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Nalini Peres-da-Silva Date

A Qualitative Evaluation of the Food as Medicine Program at Grady Memorial Hospital in Atlanta, Georgia

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A Qualitative Evaluation of the Food as Medicine Program at Grady Memorial Hospital in Atlanta, Georgia

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2017

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An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
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Abstract
A Qualitative Evaluation of the Food as Medicine Program at Grady Memorial Hospital in Atlanta, Georgia
By Nalini Peres-da-Silva

Introduction: Hypertension and diabetes are chronic diseases with largely diet-related management. The high cost of nutritious foods creates management gaps for socioeconomically disadvantaged individuals. This cross-sectional qualitative evaluation explores how the Food As Medicine (FAM) program at Grady Memorial Hospital impacts the food-seeking behaviors (procurement, cooking, and eating habits) of food-insecure program participants living with chronic diet-related diseases.
Methods: In-depth interviews were conducted with 9 FAM participants to explore how FAM program components (Food Pharmacy, Teaching Kitchen, and Nutrition Classes) have influenced their nutrition-based disease management. In-depth interviews were also conducted with 4 staff members on successes and challenges in program implementation. Both participants and staff provided suggestions for program improvement.
Results: Access to free food encourages participants to join the FAM program. Participants are motivated to engage in behavior change by fear of life-threatening damage from chronic diseases. Health change champions supporting participants as they go through the program include their families as well as FAM staff and peers. Behavior change adoption is facilitated by knowledge and skills gained from the Nutrition Classes and Teaching Kitchen, including the link between food and disease, disease indicator tracking, toolkit of feasible nutrition strategies, hands-on culinary education and making modifications to culturally specific meals. Participants must undergo a mindset shift towards health empowerment to sustain food-seeking behavior changes. Long-term participant benefits include physical, mental, financial, and spill-over community effects. Some participants face barriers to change including not being mentally ready to change, lengthy gaps between FAM classes, and lack of time at home to buy food or cook for their families. FAM staff note that the insignificant number of staff is the most pressing concern for program implementation.
Conclusion and Recommendations: The three components of the FAM program work collaboratively to create food-seeking behavior change among program participants. Grady Hospital should re-adopt a cohort model of participation and encourage family inclusion in programming to encourage behavior change adoption. Grady Hospital should also hire additional FAM programming staff and invest in a FAM website to disseminate educational resources which can improve public health.

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Table of Contents

List of Acronyms

US	United States
CVD	Cardiovascular disease
SNAP	Supplemental Nutrition Assistance Program
FAM	Food as Medicine
T2DM	Type 2 diabetes
NHANES	National Health and Nutrition Examination Survey
FIM	Food is Medicine
ReAIM	Reach, Effectiveness, Adoption, Implementation, and Maintenance
NT	Nutrition Therapy
FVRx	Fruit and Vegetable Prescription Program

Chapter 1. Introduction

Chronic hypertension and diabetes mellitus are among the most prominent public health issues in the United States (US). Nearly 50% of US adults have hypertension (CDC, 2021) and 11% have diabetes (CDC, 2022). Hypertension and diabetes are modifiable risk factors for cardiovascular disease (CVD), which caused 1 in every 5 US deaths in 2021 (CDC, 2023). CVD also incur high costs across the healthcare system; the US spent $239.9 billion on the cost of CVD health care services, medicine, and loss of productivity due to death from 2018 to 2019 (CDC, 2023).

Diabetes and chronic hypertension are unique in that their management is largely diet related. Research has shown that diets rich in whole grains, fat-free or low-fat dairy products, fruits, vegetables, poultry, fish, and nuts are beneficial for people who have diabetes and can promote blood pressure management (Campbell, 2017). However, diets covering all recommended food groups are significantly more expensive than non-comprehensive diets, causing gaps in access and food insecurity for lower income individuals (Babey et. Al, 2008). In 2022, 12.8% of Americans lived in food-insecure houses without access to an affordable and nutritional diet (USDA Household Food Security, 2022). There is a need to provide access to nutritious foods and teach healthy food-seeking behaviors to individuals living with chronic diet-related disease in the United States.

Atlanta, Georgia is the 8th largest metropolitan city in the US with a recorded 6.2 million residents in 2022 (US Census Bureau, 2023) and a higher percentage of non-white residents than the US overall. Higher rates of food insecurity were found in core urban areas in the Atlanta metropolitan area as compared to suburban areas (Shannon et. Al, 2017). The Grady Hospital System is the busiest level 1 trauma center in Georgia, with a primary hospital located in the core

central south region of Atlanta, and other ambulatory locations capturing a service area of 1,823,052 Georgian residents (Grady CHNA, 2022). Grady is a 'safety-net' hospital, providing a significant level of care to low-income, uninsured, and vulnerable populations with limited access to health care. The 2022 Grady Community Health Needs Assessment found chronic conditions, lifestyle, and hypertension to be contributing factors to the top five causes of death in Grady's service area. Healthy food access was identified as a priority health need, impacted by metropolitan Atlanta food deserts and few affordable and healthy food options. In 2021, 49% of the population living in Dekalb county which Grady exists in were below the Supplemental Nutrition Assistance Program (SNAP) threshold of 130% poverty (Feeding America, 2021).

