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Examining the Nutrition Environment of Food Pantries in the San Joaquin Valley During the COVID-19 Pandemic

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Examining the Nutrition Environment of Food Pantries in the San Joaquin Valley
During the COVID-19 Pandemic

A Thesis Submitted In Partial Fulfillment of the Requirements for
the Degree of Master of Science in Public Health

by

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ABSTRACT

Background: Food insecurity rates drastically increased during the COVID-19 pandemic contributing to high demand for emergency nutrition assistance. Prior research indicates emergency food distribution centers mainly offer food with limited nutritional value; since nutritional status may be worse among food insecure families, it is important to conduct research to inform policy and programmatic strategies to address both food insecurity and nutrition-related health disparities during a state of emergency.

Purpose: The study objectives were to: (1) assess the nutritional environment of emergency food distribution centers in the San Joaquin Valley, CA; (2) identify challenges food distribution centers encountered during the pandemic; and (3) provide policy and programmatic recommendations to improve access to and the availability of nutritious food to low-income communities.

Methods: A nutritional assessment was conducted with 19 emergency food centers in the San Joaquin Valley, California. A modified version of the valid and reliable Nutrition Environment Food Pantry Assessment Tool (NEFPAT) was self-administered by food pantries and banks during the pandemic. The six NEFPAT objectives were included, and we developed a seventh component to capture data on challenges encountered during the COVID-19 pandemic. Challenges of distribution sites were identified and differentiated by type of organization (i.e., food bank, food pantry, church).

Results: A total of 19 completed site assessments from 7 counties are included in the analysis. Using the NEFPAT classification score, all were either bronze (16%) or silver (84%). Analyses were stratified by the type of emergency food organization: church (47%) or other food pantry (53%). All sites (i.e., church and other pantries) reported experiencing a decrease in volunteers and staff. However, food pantries experienced an increase in quantity of clients while church pantries struggled with client retention. Logistical challenges were also mentioned, pantries experienced inconsistent food donations. Others expressed high levels of concern about COVID-19 safety but managed to remain open by using a drive-thru distribution model and promoting social distancing with limits on the number of clients allowed inside a building at a time.

Conclusion: Policy recommendations include increasing funding to smaller charitable nutrition assistance sites to support fresh produce access and funding for the implementation of nutrition policy guidelines to improve the food environment. Programmatic recommendations include the adoption for a nutrition ranking system for food pantries, implementation of nudges to improve the selection of healthier food items, and use of valid and reliable data collection instruments to inform decisions to tailor food options that are aligned with the medical/health and social needs of food pantry clients.

INTRODUCTION/BACKGROUND

The dual health issues of food insecurity and obesity disproportionately affect low-income and racially marginalized communities in the U.S., leaving them more vulnerable to chronic diseases in the future. Food insecurity occurs when households have limited access to affordable and nutritious foods (Walsemann, Ro, & Gee, 2017). Low-income, Hispanic households are more likely to experience food insecurity, which can negatively impact their overall health (Hernandez et al., 2017). Although previous research has found that Hispanics had a better quality of diet than non-Hispanic Blacks and whites (Hiza et al., 2013), it is still concerning that food insecurity may worsen the quality of diet. Obesity rates are high among Hispanic populations compared to non-Hispanic whites (Hales et al., 2017), and it has been shown that food insecure Hispanics experience higher obesity rates (Hernandez et al., 2017). Obesity is a public health concern as it is a major risk factor for preventable diseases like diabetes, cardiovascular diseases, hypertension, and dyslipidemia (Leddy et al., 2020). Interventions to promote access to and consumption of nutritious food are needed to address these dual health issues.

Since economic insecurity is the main driver of food insecurity, low-income families are disproportionately impacted by food insecurity and have difficulty purchasing healthier foods (Barnidge et al., 2017; Sanjeevi et al., 2018). Fresh fruits and vegetables tend to be more expensive than nonperishable items and fast food, leaving low-income households struggling to purchase fresh produce (Simmet et al., 2017). Ultra-processed foods, which are foods that are manipulated with ingredients, tend to be more accessible, affordable, and convenient. These types of food are higher in sodium, sugar, and saturated fats and may include food items like candy, chips, soft drinks, packaged frozen dinners, and ready to eat meals (Byker Shanks et al., 2019). In addition, Latinos are more likely to live in poverty as they are more likely to work in low-wage jobs (Ng'andu & Leal Gianfortoni, 2006). Household income impacts the ability to purchase nutritional foods, leaving Latino households to purchase foods with low nutritional value (Murimi et al., 2019) and less fresh produce, fish, and lean meat (Viladrich, 2017). Economic instability impacts the availability and accessibility of nutritious foods, especially during times of emergency, leaving families to turn to food distribution centers for help in feeding their families.

Emergency food distribution centers are places that are designed to receive, handle, and distribute food to the community (Volz & Karitas, 1973); their main purpose is to alleviate hunger (Handforth et al., 2013) among low-income and food insecure households. Emergency food distribution centers are meant to help households with a short-term solution to their food needs (Bazerghi et al., 2016) and are mostly known as food banks and food pantries. Food banks are organizations that receive large quantities of food and may distribute food to charitable agencies like soup kitchens and food pantries (Simmet et al., 2017). While food banks may occasionally open to serve the community directly, food pantries directly provide food to individuals and are often smaller in size (Simmet et al., 2017). Although such distribution centers were created as a short-term solution, there are individuals who access emergency food distribution centers and rely on them for a long-term solution (Martin et al., 2013). A critique of these centers is that many may be distributing emergency food items (e.g., items high in sodium and sugar) that have lower nutritional value (Caspi et al., 2021; Payán, Díaz Ríos, Ramírez & Young, 2021; Simmet, Deoa, Tinnemann, & Stroebale-Benschop, 2017) in communities where rates of obesity and nutrition-related health disparities are already high. Increasing the availability of nutritious foods in emergency food distribution centers is critical to address the

high rates of obesity and to reduce nutrition-related health disparities among people who experience food insecurity.

Impact of the COVID-19 Pandemic on Food Insecurity

During the COVID-19 pandemic in the U.S., food insecurity rates skyrocketed, as workers lost their job or experienced hourly reductions when non-essential businesses were forced to close down, following California's shelter-in-place order (Adams et al., 2021; Niles et al., 2021; Wright et al., 2020). The unexpected loss of income impacted a household's ability to keep up with rent, utility bills, and the purchasing of foods. The pandemic brought additional burdens to households, including the loss of family members and COVID-19-related medical bills, events that negatively impacted economic stability and further hindered the ability to purchase affordable nutritious foods (Castañeda & Bedayn, 2021; Dmitrieva, 2020). Middle- and upper-income families also hoarded food products, making it difficult for low-income households—who purchase smaller amounts more frequently—to feed their families (Kinsey et al., 2020). Households relying on government assistance programs (e.g., SNAP and WIC) were also at a greater disadvantage when items that qualified for payment by these safety net programs were out of stock (Heuer et al., 2020).

Moreover, the pandemic led many K-12 schools to shift to remote learning, and these closures decreased households' access to nutritious food. More than half (60%) of California's schoolchildren—and nearly three-quarters (73%) of those in the San Joaquin Valley—are eligible to receive free or reduced-price school meals; many of these kids rely on school breakfast and lunch (RWJF, 2021). To ensure that students had the availability of meals throughout the weekday, some schools implemented drive-through distributions of free breakfast and lunches to families (Jansen, 2020; Nittle, 2020; Tadayon, 2020). However, many working-families may not have been able to pick up free school lunches for their children, leading students to miss out on healthy school meals (Bonilla-Silva, 2020; Kinsey et al., 2020; Nittle, 2020). Parents, who also relied on school lunches, potentially increased their food budget on meals to feed their children while schools remained closed.

Food distribution centers have played a critical role in helping to feed families during the pandemic. However, these centers faced numerous additional operational and administrative challenges during this time, including: decreases in volunteers, low retail donations (Feeding America, 2020a), and a surge in the number of clients (Cavaliere et al., 2021; Schmidt et al., 2020). Some distribution centers changed their distribution mode from a walk-in model to a drive-through model (Cavaliere et al., 2021). Adapting to social distancing measures and having sufficient quantities of food to meet demand may have been difficult to sustain. Limited research has been conducted on the challenges food distribution centers encountered during the pandemic and how these centers responded. Identifying the challenges and examining adaptations may help to inform strategies or policies to make nutritious foods more accessible to low-income communities, especially during an emergency.

Assessing the Nutritional Quality of Food Distributions

Food distribution centers help meet the need of those who require food assistance. Individuals who seek help from distribution centers include those who cannot access federal assistance (e.g., SNAP or WIC) or those who face food insufficiency (Byker Shanks et al., 2019; Chapnick et al., 2019). Food insufficiency occurs when families do not have enough food to eat within a seven period day (USDA, 2021b). Households who are low-income, and at higher risk of being food insufficient or insecure, may rely on food distribution centers as their main source of food assistance (Bazerghi et al., 2016) while others may access these centers to complement

household food purchases. The use of multiple food pantries is also common among low-income households, the combination of multiple food outlets are utilized to feed these households (Campbell et al., 2011; Greger et al., 2002; Simmet et al., 2017). Despite the recognized utility of food distribution centers to alleviate hunger, minimal research has examined the nutritional quality of foods provided by food distribution centers in the U.S. Low-income households who report to be food insecure have higher risk of obesity and thus a higher risk of developing cancer and other chronic diseases like hypertension and coronary disease (Gregory & Coleman-Jensen, 2017). Thus, understanding the mechanisms through which low-income and food insecure households experience obesity and chronic diseases—including the extent to which food distribution centers may negatively impact dietary health outcomes—is essential.

