# What do you want to eat? Cuisine and nutrition intervention preferences among people using a large food pantry in Texas

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A B S T R A C T

*Objective:* Nutrition interventions delivered through food pantries could reduce health disparities for people experiencing food insecurity. We identified clients' preferences for cuisines, nutrition interventions, and outcomes and whether preferences differ for subpopulations.

*Methods:* Cross-sectional study at a large pantry in Dallas, Texas (N = 200). Survey collected from February-May 2023 on demographics, cuisine preferences, nutrition intervention preferences, and outcomes clients hope to achieve when changing lifestyle (weight loss, feeling comfortable in clothes, feeling good about diet, wellbeing). A subsample (N = 130) had height and weight measured. We tested whether food security and BMI (categorical) were associated with intervention or outcome preferences using IBM SPSS Statistics (Version 29) to conduct analysis of variance.

*Results:* Top-rated cuisines were Mexican, Chinese, Italian. Participants reported a desire for interventions implemented through the pantry reflected by high Nutrition Intervention Index scores. The highest rated intervention was bringing more healthy food into the pantry and lowest rated was restricting unhealthy donations.

Overall wellbeing was the most important outcome and weight loss the least important.

Neither food security nor BMI were associated with desire for interventions. All outcomes were rated in a similar pattern, though people with obesity and overweight rated weight loss as more important than people with normal weight.

*Conclusions:* Most participants demonstrated a strong desire for healthier, ethnically diverse options, and nutrition interventions delivered through the pantry. Our findings explore cuisines and outcomes preferred by people that use food pantries which can guide researchers, clinicians, and non-profit organizations in planning and promotion of nutrition programs for pantry clients.

## 1. Introduction

Food insecurity, insufficient physical or financial access to food, constrains diet quality and negatively impacts health outcomes (Rose, 1999; Olson, 1999; Brown et al., 2022; Simmet et al., 2017; Te Vazquez et al., 2021). Currently, there is renewed attention to food insecurity and interventions to mitigate downstream effects in the United States. For example, there is funding and reimbursement through the Department of Agriculture (USDA) for produce prescription programs and Health and Human Services reimbursement of medically tailored meals for

Medicare patients with chronic diseases in participating states (U.S. Department of Health and Human Services, 2022; U.S. National Institutes of Health, 2022). Non-profit organizations and insurers are also making investments in Food is/as Medicine interventions with an emphasis on reaching under-resourced and food insecure populations, such as Rockefeller Foundation's 100 million USD donation to the American Heart Association grant program and Elevance Health Foundation's 27.4 million USD in grants as of July 2024. These initiatives highlight a revived focus on developing nutrition interventions and Food is/as Medicine programs that can be successfully

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delivered to people experiencing financial difficulties or food insecurity.

There are several ways people with lower-incomes and people experiencing food insecurity acquire food, including purchasing from food retailers with earned income and funds from federal food assistance programs. Another avenue is the charitable food system, which includes food banks and pantries where people receive donated food at no cost. Recent estimates indicate 1 in 6 people in the United States obtained food through the charitable system in 2022 (Charitable Food Assistance Participation, 2023). Given that the charitable system serves a large population, improving the nutritional quality of food provided by food banks and pantries, as well as improving nutrition interventions and Food is/as Medicine programs delivered by or in collaboration with these organizations, could improve health and reduce disparities. To effectively leverage opportunities, greater understanding of specific cuisines, nutrition interventions, and outcomes preferred by people utilizing pantries can inform the development of effective policies and programs for people living with food insecurity.

Prior literature indicates pantry clients' most persistent requests are healthier options (Simmet et al., 2017), autonomy over food choice (Te Vazquez et al., 2021), and alleviating barriers, such as the cost and time associated with procuring and preparing healthy food (U.S. Department of Health and Human Services, 2022). Reviews highlight the urgent need for prevention strategies within the charitable system given the lack of evidence-based interventions in these settings (An et al., 2019; Eicher-Miller, 2020). Commonly reported interventions include nutrition education, healthcare referrals, and/or behavioral economic approaches that "nudge" clients to select healthier options (An et al., 2019; Eicher-Miller, 2020). Some strategies are effective at increasing food security and improving client selection of healthier food. However, results are inconsistent, few studies have been designed in partnership with clients, and to our knowledge none have asked clients which health and wellbeing outcomes are most meaningful to them.

