actual pounds of foods obtained by the households for each food category. The TFP assigns weekly recommended consumption quantities of each food category based on the Dietary Guidelines for Americans and the My Pyramid Food Guidance System.[18] The TFP estimates the optimum consumption quantities that both satisfy the nutritional guidelines and achieve the minimum cost that accounts for food preferences and habits of low-income households. Due to the advantage of the TFP providing food recommendations that are nutritionally sufficient and economically feasible to low-income households, the largest public food assistance program, SNAP, uses the TFP as the basis to determine the benefits received by its program participants.[18] Because the TFP accounts for low-income households' food purchase preferences, cost of the diet, and nutritional content at the same time and is widely used in setting various government policies and in research,[19-23] the ratios of TFP served as the primary outcome variables to analyze the nutritional quality of food purchases/acquisition for low-income households. Specifically, there are different sets of TFP recommendations for 15 age-sex groups. The TFP recommended amount of consumption for a *household* is the sum of the TFP recommended consumption for each household member with different ages and sexes. The detailed weekly recommended pounds of foods purchased by different age-sex groups can be found in Table 5 of Carlson et al.[18]

The TFP food groups follow conventional definitions of each food group.[18] The 4 food groups with less transparent labels are defined as follows: the nonstarchy vegetables category incorporates dark-green vegetables, orange vegetables, canned and dry beans, lentils, and peas (legumes) and other vegetables but excludes all potato products such as potato chips and French fries. The milk products category includes whole milk yogurt and cream, lower-fat and skim milk, low-fat yogurt, all cheese, milk drinks, and milk desserts. The meat and beans category includes beef, pork, veal, lamb, game, chicken, turkey, game birds, fish, fish products, bacon, sausages, luncheon meats (including spreads), nuts, nut betters, seeds, eggs and egg mixtures. The sugar, sweets, and candies category incorporates all types of sugars, sweeteners, syrups; all types of candies and chocolates; and chewing gum.

To calculate the pounds obtained for each TFP food group, the FAH item data file was the primary data set utilized. The data file contains all information related to each FAH item acquired, combining information collected from scanners, food book, and receipts by each household member. Respondents were given a handheld scanner and were asked to scan each item acquired during the survey week. A barcode book was provided to each household to scan in items that did not have a Universal Product Code, such as

fresh produce, bulk foods, and deli items. Respondents were also asked to record the items that could not be scanned on the food book and attach the itemized receipt for each FAH event to the food book. The FoodAPS data team then calculated the quantity information for each FAH item based on the joint records from scanners, the food book, and receipts.[24] All food items were also assigned a food group based on the USDA Economic Research Services classification system.[25] The current study then further categorized each food item into 29 TFP food groups based on the USDA Economic Research Services food group classification and item descriptions.

Matching Variables

The variables used to match CFA clients and nonclients to improve the comparability of the two groups included both household primary shoppers' attributes and households' characteristics. Specifically, primary shoppers were the individuals who did most of the food shopping in the household. The attributes of primary shoppers included age, sex, marital status, race/ethnicity, and education. The characteristics of households incorporated household size, number of children in the household, number of seniors in the household, whether the household lived in rural areas, household monthly income before tax, whether the household was food insecure. Food insecure households were defined as those who had at least 3 affirmative answers to USDA's 30-day Adult Food Security Scale, a 10-item questionnaire.[26] Furthermore, the analyses included whether or not the household had liquid assets over $2000, received SNAP, or were SNAP eligible. In addition, households' food shopping behaviors and the retail environment were included and portrayed as whether the household used supermarkets as the primary place to buy food, the straight-line distance from home to primary store, and whether the household had access to cars.

Statistical Analyses

In clinical trials, treatment is randomly assigned to avoid confounding effects and clearly establish the direction of causality; however, in observational studies, there is potential for selection bias from unobserved and observed factors that affect both selection into treatment and the outcome variables.[27,28] To limit the potential confounding due to differences in observed factors, propensity score matching (PSM)[29] was used to ensure that CFA nonclients were similar to CFA clients in a number of observed variables. Specifically, the probability of being a CFA client was estimated as a function of all the matching variables mentioned previously through the logistic regression model. Each CFA client was matched to their nearest CFA nonclient neighbor, and CFA clients and nonclients had a sizable area of common support to make appropriate PSM. After PSM, the matched pair did not differ statistically significantly across all matching variables (all $P > .05$) and suggested the plausibility of PSM in this study.