Food distribution centers may not always offer nutritious options such as enough fruits and vegetables (Chapnick et al., 2019; Nikolaus et al., 2018; Payán et al., 2020); instead, they typically provide ultraprocessed food items, which tend to last longer (i.e., ready to eat foods that are high in sodium and sugar). Canned goods and dry foods are also commonly distributed items because they are shelf-stable or non-perishable, meaning that they do not need refrigeration so they last longer (Morello, 2020; Wie & Giebler, 2013). However, pantries must consider the sodium, sugar, and levels of saturated fats on these canned goods. Findings suggest that food banks and pantries primarily rely on nonperishable foods to help meet the demand with food. Sites that provide perishable and healthier items tend to vary and may not always provide a consistent supply of nutrient quality food (Byker Shanks et al., 2019, 2020).

Simmet and colleagues (2017) conducted a systematic literature review summarizing the nutritional quality of food bags distributed by food pantries in Canada, U.S., and Australia. Most food included in the distributed bags were nonperishable staple foods. However, specifically for the studies conducted in the U.S., none of the studies included in this review examined the nutritional quality of the food being provided to pantry clients except for Friedman (1991). In this study, Friedman (1991) collected data from one rural and three urban food distribution centers and assessed the nutritional value of food using the Recommended Dietary Allowance (RDA) of 1989, all of which distributed food boxes intended to last 3 days. It was found that most of the food provided by urban and rural sites had an adequate amount of nutrients compared to the RDA. However, minor differences were highlighted, for example, urban sites provided greater amounts of food that were high in riboflavin, niacin, vitamin C, iron, and fiber compared to rural sites. Also, nutrient supply (i.e., carbohydrate, protein, sodium, and phosphorus) decreased as the number of people served by box increased. The other two studies within this systematic review only assessed whether food provided was adequate enough for pantry users (Akobundu et al., 2004; Greger et al., 2002). In the study conducted by Greger et al., (2002), volunteers used the RDA to assemble nutritionally balanced food bags using food available at the pantry which supposed to be sufficient for three days for a household of four adults. Both pantries assessed had an adequate supply of food, however, it was determined that the food bags lacked items with sufficient micronutrients like vitamin A, vitamin B, and calcium.

Similar to the latter finding, in the study conducted by Akobundu et al., (2004), only one food pantry out of a sample of 19 demonstrated to have an inadequate amount of food distributed for the number of days intended to last. Akobundu and colleagues (2004) examined the nutritional quality of 19 food pantries by evaluating the number of days an individual met the minimum food recommendations of the Food Guide Pyramid and examined the nutrient density of the foods offered at the pantry. It was found that the foods distributed had an adequate amount

of protein, fiber, iron, and folate but lacked foods with micronutrients like calcium, vitamin A, and vitamin C.

Recent research indicates there is a lack of nutritious options at emergency food distribution centers. Bryan et al., (2019), examined the overall nutritional quality of foods and drinks provided in food pantries in the Bronx, New York. Their results demonstrated that a third of the pantries lacked food availability from at least one of the five MyPlate.gov food-groups. In some cases, pantries who offered foods in all the five MyPlate food-groups may not have products with high nutritional quality (e.g., canned fruit cocktail in syrup). They also found that the type of quality of fruits and vegetables were related to the distribution method and food supplier. For example, pantries where clients were allowed to choose their food offered more fresh vegetables because they partnered with local farms and organizations that provided fresh produce. More traditional pantries where food was pre-bagged provided more shelf-stable items provided by food banks (i.e., processed items like sauces, soups, and canned fruits and vegetables). Similarly, Byker Shanks et al. (2020) utilized a case study approach to evaluate the nutrition quality of two food pantries in Montana through the use of the Healthy Eating Index-2015. The Healthy Eating Index was developed and evaluated by the National Cancer Institute and the USDA to assess the level of healthfulness of foods in relation to the Dietary Guidelines for Americans (Byker Shanks et al., 2020), which are a set of food-based recommendations that promote a healthier diet (USDA, 2021a). They found that the majority of the food distributed to clients were ultraprocessed and only one third were fresh produce or staple items. Staple items are foods that are needed to cook and cannot be eaten alone like vegetable oil, butter, sugar, etc. (Byker Shanks et al., 2019).

Nanney et al. (2016) assessed the nutritional quality of food ordered by two food bank warehouses in Minnesota and food pantries they supply. The Healthy Eating Index-2010 was used and rated each food bank/pantry within the ‘needs improvement’ (89%), ‘good’ (2%), or ‘needs substantial improvement’ (9%) category. The lowest scored food categories were whole grains, dairy, total fruits, whole fruits, sodium, and refined grains. Findings also identified that larger food distribution centers were more likely to have healthier foods, had policies in place for purchasing, and received less donations than smaller sites.

Few studies have found that emergency food sites distribute healthy options to clients. Findings from one study in Illinois revealed that 96% of pantries offered canned fruits and vegetables but only 69.2% met the healthier food standards (Nikolaus et al., 2018). Caspi, et al. (2021), conducted a cross-sectional analysis of 16 urban and rural food pantries in Minnesota using the Healthy Eating Index-2015. They found that the diet quality scores of the food pantry were not associated with the foods selected by clients. A major limitation of this study was the lack of generalizability because the pantries chosen to participate may have had healthier food compared to other pantries in the U.S. Additionally, results from this study were not compared by urban and rural food pantries, which calls for an examination of pantries located in a rural location, such as the San Joaquin Valley in California.

A paradox of abundance

California’s San Joaquin Valley (SJV) is a 27,478 square-mile region in the geographic center of the state. Within California, the San Joaquin Valley (SJV) has disproportionately high rate of food insecurity—pre-pandemic, 13% of householders in the SJV were food insecure, compared to 11% statewide (Robert Wood Johnson Foundation [RWJF], 2021). The high rate of food insecurity is puzzling since the SJV is an agricultural-based community and contributes to 40% of organic produce in California and 28% of exported commodities like almonds,

pistachios, dates, garlic, and walnuts (Agriculture, 2016). Adults in the SJV also have higher obesity rates (32%) in comparison to California (24%) (RWJF, 2021). In addition, a large amount of immigrant (35%) and Latino-headed households (52%) are living in the SJV, and immigration status and race/ethnicity are both associated with food insecurity (Kissam, Mines, Quezada, Intili, & Wadsworth, 2019). Walsemann and colleagues (2017) report that non-legal permanent resident Latinos have higher risk of food insecurity than their naturalized/legal permanent resident counterparts. To my knowledge, this is the first study that focuses on assessing the nutritional environment of food pantries in the San Joaquin Valley and assesses the challenges that food distribution centers experienced during COVID-19.

Research Aims

Assessing the nutritional quality and environment of emergency food distribution centers can reveal opportunities to increase the availability of nutritious items in disadvantaged communities. The specific aims of this study are:

1. To examine the food environment of food distribution centers in the San Joaquin Valley;
2. To identify challenges food distribution centers are facing during the COVID-19 pandemic; and
3. To provide policy and programmatic recommendations to improve access to and the availability of nutritious food to low-income communities.

METHODOLOGY

This study uses a cross-sectional, quantitative survey design with convenience sampling. The survey included open-ended questions therefore qualitative data was also obtained and analyzed in the results.

Recruitment and Data Collection

A list of food distribution centers was compiled through an Internet search for each of the eight SJV counties in August 2020-June 2021. The name of the site, address, phone number, and email were extracted from public websites and listed on an excel by county. Eligibility criteria for food distribution centers included being open: (1) to the general public, and (2) at least once a week. Food distribution centers were eligible if located in one of the eight SJV counties: Merced, Stanislaus, San Joaquin, Madera, Fresno, Kings, Tulare, and Kern County.

The lead researcher contacted potentially eligible distribution sites by phone or email to explain the project and ask for their permission to participate. Sites that agreed to participate were asked if a key staff member or volunteer could respond to the instrument. Respondents either completed the Qualtrics survey link sent by email or completed the assessment over the phone with the lead researcher. Upon completing the assessment, a \$50 e-gift card was emailed. Study procedures and materials were approved by the UC Merced's Institutional Review Board (IRB). Recruitment of food distribution centers began in September 2020 and ended in August 2021.