Community-engaged research principles encourage researchers to develop interventions in partnership with community members, and to include outcomes and share results that are meaningful to participants (McDavitt et al., 2016). While prior studies have identified some food and nutrition intervention preferences of clients accessing charitable organizations in Minnesota and Connecticut (Caspi et al., 2021; Cooksey-Stowers et al., 2019), this study sought to identify and describe preferences for clients in Texas. According to Census Bureau estimates, as of 2024 there are over 30 million Texans, and for the first time, there are more Hispanic/Latino(a) Texans than non-Hispanic white Texans (U. S. Census Bureau, 2023). While Hispanic/Latino(a) participants were included in the Caspi et al. (7.5%) and Cooksey-Stowers et al. (32%) studies about preferences (Caspi et al., 2021; Cooksey-Stowers et al., 2019); data were collected in geographical, political, and ethnic landscapes that differ from Texas. Therefore, this study sought to describe whether intervention preferences replicate in this distinct community.

Another goal of this study was to learn about clients' preferences for nutritious, no-prep meals considering the growing interest in providing these meals to people experiencing food insecurity and living with chronic disease. Pilot study results suggest no-prep meals can alleviate time and preparation constraints that may face food pantry clients (e.g., mental/physical limitations, kitchen space/tools) thereby providing quick and easy access to nutritious options (Berkowitz et al., 2019; Palar et al., 2017). While market and Food is/as Medicine researchers have identified no-prep meals as a burgeoning retail avenue (The Insight Partners, 2022; Hager et al., 2022); these meals have not been rigorously tested as a strategy for improving food security, diet, and disease outcomes among clients in a pantry setting. Therefore, this study added an additional item about no-prep meals to the validated Nutrition Intervention Index (NII) (Cooksey-Stowers et al., 2019). Given that people use pantries to both prevent and alleviate food insecurity, and have varying levels of food security (Long et al., 2022; Mousa and Freeland-Graves, 2019); we also describe differences in intervention preferences by level of food security.

Lastly, our study describes for the first time client preferences for cuisines and nutrition intervention outcomes, to help researchers select meals that align with clients' cuisine preferences and outcomes that are most important to participants. We specifically sought to understand more about preferences of the pantry's African American/Black and Hispanic/Latino(a) community as researchers have found enabling client choice in pantry selections is associated with reduced food waste and improved nutritional quality of selections and food security (Martin et al., 2013; Sharma and Leonard, 2024). Further, interventions that are culturally adapted have been found to be more effective than non-adapted interventions (Jinnette et al., 2021; Livingstone et al., 2023). Based on prior literature, we hypothesized that clients would have a strong preference for healthier options and nutrition interventions delivered through the pantry. To our knowledge, no studies have asked clients to describe their preferences towards no-prep meals, cuisines, or nutrition intervention outcomes, therefore, there were no exploratory or confirmatory hypotheses regarding these variables. Rather, the goal of this study was to describe preferences for the first time to inform future study and intervention development.

## 2. Methods

### 2.1. Ethics approval

This study was reviewed by the University of Texas Southwestern Medical Center Human Research Protection Program and exempt under 45 CFR 46.102.

### 2.2. Recruitment

Participants were recruited from Crossroads Community Services, a non-profit in Dallas, Texas that provides charitable food assistance to ~20,000 people annually. Data were collected from 130 people that participated in a cross-sectional study and 70 that participated in a pilot randomized controlled trial (RCT, identifier: NCT05593510). RCT participants completed measures as part of a baseline questionnaire prior to randomization and intervention. Participants in both studies were told questionnaires were intended to learn more about their preferences for nutrition-related programs and foods that could be offered by the pantry. The manuscript describing RCT procedures and outcomes is published (Hollis-Hansen et al., 2023).

Study staff (including authors CH, JT, NV) recruited participants from February-May 2023. The team sat at a table with signage in the Crossroads waiting area and engaged clients to determine interest in participating. Fliers with survey QR codes and links were posted throughout the pantry for people to complete the eligibility screener independently if desired. All materials were provided in English and Spanish.

### 2.3. Eligibility

To use Crossroads pantry, clients must meet guidelines established by the state of Texas for the USDA Emergency Food Assistance Program (TEFAP, 2019). There are several ways eligibility is established, but most commonly households qualify on self-reported income below 185 % of the poverty guidelines (TEFAP, 2019). Study eligibility included being: 1) 18 years or older; 2) fluent in English and/or Spanish; 3) able to provide consent; 4) a client of Crossroads; and 5) willing to participate. If a client or member of their household participated in the RCT they were ineligible for the cross-sectional study to ensure no duplicates.