T tests were used to compare the means of variables. A *P* value $< .05$ was deemed as statistically significant. Sample weights were not used in the analysis given that several households were dropped due to missing data and that the sample weights for the remaining households were hard to calculate. Furthermore, PSM with sample weights are not

Table 1. Sociodemographic characteristics of CFA[a] clients and nonclients collected in the US Department of Agriculture National Household Food Acquisition and Purchase Survey

Variables	CFA clients (n = 67)	CFA nonclients (n = 4249)	P value
Primary shopper's attributes	←———————mean ± SD[b]———————→		
Age (y)	50.0 ± 14.7	45.8 ± 16.3	.036
	←n (%)→		
Male	13 (19.4)	1129 (26.6)	.187
Married	21 (31.3)	1812 (42.7)	.063
Race/ethnicity[c]			
White	48 (71.6)	3058 (72.0)	.953
Black	13 (19.4)	642 (15.1)	.331
Hispanic	7 (10.5)	842 (19.8)	.056
College graduates	15 (22.4)	1391 (32.7)	.073
Household attributes	←———————mean ± SD———————→		
Household size	3.2 ± 2.3	3.0 ± 1.7	.354
Number of children (age < 18)	1.3 ± 2.0	0.96 ± 1.28	.054
Number of seniors (age > 65)	0.25 ± 0.50	0.23 ± 0.53	.746
	←———————n (%)———————→		
Live in rural areas	20 (29.9)	1160 (27.3)	.642
	←———————mean ± SD———————→		
Household monthly income before tax ($)	1874.1 ± 1502.2	3517.9 ± 4223.4	.001
	←———————n (%)———————→		
Food insecure	32 (47.8)	1187 (27.9)	.000
Liquid assets > $2,000	8 (11.9)	1460 (34.4)	.000
Receives SNAP[d]	30 (44.8)	1394 (32.8)	.039
SNAP eligible	49 (73.1)	1984 (46.7)	.000
Supermarkets as primary place to buy food?	64 (95.5)	3984 (93.8)	.554
	←———————mean ± SD———————→		
Straight distance to primary store (miles)[e]	3.0 ± 5.6	3.3 ± 4.9	.668
	←———————n (%)———————→		
Car access	41 (61.2)	3604 (84.8)	.000

[a]CFA = charitable food assistance.

[b]SD = standard deviation.

[c]Other race is not included because the shares of other race, white, Hispanic, and black sum up to 1 and is perfectly collinear. In other words, adding the indicator of other race in the propensity score matching would not give any additional information on top of including white, Hispanic, and black race indicators.

[d]SNAP = Supplemental Nutrition Assistance Program.

[e]Straight distance to primary store is measured from the household's resident census block group centroid to the geocoordinates of the store where the household identifies as spent most food dollars.

established procedures yet. All analyses were conducted with Stata 15.1 software (Release 15; 2017; Stata Corp, College Station, TX).

RESULTS

Sociodemographics of CFA Clients and Nonclients

The average sociodemographic characteristics for CFA clients and nonclients are shown in Table 1. CFA clients had lower monthly income ($1874 vs $3517, $P = .001$), were less likely to have liquid assets greater than $2000 (11.9% vs 34.4%, $P <$ .001), and were less likely to have access to a car (61.2% vs 84.8%, $P < .001$) compared with nonclients. CFA clients were also more likely to be food insecure (47.8% vs 27.9%, $P < .001$) and eligible for SNAP (73.1% vs 46.7%, $P < .001$) than nonclients. CFA clients were older than nonclients on average (50.0 vs 45.8, $P = .036$).

CFA clients and nonclients did not differ in sex ($P = .187$); marital status ($P = .063$); the probability of being non-Hispanic white ($P = .953$), Hispanic ($P = .056$), or black ($P = .331$); household size ($P = .354$); or whether they lived in rural areas ($P = .642$). Both CFA clients and nonclients chose supermarkets

Table 2. Sociodemographic characteristics of propensity score-matched CFA[a] clients and nonclients collected in the US Department of Agriculture National Household Food Acquisition and Purchase Survey