Data Collection Instrument

NEFPAT Tool

This study used the Nutrition Environment Food Pantry Assessment Tool (NEFPAT), a validated and reliable tool developed and evaluated by Nikolaus and colleagues (2018) that has helped assess the food environment and the use of recommended practices in food pantries. The assessment uses the Foods to Encourage (F2E) Guidelines by Feeding America Pantries, which were created by hunger, nutrition, food bank, and food policy experts. The F2E guidelines encourage the access to healthier food choices by organizing and ranking products according to

the amount of saturated fats, sodium, and added sugar the food item contains (America, 2020). Per observation, there are also certain items in the NEFPAT tool that allude to the Dietary Guidelines for Americans (i.e., MyPlate). The six objectives of the NEFPAT tool are to: (1) increase client choice, (2) nudge for healthful foods, (3) diversify the form of fruit/vegetables (e.g., fresh, canned, frozen), (4) diversify the types of fruits/vegetables (e.g., orange, yellow, green), (5) promote additional resources, and (6) accommodate alternative eating patterns. Objectives 1-3 and 5 are scored at a maximum of 8 points each. Objective 4 has a maximum of 10 points and objective 6 has a maximum of 5 points. Overall, pantries can score up to 47 points (bronze 0-15, silver 16-31, and gold 32-47).

NEFPAT objective 1 includes items to evaluate strategies organizations use to offer clients choices and variety (See Appendix A). The items include whether clients can select their own foods and if distribution is set up as “grocery store” style. Accessibility and availability of nutritious food is evaluated by whether sites allow clients to pick up food more than once per month, if they offer food items from the five food groups, encourage nutritious donations, seek out donations from gardeners/farmers, and whether policies are in place when purchasing food and for proper food safety.

Objective 2 items evaluate whether food sites employ “nudges” as one of their strategies to encourage nutritious food options, like offering recipes and food samples, promotional materials, and altering how food is presented.

Items for the third objective focus on evaluating the different forms of fruits and/or vegetables that food sites offered their clients (i.e., fresh, canned, frozen, dried, and/or in juice). Similarly, objective 4 items focus on learning what types (i.e., color) of fruits and/or vegetables the food sites provided for clients. Food sites marked whether they offered one or more than 2 types of each color: red, yellow/orange, white or tan/brown, green, and blue/purple fruits or vegetables.

Items for the fifth objective focus on additional resources promoted in food sites. Topics include community and government food resources, nutrition education for clients, healthcare resources, and other self-improvement resources. Since food allotment may not be sufficient for a long-period, community and government resources may complement the lack of enough food resources.

Items to evaluate the last objective focus on alternate eating patterns which include nutrition education for volunteers and the evaluation of culturally appropriate food options for diverse groups of clients.

Development of a Novel COVID-19 Objective

No previous survey tools were found to examine the transition of food pantries during a state of emergency (i.e., pandemic). Therefore, formative research was conducted to develop a new objective to capture information on challenges food distribution centers encountered during the pandemic (See Appendix B). This new objective had six sub-components and were a mixture of multiple choice, yes/no answer choices, and open-ended questions. For questions that were multiple choice, respondents were allowed to mark all that applied, for example, pantries were asked about the type of distribution mode(s) offered at the pantry (i.e., home-delivery, drive-thru distribution, mobile markets, walk-in/in-person, and/or other). Pantries were also asked about the type of donations accepted during the pandemic (i.e., money, perishable food, non-perishable food, and/or other) and about the organizations their pantry accepted donations from (i.e., local gardeners, farmers, gleaning groups, grocery stores, and/or other). Another question listed potential challenges that pantries may have experienced during the pandemic from which survey

respondents were required to mark “yes” or “no” for each item on the list. Two other questions asked pantries to reflect upon the number of personnel and the number of partnerships they had during the pandemic and respond whether these had increased, decreased, or stayed the same. Lastly, there were three open-ended questions which asked about the biggest challenge faced by the pantry during the pandemic, additional challenges that may have not been included in the list of challenges, and something the pantry was proud of overcoming.

The new objective was developed with a gray literature search of emerging reports (Carson, 2020; De et al., n.d.; Kinsey et al., 2020) and review of SJV newspaper articles (Kulish, 2020; Mink, 2020; Rivera, 2020; Schock, 2020; Thompson, 2020; Tobias & Rodriguez, 2020; Ugwu-Oju, 2020). Informal meetings with five CARE emergency food distribution sites and former emergency food distribution director in the SJV were conducted between July 2020-September 2020. These meetings asked about their experiences working at food distribution centers and served as a purpose to learn how food sites managed their programs. In addition, notes from a “Food Access” talk hosted by CARE Innovation in July 2020 was used to learn more about the transition and challenges of distribution sites during COVID-19.

Food sites were identified by type of distribution center: church pantry or other pantry. If a church organization had a food pantry at their site, they were coded as church pantry. Any other pantries not based at a church were coded as “other” pantry. Per observation, church pantries rely on monetary and food donations primarily from church members and other food pantries rely on USDA and private grants.

Data Analysis

Survey data was downloaded into an excel sheet from the Qualtrics system. Data was cleaned, and a quantitative codebook was created prior to analyses. The codebook included the variable name, the variable label, the NEFPAT/survey questions, and a mixture of dichotomous, categorical, and continuous variables. Descriptive statistics and data analysis were performed using Stata 17 (Stata Corp). The mean and standard deviation were calculated for continuous variables and counts and percentages were calculated for categorical and dichotomous variables (Nikolaus et al., 2021).

Data collected to answer Aim 1 was analyzed using the original NEFPAT tool score range for objectives 1-6. Sites received a score between 0 to 47 points (without the new objective). Three NEFPAT standards were used to classify the healthful level of the food distribution centers, which include: bronze (0-15), silver (16-31), and gold (32-47). Fisher’s Exact Test was used to measure association between food pantry type and NEFPAT scores, the p-value threshold set at $<.05$. The seventh component, which was developed as part of this study, is not part of the cumulative score. The seventh component was analyzed independently from objectives 1-6 of the NEFPAT.

Quantitative survey data was analyzed using a Fisher’s Exact Test to measure the association between food pantry type and challenges each distribution site experienced. A Chi-Square Test was performed to assess the relationship between the type of site and the sources of food, funding donated to these sites, and languages served. Further, the Mann-Whitney U test was used to compare continuous variables such as the overall NEFPAT score and individual objectives. The threshold for statistical significance was set at $p \leq .05$.

Themes were created to simplify the reporting for each of the objectives in the NEFPAT tool (1-6). Objective 1 had five themes within: client choice, accessibility, availability, nutritious food donations, and nutrition policies. Client choice was related to sub-objectives 1.1 and 1.2. Accessibility refers to sub-objectives 1.3 and availability was related to sub-objective 1.4. Next,

nutrition food donations was related to sub-objectives 1.5 and 1.6 and the nutrition policies theme was based off sub-objectives 1.7 and 1.8.

The results for objective 2 were separated within three themes: recipes and food samples, promotional materials, and display of food items. Recipes and food samples consisted of sub-objectives 2.1 and 2.2. The theme on promotional materials included sub-objectives 2.3 and 2.4. The rest of sub-objectives 2.5-2.8 were reported under the theme display of food items.

There were five themes within objective 3: fresh fruits and vegetables, canned fruits and vegetables, frozen fruits and vegetables, dried fruits and vegetables, and fruit and/or vegetable juice. Sub-objective 3.1 was part of the first theme. Canned fruits and vegetables included sub-objectives 3.2 and 3.3. Next, the theme on frozen fruits and vegetables consisted of sub-objectives 3.4 and 3.5. Sub-objectives 3.6 and 3.7 were included in the theme for frozen fruits and vegetables and sub-objective 3.8 was organized under fruit and/or vegetable juice.

The fourth objective was not analyzed by themes, as they were already separated by color of fruits and vegetables. Objective 5 had four themes: community and government food resources, nutrition education for clients, healthcare resources, and self-improvement resources. Community and government food resources encompassed sub-objectives 5.1, 5.3, and 5.4. The theme of nutrition education for clients covered objective 5.2. The theme on healthcare resources included sub-objectives 5.5 and 5.6. The last theme of objective 5, self-improvement resources, comprised of sub-objectives 5.7 and 5.8.

Lastly, there were two themes in objective 6: nutrition education for volunteers and cultural and diverse food options. Nutrition education for volunteers was related to sub-objective 6.1. The theme on diverse food options encompassed the rest of sub-objectives 6.2-6.5.

A content analysis was conducted to analyze the open-ended questions from the new COVID-19 component. The questions that were analyzed were about the primary challenges and successes experienced by distribution site during COVID-19. This data was extracted to a table created on Word and the responses were separated by food pantry or other pantry. A line-by-line coding was utilized and analyzed following the categories from the quantitative analysis.

RESULTS

Sample Characteristics

A total of 24 assessments were completed, however some sites were excluded. Two sites did not directly provide food, one only distributed food once a month, and two were food banks. The total sample included in data analyses was N=19. A majority of sites were in Merced, San Joaquin, and Stanislaus Counties (58% or n=11) with at least one site from Fresno, Kings, Madera, Kern, and Tulare counties (42% or n=8).

Table 1 provides the characteristics of food pantries by type of organization and overall. Nine were church-based food pantries (47%) and 10 were other types of food pantries (53%). Food pantries obtained food from an average 3.37 sources (S.D.=1.46) and an average of 2.58 sources of funding (S.D.=1.64). Most pantries, regardless of type of organization, received food donations from food banks and funds from private donors. "Other" sources of funding were statistically significant among church pantries than other pantries which included church member cash donations (p=.033, FET). No other differences were statistically significant by type of organization.