Interested participants had a study information sheet read to them, questions answered and provided verbal consent which was recorded by staff. Participants completed a questionnaire in English or Spanish. Participants in the cross-sectional study (N = 130) had height, weight, and waist circumference measured after completing the questionnaire. Participants in the RCT did not have height, weight, or waist

circumference measured due to the intervention lasting only two weeks. A short intervention period does not allow enough time to observe meaningful changes in weight or waist circumference, and the team felt measuring may unnecessarily discourage those that made improvements in diet but did not lose weight or centimeters.

### 2.4. Measures

#### 2.4.1. Demographics

Race and ethnicity were treated as a categorical variable with options African American/Black, American Indian/Alaskan Native, Asian, Hispanic/Latino(a), Multiracial/more than one race, Native Hawaiian/ Other Pacific Islander, White. We elected not to separate Hispanic/ Latino(a) from race to remain consistent with how data are collected by our community partner. In addition, research suggests most people that identify as Hispanic/Latino(a) do not identify as a separate race and are more likely to leave separate items blank or select "Other" and input Hispanic/Latino(a) for race (U.S. Census Bureau, 2023; Hugo Lopez et al., 2023). Gender was a categorical variable with options Male, Female, Other. Years of education, income, age, and household size were continuous.

The USDA US Household Food Security Survey Module: Six-Item Short Form was used to determine food security (Harrison et al., 2003). Food security was treated as a categorical variable with three categories, zero to one affirmative response indicating high or marginal security, two to four indicating low security, and five to six indicating very low security.

#### 2.4.2. Nutrition intervention preferences and the Nutrition Intervention Index (NII)

Author KCS developed and validated the Nutrition Intervention Index (NII) (Cooksey-Stowers et al., 2019); which describes clients' preferences for 14 nutrition and nudging strategies that can be implemented through the charitable system. We added an item on nutritious no-prep meals to learn more about this strategy as it has shown promise for people experiencing food insecurity (Berkowitz et al., 2019). Participants were instructed: "There are different ideas on how to help people at food pantries choose nutritious options. You may like some of these ideas and not like others. Thinking about what would be most helpful for you, we want to know how much you support (like) or oppose (don't like) the following changes in food pantries." Responses were provided using a five-point Likert anchored by strongly support (4) and strongly oppose (0). A mean score is provided for each intervention, and the NII is calculated by summing responses. The traditional NII ranges from zero-56. The adapted NII including the no-prep meals item ranges from zero-60. Higher scores indicate greater support for interventions.

#### 2.4.3. Cuisine preferences

Participants were instructed "Please select all types of food you eat on a regular basis, or you would like to eat if available to you." Options included: African, Caribbean, Central American, Chinese, Cuban, Greek/ Mediterranean, Indian, Italian, Japanese, Korean, Mexican, South American, Soul Food, Southwest/TexMex, Thai, and Vietnamese. An "Other" write-in option was provided. Affirmative responses were summed for each cuisine.

#### 2.4.4. Food acquisition and meal preparation

Two-items from the National Household Food Acquisition and Purchase Survey measured usual food acquisition and preparation. 1) "How many times over the month do you get food from each of the following?" (e.g. supermarket) with options "Never" "Once per month" "Two to three times per month" "Once per week" "More than once per week" 2) "During a typical week, how many days do you cook at home, eat at a fast-food restaurant or eat at a full-service restaurant?" with options zero-seven. Food acquisition data were treated as categorical variables (frequencies) and meal preparation data were treated as continuous

variables (mean days) (Crespo-Bellido et al., 2021).

#### 2.4.5. Perceived importance of intervention outcomes

To identify which of four potential outcomes were most important to participants (weight loss, having clothes fit more comfortable, feeling good about ones diet, overall wellbeing), they were instructed "These are examples of common health outcomes people hope to achieve when changing their diet or lifestyle. Please think about what outcomes, if any, are most important to you." Clients used a sliding scale from zero-100 with anchors "not at all important to me" (0), "somewhat important to me" (50), or "very important to me" (100).

#### 2.4.6. Height, weight, and waist circumference

Participants that completed the cross-sectional study (N = 130) had height, weight, and waist circumference measured by trained staff using a WB-3000 Digital Tanita Stadiometer and Scale. Body mass index (BMI) was calculated as BMI = $kg/m^2$. BMI was categorized as underweight (<18.5), normal weight (18.5–24.9), overweight (25–29.9), or obese (30+). Waist circumference was measured in centimeters using a FITINDEX digital tape measure and treated as high-risk for abdominal adiposity and cardiometabolic disease outcomes if ≥88 cm for women and ≥102 cm for men (Lean et al., 1995).