To understand how the Grady Memorial Food as Medicine (FAM) program impacts the food-seeking behaviors of program participants living with chronic diet-related diseases, this qualitative research study will gain staff and program perspectives to accomplish the following aims:

1) Explore the impact of the FAM program components on the food-seeking behaviors (food procurement, cooking and eating habits) of program participants

2) Understand the impact of the FAM program on participant chronic diet-related disease and chronic diet-related disease management

3) Investigate how the FAM program can improve to better serve participant needs

This research study will allow Grady to demonstrate the impact on food-seeking behaviors and chronic disease management of some of its most vulnerable patients. Findings can be shown to potential stakeholders to secure future capital for this donor-funded initiative. Patient and staff perspectives provided in the study will bring to light any gaps within the

program design and implementation and guide program administration on know how to improve the program to better meet patient needs. The insights gained from this research study can be used by other FAM programs to support program design and chronic diet-disease management. Hospital systems can also use these findings to advocate for the adoption and funding of FAM programs for their patients.

Chapter 2. Literature Review

Hypertension and Diabetes: Chronic cardiovascular diseases

Chronic diseases are conditions which last one year or more and require ongoing medical attention, limit activities of daily living, or both (CDC, 2022). CVD is a chronic disease related to nutrition which caused 1 in every 5 deaths in the US in 2021 (CDC, 2023). From 2018 to 2019, the US spent $239.9 billion on the cost of CVD health care services, medicine, and loss of productivity due to death (CDC, 2023). Modifiable (i.e. controllable) risk factors for CVD include diabetes, hypertension, and hyperlipidemia. Diabetes and hypertension are leading chronic diseases across the US, specifically within the Southeastern part of the country including the state of Georgia (GDPH, 2023).

Hypertension, or elevated blood pressure, is defined as a blood pressure reading of 140/90 mmHg or higher (CDC, 2023). Stage 1 Hypertension is between 130-139 mmHg/80-89 mmHg and becomes Stage 2 or uncontrolled hypertension when the systolic blood pressure reading on two different days is ≥ 140 and/or two diastolic blood pressure readings are ≥ 90 (CDC, 2023). In 2021, nearly half (48.1%) of American adults had Stage 1 or higher hypertension. Forty-five percent of adults with hypertension experience uncontrolled hypertension (CDC, 2023). People living with hypertension do not normally experience symptoms, however, uncontrolled blood pressure can cause painful symptoms including headaches, blurred vision, and chest pain (CDC, 2023). Hypertension which is not treated can cause more dangerous health conditions including stroke, kidney and heart disease. In 2021, hypertension was a primary or contributing cause of 691, 095 deaths in the US (NCHS). The same year, 36.6% of adults living in Georgia were told by a health professional that they had high blood pressure (AHR, 2021).

Diabetes is also a major health issue across the US and in Georgia. Type I Diabetes occurs when the pancreas does not produce enough insulin and Type II Diabetes Mellitus (T2DM) occurs when the body cannot effectively use insulin, both leaving excess glucose in the bloodstream (CDC, 2023). Diabetes is measured by glycated hemoglobin (HbA1C) levels of 6.5% or higher, a fasting blood sugar test of 126 mg/dL or higher, or a glucose tolerance test of 200 mg/dL or higher (CDC, 2023). Diabetics can experience grave health problems including loss of vision, and heart disease. As of 2023, 1 in 10 Americans have diabetes and about 90-95% of these cases are T2DM (CDC, 2023). Diabetes is the eighth leading cause of death in the US, and the number one leading cause of kidney failure, lower-limb amputations, and adult blindness (CDC, 2023). Approximately 1 million Georgia residents (12.4% of the population) has diabetes (GDPH, 2023). Diabetes prevalence in Georgia increased almost 20% from 2006 to 2016, representing its upward trend within the population. (GDPH, 2023).

Inequities in chronic disease distribution

Certain groups of people are more likely to have hypertension than others. In the US, 56% of non-Hispanic black adults have hypertension, which is higher than levels for non-Hispanic white adults (48%) or Hispanic adults (39%) (CDC, 2023). The Southern US including Georgia has a disproportionately higher proportion of counties with high hypertension prevalence (CDC, 2023). A systematic review of 2404 references showed low socioeconomic status (SES) and level of education are associated with higher hypertension (Leng et. Al, 2015). Similar relationships are seen in diabetes trends across the US.

Impact of Nutrition on Hypertension and Diabetes

Diabetes and chronic hypertension diseases are unique as they are largely managed through diet as opposed to solely medical intervention (Food Insecurity, 2016). Hypertension risk can be

increased by unhealthy diets, including those with excessive salt, high in saturated and trans fats, and low in fruits and vegetables (WHO, 2023). Research has shown that diets rich in whole grains, fat-free or low-fat dairy products, fruits, vegetables, poultry, fish and nuts are beneficial for people who have diabetes and can promote blood pressure management (Campbell, 2017). However, diets covering all recommended food groups are significantly more expensive than non-comprehensive diets, causing gaps in access and food security for lower income individuals.

