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Formative assessment of community health center Food is Medicine programs during COVID-19 in Northern California

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Abstract

The COVID-19 pandemic disrupted implementation of Food is Medicine (FIM) programs and imposed food security and healthcare-related hardships. Understanding access to and experiences with FIM programs during crises and among diverse populations can help build resilience of

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Disclosures

Edye Kuyper is employed as the Food and Wellness Manager at CommuniCare+Ole, the health center network where this research took place. All other authors have no disclosures to declare.

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programs to future shocks. This formative, mixed-methods study aimed to (1) assess potential barriers and facilitators to access to health services during the COVID-19 pandemic, with emphasis on Food is Medicine (FIM) programs; and (2) understand the effects of the pandemic on healthcare access, food security, and related coping strategies among Federally Qualified Health Center (FQHC) clients. From December 2021 to September 2022, 19 interviews (10 in English, 9 in Spanish) were conducted with clients in Yolo County, CA, with close-ended and open-ended questions about their experiences for a pre-pandemic period (before March 2020) and a pandemic period (last 12 months). Qualitative analysis was conducted in NVivo and using the Framework Method. Major themes identified for Objective 1 were: (1) perceived benefits of FIM programs, including increased knowledge and skills and increased access to produce; (2) barriers to program participation, including client time constraints and limited program awareness; and (3) satisfaction with FQHC services. Themes identified for Objective 2 were: (1) changes in healthcare access, such as increased difficulty with access and healthcare cost, and the use of telehealth; (2) changes in food security, including economic barriers to purchasing quality food and the decreased quantity of food; and (3) use of federal and community resources to cope with difficulties. Our results suggest potential avenues to strengthen Food is Medicine programs, and highlight the role of FQHC programs, community resources, and social networks as coping strategies for food insecurity and decreased access to care.

Keywords
COVID-19, pandemic, food security, Food is Medicine, food systems, mixed-methods research, nutrition programs

Introduction and Literature Review

Non-communicable disease (NCD) is the leading cause of death worldwide; in 2019, over 2,500,000 deaths in the U.S. were due to NCDs (Hambleton et al., 2023); the four leading contributors were ischemic heart disease, lung cancer, chronic obstructive pulmonary disease, and stroke (GBD 2019 Diseases and Injuries Collaborators, 2020). In the U.S., the NCD burden is greatest among food-insecure and low-income populations (French et al., 2019; Gundersen & Ziliak, 2015; Ritte et al., 2020). Food is Medicine (FIM) programs work to integrate food and nutrition interventions into the healthcare system for prevention and management of NCDs (Downer et al., 2020). Such programs include medically tailored meals and groceries, produce prescription programs, nutrition education, and culinary education. Several studies, including research involving randomized trials, have found that these programs are associated with positive behavior change, improved health outcomes, reduced healthcare costs, and improved food security (Berkowitz et al., 2019; Berkowitz et al., 2018; Cavanagh et al., 2017; Community Preventive Services Task Force, 2023; Ferrer et al., 2019; Gao et al., 2023; Palar et al., 2017; Seligman et al., 2015; Sharma et al., 2021; Trapl et al., 2018).

Federally Qualified Health Centers (FQHCs) are community-based healthcare providers that are uniquely situated to play a vital role in health and local food systems by implementing FIM programs that serve low-income groups. FQHCs receive funds from the Health Resources & Services Administration (HRSA) Health Center Program to provide comprehensive primary care services in underserved areas, offering services on a sliding fee scale for uninsured patients (HRSA, 2024). Previous literature on FIM programs implemented through FQHCs, including farmers' markets, financial incentives for fruits and vegetables, and produce prescriptions, has shown a positive effect on outcomes such as fruit and vegetable consumption and hemoglobin A1c among participants (Aiyer et al., 2019; Bryce et al., 2017; Freedman et al., 2013).

The COVID-19 pandemic imposed a dynamic succession of challenges, both on individuals and the healthcare sector, which may influence the implementation and impacts of FIM programs. These programs face an ongoing need to adapt to the needs and constraints of clients, which changed dramatically during the pandemic (Saxe-Custack et al., 2022; Stotz et al., 2022). In general, during the pandemic, households and individuals faced job loss, fear of exposure to the virus, reduced healthcare services, increased demand for food at home,

unavailability of food at stores, and increased concern and worries related to food access (Leddy et al., 2020; Niles et al., 2020; Wolfson & Leung, 2020). Coping strategies for such challenges included utilizing government programs and the charitable food sector, relying on friends and families, or making tradeoffs, such as eating less food or cutting back on other spending categories (Halverson & Karpyn, 2022; Kinsey et al., 2020; Leddy et al., 2020; Loth et al., 2023; Niles et al., 2020). Some of these strategies succeeded in buffering low food access among low-income and food-insecure people (Harper et al., 2022; Lee et al., 2022; Reimold et al., 2021). However, few studies have documented pandemic-related experiences of access to FIM programs, which theoretically could have mitigated pandemic effects on food insecurity and nutrition outcomes. One qualitative study, focused on families with children and conducted with a clinic-based, community-supported agriculture program, found that clients faced several challenges, including financial and shopping related difficulties, and that federal food assistance programs facilitated food access (Cullen et al., 2023). A study of a produce prescription program set in a large pediatric clinic during the pandemic (April–June 2020) reported that participants had several food access constraints, such as rising food costs and shortages, had to make food shopping adjustments, and experienced stress regarding food insecurity (Saxe-Custack et al., 2022).