### 2.5. Analytic plan

Variables were named consistently across datasets and a merged file including the full analytic sample (N = 200) was created by adding cases from both studies. Missing data were <5 % for all variables, and there were no statistically significant differences for those missing vs. not missing data, therefore values were not imputed.

Descriptive statistics (e.g., means, percentages, chi-squared tests) were used to describe participant characteristics, meal preparation and food acquisition behaviors, and cuisine preferences. Fisher's exact tests were used if categorical items had small cell counts. After distributions and QQ plots were checked, one way analysis of variance (ANOVA) was used to test whether nutrition intervention and intervention outcome preferences differed by food security (high/marginal security, low security, very low security) or weight (normal weight, overweight, obese). Bonferroni adjusted α was set to 0.0025 as 20 comparison tests may lead to risk for Type 1 error. Therefore, the null hypothesis would only be rejected if the p-value is <0.0025. IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp was used to merge and analyze data.

### 2.6. Participant payment

Participants were paid $50 using a ClinCard® MasterCard. The National Health Council developed a community-informed methodology for determining a Fair Market Value for research compensation (Perfetto et al., 2020). In this study, the appointment was predicted to last 1–1.5 h thus $50 was appropriate compensation for the commitment requested.

## 3. Results

### 3.1. Participant characteristics

Most participants identified as female (84%), African American/ Black (41%) or Hispanic/Latino(a) (52%), which reflects Crossroads' demographics. Most reported they were experiencing low (42%) or very low food security (29%). Several indicated they had not received medical care within the past two years when needed, due to cost concerns (43%), and did not have any medical insurance (35%). Most had an overweight (27%) or obese (65%) BMI and waist circumference associated with greater abdominal adiposity and higher risk for cardiometabolic disease (85%).

Participants reported preparing food at home most days 5.21 ± 1.82

(Min = 0, Max = 7), with 38% cooking every day (N = 75), 13% six days (N = 25), and 18% five days (N = 36) per week. Participants reported rarely purchasing meals from fast food 0.86 ± 0.99 (Min = 0, Max = 6) or sit-down restaurants 0.41 ± 0.65 (Min = 0, Max = 3).

Participants acquired food from supermarkets, supercenters, and discount/dollar stores most often. Participants were least likely to receive food through hunting or fishing, gardening, or growing, and farmers markets. See Table 1.

### 3.2. Nutrition intervention index scores and preferences

The average Nutrition Intervention Index score was 49.32 ± 7.52 (Min = 16, Max = 60) and did not differ by food security ($F(2,197) = 0.26, p = 0.75$) or weight ($F(2,127) = 1.21, p = 0.30$). The five highest rated interventions were bringing more healthy items into the pantry, providing meal kits which bundle nutritious foods with a recipe that instructs how to prepare a healthy meal, making healthy food more noticeable on shelves (e.g., nudges), more refrigerators for fresh produce, and labeling for diet-related illnesses. Restricting unhealthy donations, nutritious no-prep meals, a smartphone application that indicates healthy choices, dividing the shopping cart into food groups, and labeling foods with a traffic light were the five lowest rated

interventions, though all interventions had more affirmative responses on average than negative. **See** Table 2.

### 3.3. Cuisine preferences

The top five rated cuisines were: Mexican (83%), Chinese (59%), Italian (53%), Soul Food (40%), and Southwest/TexMex (40%). **See** Table 3.

### 3.4. Nutrition intervention outcome preferences

The preferred nutrition intervention outcomes were 1) overall wellbeing 2) feeling good about one's diet 3) feeling more comfortable in one's clothes and 4) weight loss (N = 200). Among participants that had their height and weight measured (N = 130), those with overweight and obesity rated weight loss ($F(2,127) = 9.95, p < 0.001$) and feeling comfortable in clothes ($F(2,127) = 5.02, p = 0.008$) as more important than participants with normal weight. However, the general patterning of importance (e.g., overall wellbeing being most important and weight loss being least important) was the same regardless of weight status. **See** Table 4.