Food Insecurity in the US and Georgia

Food insecurity is defined as a "household-level economic and social condition of limited or uncertain access to adequate food" (USDA ERS, 2023). Households in the US experience very *low food security* when several indications of interrupted eating patterns and decreased food intake take place. Seventeen million American households (12.8% of total households) were food insecure at some time point during 2022 and living without access to an affordable and nutritious diet (USDA ERS, 2023). There was a statistically significant increase in food insecurity experienced among households in 2022 as compared to 2021 (13.5 million households, 10.2% of total), demonstrating a rise in households which cannot meet the nutritional needs of all members due to inadequate financial means (USDA ERS, 2023). Food insecurity is not experienced equally across US subgroups and is different across racial groups and geographic areas. Black non-Hispanic households experienced the highest levels of food insecurity among all US households at 22.4% (USDA ERS, 2023). Hispanic households experiences the second highest rate of food insecurity at 20.8% of all US Hispanic households. The US South experiences the statistically highest level of food insecurity than any other US regions; 14.5% of Southern households experience food insecurity (USDA ERS, 2023). In Georgia, 11.3% of the population experienced food insecurity from 2020-2022. (USDA Household Food Security, 2022).

Relationship between food insecurity and chronic disease indicators

Food insecurity impacts hypertension and diabetes rates across America. An analysis of the National Health and Nutrition Examination Survey (NHANES) 2011-2012 and 2013-2014 waves showed an increased odds of having hypertension among food insecure individuals as compared to food secure individuals, and decreased odds of having controlled blood pressure among food insecure individuals compared to food secure individuals (Luttrell, 2018). A similar correlation is seen between T2DM and food insecurity. An analysis of the 1999-2008 NHANES data set indicated that food insecure individuals were significantly more likely to have a poorly controlled T2DM (HbA1c > 9.0%), even when BMI was controlled for (Berkowitz et. Al, 2013). The inverse relationship was also demonstrated; analysis of a 2005-2014 NHANES data set showed people with diagnosed T2DM were 1.58 times more likely to be food insecure than those without T2DM (Walker et. Al, 2019). Food insecurity is clearly a significant barrier to hypertension and diabetes management in the US. There is a need to provide access to nutrition foods and teach healthy food-seeking behaviors to food-insecure individuals living with chronic diet-related diseases in the United States.

Prevalence and growth of Food as Medicine initiatives across the US

The FAM methodology integrates food and nutrition interventions with the healthcare system to manage, treat, and potentially reverse chronic diet-related diseases. FAM programs are typically delivered within the healthcare system by clinicians and supporting nutritionists and funded by healthcare, government, or philanthropy. The pillar of these programs includes the offering of food strategies as compared to traditional medical nutritional interventions to improve health (Downer et. Al, 2020). FAM programs support an individual's ability to follow medically correlated dietary recommendations and ultimately change food-seeking behaviors.

A qualitative review of FIM (Food is Medicine) perinatal programs utilized the ReAIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance) framework to assess perceptions of public health impacts of the program (Balis et. Al, 2024). Program effectiveness across program is defined with newborn birth outcomes, nutrition patterns and practice, and chronic disease indicators. However, barriers to establishing program effectiveness were challenges in measuring long-term changes and general lack of evidence for FIM programs. Program implementation differed across distinct program, including types of foods provided, location of food exchange, and provision of nutrition education (Balis et. Al, 2024). Across the US, FAM initiatives have included novel interventions like food supplementation, teaching kitchens, and nutrition education.

Food as Medicine Program Components

Food Supplementation

Food supplementation programs play a vital role in providing food-insecure households with nutritious and healthy foods and mitigating short-term food insecurity. Food prescription addresses food insecurity and correlated negative health outcomes by addressing nutritional, financial, and psychological pathways (Vazquez et. Al, 2021). As a result, food supplementation recipients have increased dietary options and quality from fruits, vegetables, whole grains, and lean protein options.

There are a few types of food supplementation programs used in healthcare settings as food insecurity interventions. Medically tailored meals are full-meal preparation specific to the dietary needs of an individual. These are the highest level of intervention for people with complex medical conditions who cannot shop or self-prepare their meals. One level down is medically tailored grocery prescriptions, which can be provided to medical patients who can cook and prepare food at home. This approach is used by physicians at the Boston Medical

Center who write a prescription for supplemental foods for patients with health diseases including hypertension and diabetes. Produce prescription programs are another type of medically tailored supplementation which provide clinical patients identified by income-levels and/or chronic disease risk status prescriptions for subsidized produce (Swartz, 2018). Participants collect food at partner locations including local farmers' markets, supermarkets, or community gardens. Food Pharmacies provide standard produce packages to all participants.