Healthcare utilization data from FQHCs across the U.S. demonstrated precipitous drop in service volumes during March–May 2020 (Simon et al., 2021). FQHCs faced additional hardships, such as decreased resources and supplies and increases in client food insecurity (Abrams et al., 2020). The disruptions to health center operations, such as fluctuations in staffing and difficulty with predicting patient volume and participation in programs, also made it difficult to implement FIM programs. (Brown et al., 2020). Previous studies assessing impacts of the pandemic on FIM programs found that barriers to participation included fear of exposure to infection (Saxe-Custack et al., 2022), and that benefits from participation included promotion of healthy dietary habits, improved access to high-quality foods, and alleviation of some barriers to accessing food and cooking (Zimmer et al., 2022).

While previous studies help to understand how the pandemic impacted individuals participating in FIM programs as well as FIM program operations, the available literature does not fully capture the breadth of program models or client populations. Most of the studies were conducted in partnership with or were set in large medical centers (Brown et al., 2020; Cullen et al., 2023; Saxe-Custack et al., 2022; Zimmer et al., 2022) and focused on families with children (Brown et al., 2020; Cullen et al., 2023; Saxe-Custack et al.). Studying FIM programs in different populations and settings, such as adults in FQHCs, allows researchers and practitioners to assess the generalizability of FIM programs across populations with different needs and priorities. It is important to understand how FIM programs implemented in FQHCs can meet the needs of those experiencing reduced food security and access to healthcare during crises, and to guide efforts to build resilience of these programs to future economic or social shocks. This formative, mixed-methods study aimed to 1) assess potential barriers and facilitators to access to FQHC services, with emphasis on FQHC FIM programs; and 2) understand the effects of the pandemic on healthcare access, food security, and coping strategies among FQHC clients.

Research Methods

Study Site

CommuniCare+OLE (CC+OLE) is a network of community health centers designated as both FQHCs and Migrant Health Centers in Yolo, Napa, and Solano counties, California (CommuniCare Health Centers [CCHC], n.d.). CC+OLE operates FIM activities in Yolo County that emphasize growing, sharing, cooking and enjoying local food to address diet-related disease and loneliness. FIM programs include managing an onsite garden where staff and clients produce food and which also serves as an outdoor space for appointments and classes. Program activities include produce distribution from the garden, and other sources such as local farms, and culinary

education. In 2019, CC+OLE conducted a total of 132,632 patient visits and served 24,187 patients across their three comprehensive health centers; during the first year of the pandemic (2020), totals dropped to 118,274 visits and 22,196 patients (CCHC, 2020; CCHC, 2021). The health centers were able to quickly transfer to telehealth services, and also shifted operations of their FIM programs. Group Medical Visits for patients with diabetes that included produce distribution were paused from the onset of the pandemic. Group visits resumed in 2022, but garden produce continued to be available in clinic waiting areas during the pandemic, distributed in accordance with health and safety recommendations on a table in one clinic waiting room. Culinary education was offered virtually; patients retrieved ingredients prior to classes from their respective clinics and cooked along with instructors via Zoom.

Participant Selection

We used a mixed-methods approach to capture experiences and perspectives from a convenience sample of clients accessing services at CC+OLE. Advertising was conducted through flyers posted in the clinic, as well as by program staff administering other services. Interested individuals shared their contact information with study personnel, who reached out to schedule interviews. Participants were eligible if they were at least 18 years old, accessing services at CC+OLE, residing in California, provided oral consent, and were able to respond to questions in English or Spanish. Ethical approval was obtained from the UC Davis Institutional Review Board.

Data Collection

This cross-sectional study was conducted using a semi-structured interview script, which included a pre-coded survey questionnaire as well as open-ended questions. Data collection for each participant was conducted in a single session of approximately one hour. Recruitment and interviews took place December 2021–September 2022. The interview script was developed using a combination of previously validated questionnaires and questions developed for this study in coordination with CC+OLE.

At the beginning of the interview, participants answered questions about the types of services (e.g., produce distribution, culinary education) and the frequency with which they had accessed these services through the clinic. Participants were asked to rate their satisfaction with the programs on a scale of 1–5, 1 being "not satisfied at all" and 5 being "extremely satisfied." These were followed by open-ended questions regarding perceived potential benefits of the program and barriers to participation. Prompts were program-specific; for example, patients who participated in produce distribution were asked opened-ended questions about whether and how the types of foods they ate had changed, and culinary education participants were asked to reflect on new skills or knowledge they may have gained. If clients participated in a different type of program, identified as "other," they were also asked about perceived benefits and barriers, and about connections with other participants. "Other" programs included substance use/behavioral health programs and one-on-one diabetes education. While these programs are not part of traditionally recognized FIM approaches, the patients in diabetes education programs are a target population for FIM program activities and patients in the substance use/behavioral health programs received access to garden produce in behavioral health clinics; however, they primarily attended the clinic for behavioral health programs. All participants responded to a demographics questionnaire and answered questions related to food security, access to healthcare, coping strategies, employment, transportation, food and nutrition related behaviors, social isolation and social networks, as well as a medical questionnaire. These questions were intended to provide descriptive information about the participants and their pandemic experiences.

Food security was assessed for two 1-year time periods: a pre-pandemic period and a pandemic period. The pandemic period was assessed using the USDA Six-item Short Form Food Security Survey Module, which asks participants to reflect on the past 12 months (U.S. Department of Agriculture Economic Research Service [USDA ERS], 2022). Interviews occurred during a nine-month period, so the calendar months corresponding to

the pandemic period ("the last 12 months") ranged from December 2020–December 2021 to September 2021–September 2022, depending on the date on which the interview occurred. The questionnaire included identical questions for the pre-pandemic period, in which the reference time frame was "in the year before the COVID-19 outbreak" (before March 2020); for example: "In the year before the COVID-19 Outbreak (from April 2019 to March 2020), the food that my household bought just didn't last and I/we didn't have money to get more." Participants were also asked open-ended questions about food security, prompting them to reflect on changes in the quantity and quality of food that they were able to obtain during the specified time period.