TABLE 1. Characteristics of food pantries by type of organization (church food pantry, other food pantry) and total

	Church Food Pantry n=9	Other Food Pantry n=10	Total Pantries N=19
Characteristic	Mean (SD)	Mean (SD)	Mean (SD)
No. of food sources	3.44 (1.24)	3.3 (1.70)	3.37 (1.46)
No. funding sources	3 (1.32)	2.2 (1.87)	2.58 (1.64)
	n (%)	n (%)	p-value
Sources of food (select all that apply)			
Food bank	7 (78%)	8 (80%)	0.906
Faith-based organizations	5 (56%)	4 (40%)	0.498
Nonprofit organizations	5 (56%)	4 (40%)	0.498
Government	2 (22%)	5 (50%)	0.210
Private donors	4 (44%)	5 (50%)	0.809
Commercial businesses	2 (22%)	3 (30%)	0.701
Community groups	4 (44%)	3 (30%)	0.515
Other	2 (22%)	1 (10%)	0.466
Sources of funds (select all that apply)			
Food bank	0 (--)	0 (--)	--
Faith-based organizations	4 (44%)	5 (50%)	1.000
Nonprofit organizations	1 (11%)	1 (10%)	1.000
Government	1 (11%)	6 (60%)	0.057
Private donors	8 (89%)	6 (60%)	0.303
Commercial businesses	4 (44%)	2 (20%)	0.350
Community groups	6 (67%)	2 (20%)	0.070
Other	4 (44%)	0 (--)	0.033*

Healthfulness of Food Sites

Table 2 provides the results of the NEFPAT assessment by type of organization and overall. In sum, 14% of distribution centers were classified as bronze, 86% classified as silver, and none met the “Gold” standard, suggesting room for improvement for all organizations (see Table 2). The NEFPAT classification score did not differ by type of organization. A majority of church-based pantries (89%) and other food pantries (80%) were in the silver category. The average NEFPAT score (range: 0-47) for each type of organization was: 18.89 for church-based food pantries and 18 for other food pantries out of a possible 47 points. Results indicate that, on average, all sites are on the lower scale of the silver category. Findings reveal that the food environment and quality of food items offered at pantries are similar across type of organization (i.e., church food pantry or other food pantry). Differences within each objective (1-6) were also not statistically significant (Table 2).

TABLE 2. Results from the NEFPAT assessment by type of organization and overall

	Church Food Pantry n=9	Other Food Pantry n=10	Total Pantries N=19	p-value
NEFPAT Score, mean (median)	18.89 (19)	18 (17.5)	18.42 (18)	0.742
Average Score, mean (median)				
Objective 1 (0-8)	3.78 (5.00)	3.70 (3.50)	3.74 (4.00)	0.386
Objective 2 (0-8)	1.22 (0.00)	1.50 (1.50)	1.37 (1.00)	0.741
Objective 3 (0-8)	5.33 (5.00)	4.20 (4.50)	4.74 (5.00)	0.836
Objective 4 (0-10)	4.67 (4.00)	5.00 (5.00)	4.84 (5.00)	0.391
Objective 5 (0-8)	2.56 (3.00)	2.40 (2.00)	2.47 (2.00)	0.847
Objective 6 (0-5)	1.33 (1.00)	1.20 (1.50)	1.26 (1.00)	0.356
Category (score), n (%)				
Gold (32-47)	0 (--)	0 (--)	0 (--)	1.000
Silver (16-31)	8 (89%)	8 (80%)	16 (84%)	
Bronze (0-15)	1 (11%)	2 (20%)	3 (16%)	

Objective 1: Increase Client Choice for Nutritious Options

Table 3 provides the results for the number of sites that implemented strategies for Objectives 1-6 by type of organization. For objective 1, average scores were below 4 points (maximum 8 points) for all types of sites (M=3.74, Median=4.00), suggesting a need for improvement to increase client choice for nutritious options. Church food pantries (M=3.78, Median=5.00) and other food pantries (M=3.70, Median=3.50) scored slightly lower on average. The results of the Mann-Whitney U (MWU) test indicate that the difference is not statistically significant between church food pantries and other food pantries for objective 1 (p=.386), however there were observational distinctions across sub-objectives.

Client Choice. Only 22% of church pantries and 40% of other pantries allowed clients to choose their food items. Other food pantries were more likely to offer a “grocery shopping” style distribution than church pantries.

Accessibility. More than half of church pantries (78%) allowed clients to pick up food more than once per month, which is an indicator for accessibility. Only 40% of other pantries allowed clients to pick up food more than once per month.

Availability. A majority of church pantries (67%) and other pantries (70%) offered items from each of the five food groups (i.e., fruits, vegetables, grains, protein, and dairy).

Nutritious Food Donations. A high percentage of church pantries (67%) encouraged nutritious donations, such as distributing a list of suggested items or asking donors to provide only certain foods. Half of other types of pantries also practiced this strategy. Only 44% of church pantries and 30% of other pantries sought out donations from local gardeners/farmers, which is a potential area for improvement.

Nutrition Policies. Only about a third of church pantries and other pantries established nutrition policies for purchasing food items. About 67% of church pantries and 80% of other pantries had a policy related to proper food safety.

Objective 2: Market & “Nudge” Healthful Products

Scoring for objective 2 was below 2 points (maximum 8 points) for all sites (M=1.37, Median=1.00), indicating a need for improvement in using nudge strategies to promote selection

of healthful products. Other food pantries scored the highest (M=1.50, Median=1.50) and church pantries scored the lowest (M=1.22, Median=0.00). There was no statistical significance across sites for objective 2 and only minimal differences across sub-objectives (p=.741, MWU). **Recipes and Food Samples.** Only one church pantry and one of the other pantries mentioned providing recipes that included F2E items. Similarly, only one church pantry (11%) and none of the other pantries offered food samples to their clients.

Promotional Materials. Across all sites, only one church pantry (5% of sites) provided MyPlate or other healthy eating materials that promoted F2E such as posters, fliers, and/or window stickers. None of the sites displayed or hung materials supporting F2E such as nutrition information.

Display of Food Items. Less than half of the church pantries (44%) and other pantries (30%) reported pairing F2E items in a bundle as a meal (e.g., rice and beans). Only 22% of church pantries and 50% of other pantries reported being stocked with F2E which appeared to be abundant. Only one church pantry and 30% of other pantries displayed F2E items at the eye-level of average clients and F2E items at eye-level upon entering the pantry.

Objective 3: Provide Various Forms of Fruits and/or Vegetables

The scoring for objective 3 was higher than other objectives, with scores averaging at or below 5 points (maximum 8 points) (M=4.74, Median=5.00). Church pantries scored the highest (M=5.33, Median=5.00) and other pantries scored the lowest (M=4.20, Median=4.50), suggesting that there is still need for improvement in the forms that fruits and/or vegetables are provided. There was no statistical significance across sites for objective 3 and only minimal differences across sub-objectives (p=.836, MWU; Table 3). **Fresh Fruits and Vegetables.** More than half of church pantries (89%) and other pantries (70%) offered fresh fruits and vegetables to their clients during distribution days.

Canned Fruits and Vegetables. All church pantries provided clients with canned fruits and/or vegetables compared to 70% of other food pantries. Although all church pantries offered this option, only 78% of canned fruits and/or vegetables fit the F2E requirements (i.e., fruits in lite syrup or juice or ≤ 12 Sugar and/or vegetables with ≤ 230 mg Sodium and ≤ 2 g saturated fats). Other pantries had a slight decrease with only 60% of canned fruits and/or vegetables meeting F2E requirements.

Frozen Fruits and Vegetables. A majority of church pantries (56%) distributed frozen fruits and vegetables from which only 33% met the F2E requirements (i.e., fruits in lite syrup or juice or ≤ 12 Sugar and/or vegetables with ≤ 230 mg Sodium and ≤ 2 g saturated fat). Only 30% of other pantries offered frozen fruits and vegetables that met the F2E requirement.

Dried Fruits and Vegetables. More than half of church pantries (56%) included dried fruits and/or vegetables in their food distribution but only 33% met the F2E requirements (i.e., ≤ 12 Sugar, ≤ 230 mg Sodium and ≤ 2 g saturated fats). Similarly, half of other pantries offered dried fruits and/or vegetables but only 40% met the F2E requirements.

Fruit and/or Vegetable Juice. Most of the church pantries (89%) and other pantries (70%) offered 100% of fruit or vegetable juice.

Objective 4: Provide Various Types of Fruits and/or Vegetables

On average, the scoring was at or below 5 points (maximum of 10) for all sites (M=4.84, Median=5.00) which calls for an expansion in the variety of colors offered for fruits and vegetables. Other pantries scored the highest (M=5.00, Median=5.00) and church pantries scored the second highest (M=4.67, Median=4.00). There was no statistical significance across sites for objective 4 and only minimal differences across sub-objectives (p=.391, MWU; Table 3).

Church pantries more commonly offered at least one type of red fruit/vegetables (89%), green (89%), yellow/orange (67%), and white or tan/brown (67%). Blue/purple were the least common items (22%). Very few church pantries offered two or more types of items in one color category, specifically 56% of those who mentioned they offered green fruits and vegetables, offered their clients with two or more green items.