**Table 1**

Characteristics of pantry clients collected from a large food pantry in Dallas, Texas from February-May 2023 (N = 200).

| | All participants (N = 200) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | N | % | | | | | | | |
| **Race and Ethnicity** | | | | | | | | | |
| African American or Black | 82 | 41.4 | | | | | | | |
| American Indian or Alaska Native | 1 | 0.5 | | | | | | | |
| Hispanic or Latino(a) | 103 | 52 | | | | | | | |
| Multiracial | 6 | 3 | | | | | | | |
| White | 6 | 3 | | | | | | | |
| **Preferred language** | | | | | | | | | |
| English | 132 | 66 | | | | | | | |
| Spanish | 68 | 34 | | | | | | | |
| **Gender** | | | | | | | | | |
| Female | 167 | 83.5 | | | | | | | |
| Male | 32 | 16 | | | | | | | |
| Other | 1 | 0.5 | | | | | | | |
| **Do Not Have Medical Insurance** | 70 | 35 | | | | | | | |
| **Did Not Seek Medical Care Due to Cost** | 86 | 43 | | | | | | | |
| **Food Security** | | | | | | | | | |
| High/marginal food security | 58 | 29 | | | | | | | |
| Low food security | 84 | 42 | | | | | | | |
| Very low food security | 58 | 29 | | | | | | | |
| **Monthly food acquisition behaviors** | Never | | Once per month | | 2–3 times per month | | Once per week | | More than once per week |
| Supermarket, Grocery Store | 6 | 3 | 68 | 34 | 55 | 27.5 | 56 | 28 | 15 | 7.5 |
| Discount, Dollar Store | 53 | 26.5 | 72 | 36 | 36 | 18 | 26 | 13 | 8 | 4 |
| Supercenter (e.g., Walmart, Costco) | 25 | 12.5 | 97 | 48.5 | 33 | 16.5 | 28 | 14 | 9 | 4.5 |
| Corner store, convenience store | 113 | 56.5 | 45 | 22.5 | 16 | 8 | 11 | 5.5 | 11 | 5.5 |
| Another food pantry | 121 | 60.5 | 55 | 27.5 | 13 | 6.5 | 2 | 1 | 3 | 1.5 |
| Hunting, fishing | 176 | 88 | 8 | 4 | 4 | 2 | 1 | 0.5 | 0 | 0 |
| Gardening, growing | 165 | 82.5 | 16 | 8 | 1 | 0.5 | 5 | 2.5 | 3 | 1.5 |
| Friend, family member | 102 | 51 | 48 | 24 | 20 | 10 | 14 | 7 | 5 | 2.5 |
| Farmers' market, mobile market | 174 | 87 | 15 | 7.5 | 4 | 2 | 0 | 0 | 0 | 0 |
| **Anthropometrics (N = 130)** | | | | | | | | | |
| Normal weight (18.5–24.9) | 11 | 8.5 | | | | | | | |
| Overweight (25–29.9) | 35 | 26.9 | | | | | | | |
| Obese (30+) | 84 | 64.6 | | | | | | | |
| High-risk for abdominal adiposity and cardiometabolic disease[B] | 110 | 84.6 | | | | | | | |
| | M | SD | | | | | | | |
| **Household Size (People)** | 3.5 | 2.0 | | | | | | | |
| **Months of Pantry Utilization*** | 6.6 | 4.4 | | | | | | | |
| **Weekly meal preparation and food acquisition behaviors (in Days)** | | | | | | | | | |
| Cook at home | 5.2 | 1.8 | | | | | | | |
| Fast food | 0.9 | 1.0 | | | | | | | |
| Restaurant | 0.4 | 0.7 | | | | | | | |
| **Body Mass Index (N = 130)** | 33.16 | 7.5 | | | | | | | |
| **Waist Circumference (cm, N = 130)** | 107.4 | 16.2 | | | | | | | |

[A]The number of months clients used the pantry within the past 12-months (self-report), [B]Waist circumference ≥88 cm for women and ≥102 cm for men.