Healthcare access was also queried separately for the two time periods (e.g., "In the year before the COVID-19 outbreak [from April 2019 to March 2020], when did you have health insurance?"), in addition to questions on the use of food assistance (charitable food sector, CalFresh, WIC, school meal program, unemployment, or other), or other food security-related coping mechanisms (reliance on friends, family outside the household, church or faith group, CC+OLE or other clinic, or other). Questions on employment status, which assessed participant current employment and income and wage status, also assessed the number of months employed and number of employers for the two time periods. Each of these sections also included open-ended questions to explore participant experiences not captured by the close-ended questions. Participants were asked to report nutrition-related behaviors using the Food Behavior Checklist (e.g., typical beverage consumption, typical fruit and vegetable consumption) (Townsend et al., 2006), and a health and medical history section (e.g., any previous diagnoses, medications used, health coverage).

Because one potential additional benefit of FIM programs is to address social isolation (Wright et al., 2015), which is associated with poor health outcomes and increased food insecurity (Barnes et al., 2022; Burris et al., 2019; Wang & Bishop, 2019), we also assessed social isolation and social networks. The Berkman-Syme Social Network Index (SNI) was used to measure social connectedness (e.g., contacts with friends and relatives, memberships in groups) (Berkman & Syme, 1979), and the PROMIS Social Isolation Short Form 8a was used to measure social isolation (e.g., feelings of loneliness, feelings of connectedness) (Cella et al., 2010).

The interview was piloted with three FQHC clients, two in English and one in Spanish, then refined and updated before data collection began. A bilingual interviewer (CMF), who also served as the study coordinator and had no previous relationship with participants, conducted the interviews (ten in English, nine in Spanish). Interviews were conducted remotely by phone or Zoom and lasted 45–60 min. Before data collection began, the study procedures were described and the consent form was read to the participant who was given a chance to ask any questions before giving oral consent.

Audio recordings of the interviews were translated when appropriate and transcribed by the study coordinator and three research assistants. The study coordinator reviewed all translations and transcriptions, and the audio recordings were used to resolve any discrepancies. The transcribed interviews and interview guide were used to develop an initial codebook.

Data Analysis

Descriptive statistics were calculated for pre-coded survey questions. Due to the small sample size, we did not perform hypothesis testing on the quantitative data. Thematic analysis of open-ended questions was conducted with the Framework Method, a common methodology in health-related qualitative research to analyze data from semi-structured interviews (Gale et al., 2013). The Framework Method allows for themes and codes to be derived before analysis, utilizing the interview script, as well as throughout the analytic process, as new themes emerge from the interviews. The data were coded and reduced through a data matrix. Two researchers (the study coordinator and a trained undergraduate assistant) read the first five interview transcripts in their entirety and then used the codebook to independently code each one. An intercoder reliability score (ICR) was calculated for each segment of the transcript. Segments with poor agreement

(less than 80% agreement, or Kappa < 0.7) were discussed and revised to reach consistency in the codebook. The remaining 14 transcripts that were not coded in tandem were coded by the study coordinator, using the codebook that was developed by the initial two coders. Data saturation was assessed by comparing the number of codes developed in the initial five interviews to the number of additional codes generated from each set of two additional interviews; thematic analysis was halted once saturation was reached (i.e., no new meaningful codes were generated). All coding and subsequent thematic analysis was conducted using NVivo.

Results

Participant Characteristics

Twenty-six clinic clients shared contact information with the research team. One declined to participate, 3 could not be reached after several attempts, and 3 scheduled a data collection appointment but later could not be reached or declined to participate. For the remaining 19 participants, all data collection was completed with the exception of 1 participant who was not able to complete the full session and had missing data for the food behavior checklist, social isolation/ networks, and medical history.

A majority of the participants were female (14, 74%) and Hispanic (14, 74%), with an average age of 47.8 ± 13.1 years; just over half (10, 53%) had education beyond high school (Table 1). Diabetes was self-reported in 9 (50%) of the participants who answered the medical history section, and hypertension and high blood cholesterol were also commonly reported (Appendix, Table A1). Ten participants (56%) participants self-reported "Fair" health and eight (44%) scored low on the Social Network Index score, indicating high levels of social isolation. Participants self-reported an average of 2 servings per day for fruits and 2 servings per day for vegetables (Appendix, Table A2), close to the 4.5 cup equivalents per day of fruit and vegetable recommendations for a 2,000-calorie diet (USDA & U.S. Department of Health and Human Services, 2020). On the Food Behavior Checklist, 13 (72%) reported consuming fruit drinks, sport drinks, or punch never or less than 1 time a week and 9 (50%) reported consuming regular soda or energy drinks never or less than 1 time a week. At the time of analysis, 16 participants (84%) were classified as food insecure.

Thematic Analysis

Table 2 summarizes the major themes identified for each of the two objectives, along with their corresponding subthemes and with exemplary quotes. Each theme is further discussed in the following sections.