There was more stability within the colored items offered by other pantries. These pantries offered at least one type of red, yellow/orange, and green fruits and vegetables (70%) and 40% offered more than two types of items within each color. White or tan/brown was also a popular color (70%), however only 20% offered more than two types of fruits and vegetables. Blue/purple fruits and vegetables were the least common color (60%) and at least 20% of other pantries offered more than two types.

Objective 5: Promote Additional Resources

Average scores were below 3 points (maximum of 8) for all sites (M=2.47, Median=2.00), with church pantries scoring the highest (M=2.56, Median=3.00) and other pantries the lowest (M=2.40, Median=2.00). There was no statistical significance across sites for objective 5 and only minimal differences across sub-objectives ($p=.847$, MWU; Table 3).

Community and Government Food Resources. A majority of church pantries (44%) and other pantries (50%) reported providing clients with information on SNAP, WIC, Senior Farmers Market coupons or other low-income resources. The promotion or provision of mobile markets was less common as only a third of church pantries and other pantries offered this resource. Even less sites offered clients with onside gardening or other gardening resources (11% of church pantries and 30% of other pantries).

Nutrition Education for Clients. Results also found that about one in every five church pantries and other pantries provided nutrition education to clients. These nutrition education classes counted if they provided them at their site or partnered with other organizations.

Healthcare Resources. About half of church pantries (56%) and other pantries (50%) provided clients with information on Medicaid/affordable healthcare. The promotion or provision of health screenings were even lower among church pantries (22%) and other pantries (20%).

Self-improvement Resources. Findings highlight that 22% of church pantries and 20% of other pantries provided employment assistance information for clients. In addition, 44% of church pantries and 20% of other pantries provided other educational and/or self-improvement resources.

Objective 6: Plan for Alternate Eating Patterns

Average scores for objective 6 were below 2 points (maximum of 5) for all sites (M=1.26, Median=1.00). Church pantries scored the highest (M=1.33, Median=1.00) and other pantries scored the lowest (M=1.20, Median=1.50). There was no statistical significance across sites for objective 6 and only minimal differences across sub-objectives ($p=.356$, MWU; Table 3).

Nutrition Education for Volunteers. Only 33% of church pantries and 20% of other pantries provided their volunteers with nutrition education.

Cultural and Diverse Food Options. Very few of the church pantries (11%) and other pantries (40%) reported using the Commodity Supplemental Food Program (CSFP) to provide food tailored for low-income elderly clients. Labeling sections for specific food items (e.g., gluten free, dairy free, no/low sodium, vegetarian, and/or no-prep-required options) was not common among church pantries (22%) and other pantries (10%).

More than half of church pantries (56%) and only 40% of other pantries provided clients with diverse options for protein such as tofu, beans, fish, and peanut butter. However, only one church pantry and one other pantry provided culturally diverse foods like Kosher, Halal, or foods from ethnic cuisines.

TABLE 3. Number of sites that implement strategies for Objectives 1-6 by type of organization

	Church Food Pantry n=9	Other Food Pantry n=10	p-value
Objective 1: Increase Client Choice for Nutritious Options			
1.1. Client choice of F2E	2 (22%)	4 (40%)	0.628
1.2. Grocery “shopping style” distribution	0 (--)	3 (30%)	0.211
1.3. Clients may receive food more than once per month	7 (78%)	4 (40%)	0.170
1.4. Items offered for each of the five groups (fruits, vegetables, grains, protein, dairy)	6 (67%)	7 (70%)	1.000
1.5. Encourages nutritious donations	6 (67%)	5 (50%)	0.650
1.6. Food pantry seeks donations from local gardeners/farmers or community gardens	4 (44%)	3 (30%)	0.650
1.7. Pantry uses nutrition policy for purchasing food	3 (33%)	3 (30%)	1.000
1.8. A policy is in place for proper food safety	6 (67%)	8 (80%)	0.628
Objective 2: Market & “Nudge” Healthful Products			
2.1. Recipes featuring F2E are available to clients	1 (11%)	1 (10%)	1.000
2.2. Offers food samples to clients	1 (11%)	0 (0%)	0.474
2.3. F2E healthy eating materials are visible	1 (11%)	0 (0%)	0.474
2.4. Displays/hangs supporting materials for F2E	0 (--)	0 (--)	--
2.5. Display food items together as a meal	4 (44%)	3 (30%)	0.650
2.6. F2E are stocked to appear abundant	2 (22%)	5 (50%)	0.350
2.7. F2E are displayed to be viewed at eye-level	1 (11%)	3 (30%)	0.582
2.8. F2E item(s) are within eyesight upon entering the pantry	1 (11%)	3 (30%)	0.582
Objective 3: Provide Various Forms of Fruits and/or Vegetables			
3.1. Fresh	8 (89%)	7 (70%)	0.582
3.2. Canned (Any type, no rust and minimal dents)	9 (100%)	7 (70%)	0.211
3.3. Canned (fruit in lite syrup or juice)	7 (78%)	6 (60%)	0.628
3.4. Frozen (Any type, no frostbite)	5 (56%)	3 (30%)	0.370
3.5. Frozen (low sodium/low sugar)	3 (33%)	3 (30%)	1.000
3.6. Dried (any type, no mold and packaging intact)	5 (56%)	5 (50%)	1.000
3.7. Dried (low sodium/low sugar)	3 (33%)	4 (40%)	1.000
3.8. Juice (100% fruit or vegetable juice)	8 (89%)	7 (70%)	0.582
Objective 4: Provide Various Types of Fruits and/or Vegetables			
4.1. Red	8 (89%)	7 (70%)	0.582
More than 2 types	1 (11%)	4 (40%)	0.303
4.2. Yellow/Orange	6 (67%)	7 (70%)	1.000

More than 2 types	3 (33%)	4 (40%)	1.000
4.3. White or Tan/Brown	6 (67%)	7 (70%)	1.000
More than 2 types	2 (22%)	2 (20%)	1.000
4.4. Green	8 (89%)	7 (70%)	0.582
More than 2 types	5 (56%)	4 (40%)	0.656
4.5. Blue/Purple	2 (22%)	6 (60%)	0.170
More than 2 types	1 (11%)	2 (20%)	1.000
Objective 5: Promote Additional Resources			
5.1. Provides information low-income food resources	4 (44%)	5 (50%)	1.000
5.2. Provides nutrition education to clients	2 (22%)	2 (20%)	1.000
5.3. Promotes or provides mobile markets	3 (33%)	3 (30%)	1.000
5.4. Has onsite garden or other gardening resources	1 (11%)	3 (30%)	0.582
5.5. Provides Medicaid/affordable health care information	5 (56%)	5 (50%)	1.000
5.6. Promotes or provides health screenings	2 (22%)	2 (20%)	1.000
5.7. Provides employment assistance information	2 (22%)	2 (20%)	1.000
5.8. Provides other educational/self-improvement resources	4 (44%)	2 (20%)	0.350
Objective 6: Plan for Alternate Eating Patterns			
6.1. Pantry volunteers receive nutrition education	3 (33%)	2 (20%)	0.628
6.2. Uses Commodity Supplemental Food Program (CSFP) to tailor food for low-income elderly clients	1 (11%)	4 (40%)	0.303
6.3. Sections for specific foods are labeled	2 (22%)	1 (10%)	0.582
6.4. Provides diverse options for protein	5 (56%)	4 (40%)	0.656
6.5. Provides culturally diverse foods	1 (11%)	1 (10%)	1.000

Food Distribution Environment and Challenges Encountered during COVID-19

The seventh objective of the NEFPAT assessment focused on collecting information about food distribution during COVID-19 and challenges encountered. Only 18 sites are included in the analysis for this objective because one pantry did not complete these questions. Table 4 displays the various challenges encountered during COVID-19 by type of organization. An increase in the quantity of clients was statistically significant where 100% of other food pantries experienced this challenge compared to 44% of church pantries (p=.029, FET).

TABLE 4. Various challenges encountered during COVID-19 by type of organization

	Church Food Pantry n=9	Other Food Pantry² n=9	p-value
Challenges¹, n (%)			
Loss of volunteers	8 (89%)	8 (89%)	1.000
Difficulty implementing COVID-19 precautions	6 (67%)	7 (78%)	1.000
Loss of distribution sites	1 (11%)	5 (56%)	0.131
Increased quantity of clients*	4 (44%)	9 (100%)	0.029*
Increased demand for food	7 (78%)	9 (100%)	0.471
Decreased food donations	1 (11%)	5 (56%)	0.131
Increased operational costs	2 (22%)	7 (78%)	0.057
Concerned for funding	3 (33%)	6 (67%)	0.347
Unable to provide health education sources	4 (44%)	5 (56%)	1.000
Unable to provide nutritious food sources	3 (33%)	1 (11%)	0.576
Unable to acquire sufficient fruits and vegetables	4 (44%)	2 (22%)	0.620

¹The survey question provided a list of challenges and pantries responded whether they experienced these challenges (yes/no). ²One pantry from the “other food pantry” did not complete the seventh objective and was excluded from this analysis.

Table 5 is a summary of the client and food pantry characteristics during COVID-19 by type of organization. The table shows that all pantries reported serving clients who spoke English or Spanish, while fewer also reported serving clients who spoke Chinese, Hindu, Punjabi, and Hmong.