**Table 2**

Nutrition Intervention Index (NII) scores and preferences by food security status (N = 200) and weight (N = 130) collected from pantry clients in Dallas, Texas from February-May 2023.

| | Total sample (N = 200) | | High/ marginal food security (N = 58) | | Low food security (N = 84) | | Very low food security (N = 58) | | | Normal BMI 18.5–24.9 (N = 11) | | Overweight BMI 25–29.9 (N = 35) | | Obese BMI >30 (N = 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | p | Mean | SD | Mean | SD | Mean | SD | p |
| Nutrition Intervention Index (NII) scores | 49.3 | 7.5 | 49.1 | 7.8 | 49.0 | 6.8 | 50.0 | 8.3 | 0.753 | 45.6 | 11.8 | 48.4 | 8.9 | 49.4 | 6.8 | 0.301 |
| Bring more healthy items into pantry | 3.7 | 0.6 | 3.6 | 0.8 | 3.8 | 0.5 | 3.7 | 0.7 | 0.354 | 3.6 | 1.0 | 3.7 | 0.7 | 3.8 | 0.6 | 0.552 |
| Meal kits | 3.6 | 0.8 | 3.6 | 1.0 | 3.7 | 0.7 | 3.6 | 0.9 | 0.656 | 3.2 | 1.3 | 3.5 | 1.0 | 3.6 | 0.9 | 0.409 |
| Make healthy food more noticeable on shelves | 3.6 | 0.8 | 3.5 | 0.9 | 3.6 | 0.7 | 3.6 | 0.8 | 0.746 | 3.4 | 1.1 | 3.4 | 1.0 | 3.6 | 0.7 | 0.364 |
| New refrigerators for fresh fruits and vegetables | 3.6 | 0.8 | 3.6 | 0.8 | 3.6 | 0.8 | 3.6 | 0.9 | 0.951 | 3.2 | 1.2 | 3.4 | 1.0 | 3.7 | 0.8 | 0.127 |
| Label food for diet-related illnesses | 3.5 | 0.9 | 3.5 | 0.9 | 3.5 | 0.9 | 3.5 | 1.0 | 0.945 | 3.5 | 1.0 | 3.5 | 1.0 | 3.5 | 0.9 | 0.964 |
| Cooking demonstrations | 3.4 | 1.0 | 3.5 | 1.1 | 3.4 | 0.9 | 3.5 | 0.9 | 0.852 | 3.2 | 1.1 | 3.2 | 1.1 | 3.4 | 1.1 | 0.770 |
| Label foods with stars to show nutrition | 3.4 | 0.9 | 3.2 | 1.0 | 3.5 | 0.9 | 3.5 | 0.9 | 0.310 | 3.1 | 1.5 | 3.2 | 1.0 | 3.5 | 0.9 | 0.276 |
| Sign with top 10 most healthy items others choosing | 3.4 | 0.9 | 3.3 | 1.0 | 3.4 | 0.8 | 3.3 | 1.0 | 0.594 | 2.7 | 1.1 | 3.4 | 1.0 | 3.5 | 0.8 | 0.046 |
| Divide shopping cart/bags into food groups | 3.3 | 0.9 | 3.3 | 1.1 | 3.3 | 0.8 | 3.2 | 1.0 | 0.832 | 2.8 | 1.3 | 3.3 | 1.1 | 3.2 | 0.9 | 0.383 |
| Pantry staff provide nutrition information and advice | 3.3 | 1.0 | 3.3 | 1.0 | 3.2 | 1.1 | 3.3 | 0.9 | 0.707 | 3.2 | 1.2 | 3.3 | 1.0 | 3.3 | 1.0 | 0.891 |
| Taste testing | 3.2 | 1.0 | 3.3 | 1.1 | 3.2 | 1.0 | 3.2 | 1.0 | 0.964 | 2.9 | 1.1 | 2.9 | 1.4 | 3.4 | 0.9 | 0.123 |
| Label foods with traffic light to show nutrition | 3.2 | 1.1 | 3.3 | 1.0 | 3.1 | 1.1 | 3.2 | 1.1 | 0.550 | 3.0 | 1.1 | 3.4 | 1.0 | 3.1 | 1.2 | 0.505 |
| Smartphone application | 3.1 | 1.1 | 3.0 | 1.2 | 2.9 | 1.2 | 3.3 | 0.9 | 0.121 | 2.9 | 1.3 | 3.0 | 1.2 | 3.0 | 1.1 | 0.949 |
| No-prep, ready-to-eat meals (**new item**) | 2.9 | 1.3 | 2.8 | 1.4 | 2.7 | 1.3 | 3.2 | 1.2 | 0.090 | 2.8 | 1.4 | 2.9 | 1.4 | 2.9 | 1.4 | 0.989 |
| Restrict unhealthy donations | 2.2 | 1.3 | 2.3 | 1.4 | 2.1 | 1.2 | 2.3 | 1.2 | 0.641 | 2.3 | 1.3 | 2.3 | 1.4 | 2.2 | 1.2 | 0.831 |

One way analysis of variance (ANOVA) was used to test whether nutrition intervention preferences differed by food security (high/marginal security, low security, very low security) or weight (normal weight, overweight, obese). Bonferroni adjusted α was set to 0.0025 as 20 comparison tests may lead to high risk for Type 1 error. Therefore, the null hypothesis should only be rejected if the p-value is <0.0025.