Table 1. Participant Demographic and Socioeconomic Characteristics

Participant Characteristics (*N* = 19)	Mean ± SD
Age (year)	47.8 ± 13.1 (range: 32-80)
Household Size (number of people)	3.1 ± 1.5
	N (%)
Gender	
Male	5 (26%)
Female	14 (74%)
Interview Language	
English	10 (53%)
Spanish	9 (47%)
Ethnicity	
Hispanic	14 (74%)
Non-Hispanic	5 (26%)
Education	
Less than high school	5 (26%)
High school equivalent	4 (21%)
Some college	6 (32%)
4 year college degree or more	4 (21%)
Income (Yearly; US$)	
$10,000–$20,000	7 (37%)
$20,000–$30,000	5 (26%)
$30,000–$40,000	3 (16%)
More than $40,000	3 (16%)
Refused/I don't know	1 (5%)

Table 2. Interview Themes, Subthemes, and Exemplary Quotes, by Study Objective

Themes	Subthemes	Exemplary Quotes
Experiences with Food is Medicine programs		
Satisfaction and benefits with FIM program activities	Increase in knowledge and skills from participation in culinary education	"The cooking classes … teach you how to cook, without so much fat, with more natural things, like olive oil and everything, which isn't as harmful for you. And the people that do the cooking classes are kind and you can tell that they know what they are doing and teaching us." –Female, 56, Produce distribution and culinary education participant
		"I really liked them very a lot, I felt that we learned a lot, and also that they gave us fruits there and I had something in my garden, and got to share with others, or things that helped us. We were always sharing recipes or things that we did not know if they were good, or not good but not harmful for our health, and because the person who helped us would tell us things like it's okay but it has a lot of this, this has too many carbohydrates or things like that, and that made it a good program for me." –Female, 49, Produce distribution participant
	Positive interactions with staff	"The people from the group medical visits, the doctors…explain to you, what benefits you and helps you, how to eat, how to measure your glucose and all that. And the doctors speak the language that we speak, which is better for my mother, she speaks Spanish." –Female, 56, Produce distribution and culinary education participant
		"[The educator] is pretty organized, she has different…resources available…starting with fundamental education around diabetes and really being able to adapt to whatever my questions are and my gaps in learning are to help me contextualize it to make the necessary changes to be healthier. " –Male, 43, 1–1 Diabetes education participant
	Increased access to quality food	"I watch people out there gardening. You see them out there working just enjoying what they're doing and they're giving you food and it's good food and it's healthy, it's not sprayed with pesticides and stuff. You can actually pick it off the vine and eat it and not be worried that you're going to get sick from something that they sprayed on a crop." –Female, 51, Produce distribution participant
		"I've gotten more products from here locally, such as more organic [foods]" –Female, 37, Produce distribution participant
Barriers to FIM program participation	Client time constraints	"Right now, I don't go even though I like the classes very much, but it's complicated since I have work during the week. I couldn't take my mom nor go myself anymore, well since it benefits both of us." –Female, 56, Produce distribution and culinary education participant
	Limited program awareness among clients	"The thing about it was that they have it like in a little table and they advertise the garden program on the little piece of paper so I wasn't sure if that was just like for the advertisement or that we can actually grab the produce and so that wasn't clarified and then I saw other people grab it and I was like oh okay it's okay to take it." –Female, 51, Produce distribution participant

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		"Oh well if there was more information…because sometimes you don't know what programs exist or which programs you could do, and then sometimes you find out and the program has already passed. … It would be good to publish them a little more, on Facebook, or sometimes in the community clinic, so that we can have access to more of this, more of the things that could help us in the community." –Female, 37, Produce distribution and culinary education participant
Satisfaction with FQHC	The FQHC was a well-received source of care	"I feel that when I have needed them, they have always helped, and during the pandemic I understand that sometimes things couldn't be done, unless they were urgent." –Female, 49, Produce distribution participant
		"I don't think they could do any better than what they're doing. I honestly don't. I mean I've seen them and I know that there's some challenges for them, with the covid." –Female, 51, Produce distribution participant
Impact of the COVID-19 pandemic and related coping strategies		
Pandemic related changes with healthcare access	Decreased access to healthcare services	"Before I was able to access health services whenever I wanted, for whatever reason I wanted…but afterwards it was like pulling teeth to get an appointment. Oh, it's not that serious, it's not life-threatening, it can wait. I felt like I was used to a certain standard of living, where like I if I had issues, I could … have them seen, but I didn't feel like that was the same." – Female, 36, Produce distribution participant
	Experiences with the shift to telehealth	"The good thing is that they had this tele-health thing, we were able to do zoom calls and telephone. So that was good and that increased so with my doctor, the behavioral therapist, and somebody else [*sic*]." –Male, 67, Produce distribution participant
		"Well I had to get Wi-Fi, so … I just got into some situation where they're cutting down price, but I had to pay for that, that was an extra expense. I had to keep going 'this is too much' so sometimes they would give me a coupon but now it's getting better." –Male, 67, Produce distribution participant
Pandemic related changes with food security	Economic barriers to purchasing quality food	"Well, you can no longer eat what you want, you eat what you can afford." –Female, 64, Produce distribution participant
		"The truth is that one would like to eat better but everything is expensive, expensive, expensive. You can't buy what you really should to be able to be healthy. … You go with [whatever is] cheaper because you have to eat." –Female, 56, Produce distribution and culinary education participant
	Decreased quantity of food	"I would have to just eat [smaller], eat small portions of food to make it last during the week or during the month so I have extra. Or usually sometimes I only eat like two meals a day." –Male, 57, Culinary education participant
Use of federal and community resources as	Greater utilization of the charitable food sector	"We're getting food from the food bank, a lot more of it too…and it's good food and it's fresh food and it's you know, a blessing." –Female, 51, Produce distribution participant