In terms of mode of distributing food, walk-in/in-person was the most popular mode followed by a drive-thru model during COVID-19. A few pantries mentioned using alternate distribution modes, including a pantry that left a bag of food in front of a church with a family name or a food pantry with a community fridge.

Responses to open-ended items suggest a shift in distribution mode introduced logistical challenges, primarily among other food pantries. Transitioning to new COVID-19 measures caused delays on food distribution days and decreased in-person interactions with clients. For example, a non-church pantry in the San Joaquin County mentioned that “learning how to limit contact with the public and still be effective” was challenging. A pantry in Merced County experienced similar challenges while transitioning to a drive-thru model, which led to additional traffic on distribution days: “Because we switched to a drive through model, we were also having some trouble with traffic control during the distributions.” Another pantry in Merced County found it difficult to limit the number of people allowed in the center at a single time.

More than half of the sites agreed that money, perishable food items, and non-perishable food items were accepted donation items during COVID-19 (Table 5). Churches that marked “other” in the expanded donation options mentioned they fundraised to maintain their pantry, while one mentioned they accepted frozen food as well. Qualitative results reveal that all sites were in need of financial support and expanded donation options. Many pantry sites encountered

a lack of funding to meet the high demand for nutrition assistance during the pandemic. A church pantry in Stanislaus County shared they often relied on the church members for monetary and food donations to maintain their pantry. A church pantry (Tulare County) mentioned, “Funding is a worry. There aren't a lot of grants that match with what we do here. [There is a] lack of funding availability in this area.” A pantry in Stanislaus County mentioned concerns over the lack of funding and felt pressure meeting their program numbers:

...our site is not funded to do any of these [food] programs, but we do them because there is need. It is hard at times to maintain the pantry and still meet the numbers for the programs we are actually funded to do (Pregnancy classes, school readiness classes, CalFresh enrollment, mental health awareness/prevention, utility assistance, etc.).

Seventy-eight percent of other food pantries also mentioned an increase in operational costs compared to only 22% of church pantries (Table 4). Qualitative results reveal a specific need for equipment to provide fresh produce to clients. A church pantry from Merced County shared, “We do not have a refrigerator to take in fresh fruits and vegetables.” A food pantry in San Joaquin County mentioned needing a reefer truck—a refrigerated truck designed to carry perishable food items—to help increase the availability of fresh fruits and vegetables in their community.

Nearly all church pantries (89%) and other pantries (100%) reported accepting donations from grocery stores. Gardeners, farmers, and gleaning groups were also common across all sites. In addition to the mentioned entities, one church pantries considered church members as a partnership and one accepted food from other food pantries. Although many sites received monetary and/or food supply from partnerships, qualitative results found that pantries experienced inconsistent assistance from partnered organizations and/or programs that provided food for their pantry. Pantries were uncertain of when they would be receiving food and if they would be able to provide food to their clients. A pantry said:

“We receive commodities monthly [...]. Once Covid-19 started, we also started getting [...] produce boxes [...] every week. The program would often start and stop and is currently stopped and we do not know if it will resume. [...]” (Other Pantry, Stanislaus County).

The majority of pantries experienced a decrease in the number of personnel, especially their volunteers (Table 5). However, sites reported a slight increase in partnerships that included other pantries, stand-alone facilities, pop-up pantries, and mobile distributions.

TABLE 5. Summary of Client and Food Pantry Characteristics During COVID-19 by type of organization

	Church Food Pantry n=9	Other Food Pantry ¹ n=9	p-value
<u>Languages Spoken by Clients</u>			
English	9 (100%)	9 (100%)	--
Spanish	9 (100%)	9 (100%)	--
Chinese	2 (22%)	2 (22%)	1.000
Hindu	1 (11%)	2 (22%)	1.000
Punjabi	2 (22%)	2 (22%)	0.712
Other	3 (33%)	2 (22%)	1.000
<u>Distribution Mode</u>			
Home Deliveries	2 (22%)	5 (56%)	0.335
Drive-Thru Model	3 (33%)	5 (56%)	0.637
Mobile Markets	1 (11%)	1 (11%)	1.000
Walk-in/In-person	8 (89%)	6 (67%)	0.576
Other	1 (11%)	1 (11%)	1.000
<u>Expanded Donation Options</u>			
Donations items accepted			
Money	8 (89%)	6 (67%)	0.576
Perishable food items	5 (56%)	7 (78%)	0.620
Non-perishable food items	9 (100%)	8 (89%)	1.000
Other	2 (22%)	0 (--)	0.471
Orgs they accept donations from			
Gardeners	6 (67%)	6 (67%)	1.000
Farmers	7 (78%)	7 (78%)	1.000
Gleaning Groups	6 (67%)	5 (56%)	1.000
Grocery Stores	8 (89%)	9 (100%)	1.000
Other	5 (55%)	2 (22%)	0.335
<u>Decrease of Capacity and Personnel</u>			
Full-time employees	3 (33%)	4 (44%)	1.000
Part-time employees	5 (56%)	4 (44%)	1.000
Volunteers	7 (78%)	8 (89%)	1.000
<u>Increase of Partnerships²</u>			
Pantries	7 (100%)	7 (78%)	0.475
Stand-alone facilities	4 (100%)	3 (60%)	0.444
Pop-up pantries	3 (100%)	5 (83%)	1.000
Mobile distributions	5 (100%)	5 (71%)	0.470

¹One pantry from the “other food pantry” did not complete the seventh objective and was excluded from this analysis. ²Some sites responded “Not Applicable” for some of the listed partnerships and therefore were excluded from this analysis.

Capacity and personnel. Servicing an influx of clients was challenging because most sites were impacted by the loss of full-time and part-time employees (see Table 5). Volunteers were a key challenge during COVID-19 that impacted more than half of church pantries (78%) and other pantries (89%).

Qualitative data highlights a high level of concern over the loss of personnel (primarily volunteers). Inconsistent availability of volunteers was said to have impacted the effectiveness at which the food site provided services to the community. A church pantry in Tulare County shared the impact of having low numbers of volunteers:

How do we operate mainly in the kitchen because we have always had [volunteer] groups. How do we best operate with having just 3 people, with giving over 600 meals a month. We managed how to still meet the demand and provide the service.

Client retention. Qualitative data revealed that client retention was a challenge for church pantries during the COVID-19 pandemic. With strict safety measures in place, some church sites experienced a lower volume of clients attending food distribution days and an increased food donation from partnerships. With this shift sites experienced an increased quantity of food. One of the church pantries in Kings County shared that the “[n]umber of clients decreased due to reduced days and hours of operation, yet food supply from partners increased. – to resolve, we have increased the frequency allowance for clients.”

A church pantry in Kings County mentioned a decrease in clients because they no longer provided clothing and other household items along with food box:

During the pandemic we have not been able to take donations of clothing and other household items. Many of our clients that used to come for food and clothing are no longer coming for their food. (Church Pantry, Kings County)

Social distancing measures also impacted the ability to reach community members who were homebound (Other Pantry, Stanislaus County). A church-based pantry in Kern County added that many community members were not aware that their food pantry was still open: “The word is not getting out to people that we are open. It’s a challenge to get that information out to them regarding the food pantry.”

Although the uncertainty of COVID-19 might have led to a decrease in client participation at church pantries, a Fresno County church pantry highlights the need that families have for emergency nutrition assistance due to other circumstances that were not pandemic related—such as fire season that displaces families every year: “Some of our clients have not shown up due to COVID, but we had an influx of younger and middle-aged Creek Fire Displaced Families that evened things out.”

Social distancing measures also created a sense of isolation and conflicts for church pantries. A church pantry in Merced County mentioned it was challenging to limit in-person interactions with clients who came in for food. Meanwhile, a church pantry in Madera County expressed frustration over community members who would not follow CDC guidelines.

Successes During the Pandemic

Pantries had the opportunity to share successes they had throughout the pandemic. Three themes were identified: (1) accessibility and availability, (2) implementation of COVID-19 safety measures, and (3) support from partnerships.

Accessibility and Availability. Several sites said they were proud of being able to serve their communities and those in need of nutritional assistance during a national emergency despite the limited personnel. These sites demonstrated resiliency as they adapted in many ways to help their communities. A church pantry in San Joaquin County said they were “able to sustain the food pantry [and also] being able to offer [in-home] food delivery during the Shelter in Place Order.” Another church pantry in Kings County demonstrated accessibility and availability of nutrition assistance as they “reduced the wait time between visits from every 60 days to every 30 days - or once per calendar month”. Similarly, a church pantry in Fresno County offered “pre-packaged

food bag of non-perishable, [...] perishable, [and] frozen foods to clients twice a month”, giving them the option to choose which days of the month they would like to pick up the food bag. Despite challenges presented during this national emergency, food distribution centers were able to adapt and serve their communities in need.

Implementation of COVID-19 safety measures. Other food distribution centers found implementation of COVID-19 safety measures to be a positive change for their organization. A church pantry in San Joaquin County mentioned they figured “out a new system of handing out the food in a carline [and r]eorganizing [the] pantry to streamline the meal boxing process.” A church pantry in Tulare County believed their quick adjustments to COVID-19 guidelines was efficient. They share, “[...] we saved money. It was a positive outcome for the community and our organization.”