**Table 3**

Cuisine preferences of food pantry clients (N = 200) collected in Dallas, Texas from February-May 2023.

| | N | % |
|---|---|---|
| Mexican | 166 | 83.0 |
| Chinese | 117 | 58.5 |
| Italian | 106 | 53.0 |
| Soul food | 79 | 39.5 |
| Southwest/TexMex | 79 | 39.5 |
| Japanese | 48 | 24.0 |
| Central American | 44 | 22.0 |
| Thai | 44 | 22.0 |
| Cuban | 42 | 21.0 |
| Caribbean | 38 | 19.0 |
| Greek/Mediterranean | 37 | 18.5 |
| African | 36 | 18.0 |
| Korean | 35 | 17.5 |
| South American | 35 | 17.5 |
| Vietnamese | 30 | 15.0 |
| Indian | 27 | 13.5 |

N = Number of participants that selected the cuisine in response to "Please select all types of food you eat on a regular basis or foods you would like to eat if they were available to you."

## 4. Discussion

Our findings replicate results from Caspi et al. (Caspi et al., 2021) and Cooksey-Stowers et al. (Cooksey-Stowers et al., 2019) which suggest pantry clients have a strong desire for healthier options and support a variety of interventions that can be delivered through the pantry, regardless of one's level of food security or weight. Bringing more healthy items into the pantry and meal kits that bundle nutritious ingredients with recipes on how to make healthier meals were the top two intervention types preferred by participants. These interventions may be most desirable because they increase direct access to healthier food and

in the case of meal kits, also instruct on what to do with those items, which is a frequent request of Crossroads' clients and has been documented at other pantries (Caspi et al., 2021; Stein et al., 2019; Quinn et al., 2021).

One nutrition intervention of particular interest to the team was nutritious no-prep meals as one iteration of this strategy, medically tailored meals (MTM), is gaining attention in the Food is/as Medicine movement. MTM have been shown to improve food security, diet, and glycemic control among people experiencing food insecurity (Berkowitz et al., 2019; Palar et al., 2017). Nutritious no-prep meals and MTM may be particularly helpful for people experiencing food insecurity as the meals increase direct access to nutritious food and remove barriers. However, we found that while participants in this study were more likely to rate nutritious no-prep meals as neutral or positive than negative, on average, no-prep meals were the second lowest rated intervention. These results suggest that, despite considerable policy and program investments in MTM nationally, there may be other interventions that are more desirable to people using food pantries in North Texas. This may be because our study includes a large Hispanic/Latino(a) population and/or because most of the participants reported they frequently cook at home. It has been widely established that Hispanic/Latino(a) communities are more likely to report they enjoy and prefer cooking than other ethnic groups (Taillie, 2018). Our results suggest that for this population, nutritious no-prep meals, including MTM, could be less desirable and therefore less effective.

Lastly, we identified that people using food pantries find improving their overall wellbeing and diet more important than losing weight when participating in a nutrition program. This was the case regardless of weight, though weight loss was more important to participants with obesity than those who were overweight or normal weight. Researchers have documented that people experiencing food insecurity may be less successful in weight loss programs and face additional barriers to weight loss (Myers et al., 2021). Information from our study can help

**Table 4**

Nutrition intervention outcome preferences by food security status (N = 200) and weight (N = 130) collected from food pantry clients in Dallas, Texas from February-May 2023.

| | Total Sample (N = 200) | | High/ marginal food security (N = 58) | | Low food security (N = 84) | | Very low food security (N = 58) | | | People with normal weight (N = 11) | | People with overweight (N = 35) | | People with obesity (N = 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | p-value | Mean | SD | Mean | SD | Mean | SD | p-value |
| Weight Loss | 70.9 | 29.3 | 70.1 | 29.6 | 71.4 | 26.0 | 67.1 | 33.6 | 0.701 | **47.6** | **39.7** | **60.0** | **32.0** | **78.5** | **23.3** | **0.001*** |
| Feeling comfortable in clothes | 73.3 | 26.0 | 75.3 | 26.5 | 75.6 | 23.2 | 70.3 | 28.3 | 0.430 | 52.2 | 33.5 | 70.7 | 27.5 | 77.2 | 23.0 | 0.008 |
| Feeling good about diet | 80.9 | 20.7 | 81.5 | 23.9 | 79.4 | 20.4 | 78.5 | 24.0 | 0.757 | 73.6 | 21.2 | 78.1 | 23.6 | 83.0 | 19.2 | 0.234 |
| Overall wellbeing | 89.4 | 16.0 | 88.5 | 16.3 | 87.1 | 17.0 | 87.8 | 19.5 | 0.885 | 89.6 | 14.7 | 84.5 | 16.8 | 91.4 | 15.6 | 0.099 |