coping strategies	Greater use of federal programs (WIC, school food programs)	"If it weren't for CalFresh or WIC, then we would not have that extra funds to buy the meals. So CalFresh is helping us to buy food and with WIC, that helps with milk, juices, things like that. WIC offers cheese … well everything, it's all been a big help." –Female, 37, Produce distribution and culinary education participant
	Higher reliance on social networks	"Among the family, we all support each other and if one is out of work well, the others help him, and so, right. And if someone gets sick and doesn't work, then we all cooperate. In our family I don't think there was that much…since we are together, I don't think we were short of food, right. And since we all pay the bills and everything, I think it benefits us. But if we had been alone…oy, no, we would have been on the street I think." –Female, 64, Produce distribution participant
		"Church and my friends help emotionally, when I don't have [money or food], I feel bad, I feel stressed, and I feel nervous about what's going to happen. Well, I try to talk about it and they listen to me, and that makes me feel good." –Female, 39, Culinary education and produce distribution participant
	Difficulty managing chronic disease with foodbank food	"Some of the stuff at the food bank, they're not diabetic friendly…so whatever I could use from the food bank I would use it but I gotta stay away from carbs…a lot of the bread and pasta and the stuff that will make my sugar go up." –Male, 57, Culinary education Participant

Experiences with FQHC Food is Medicine Programs

Satisfaction and benefits with Food is Medicine programs

The interviews focused on FIM programs such as produce distribution (used by nine participants) and culinary education (used by six), but five participants reported use of "other programs." Five participants were involved in more than one program, including two participants in "other programs." Average program scores ranged 4.2–4.7 on a 1–5 scale (Table 3).

Table 3. Use and Rating of CC+OLE Programs

Use of CC+OLE Programs	Mean ± SD
CC+OLE Program Participants[a]	N (%)
Produce Distribution	9 (47%)
Culinary education	6 (32%)
Other	5 (26%)
Program Rating (0-5)[b]	
Produce Distribution	4.2 ± 1.1
Culinary education	4.6 ± 0.5
Other	4.7 ± 0.7

[a.] Participants may use more than one program

[b.] Participants were asked: "If you are/were involved with any of the previously mentioned programs: how satisfied are you with them, on a scale from 1 to 5, with 1 being 'not satisfied at all' and 5 being 'extremely satisfied'?" and were then asked to rate each program they participated in.

Reported benefits of FIM programs that emerged through the qualitative analysis included increase in knowledge and skills from participation in culinary education, such as learning how to cook with different types of vegetables or learning about nutritional qualities of foods, as well as positive interactions with staff, such as working with kind and knowledgeable staff. Through food distribution programs, participants shared that they had increased access to quality food, such as organic, locally grown produce. Several participants described the food they obtained with terminology such as "fresh," "natural," "organic," "healthy," and "pesticide free," suggesting confidence that the food was of high quality.

Barriers to Food is Medicine program participation

Two main barriers to program participation emerged from thematic analysis: client time constraints and limited program awareness among clients. Some clients share that the times when programs and classes were offered did not work for them, or that it was hard to participate in programs while working. A few participants commented on not having enough information about programs, or not being aware of programs in general.

Satisfaction with Federally Qualified Health Center services

Another theme that emerged is that in times of need, the FQHC was an overall well-received source of care, apart from the FIM programs. Patients understood that resources and time were limited during the pandemic, and they were happy with the care they received.

Impact of the COVID-19 Pandemic and Related Coping Strategies

Changes with healthcare access

While we did not conduct statistical testing, due to the small sample size, survey responses on healthcare access were consistent with the general problem of reduced healthcare access and utilization during the pandemic. For example, 16 participants reported being able to access healthcare "whenever I needed to" pre-pandemic, whereas nine reported the same response for the pandemic period (Appendix, Table A3). Similarly, for the pre-pandemic period, 12 participants reported having health insurance "all of the time" and 3 participants reported that it was "difficult or very difficult" to pay for medical bills; however, in the pandemic period, 8 participants reported having health insurance "all of the time" and 7 participants reported that it was "difficult or very difficult" to pay for medical bills. Subthemes that emerged involving changes in healthcare access include decreased access to healthcare services and experiences with the shift to telehealth. Participants recalled putting off healthcare for economic reasons or due to fear of exposure to the virus. Some participants mentioned issues with medication and supply chain shortages, and others mentioned reduced staff and services at

the clinic as a barrier to healthcare. However, participants also acknowledged telemedicine as a form of healthcare continuation. While most participants shared that telemedicine was an accessible way to receive care, some mentioned having to pay for internet as a barrier.

Changes with food security

Descriptive results were consistent with less food security in the pandemic period compared to the pre-pandemic period, with 3 participants classified as food secure in the pandemic period, compared to 8 in the pre-pandemic period (Table 4). Subthemes related to changes in food security during COVID-19 included economic barriers to purchasing quality food and decreased quantity of food. Economic barriers cited often included high food prices, although participants also shared experiences related to job loss and food shortages. Several participants shared that they sought cheaper foods, or foods available through special deals.

Use of federal and community resources

Accompanying challenges to healthcare access and food security, participants also reported using more federal and community resources and relying more on social networks as coping strategies. Participants responses were consistent with greater utilization overall of federal programs, such as WIC and school meal programs, during the pandemic period, both in the close-ended questions (Table 4) and in open-ended questions, although program utilization varied by participant. Use of the charitable food sector was reported by 4 participants pre-pandemic and 9 participants during the pandemic (Table 4), and many participants described receiving food from the charitable food sector, predominantly the Yolo Food Bank. However, of 5 diabetic participants who received food from the food bank, 2 commented on the quality of the food, such as too much packaged and canned food or high glycemic foods, which made it difficult to manage diabetes.