Support from Partnerships. Sites from all types of organizations expressed gratitude and attributed part of their success to partnerships. Specifically, 22% of pantries mentioned partners provided financial support, produce, or community donations. A church pantry in Kings County expressed:

[B]usinesses providing us with food under a food recover program have increased [the] amounts of food we receive which includes many of the items on the F2E list”. While another non-church pantry in Merced County mentioned “never having to buy food, 100% has been donated.

A pantry in Stanislaus County mentioned having a partnership with Ag Link produce boxes—a program funded by the U.S. Department of Agriculture (USDA) where freshly picked produce from the area are distributed to communities in need of nutrition assistance (USDA, 2020). This same pantry also applied for COVID-19 financial relief grants that helped their community with bills.

DISCUSSION AND CONCLUSION

This study sought to examine the food environment of food pantries in the SJV as well as identify challenges encountered by these sites during COVID-19 in a predominantly rural region of California. A key finding from this study is that all pantries were categorized among the silver or bronze categories, which highlights the need for improved strategies. These results were similar to those found by Nikolaus and colleagues (2018) where 81.5% of pantries were silver and 18.5% were bronze. Additionally, loss of personnel and logistical challenges were also experienced during the pandemic. These findings improve upon the existing literature on food pantries by exploring the food environment of pantries in the SJV by type of pantry (i.e., church or other) as well as by highlighting key challenges that pantries experienced during the pandemic.

Improving the availability of healthier foods in food pantries can help provide healthier options to the community and ensure food security, which in return, the increase of food security may help improve obesity rates and chronic diseases. Existing research has emphasized that individuals use pantries as a long-term help (Martin et al., 2013), and are usually families who experience difficulties with housing, utilities, or medical bills (Long et al., 2021). However, the food provided in the boxes may not be enough to sustain families for long periods of time (Akobundu et al., 2004; Nieves et al., 2021; Nikolaus et al., 2018). For example, Robaina & Martin (2013) found that even when clients were attending food banks and food pantries daily, 50.5% were still falling within the very low food security category. Other studies have found that emergency food distribution centers may offer foods of lower nutritional value (Bryan et al., 2019; Byker Shanks et al., 2020; Nanney et al., 2016). Providing nutritional options and making

fresh produce more accessible to low-income communities may help improve the quality of meals and the overall health of recipients.

Pantries in this study were found to use limited nudging strategies to increase the selection of healthful products by clients, which is an area for improvement. Nudging is an implemented strategy focused on improving the selection of certain food items. Previous research has shown that providing nudges in pantries has resulted in an increase in healthier food selection (Caspi et al., 2019; Coombs et al., 2020; Nikolaus et al., 2018). This strategy was shown to be even more effective among Hispanics when the materials were in Spanish (Coombs et al., 2020). Nudging also has the advantages of being cost effective and easy to implement (Wilson, 2016). Nudges may include providing different bags for specific groups of foods for example, a bag for fruit, a bag for vegetables, etc. (Wilson, 2016). Other strategies that have been successfully implemented are the use of signage (Olstad et al., 2014), color-coding food items by level of healthfulness (Thorndike et al., 2012), dividing the shopping cart in compartments (Payne et al., 2014), setting aside sections dedicated for nutritious foods (Hanks et al., 2013; Payne et al., 2014), and simply moving healthier items at eye-level of pantry clients (Thorndike et al., 2012). Future research may focus on developing and evaluating interventions to increase adoption of nudging strategies in food pantries, specifically in an environment where a shopping-style distribution is not available, such as a drive-thru model.

Another finding was that the promotion of additional resources was low for all pantries. Few pantries provided clients with nutrition education courses, which is essential for knowledge attainment and food selection. Research has found that pantries that offer nutrition education to clients have seen an increase in healthful choices (Caspi et al., 2016; Marmash et al., 2021). Future research should consider investigating how nutrition education in food programs adapt under emergency situations. Other research should examine effective strategies that improve client choices through messaging and/or educational materials. Since there are some pantries that do not allow clients to choose their food, it may also be worth investigating an effective strategy to teach pantry users how to use food and ingredients provided. The promotion of health screenings (Bencivenga et al., 2008), employment assistance information, and information on other nutritional assistance (i.e., SNAP, WIC) was also low among pantries in the SJV. Promoting additional resources may help pantry users complement the insufficiency of food received at a pantry (Byker Shanks, 2017; Nikolaus et al., 2018).

Comparable to our results, studies suggest food pantries may offer little to no cultural food options (Bryan et al., 2019; Nikolaus et al., 2018; Verpy et al., 2003). Pantry users have emphasized the need for culturally diverse foods (Bryan et al., 2019; Remley et al., 2010), including immigrant communities who expressed difficulty finding cultural items (Bazerghi et al., 2016). The provision of culturally appropriate food items may also include items that are appropriate for specific dietary needs like medically appropriate food such as allergies (Palar et al., 2017; Seligman et al., 2015, 2018; Verpy et al., 2003) and non-medical related options (e.g., vegetarian, vegan, or religion-related restrictions). Nutrition policies may help guide the nutrition quality of food items that are donated and distributed and ensure that cultural needs are met. Prior supporting literature has mentioned that pantries rarely adopt a formal nutrition policy, possibly because food pantries rely primarily on volunteers and may have a lack of knowledge or a lack of time to develop a policy (Helmick et al., 2020).

COVID-19 brought upon a unique environment in which food pantries were forced to adapt in a timely manner. Many of these challenges can be interpreted as lessons for future food pantries who encounter unexpected events (e.g., natural disasters, the pandemic). We found it

was particularly difficult for food pantries to meet the increased demand and quantity of clients, especially while volunteer and staff numbers decreased. Similarly, the World Food Policy Center found that 79% of food organizations saw an increase in clients and 67% experienced a decrease in volunteers (Templeton et al., 2021). Other research found that the decrease of volunteers and staffing changes were implemented to minimize contact between staff and clients (Castro et al., 2021; Larison et al., 2021). However, in this study, church pantries did not experience a substantial increase in clients and struggled with client retention. Mainly due to the reduced hours of operation and the reduced resources available for clients, like clothing and household items. Future research should investigate additional factors that lead to the lack of church pantry users.

Many pantries in this study also reported logistical challenges. In comparison to other research studies, a drive-thru model was the most common adaptation to maximize social distancing efforts (Castro et al., 2021; Larison et al., 2021). Despite the increase in partnerships, pantries in the SJV experienced inconsistent donations and were unsure when they would receive food from partnered organizations. Similar studies found that food organizations experienced supply chain interruptions during COVID-19 (Larison et al., 2021; Templeton et al., 2021). In this study, church pantries, in particular, mentioned relying on church members for monetary and food donations. The majority of food donations accepted were non-perishable items because they did not have a refrigerator or had limited space for perishable items. Consistent with past literature, food distribution sites have struggled with providing fresh produce because they lacked refrigeration (Bazerghi et al., 2016). Additionally, there was an increase in lack of refrigeration space among other food sites during the pandemic (Templeton et al., 2021).

Policy and Programmatic Recommendations

A policy recommendation based on our findings is for the USDA to make their nutrition assistance grants easier to access. It is unknown whether smaller organizations are aware of these grants or have the capacity to apply. Providing funding to smaller centers that are closer to socially disadvantaged communities can make fresh produce and nutritious items more accessible and available to communities in need (Heemstra, 2021). Another recommendation is for the adoption of nutrition policy guidelines for food pantries, to help guide decisions around sourcing and distribution (Vollmer & Webb, 2021). These nutrition policies have found to be helpful for nudging healthful foods in the community (Campbell et al., 2009; Nanney et al., 2016) and may provide consistent messaging. Research has shown that there are few policies to address the nutritional quality of items that may be donated to food sites (Hudak et al., 2020). Moreover, providing additional funding for technical support in developing and maintaining internal nutrition ranking systems may be important to help pantries with the purchasing of more nutritious food items. Similarly, providing funding for food pantries to test nudging strategies may guide them in the selection of effective strategies.

Programmatic recommendations for food pantries include adoption of a nutrition ranking system to identify and promote healthier options to the communities they serve such as the Healthy Eating Index (Nanney et al., 2016) or the USDA Dietary Recommendations (Byker Shanks et al., 2019). Other ranking systems include the F2E (America, 2020), Choose Healthy Options (CHOP) and Supporting Wellness at Pantries (SWAP) (Schwartz et al., 2020). Since many pantry clients are usually relying on other nutritional aid, following a similar messaging frame as WIC and SNAP will help keep the messaging consistent.

Food pantries may also consider implementing nudges to improve the selection of healthier food items. Pantries should also consider partnering with local organizations to provide pantry

clients with linguistically and culturally appropriate resources. These may include nutrition education for clients and personnel, support with filling out government nutrition assistance applications, and employment assistance.

Fourth, the use of valid and reliable data collection instruments is also important to inform decisions to tailor food options that are aligned with medical/health needs (Bomberg et al., 2018; Palar et al., 2017), cultural preferences, and social needs like not having the required kitchen tools or fridge storage for perishable food items (Bryan et al., 2019). Adjusting the pantry environment and providing accessibility to resources may increase nutritious food choices.