Food supplementation provides patients with additional nutritious and plant-based ingredients to be cooked in the home setting. Supplemental food provision can be highly cost effective for healthcare systems when key sociodemographic subgroups including people with low income are targeted. Research found that a 30% subsidy on fruits and vegetables would prevent 1.93 million cardiovascular disease incidents and save $40 billion in healthcare costs over a lifetime (Lee et. Al, 2019). Receiving supplemental food also reduces the need to choose between healthy food and other basic needs like healthcare or household costs. A patient with diabetes in a Massachusetts FAM program emphasized that "lack of funds often reduce the choices in [their] meals" (Berkowitz et. Al, 2020). Decreasing food insecurity can minimize psychological factors (i.e. depression, anxiety, and feelings of shame) and empower individuals to manage their well-being and existing conditions (Walker et. Al, 2019). A diabetic individual in a medically tailored food prescription program spoke on their ability to "eat what [they] were supposed to eat" in a time when they were receiving reduced food stamps and needed financial support to follow a diet supporting their chronic disease management (Berkowitz et. Al, 2020). Food pantry supplementation for individuals living with diabetes in Michigan, Texas and California showed a statistically significant improvement in food insecurity over a 6-month intervention phase (Seligman et. Al, 2022). Food pharmacies empowers food-insecure patients

with chronic diet-related diseases to overcome environmental and mental barriers related to low food access and make healthier choices in their personal nutrition.

Research comparing fruit and vegetable prescription programs have shown the potential impact on health outcomes for low-income and at-risk chronic disease individuals. A literature review of 30 studies on community-based fruit and vegetable prescription programs quantified the benefit of produce supplementation for participants – when measured in the studies reviewed, dietary quality improved in 94%, health outcomes improved in 83% and food security status improved in 82% (Brooks et. Al, 2023). The target populations in studies reviewed were predominantly women, non-white, and low-income. Other research shows the beneficial impact clinic-community food provision programs have on chronic disease outcomes; a pre- and post-evaluation study of 22 US produce prescription programs for individuals with or at risk for cardiometabolic health issues living in low-income neighborhoods found an increase of fruit and vegetable consumption by 0.85, 0.37 decrease in the odds of being food insecure, and increased odds of improving one level in self-reported health status for adults (Hager et. Al, 2023). Encouraging nutritious eating for chronic disease patients can be bolstered by produce supplementation alongside other interventions. A literature review of clinic-community food provision programs on impact of HbA1c values for food-insecure adults with T2DM or prediabetes found that when a nutrition education component was delivered along with food supplementation, participation HbA1c was reduced in all programs (Schier et. Al, 2023). Four programs which delivered both services reported increase in participant fruit and vegetable purchases or improved dietary quality (Schier et. Al, 2023).

While most nutrition monitoring and evaluation efforts are quantitatively assessed, there are some qualitative studies which have assessed program participant's personal experiences on

interventions. In a qualitative review of a Canadian fruit and vegetable prescription program, participants noted the direct support to their health by the prescription of the produce boxes (Johnson et. Al, 2023). This included benefits to physical health like diabetic and hypertension control, as well as to mental health. Program limitations found were a lack of choice in produce received and the intervention only lasting 6 months. A qualitative review of a pediatric produce prescription program in Hawaii found that participants motivation for participation in the program included produce enjoyment, child support, financial support, and a positive familial effect (Esquivel et. Al, 2022). As participants had to go to a market to pick up their foods, barriers to participation in the program included challenges using food vouchers at the market, conflicting schedule with markets, and challenges with using online market services.

Teaching Kitchen

The frequency of meals consumed outside of the household rapidly increased over the past few decades, and cheap and quick meals add to chronic disease risk (Bahadoran et. Al, 2015). Teaching Kitchens integrate culinary education in healthcare settings to combat the impacts of fast-food culture on food-insecure individuals living with chronic diet-related diseases (Tanumihardjo et. Al, 2023). Teaching Kitchens provide a supporting community for patients to learn, practice, and share culinary skills and knowledge. Patients are taught how to plan meals to meet dietary needs, select healthy ingredients and cooking techniques. Teaching Kitchens aim to promote sustainable food-seeking behavior change by teaching which foods to consume more or less of, how to look for healthy foods to shop for, and ways to recycle foods in a cost-saving way.

Teaching Kitchen Programs have shown to be successful in supporting chronic disease management among patients with unmet social needs including food insecurity. Patients with diabetes (baseline HbA1c > 8%) utilizing an Oregon hospital Teaching Kitchen experienced a

reduction of HbA1c by 1.2% from baseline to 6 months involvement (Tanumihardjo et. Al, 2023). Patients with hypertension utilizing the same Teaching Kitchen experienced significant average changes in SBP from 141.4 mmHg to 134.2 mmHg, and changes in DBP from 86.8 mmHg to 81.2 mmHg over 6 months. Diabetic participants utilizing a Teaching Kitchen at Tulane University experienced significantly greater reductions in DBP and superior mean HbA1c than a control group (Monlezun et. Al, 2015). The significant changes in blood sugar control and hypertension management in such Teaching Kitchen environments demonstrates their potential efficacy to achieve chronic-disease management among high-risk patients.