Variables	CFA clients (n = 67)	CFA nonclients (n = 67)	P value
Primary shopper's attributes	←————————————mean ± SD[b]————————————→		
Age (y)	50.0 ± 14.7	50.3 ± 14.0	.895
	←————————————n (%)————————————→		
Male	13 (19.4)	13 (19.4)	>.999
Married	21 (31.3)	20 (29.9)	.853
Race/ethnicity[c]			
White	48 (71.6)	48 (71.6)	>.999
Black	13 (19.4)	12 (17.9)	.826
Hispanic	7 (10.5)	8 (11.9)	.786
College graduates	15 (22.4)	13 (19.4)	.674
Household attributes	←————————————mean ± SD————————————→		
Household size	3.2 ± 2.3	2.9 ± 2.1	.442
Number of children (age < 18)	1.3 ± 2.0	1.1 ± 1.9	.725
Number of senior (age > 65)	0.25 ± 0.50	0.24 ± 0.52	.867
	←————————————n (%)————————————→		
Live in rural areas	20 (29.9)	18 (26.9)	.704
	←————————————mean ± SD————————————→		
Household monthly income before tax ($)	1874.1 ± 1502.2	2187.4 ± 2163.6	.332
	←————————————n (%)————————————→		
Food insecure	32 (47.8)	32 (47.8)	>.999
Liquid assets > $2,000	8 (11.9)	10 (14.9)	.616
Receives SNAP[d]	30 (44.8)	32 (47.8)	.731
SNAP eligible	49 (73.1)	48 (71.6)	.848
Supermarkets as primary place to buy food?	64 (95.5)	64 (95.5)	>.999
	←————————————mean ± SD————————————→		
Straight distance to primary store (miles)[e]	3.0 ± 5.6	2.7 ± 3.8	.676
	←————————————n (%)————————————→		
Car access	41 (61.2)	41 (61.2)	>.999

[a]CFA = charitable food assistance.

[b]SD = standard deviation.

[c]Other race is not included because the shares of other race, white, Hispanic, and black sum up to 1 and is perfectly collinear. In other words, adding the indicator of other race in the propensity score matching would not give any additional information on top of including white, Hispanic, and black race indicators.

[d]SNAP = Supplemental Nutrition Assistance Program.

[e]Straight distance to primary store is measured from the household's resident census block group centroid to the geocoordinates of the store where the household identifies as spent most food dollars.

as their primary shopping venue (95.5% vs 93.8%, P = .554), and the distance to their primary shopping store was similar between the 2 groups (3.0 vs 3.3 miles, P = .668).

Sociodemographics of Matched CFA Clients and Nonclients

Table 2 presents the average sociodemographic characteristics between CFA clients and propensity score-matched CFA nonclients. Each of the 67 CFA clients was matched to their nearest neighbor, and thus 67 CFA nonclients were included

in the analyses. The table shows that after PSM, CFA clients and nonclients were not significantly different across all observable sociodemographic variables. In other words, each CFA client was matched to the closest nonclient neighbor with no observable differences.

Nutritional Quality of Foods Obtained by Matched CFA Clients and NonClients

Table 3 shows the average ratios of foods obtained as proportions of TFP recommendations between propensity score-

Table 3. Average ratios of food at home obtained as a portion of TFP[a] recommended consumption among all shopping venues between propensity score-matched CFA[b] clients[c] and nonclients[d] collected in the US Department of Agriculture National Household Food Acquisition and Purchase Survey

TFP category	CFA clients (n = 67)	CFA nonclients (n = 67)	P value[e]
	←——mean ± SD[f]——→		
Fruits	0.26 ± 0.05	0.25 ± 0.04	.797
Whole fruits	0.22 ± 0.04	0.19 ± 0.03	.585
Vegetables	0.37 ± 0.10	0.19 ± 0.04	.102
Nonstarchy vegetables	0.16 ± 0.03	0.08 ± 0.02	.018
Grains	0.69 ± 0.07	0.59 ± 0.10	.397
Whole grains	0.26 ± 0.04	0.27 ± 0.07	.932
Milk products	0.32 ± 0.05	0.32 ± 0.04	.912
Meat and beans	0.57 ± 0.11	0.34 ± 0.06	.051
Sugar, sweets, and candies	17.02 ± 5.43	21.18 ± 5.86	.614

[a]TFP = Thrifty Food Plan.
[b]CFA =charitable food assistance.
[c]CFA clients included households who had obtained foods in charitable food assistance during the 7-day interview period.
[d]CFA nonclients consist of households who had not used any kind of charitable food assistance programs during the survey period.
[e]The P value shows the t test results from comparing the means of CFA clients and CFA nonclients.
[f]SD = standard deviation.

matched CFA clients and nonclients. CFA clients obtained more nonstarchy vegetables than CFA nonclients (0.16 vs 0.08, P = .018). CFA clients also obtained more meat and beans than CFA nonclients, although the difference is marginally significant (0.57 vs 0.34, P = .051).