Reliance on all forms of social networks assessed, including friends, family outside of the household, church or faith group, or the CC+OLE clinic, appeared to be greater in the pandemic period than pre-pandemic (Table 4). While a few participants mentioned receiving food or financial assistance from their social networks, several also indicated relying on their friends/family/faith groups for emotional support.

Information on changes that could affect access to food and healthcare, such as in transportation and employment from the pre-pandemic period to pandemic was also sought. Participant responses were consistent with reduced employment during the pandemic (an average of six months of employment in the pre-pandemic year and four

Table 4. Reported Experiences with Food Security and Related Coping Strategies in Pre-Pandemic and Pandemic Periods[a]

N = 19	Pre-Pandemic	Pandemic
	N (%)	*N* (%)
Food Security		
Food secure	8 (42%)	3 (16%)
Low food security (Food insecure)	9 (47%)	11 (58%)
Very low food security (Food insecure)	2 (11%)	5 (26%)
Resources Used		
Charitable food sector (Food bank/pantry)	4 (21%)	9 (47%)
CalFresh/food stamps	5 (26%)	3 (16%)
WIC	1 (5%)	3 (16%)
School meal program[b]	3 (16%)	6 (32%)
Unemployment benefits	1 (5%)	1 (5%)
None	12 (63%)	6 (32%)
Social Networks Used		
Friends	3 (16%)	6 (32%)
Family outside the household	3 (16%)	6 (32%)
Church or faith group	2 (11%)	5 (26%)
CC+OLE clinic	5 (26%)	8 (42%)
None	9 (47%)	5 (26%)

[a] All numbers are presented for descriptive purposes; no statistical testing was done.
[b] Two participants considered P-EBT, a pandemic EBT for school-age children, as a "school meal program," aside from meals given from schools.

months in the pandemic year), but reported methods of transportation were similar in the two time periods (Appendix, Table A4). Some participants described using their car less because of economic reasons, such as high gasoline prices or putting their car at risk of damage/need of repair. Participants also described decreased income, decreased work hours, and job loss during the pandemic, or having to implement social distancing and COVID-19 safety procedures at work.

Discussion

With this formative study, we sought to assess barriers and facilitators to participating in FIM programs among participants at a Federally Qualified Health Center. Additionally, we described participant experiences with healthcare access, food security, and related coping strategies during the pandemic. In the context of expanding the literature on FIM programs and on effects of the pandemic, this study is unique in exploring these themes together among FIM clients in a Federally Qualified Health Center. Major themes identified as barriers or facilitators to FIM program participation included satisfaction and perceived benefits of programs, including knowledge and skills and increased access to produce; and specific barriers to program participation, such as lack of information about the program and participant time constraints. Additionally, individuals expressed satisfaction with FQHC services generally, suggesting the importance of the institutional environment in which the program operates and the opportunity for connecting individuals to local food systems and additional resources in a trusted setting. Major themes related to the pandemic included changes in healthcare access, such as decreased access to healthcare and experiences with shifting to telehealth; changes in food security, including economic barriers to purchasing quality food and decreased quantity of food; and greater use of federal and community resources. In a time of increased food insecurity and decreased access to care during the pandemic, individuals relied on an intricate network of coping strategies, including federal and community resources, personal strategies and networks, and, for this client population, FIM programs. Recognizing how FIM programs are nested within this complex network is crucial for optimizing their effectiveness: a broader understanding of participant experiences, needs, and resources can guide efforts to provide more comprehensive support that complements other resources.

Our findings support previous literature on potential benefits of FIM programs, including increased access to fresh produce for participants (Aiyer et al., 2019; Freedman et al., 2013; Tester & Leak, 2021; Trapl et al., 2018) and improved knowledge and skills through culinary education (Sharma et al., 2021). Additionally, participants perceived the food that they received to be of high quality, important to fostering positive behavior change and trust in the organization. Another potential benefit of FIM programs is providing outlets to alleviate social isolation though group engagement and community-building efforts such as community gardens. While some participants commented on the social aspects, social interaction as a benefit did not arise as a theme in our analysis, possibly because many program operations were conducted online during the time period examined. However, 8 of the 18 participants who answered the social network section had a Social Network Score of 0 or 1, the most isolated groups, suggesting that social isolation is an important consideration for this population.

Our findings regarding barriers to program participation also highlight potential avenues for improving FIM programs, such as increased outreach and advertising, and more flexible program offerings, particularly with regard to scheduling. Other studies have suggested that more health information and more culturally diverse recipes should be included in produce prescription programs (Zimmer et al., 2022). Additionally, incorporating social determinants of health and food security screeners into standard medical care, increasing funding for piloting programs, and providing patients with resources to alleviate barriers such as transportation could further improve FIM programs (Stotz et al., 2022). Several studies have also highlighted the importance of clinician and practitioner involvement for the success of FIM programs (DePuccio et al., 2022; Mozaffarian et al., 2024; McWhorter et al., 2023; Stotz et al., 2022), to

help screen and identify patients, as well as provide referrals and promote FIM initiatives and food-related support. However, involvement requires training, support, and engagement of healthcare staff, which may be challenging in the face of competing demands.

The results of this study and related literature suggest several specific recommendations to successfully implement food-related programs in primary care settings. While these are tailored to the CC+OLE program offerings, the underlying principles are relevant for programs with similar goals and approach, even if specific activities differ.