Knowledge gained in Teaching Kitchens aims to positively impact food-seeking behaviors by providing nutrition education through hands-on cooking. Teaching participants how to prepare foods empowers individuals to create meals which align with their dietary goals and reduces the reliance on cheap yet unhealthy fast-food. Patients using a Louisiana Hospital Teaching Kitchen experienced an increased confidence in eating correct portions and use nutrition panels to make food choices as compared to a control group (Monlezun et. Al, 2015).

Nutrition Education

While clinical and diet-supported management of hypertension and T2DM are well established practices, many patients experience gaps between knowledge, attitudes and practices which can cause challenges in management capabilities. Nutritional education can play a key role in filling gaps between knowledge and practice to support sustainable management of chronic diet-related diseases. Nutrition Therapy (NT) consists of education for patients to adopt healthy eating patterns to manage T2DM and hypertension (Galendi et. Al, 2022). The American Diabetes Association recommends NT to promote dietary quality and energy restriction as well as the combination of patient preferences and metabolic needs (ADA, 2019). Diets commonly

promoted to manage hypertension and diabetes include the Mediterranean diet, Dietary Approaches to Stop Hypertension, low carbohydrate and plant-forward diets.

NT has been shown to have positive impacts on improving dietary habits among individuals living with chronic diet-related diseases. A systematic review of studies on NT to support management of hypertension and T2DM in the primary care setting showed that educational counseling and food replacement programs in the primary care setting had a -0.37 HbA1c reduction in an intervention verse control group among T2DM patients across 27 studies (Galendi et. Al, 2022). Across 9 studies, education and counseling programs showed slight reductions in diastolic blood pressure in hypertensive patients by 1.79 mmHg. NT provides patients awareness of behaviors supporting positive health outcomes.

Teaching individuals how to adopt their eating patterns can have important impacts on diet-related disease management. The Mediterranean diet emphasizes healthy fats, whole grants, fruits, vegetables, beans, nuts and seeds. Encouraging consumption of this diet has shown lower HbA1c levels, decrease insulin resistance, and greater reductions in body weight over time (Esposito et. Al, 2010). Similarly, encouraging non-meat diets including vegetarian or vegan eating patterns can improve chronic disease management. A meta-analysis showed that the adoption of such dietary patterns reduces HbA1c levels by 0.3-0.4%, improve blood lipid levels and reduce weight (Salvia et. Al, 2023).

Behavior changes such as reducing carbohydrate, sugar and salt intake are also key components of nutritional education for managing T2DM and hypertension. As carbohydrates are internally digested into glucose, low-carbohydrate diets are proposed to manage T2DM. Related to hypertension, increased salt consumption can disrupt sodium balance and cause water retention, leading to fluid retention and increase in pressure against blood vessel walls. NT

focusing on known dietary patterns which support chronic disease management are important ways to impact food-seeking behaviors.

Summary of Findings and Gaps in Literature

The review of relevant literature shows that providing food supplementation, culinary and nutrition education for individuals living with chronic hypertension and diabetes can support the management and potential improvement of such chronic diseases. This is especially important among food-insecure individuals with a higher rate of chronic diet-related diseases yet limited access to foods which can manage their disease. There is an unequal distribution of hypertension and T2DM among people living in the US South, African Americans, and lower socioeconomic and educated populations. Research has shown that the components of the US FAM initiatives provide these populations with access to healthy foods, empower patients to make positive nutrition behavior change and simultaneously reduce the financial cost of disease management on the patients and the healthcare system (Brooks et. Al, 2023) (Lee et. Al, 2019).

There is limited qualitative data on how FAM programs change the food-seeking behaviors of program participants for chronic disease management. Program implementors note the lack of evidence for FAM programs contributed to barriers for assessing program effectiveness, highlighting the need to perform evaluations of these potentially high-impact program. Research demonstrates the impact of FAM programs on hypertension and diabetes indicators (Schier et. Al, 2023), (Tanumihardjo et. Al, 2023) (Galendi et. Al, 2022), yet the emic perspective of participants in how they made these changes and sustained them long-term is largely missing. There is also a noticeable gap in how community aspects of nutrition education promote education and behavior change among FAM participants. All FAM programs do not provide mandatory nutrition education as a stipulation of receiving food from programs, which

could distinguish the impact of the Grady FAM program on participant behavior change. Finally, there is a need to collect data highlighting the perspective of nutritionists managing FAM programs to gain insight to program implementation. Comparing staff and participant perspectives of the program aims and implementation will highlight gaps in how the program is delivered and key recommendations for improvement. Collecting data on these key areas will provide insights on the long-term sustainability and impact of the FAM program on creating food-seeking behavior change in food-insecure individuals living with chronic disease.