Table 4 presents percentages of the total pounds of food acquired from difference sources. The results suggest that CFAs were important sources of food for CFA clients. CFA clients obtained 28% of their foods from CFAs, 52% from supermarkets, 15% from small to medium stores, and 4% from other sources such as gardens, families, and friends in a given week. The primary difference for nonclients is that they obtained more food at supermarkets than clients (66% vs 52%). In addition, 14% of households below federal poverty line reported using food bank or pantry in the past 30 days for groceries.

The average ratios of foods obtained as proportions of TFP recommendations for propensity score-matched CFA clients and nonclients were compared between different shopping venues (Table 5). CFAs were an important source of healthy foods for CFA clients. For example, CFA clients acquired 10% of their recommended quantities of nonstarchy vegetables from CFAs compared with 5% from supermarkets and 1% from small to medium stores. In addition, CFA clients acquired fewer sugar, sweets, and candies from CFAs than from supermarkets (1.5 vs 13.6, P = .031).

Use of SNAP and CFA by Matched CFA Clients and Nonclients

Last, we considered how CFA use related to SNAP. The Figure depicts the kernel density distribution of days when SNAP and CFA were used compared with when SNAP benefits were distributed. Among the 45% CFA clients who were also recipients of SNAP, the majority (52.4%) of them used SNAP benefits within 10 days of SNAP benefits distribution, while most (67.9%) of those households used CFAs starting on day 11 or later after SNAP benefits were allocated.

DISCUSSION

This study found that households with more children, lower levels of food security, lower income, and less access to a vehicle were more likely to use CFAs. This finding suggests that households who are most vulnerable to hunger use CFA services the most. The results are consistent with previous research that found CFA clients reported difficulty adequately feeding their families and that CFA use was highest among the poorest group of households.[30,31] In addition, previous research suggests that after variables for income and assets were included in the regression equation, the only variable significantly related to the probability of going to a CFA provider was whether or not the household owned a car, which highlights the importance of neighborhood-based local CFA programs in reducing food insecurity.[30]

The current study shows that CFA agencies are an important source of foods for CFA clients, constituting 28% of CFA clients' foods at home acquisition. Recent evidence suggests that more than 60% of CFA clients plan on getting CFA as a regular strategy for making ends meet,[10] thus stressing the importance of CFA as coping strategies for low-income

Table 4. Average percentages of total pounds of food at home obtained from each shopping venue between propensity score-matched CFA[a] clients[b] and nonclients[c] surveyed in the US Department of Agriculture National Household Food Acquisition and Purchase Survey[d]

Shopping venues	CFA clients (n = 67)	CFA nonclients (n = 67)
	←——(%)——→	
CFA	28	0
Supermarkets	52	66
Small-medium stores[e]	15	11
Other sources[f]	4	7

[a]CFA = charitable food assistance.
[b]CFA clients included households who had obtained foods in charitable food assistance during the 7-day interview period.
[c]CFA nonclients consist of households who had not used any kind of charitable food assistance programs during the survey period.
[d]The percentages do not sum up to 1 because both CFA clients and nonclients who obtained 0 food in the survey week were included and 0 percentage is assigned to each venue, namely CFA, supermarkets, small-medium stores, and other stores for those households.
[e]Small-medium stores include convenience stores, corner groceries, specialty stores, etc.
[f]Other sources include gardens, families, friends, and churches.

Table 5. Average ratios of food at home obtained as a portion of TFP[a] recommended consumption across different shopping venues between propensity score-matched CFA[b] clients[c] and nonclients[d] collected in the US Department of Agriculture National Household Food Acquisition and Purchase Survey