Communication and outreach:

- Work with clinic staff to actively promote the programs during patient visits and also provide information on community and federal resources.
- For produce distribution programs, add signage next to the fresh produce offered in the waiting areas informing patients they can take the produce bags; include pamphlets such as produce "info sheets" and recipes in multiple languages and that are culturally relevant.
- For all programs, ensure visibility of flyers and pamphlets in the clinic waiting areas and promote program information and opportunities for involvement through other channels, such as email newsletters or social media.
- Explore the use of food security screeners in primary care visits and implement a resource referral program that connects patients to resources and to onsite FIM programs.

Flexible scheduling:

- Offer multiple session times or after hours options for patients with varying work hours.
- Provide recordings of virtual sessions or online resources for patients who are unable to attend in-person sessions.

The preliminary findings of this formative research were used by CC+OLE to strengthen programs and provide patients with more information on resources to further integrate FIM initiatives with primary care. CC+OLE FIM programming has expanded to include a USDA Gus Schumacher Nutrition Incentive Program (GusNIP)-funded Produce Prescription Program, two additional health center–based gardens, and further integration of care with FIM activities. Regular staff-focused culinary education and gardening activities engage frontline healthcare workers, supporting staff wellbeing and equipping them to promote resources for patients with whom they interact. Improved signage has been added to produce distribution locations, and tours familiarize patients with the gardens. Multiple group medical visits have been added at a variety of times and days of the week. Progress is incremental, and reflection is essential to developing the programs in ways that will lead to successful integration of care with FIM programs.

It is important to consider our findings in the context of other changes occurring within the healthcare system during the pandemic and at the FQHC where our study was conducted. During the pandemic, health centers saw decreases in supplies, materials and staff, reductions in use of services; individuals faced challenges such as fear of contagion, and economic and technological barriers (Pujolar et al., 2022). In this study, while participants indicated increased difficulty with accessing healthcare, several expressed that they acknowledged the additional barriers that the clinic was facing and were happy with the care that they received. Participants' overall positive perception of the health centers may suggest that FQHCs are trusted safety net institutions, and can therefore be valuable partners in improving access to locally grown produce.

In our study, FIM programs served individuals during a critical time of increased food insecurity and reduced access to healthcare. In accordance with previous literature, participants in this study faced challenges as job loss, reduced healthcare services, and decreases in food security (Leddy et al., 2020; Niles et al., 2020; Wolfson & Leung, 2020). Participants utilized a variety of coping strategies which have also been previously documented, including utilizing resources from the charitable food sector and government programs, relying on social networks for support, or buying different and cheaper foods (Halverson & Karpyn, 2022; Kinsey et al., 2020; Niles et al., 2020).

Consistent with previous studies, it was determined that federal expansion of food assistance programs during the pandemic, such as SNAP, WIC, and Pandemic-Electronic Benefit Transfer (P-EBT), assisted families with food attainment (Cadenhead et al., 2022). Interestingly, we observed less reported SNAP participation (not including P-EBT) during the pandemic in our sample. While this decrease in SNAP participation was observed in other studies conducted early in the pandemic among vulnerable groups (Harper et al., 2022), this was reported by only 2 participants in our study and is not necessarily indicative of trends in other healthcare settings or in the U.S. in general (Toossi et al., 2022). In our study, reported WIC participation was higher during the pandemic period, consistent with federal level estimates and other studies regarding children's participation (Fang et al., 2022; Toossi et al., 2022). Qualitative studies have reported that WIC fruit and vegetable allotments increased WIC purchasing and consumption of fruits and vegetables, increased shopping frequency, and enhanced their dietary variety (Halverson & Karpyn, 2022). While it is difficult to assess how an expansion of food benefit programs affected food security status in our population, it is possible that without the expansion there would have been more instances of very low food security. Participants shared that federal programs helped alleviate food-related needs. However, given the recent end to emergency federal food assistance allotments, intended as a temporary strategy to combat food insecurity (Rosenbaum et al., 2023), it is important to consider how community food security programs, including FIM interventions, and other resources may help fill a critical gap introduced by a decrease in benefits.

Utilization of the charitable food sector (food banks and food pantries) during the pandemic increased among our participants, as seen in other studies (Harper et al., 2022; Reimold et al., 2021). According to the USDA Economic Research Service (Coleman-Jensen & Rabbitt, 2021), 6.7% of U.S. households reported using a food pantry in 2020, an increase from 4.4% in 2019. A study conducted in Vermont found that use of food banks and food pantries helped participants maintain fruit and vegetable intake during the pandemic (Bertmann et al., 2021). In our study, several participants expressed being able to meet their food needs through food banks and food pantries. However, we noted that some participants with diabetes commented that the quality of food bank food made it difficult to manage their disease, with much of their food from the food bank consisting of canned and prepackaged items. Previous studies have also found lower food bank food satisfaction among those with chronic disease or desire for more fruits and vegetables among food bank participants managing chronic disease (Remley et al., 2019; Short et al., 2022).

Limitations of this research include the small sample size, which limits statistical testing of survey data, and the convenience sampling method, which limits our ability to generalize to the total client population. Recall bias or social desirability bias may have impacted responses; we aimed to mitigate social desirability bias by having interviews conducted by staff not affiliated with CC+OLE. A strength of this study is the in-depth nature of the interviews, allowing us to better understand participants' perspectives and solicit suggestions for improving programs and program access. Further research may test the effectiveness of specific program changes on participants' experiences and health outcomes, or explore resilience to other types of challenges and shocks.

Conclusion

In summary, this study provides insight into FIM programs conducted in FQHCs during the pandemic, and how program participant experiences were impacted by the COVID-19 pandemic. FIM programs have the potential to benefit participants through access to produce and culinary education, and increased advertising and flexible program offerings may increase program reach. Our study highlights the complex interplay between various sectors and resources, including personal strategies and networks, federal and community resources, and healthcare settings, that helped individuals combat pandemic-related challenges with healthcare and food security. Understanding the role of FIM programs among other resources that community members rely on may help programs to better meet the needs of clients. Continued support

and funding are needed both to pilot FIM programs and to learn how to better implement programs among diverse populations, maintain FQHC services, and increase multi-sectoral collaboration to support health and food security in low-income populations.