Chapter 3. Methods

Intervention

This study is a cross-sectional qualitative evaluation of the Grady Memorial Hospital FAM Program in Atlanta, Georgia. The program was launched in 2020 and is a 1-year intervention implemented as a partnership between Grady Health System, Open Hand Atlanta, and the Atlanta Food Bank. The multi-pronged intervention provides patients with nutrition counseling, cooking classes, and fresh food. The Grady FAM program aims to: 1. Increase access to healthy, affordable food for patients and their families, employees, visitors and the wider community; 2. Leverage community resources and expertise to address food insecurity and chronic disease, and 3. Improve the health and overall quality of life of patients (Owens et. Al, 2023). During the first two years from August 2020 to August 2022, 1,012 patients enrolled in the Food as Medicine Program. Ninety-three percent of program participants identified as African American and 60% as female (Owens et. Al, 2023).

Once enrolled in the FAM program, every 2- or 3-weeks patients can pick up plant-based food from the Food Pharmacy provided by the Atlanta Food Bank. The standard pick-up consists of one type of fresh fruit, two types of fresh vegetables and one dried good. Participants who have a family of four people or less receive 24 pounds of fresh food, while those with a family of five or more receive 48 pounds. Participants attend quarterly cooking classes in the Teaching Kitchen at Jesse Hill Market which have both educational and hands-on cooking components. The educational section consists of teaching safety in the kitchen, building a balanced plate of food, making over traditional recipes, portion sizes. The hands-on component is an opportunity for participants to cook a side-dish using produce received from the food pharmacy that week. Participants also attend quarterly nutrition education classes at Grady Hospital which focus on

diabetes and hypertension, dietary cholesterol and fat, label reading and portion sizes. All program components are managed and facilitated by registered dieticians.

Study Area & Population

Grady clinicians refer program participants based on an 'at-risk' food insecurity status determined by the validated 2-item Hunger Vital Sign questionnaire and either an uncontrolled hypertension reading (last systolic blood pressure reading greater than 140 mmHg or diastolic reading greater than 90 mmHg) or an HbA1c reading greater than 9.0%.

This qualitative evaluation was conducted by speaking to currently enrolled FAM participants and program managers between October 2023 to January 2024. Criteria for participant enrollment in this study was enrollment in the FAM program for a minimum of 4 months. All program managers interviewed have worked in their positions at Grady for longer than one year.

This qualitative evaluation was conducted by speaking to currently enrolled FAM participants and program managers between October 2023 to January 2024.

Evaluation

In-depth interviews were conducted with 9 FAM program participants and 4 dieticians who manage the Food Pharmacy, Teaching Kitchen and Nutrition Education classes. All interviewees received a $20 Kroger gift-card after the interview. Interviews provided the program participant and staff emic perspectives on the program's ability to impact food-seeking behavior and chronic diet-related disease management. Gaps in the program and suggested improvements by both participants and staff were also evaluated. IRB approval was not required for the study as it was done through existing FAM programming.

The study population was defined deductively based on being Grady FAM participants for at least 4 months. Purposive and convenience sampling strategies were used to recruit FAM

participants from a Teaching Kitchen cooking session. As a volunteer in the Teaching Kitchen, I was able to connect with the program participants and staff and explained the research purpose and procedures prior to asking for their voluntary participation in the study. All participants provided verbal consent prior to engaging in the interviews. Eight of the 9 program participant interviews were conducted in the Jesse Hill Market, a part of the FAM infrastructure at Grady, and one was conducted on Zoom. Confidentiality was ensured by conducting the interview in a program staff's private office with the door closed. All staff interviews were conducted on Zoom to allow for flexibility of the staff's busy schedules. All interviewees consented to participation and to being recorded before starting each interview. All interview recordings were kept on a password-protected laptop.

After completing a few participant interviews, I used the inductive process to identify participants I wished to gain the perspective of but was missing in my sample, including Spanish-speaking and male participants. Saturation was reached at 9 participants when new information was no longer being gleaned from participant interviews.

Program Participant Demographics

IDI #	Gender	Race	Highest Education level	Chronic Disease Status
1	F	African American	High school	Diabetes
2	F	African American	Jr in college	diabetes and Hypertension
3	F	African American	High school	diabetes and Hypertension
4	F	African American	Associates Degree	diabetes and Hypertension
5	M	Latino	No school	diabetes and Hypertension
6	M	African American	10th grade	Diabetes and Hypertension
7	F	African American	Associates Degree	Diabetes and Hypertension

8	F	African American	Bachelors Degree	Diabetes and Hypertension
9	F	African American	High school	Cholesterol and borderline hypertension

Data Management and Analysis

Once all participant and staff interviews were complete, the records were uploaded to MAXQDA AI transcription software for audio-to-text conversion. I listened to all the interview recordings and removed de-identifiable information from the transcriptions. I also compared the recordings to the text transcripts to fill in gaps and ensure fidelity to the recordings. I took notes on key concepts as I listened to the audio recordings and chose data-driven recurring concepts as my inductive codes. I reviewed the interview guides and identified deductive concepts informed by my interview questions and research question. I compiled both inductive and deductive themes into a comprehensive codebook and coded the data according to the definitions developed for each code. After coding, I reviewed all coded data across all participants and made comparisons across participant perspectives based on gender, age, and length of time in FAM program. I created thick descriptions including nuance and breadth among the codes. I then reviewed the descriptions to identify overlap between concepts and compiled codes into larger themes which fit within a larger conceptual model “Adopting and Sustaining Food-Seeking Behavior Changes”.