Strengths and Limitations

A strength of this study was the timing of data collection with emergency food sites during a worldwide pandemic that had broad impacts on institutions and the distribution of services, including its impact on food insecurity levels and the demand for nutrition assistance. This study also identifies challenges exacerbated during the pandemic for these sites in a particularly underserved region. A third strength is the use of the NEFPAT tool, a validated tool. The seventh objective created for the COVID-19 challenges was also created through the use of an extensive search of gray literature and with the verification of various researchers and workers in the food emergency sector.

This study has several limitations. First, data was only collected during the pandemic therefore we did not collect data before and during the pandemic for comparison. A future study can use the results from this study for comparison. Next, there were several online websites that served as food locators which included the hours of operation, address of the food pantry, and requirements if any; however, many were outdated or not accurate. It could be possible that there were existing pantries that were not listed on these websites. Also, due to the restrictions set for the COVID-19 pandemic, the observational component assessments were not conducted as intended, and we relied primarily on self-administration by food pantry representatives or liaisons. The NEFPAT tool was designed to be completed by trained external observers to reduce bias and increase uniformity of the collection of data (Nikolaus et al., 2018). Another limitation of the NEFPAT tool was that it was not as comprehensive as other tools that focus on nutrition quality, because this tool focused on fruit and vegetable items, it left out the other three food categories (i.e., grains, dairy, and protein). The sample size is also low, which may have contributed to the low number of significant results (i.e., lack of statistical power to detect significance). Given the convenience sampling approach, the results may not be generalizable to food pantries elsewhere. Finally, the seventh objective was not validated as part of this work. Future work will focus on testing the validity and reliability of the instrument to evaluate the seventh objective.

Conclusion

The food environment of food pantries continues to need improvement of healthful food items. Additionally, the COVID-19 pandemic brought upon various challenges for food distribution sites. Many of these sites adapted to the COVID-19 precautions and continued to serve the community, especially during a time where food insecurity rates skyrocketed. Tailoring healthful strategies and implementing policies may increase healthful selections in food pantries and may ultimately help improve food security among low-income communities thus decreasing obesity and chronic diseases.

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APPENDICES

Appendix A. List of the 1-6 NEFPAT objectives and their sub-objectives.

Objectives	Sub-objectives
Objective 1: Increase Client Choice for Nutritious Options (Maximum 8 points)	1.1. Clients may choose which types of F2E they would like to take 1.2. Pantry hosts a “shopping style” distribution (set up like a grocery store) 1.3. Clients are able to come to the pantry for food more than once per month 1.4. Food pantry offers items from each of the five food groups (fruits, vegetables, grains, protein, dairy) 1.5. Encourages nutritious donations (e.g., by distributing a list of suggested items or asks donors not to provide certain foods) 1.6. Food pantry is listed on AmpleHarvest.org website (if not, seeks donations from local gardeners/farmers or community gardens) 1.7. Has established nutrition policy used for purchasing food for clients 1.8. A policy is in place for proper food safety
Objective 2: Market & “Nudge” Healthful Products (Maximum 8 points)	2.1. Recipes featuring F2E are available to clients 2.2. Offers food samples to clients 2.3. MyPlate or other healthy eating materials that promote F2E are visible (e.g., posters, fliers, window stickers, etc.) 2.4. Displays/hangs supporting materials for F2E (e.g., shelf talkers/shelf tags, nutrition information, etc.) 2.5. Includes at least one F2E item in a bundle to display items together as a meal (e.g., beans and rice) 2.6. F2E are stocked to appear abundant 2.7. Majority of F2E are displayed/angled to be viewed easily from the eye-level of an average client 2.8. At least one F2E item is within eyesight upon entering the pantry during distribution
Objective 3: Provide Various Forms of Fruits and/or Vegetables (Maximum 8 points)	3.1. Fresh 3.2. Canned (Any type, no rust and minimal dents) 3.3. Canned (fruit in lite syrup or juice or $\leq 12g$ Sugar or Vegetables with $\leq 230mg$ Sodium and $\leq 2g$ Sat. fat) 3.4. Frozen (Any type, no frostbite) 3.5. Frozen ($\leq 12g$ Sugar, ≤ 230 mg Sodium, & $\leq 2g$ Sat. fat) 3.6. Dried (any type, no mold and packaging intact) 3.7. Dried ($\leq 12g$ Sugar, ≤ 230 mg Sodium, & $\leq 2g$ Sat. fat) 3.8. Juice (100% fruit or vegetable juice)
Objective 4: Provide Various Types of Fruits and/or Vegetables (Maximum 10 points)	4.1. Red More than 2 types of Red 4.2. Yellow/Orange More than 2 types of Yellow/Orange 4.3. White or Tan/Brown

	<p>More than 2 types of White or Tan/Brown</p> <p>4.4. Green More than 2 types of Green</p> <p>4.5. Blue/Purple More than 2 types of Blue/Purple</p>
<p>Objective 5: Promote Additional Resources (Maximum 8 points)</p>	<p>5.1. Provides information on SNAP, WIC, Senior Farmers Market coupons or other low-income resources</p> <p>5.2. Provides nutrition education to clients (e.g., by partnering with Extension or other sources of expertise)</p> <p>5.3. Promotes or provides mobile markets</p> <p>5.4. Has onsite garden or other gardening resources</p> <p>5.5. Distributes Medicaid/affordable health care information</p> <p>5.6. Promotes or provides health screening (e.g., blood pressure, glucose, BMI, etc.) by partnering with local organizations</p> <p>5.7. Provides employment assistance information</p> <p>5.8. Provides other educational/self-improvement resources</p>
<p>Objective 6: Plan for Alternate Eating Patterns (Maximum 5 points)</p>	<p>6.1. Provides food pantry volunteers with nutrition education</p> <p>6.2. Utilizes Commodity Supplemental Food Program (CSFP) to provide food tailored for low-income elderly clients</p> <p>6.3. Has labeled sections for specific foods (e.g., gluten free, dairy free, no/low sodium, vegetarian or no-prep-required)</p> <p>6.4. Provides diverse options for protein (e.g., tofu, beans, fish, peanut butter)</p> <p>6.5. Provides culturally diverse foods (e.g., Kosher, Halal, ethnic cuisines)</p>

Appendix B. List of questions and answer choices to the novel COVID-19 section

Question	Answer Choice
7.1. Which of the following types of food distribution has your food pantry used during the pandemic? (Select all that apply)	<input type="checkbox"/> Home-delivery <input type="checkbox"/> Drive-thru distribution <input type="checkbox"/> Mobile Markets <input type="checkbox"/> Walk-in/in-person <input type="checkbox"/> Other: (please specify)
7.2. What type of donations has your organization been accepting during the pandemic? (Select all that apply)	<input type="checkbox"/> Money <input type="checkbox"/> Perishable food (requires refrigeration) <input type="checkbox"/> Non-perishable food <input type="checkbox"/> Other: (please specify)
7.3. Is your organization concerned to run out of cold storage for fresh fruits and vegetables?	<input type="radio"/> Yes <input type="radio"/> No
7.4. Your organization accepts donations from... (select all that apply)	<input type="checkbox"/> Local gardeners <input type="checkbox"/> Farmers <input type="checkbox"/> Gleaning groups <input type="checkbox"/> Grocery stores <input type="checkbox"/> Other: (please specify)
7.5. Reflecting on the number of staff and volunteers during the COVID-19 pandemic, have the number of: a) Full-time employees: b) Part-time employees: c) Volunteers:	The following answer choices were an option for each item: a-c. <input type="radio"/> Increased <input type="radio"/> Decreased <input type="radio"/> Stayed the same
7.6. Reflecting on the number of partnerships, have the number of: a) Pantries b) Stand-alone facilities (pantries that have their own space) c) Pop-up pantries (pantries that borrow a space to host their pantry, such as a parking lot) d) Mobile distribution (bringing food to a location that is in need, the location often changes)	The following answer choices were an option for each item: a-d. <input type="radio"/> Increased <input type="radio"/> Decreased <input type="radio"/> Stayed the same <input type="radio"/> Not applicable
7.7. During the COVID-19 pandemic, did you organization experience any of the following changes? a) The loss of volunteers b) Difficulty implementing COVID-19 precautions (e.g., limiting number of clients coming in, switching to drive-thru, etc.) c) The loss of pantries/distribution sites d) Increased quantity of clients e) Increased demand for food	The following answer choices were an option for each item: a-k <input type="radio"/> Yes <input type="radio"/> No

-
- f) Decreased food donations from retail stores
 - g) Increased operational costs
 - h) Concerned you would not have sufficient funds to meet the increased demand for food?
 - i) Unable to provide health education sources (e.g., nutrition class, health class, flyers, cooking demonstrations)
 - j) Unable to provide healthy food options
 - k) Unable to acquire sufficient fruits and vegetables to meet the demand
-

7.8. What is the biggest challenge your organization is facing during COVID-19? Open-ended response

7.9. Are there additional challenges that your organization has been faced with that were not mentioned above in Question 7.7?
 Yes → skip to 7.9a
 No → skip to 7.10

7.9a. You selected that your organization has experienced additional challenges that were not mentioned in the previous question. Please describe the additional challenges below: Open-ended response

7.10. What is something your organization is most proud of overcoming during the COVID-19 pandemic? Open-ended response

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