TFP category	CFA clients (n = 67)	Supermarkets			Small-Medium Stores[e]		
		CFA clients (n = 67)	CFA nonclients (n = 67)	P value[f]	CFA clients (n = 67)	CFA nonclients (n = 67)	P value[f]
	⟵————————mean ± SD[g]————————⟶				⟵————————mean ± SD[g]————————⟶		
Fruits	0.01 ± 0.04	0.06 ± 0.02	0.07 ± 0.02	.786	0 ± 0	0.01 ± 0.01	.321
Whole fruits	0.05 ± 0.10	0.17 ± 0.04	0.17 ± 0.03	.957	0.002 ± 0.002	0.01 ± 0.01	.459
Vegetables	0.09 ± 0.16	0.08 ± 0.02	0.11 ± 0.03	.311	0.01 ± 0.01	0.01 ± 0.01	.591
Nonstarchy vegetables	0.10 ± 0.20	0.05 ± 0.01	0.06 ± 0.02	.563	0.01 ± 0.004	0.003 ± 0.002	.706
Grains	0.24 ± 0.35	0.23 ± 0.04	0.41 ± 0.08	.050	0.05 ± 0.02	0.02 ± 0.01	.133
Whole grains	0.13 ± 0.24	0.12 ± 0.03	0.26 ± 0.07	.074	0.01 ± 0.01	0.01 ± 0.01	.933
Milk products	0.07 ± 0.28	0.21 ± 0.04	0.27 ± 0.04	.338	0.04 ± 0.02	0.04 ± 0.02	.803
Meat and beans	0.15 ± 0.25	0.38 ± 0.09	0.29 ± 0.05	.361	0.04 ± 0.02	0.01 ± 0.01	.209
Sugar, sweets, and candies	1.52 ± 9.23	13.62 ± 5.31	17.96 ± 5.80	.581	1.88 ± 7.63	1.98 ± 0.96	.926

[a]TFP = Thrifty Food Plan.
[b]CFA = charitable food assistance.
[c]CFA clients included households who had obtained foods in charitable food assistance during the 7-day interview period.
[d]CFA nonclients consist of households who had not used any kind of charitable food assistance programs during the survey period.
[e]Small-medium stores include convenience stores, corner groceries, specialty stores, etc.
[f]The P value shows the t test results from comparing the means of CFA clients and CFA nonclients.
[g]SD = standard deviation.

households to stay food secure.[32] Many CFA clients participate in other forms of nutritional assistance particularly focused on children. For example, Feeding America's Hunger in America National Report[10] found that 24.4% of the CFA clients with children received benefits from WIC, 94% with school-aged children received benefits from NSLP and 46% benefited from SBP. These findings collectively suggest that CFA complemented the public assistance programs in helping low-income households combat food insecurity.

CFA clients treated CFA agencies as an important source of healthy food. Specifically, CFA clients acquired *more* nonstarchy vegetables from CFAs than they did from supermarkets and small to medium stores combined. CFA clients also obtained *fewer* sugar, sweets, and candies from CFAs than they did from supermarkets or small to medium stores. This finding is consistent with recent efforts directed toward improving the nutritional quality of foods offered in CFAs. For example, Feeding America has partnered with the Academy of Nutrition and Dietetics and the National Dairy Council to create the Healthy Food Bank Hub that disseminates information about how to supply foods that align with MyPlate guidelines to local food banks.[33] Various community-based programs also strive to give more healthy foods to local CFAs: AmpleHarvest.org encourages home gardeners to donate excess produce to local food pantries[34]; Farm to Food Bank programs connect CFAs with local produce through gleaning, discounted purchasing, or donations of excess fruits and vegetables[35]; and Plant a Row programs encourage food producers to grow and harvest a "row" (portion) of produce for a local food bank.[36]

This study revealed that the use of CFA agencies rose as the use of SNAP benefits fell for CFA clients who were also SNAP recipients. Although only 45% of CFA clients also received SNAP, among those who used both CFA and SNAP in a month, the current study found that 67.9% of CFA clients used CFA programs starting on day 11 or later since SNAP benefits were distributed to complement the use of SNAP. CFA usage is relatively low in the days after SNAP distribution, especially in comparison with SNAP usage. In contrast, as the days since SNAP distribution lengthens, the use of SNAP declines and the use of CFAs increases. These findings revealed that CFA usage represented an important mechanism for low-income households to cope with food insecurity at a time when they were most vulnerable.