One way analysis of variance (ANOVA) was used to test whether nutrition intervention outcome preferences differed by food security (high/marginal security, low security, very low security) or weight (normal weight, overweight, obese). Bonferroni adjusted α was set to 0.0025 as 20 comparison tests may lead to high risk for Type 1 error. Therefore, the null hypothesis should only be rejected if the p-value is <0.0025.

researchers determine how to best promote and recruit for nutrition intervention studies in pantries and to consider whether there are messages and measures that may be more meaningful to participants and thus more important to include than focusing on weight loss.

### 4.1. Strengths

Our study has several strengths. The first is the replication of prior findings among a majority African American/Black and Hispanic/Latino (a) community accessing a large pantry in Dallas, Texas, which suggests that the highest rated interventions may have broad appeal. Additionally, to our knowledge, this is the first study to ask clients about their preferences for no-prep meals and to rate nutrition intervention *outcomes*. It is also the first study to assess intervention and outcome preferences by levels of food security and weight. Understanding which interventions and outcomes are most salient to participants overall and specifically for participants with obesity that may be most at risk for diet-related diseases can help researchers, clinicians, and community organizers promote goals of nutrition intervention programs more effectively and encourage engagement.

### 4.2. Limitations

Our study has limitations. It was conducted at one pantry, at one time. Convenience sampling was used and is appropriate given that the study is exploratory and the population is interconnected, relatively small, and understudied (Galloway and Kimberly, 2005). However, this means that generalizability is limited, and replication in additional locations, with larger samples, over time is encouraged.

Another limitation is the lack of information on clients' nativity and acculturation, as these factors have been associated with diet, cardiometabolic disease, and intervention effectiveness among African American/Black and Hispanic/Latino(a) groups (Alegria et al., 2022; Fernandez et al., 2022; Osborn et al., 2022). It is the pantry's policy not to ask about immigration status as to not deter anyone from accessing services, thus we elected not to ask related questions. Future research could explore moderating effects of nativity and acculturation, as they are factors associated with facilitators of nutrition interventions, such as preference towards fruit and vegetable consumption and cooking (Taillie, 2018; Di Noia et al., 2016; Hollis-Hansen et al., 2022).

### 4.3. Future directions

For our team and others that serve a similar population, next steps are to develop and rigorously evaluate nutrition interventions that include clients' preferred nutrition intervention strategies, cuisines, and outcomes. Researchers could also test whether interventions that include clients' top-rated interventions and nutritious options that align

with clients' cuisine preferences lead to greater improvements in nutrition security and diet than non-adapted interventions. Intervention satisfaction and cuisine preferences could also be tested as mediating factors in addition to typical mediators of behavior change (e.g., adherence, self-efficacy) of any observed direct effects to help identify mechanisms of change.

### 4.4. Conclusions

We identified that people who use pantries in Dallas, Texas desire nutritious food and would like a variety of nutrition interventions to be implemented through the pantry. There were some interventions that were more preferrable than others, but all interventions had a rating of two (neutral) or higher and most were rated at three or higher suggesting clients support several strategies. Our findings regarding outcome preferences and cuisine preferences could be replicated in larger samples in geographically diverse communities and contextualized through qualitative research.

*CRediT authorship contribution statement*

**Kelseanna Hollis-Hansen:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Sandi L. Pruitt:** Writing – review & editing, Conceptualization. **Jessica Turcios:** Visualization, Project administration, Data curation. **Carolyn Haskins:** Writing – review & editing, Visualization, Project administration, Data curation. **Natalie Valles:** Writing – review & editing, Project administration, Data curation. **Minh-Chau Hoang:** Writing – review & editing, Project administration. **Cayla Nguyen:** Writing – review & editing, Project administration. **Kristen Cooksey-Stowers:** Writing – review & editing.

**Declaration of competing interest**

## Data availability

Data will be made available on request.

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