Chapter 4. Results

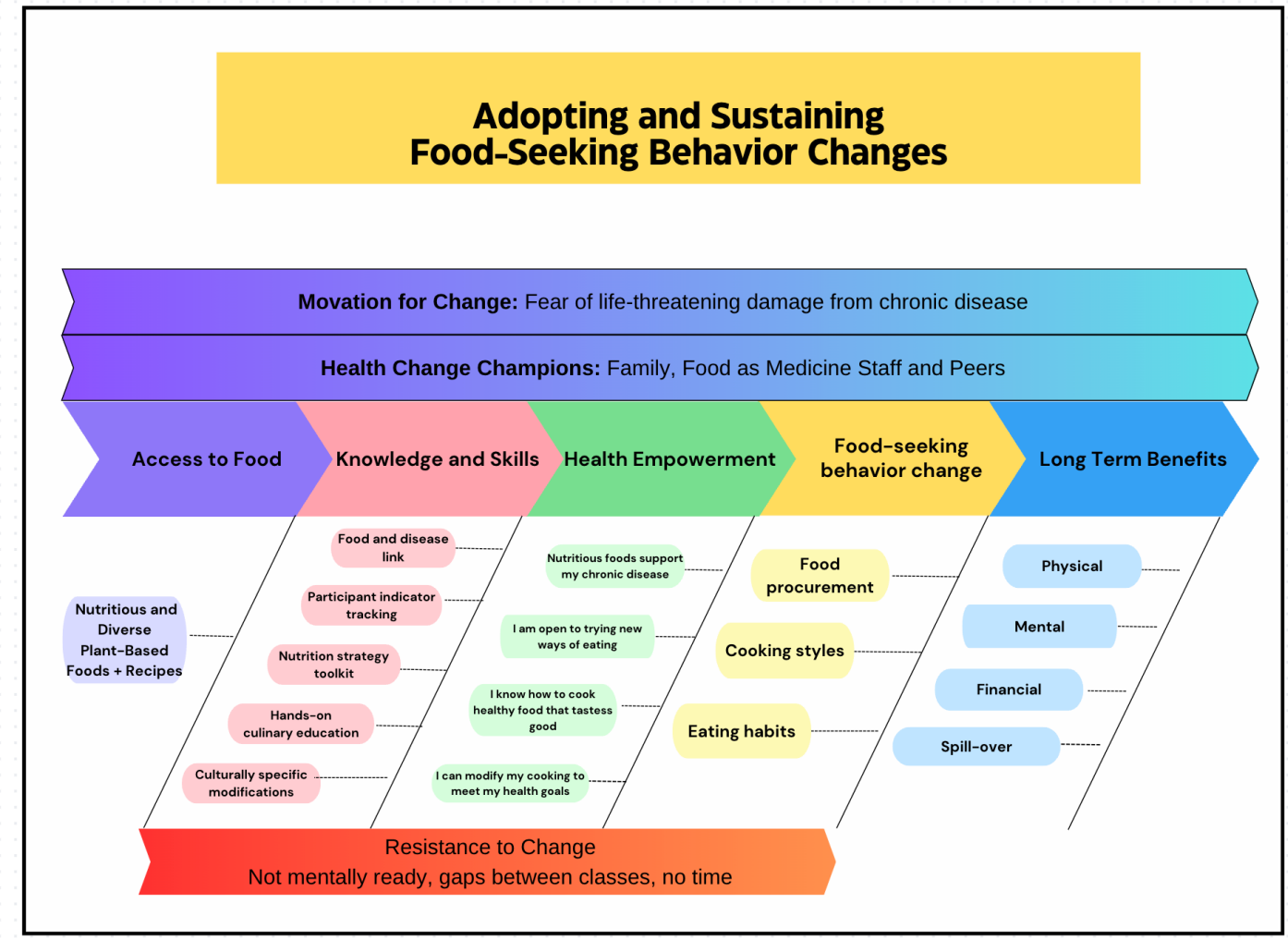

Figure 1. Adopting and Sustaining Food-Seeking Behavior Change among Food as Medicine participants

Figure 1. above demonstrates a potential pathway for food-insecure individuals to adopt and sustain changes in their food-seeking behaviors. Participants are motivated to start the program by the access to free food from the Food Pharmacy, then proceed to gain nutritional knowledge and culinary skills from Nutrition Classes and the Teaching Kitchen, empowering them to manage their disease by adopting and sustaining nutritious food-seeking behaviors.