Two policy implications are emphasized from the results. First, this article demonstrates that CFAs play a critical role in supporting the diets of households in need, both in terms of quality and quantity. As such, the government should continue to support food banks through The Emergency Food Assistance Program,[37] through favorable tax treatment of donations to food banks, and by ensuring regulatory frameworks do not inhibit the ability of food banks to successfully serve vulnerable households. Second, this article suggests that CFA usage increases at the same time SNAP usage falls. One possible response to this is to increase SNAP benefits, which may allow for longer time periods of using SNAP benefits.[38,39] Along with helping to improve the well-being of vulnerable households, this would also aid food banks to free up more food for other households in need. In addition, only
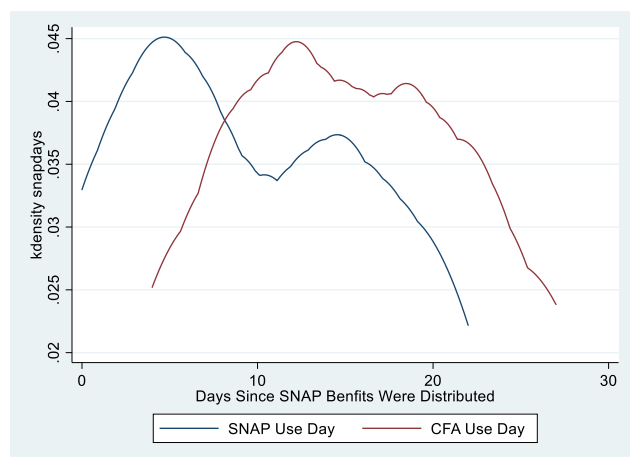
Figure. Kernel probability density of days since Supplemental Nutrition Assistance Program (SNAP) benefits were distributed when SNAP was used and when charitable food assistance (CFA) was used for CFA clients who also participated in SNAP.

45% of CFA clients report receiving SNAP. Thus CFAs are encouraged to connect clients with other public assistance and community-based programs that can support CFA clients beyond emergency food needs.

This study has several strengths. First, the FoodAPS surveyed a nationally representative sample of households in contrast to existing studies where only one food pantry was selected to study CFA clients' food acquisition behavior. Second, foods obtained from multiple sources including CFA, public nutrition assistance programs, food stores, family, friends, gardens, and schools were included in the analyses. A more comprehensive data set of foods acquired by households allowed for the comparison of foods obtained from different sources and in turn facilitated studying the role of each shopping venue for CFA clients. Third, because the information of households who did not use CFAs was also recorded in addition to the experiences of CFA clients, the comparison between CFA clients and nonclients was possible. Fourth, PSM was used to match CFA clients and nonclients to improve the comparability of the two groups and raise the accuracy of the estimates. Lastly, because both the timing of SNAP benefits and CFA uses were collected, this study provides new findings on how CFA is used as a means to supplement SNAP (i.e., being used most heavily as SNAP dollars are depleted).

There are limitations of this article as well. Though a nationally representative sample, the sample size of CFA clients was small. It is possible that the CFA clients underreported their use of CFA because of stigma[3] or some CFA clients happened not to have obtained any food from CFA during the interview week but had done so on other days of the month. Furthermore, food-away-from-home and some FAH acquisitions were excluded in this study due to lack of quantity information for individual food groups. As a result, foods consumed at some CFA agencies such as soup kitchens were not captured in the study. Recent statistics from the USDA report that in 2015, 6.5 million households (or 5.2% of all American households) obtained food from food pantries at least once. A much smaller share, around 727,000 households or 0.6% of all American households, used a soup kitchen during the same period.[40]

Another limitation of the current study is that PSM methods cannot match unobserved variables such as nutrition knowledge and distance to the CFA, which may explain why CFA clients obtained more healthy foods than nonclients. That being said, education levels, living in rural areas, and access to cars were matched between CFA clients and nonclients to mitigate some of the potential bias. Finally, the FoodAPS only collected data on food purchases and acquisition, thus no data were available to analyze the food consumption patterns of CFA clients and nonclients. Despite the limitations, the current research is the first to use a nationally representative sample of households to compare the nutritional quality of foods obtained by CFA clients and otherwise similar nonclients. It also provides valuable information on how CFA clients use the private food assistance programs in relation to the use of public food assistance programs.

CONCLUSION

CFA programs represent an important mechanism to combat food insecurity and poor dietary quality for the most vulnerable US households. This study found that CFA clients obtained more nonstarchy vegetables than matched nonclients. In addition, CFA clients acquired more nonstarchy vegetables from CFAs than they did from supermarkets and small to medium stores combined. CFA clients also obtained fewer sugar, sweets, and candies from CFAs than they did from supermarkets or small to medium stores. CFA use rose as the use of the SNAP fell as the time since SNAP benefits distribution lengthened. Therefore, CFAs may serve as an important source of healthy foods for their clients whose SNAP dollars are depleted during the month. Future studies are warranted to assess the causal impact of CFAs on the food security and dietary quality of their clients and identify ways to improve their food security and dietary quality through innovative programs.

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