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Appendix

Table A1. Participant Health Characteristics

Participant Characteristics (*N* = 18)	Mean ± SD
Social Isolation [a]	49.5 ± 9.4
Self-Rated Health	
Poor	0 (0%)
Fair	10 (56%)
Good	6 (33%)
Excellent	2 (11%)
Diagnosed Health Conditions (based on participant report) [b]	
Diabetes	9 (50%)
Hypertension	6 (33%)
High blood cholesterol	7 (39%)
Heart disease	0 (0%)
Stroke or cerebral vascular incident	2 (11%)
Cancer	0 (0%)
Other	9 (50%)
None	6 (33%)
Social Network Index Score	
0/1 (most isolated)	8 (44%)
2	5 (28%)
3	4 (22%)
4 (not isolated)	1 (6%)

[a] A score of 50 is the average for the United States general population with a standard deviation of 10. A higher PROMIS T-score represents more of the concept being measured.
[b] Participants could have multiple conditions

Table A2. Food Behavior Checklist

Food Behavior Checklist (*N* = 18)		Mean ± SD
How many servings of fruit do you eat per day?		2.1 ± 1.1
How many servings of vegetables do you eat per day?		2.0 ± 0.8
How would you rate your eating habits? (with 1 being poor and 10 being excellent)		6.1 ± 2.1
		N (%)
How often do you drink fruit drinks, sport drinks, or punch?	Never or less than 1 time a week	13 (72%)
	1–3 times a week	4 (22%)
	4–6 times a week	1 (6%)
	1 time per day	0 (0%)
	2+ times per day	0 (0%)
About how much do you drink each time?	8 oz. (1 cup) or less	16 (89%)
	12 oz. (1 normal can)	2 (11%)
	20 oz. or more	0 (0%)
How often do you drink regular soda or energy drinks?	Never or less than 1 time a week	9 (50%)
	1–3 times a week	4 (22%)
	4–6 times a week	1 (6%)
	1 time per day	2 (11%)
	2+ times per day	2 (11%)
About how much do you drink each time?	8 oz. (1 cup) or less	10 (56%)
	12 oz. (1 normal can)	8 (44%)
	20 oz. or more	0 (0%)
Do you eat more than one kind of fruit per day?	No	6 (33%)
	Yes, sometimes	7 (39%)
	Yes, often	3 (17%)
	Yes, everyday	2 (11%)
Do you eat more than one kind of vegetable per day?	No	1 (6%)
	Yes, sometimes	6 (33%)
	Yes, often	7 (39%)
	Yes, everyday	4 (22%)

Table A3. Reported Experiences with Access to Healthcare in Pre-pandemic and Pandemic Periods

Access to Healthcare (*N* = 19)		Pre-Pandemic	Pandemic
		N (%)	*N* (%)
How often were you able to get healthcare when you needed it? (able to visit a clinic/physician/dentist/etc)	Not at all	0 (0%)	0 (0%)
	Only sometimes	0 (0%)	6 (32%)
	Most of the time	3 (16%)	4 (21%)
	Whenever I needed to	16 (84%)	9 (47%)
How often were you able access to services at CC+OLE Health Centers when you needed it? (able to visit a clinic/physician/dentist /etc. or participate in a program)	Not at all	0 (0%)	0 (0%)
	Only sometimes	1 (5%)	6 (32%)
	Most of the time	0 (0%)	2 (11%)
	Whenever I needed to	15 (79%)	10 (53%)
	Refused/I don't know	3 (16%)	1 (5%)
During this time period, when did you have health insurance?	All of the time	12 (63%)	8 (42%)
	Some of the time	2 (11%)	4 (21%)
	None of the time	5 (26%)	7 (37%)
How hard was it/has it been for you to pay for medical bills?	Not at all difficult	7 (37%)	6 (32%)
	Not very difficult	4 (21%)	4 (21%)
	Somewhat difficult	5 (26%)	2 (11%)
	Difficult	1 (5%)	4 (21%)
	Very difficult	2 (11%)	3 (16%)
How hard was it/has it been for you to pay for medication?	Not at all difficult	9 (47%)	7 (37%)
	Not very difficult	2 (11%)	1 (5%)
	Somewhat difficult	6 (32%)	3 (16%)
	Difficult	2 (11%)	4 (21%)
	Very difficult	0 (0%)	4 (21%)

Table A4. Reported Experiences with Employment and Transportation in Pre-pandemic and Pandemic Periods

N = 19	Pre-Pandemic	Pandemic
	Mean ± SD	Mean ± SD
Employment		
Months employed[a]	6.3 ± 5.8	4.2 ± 5.5
Number of employers	1.1 ± 1.3	0.9 ± 1.0
	N (%)	*N* (%)
Employed	11 (59%)	7 (37%)
Transportation[b]		
Bus or other public transport	2 (11%)	3 (16%)
Own vehicle	17 (89%)	16 (84%)
Ride from friend/family/neighbor	2 (11%)	4 (21%)
Ride from taxi or app like Lyft/Uber	2 (11%)	2 (11%)
Some brings food to me (delivery service or friend/family member)	1 (5%)	3 (16%)
Walk or bike	5 (26%)	7 (37%)

[a] Months employed and number of employers calculated among all participants
[b] Participants could elect multiple forms of transportation