Motivation for Change

Participants battling with chronic diet-related diseases are motivated to change food-seeking behaviors because they are fearful that their life span and quality of life is at risk if they do not manage their disease. Participants recognize that they must make a choice between modifying their nutrition to support their health or remaining on track to become ill and ultimately incapable of changing their physical conditions. The chronically hypertensive and diabetic patients know others with the same diseases who have suffered life-altering physical events like a heart attack, stroke, blindness, or limb amputation. Participants note seeing their parent or sibling lose a life battle with chronic diet-related disease, which has motivated them to change food-seeking habits to "stay around for a minute". Participants are largely motivated to stay alive longer to be with their families. A FAM participant's husband notes that the love him and his wife have for each other fuel their shard desire to change their eating habits. His wife's motivation to combat her disease and live longer is her devotion to God and desire to serve other people in life, which she reasons she is unable to do if she is sick or dead. The desire to live a longer life fuels nutritious food-seeking behavior change from the moment a participant considers changing their behavior to their sustained behavior change.

Health Change Champions

Health change champions supporting participants during their journey in adopting a nutritious diet are a participant's family, FAM staff and peers. Many families of FAM participants have watched their loved one's struggle with the health impact of diet-related chronic diseases for multiple years and wish to support them in making sustainable behavior changes. Participants note how it is easier to modify cooking and eating habits when their families also adopt and hold each other accountable for engaging in nutritious eating habits. This

is especially true for men, as the wife and sister of the two male participants interviewed are the primary household chefs and dictate the type of foods cooked at home.

Participants recognize from the moment they start the FAM program that it ‘has a heart [for] people.. [with the] goal to help people become healthier and live better”. FAM staff are described as engaging, attentive, and ready to listen to and address participant questions in an evidence-informed manner. Staff hold participants accountable to working towards their health goals, and one staff says participants have told her “I went grocery shopping and I could hear your voice in my head”. Staff try to make program changes from participant feedback given, like providing a more diverse set of produce from the food pharmacy. Staff try to make themselves approachable and all wear scrubs while holding classes to minimize white coat syndrome among patients. Some staff educate patients from a place of not only knowledge but situational understanding; one staff explained that she “came from, you know, food, food insecurity. I grew up in the projects…and I remember, like getting free food and not having food to last, like the food would run out like. So I know what that's like.” FAM staff are all passionate about supporting patients to make sustainable nutrition changes to impact their long-term health.

The larger FAM peer community is another substantive health change champion group. Participants note sharing recipes, ingredients, and cooking tips to manage disease with other participants in classes. It’s recognized that all participants come to FAM “with one goal in mind. Um, making themselves better”. This shared journey helps participants find comradery among other participants, specifically when encountering struggles in ones personal journey. Participants describe thoughts of being alone or unable to change your health status but “when you go in class, you'll meet people who think like you. You'll meet people who already been through the struggle and say, yeah, it's a true struggle, but once you get used to it, it is so much

easier". Participants are commonly motivated by the experiences which other FAM participants have gone through to improve their own chronic disease management strategies.

Access to Food

FAM staff describe the produce pick-ups from the food pharmacy as the "Selling point for the Food as Medicine Program". A common burden for food-insecure individuals is having to make challenging financial decisions between bills, medicine, and food, "so the food came last because I didn't have enough to pay the bills, or my medicine was too high and I had to take away from my bills to pay for the medicine". Participants acknowledged current economic challenges in America, one noting "In this economy with inflation, getting food is a great blessing", and another whose food stamp funds was recently reduced to $20 a month. An African American participant acknowledged how food insecurity disproportionately impacts people of her ethnic group "having been enslaved people, unless we were blessed to be the type that made it into a different, uh, economic environment, we were limited to what we could buy". A male head of household participant noted how when he got incredibly sick from his diabetes, it was challenging to make enough money to buy fruits and vegetables for his family. Being in the FAM program minimized worries participants experience with food, like "Do I have enough money to pay for this"?

The food provided by the Atlanta Food Bank for FAM are intentionally "plant-based items" which can "alleviate chronic conditions" and "expose patients to a plethora of food items they may have never seen before". This emphasis on nutritious and diverse plant-based foods is distinct from other food supplementation programs which patients have experienced where "they would give out meat. No fruit. No vegetables.." Participants are excited about the quality ingredients provided by the Atlanta Food bank, noting "I don't know where they get their

vegetables from, but they look way better than some of those in the grocery store. I am here to tell you. And they taste much better. They be so fresh and crisp, especially like oranges, those oranges and peaches and stuff like that." Patients enjoy the variety of produce received bi-weekly in their 24- or 48- pound produce pick-ups, and as they gain new medically-tailored recipes from the program "don't have to get bored with eating the same thing over and over again". They also appreciate the frequency of produce pick-ups, with one stating "picking the food up every two weeks is actually a good pace… because I see that as my fruits and my vegetables are, are getting limited. It's almost time to go pick up again." While patients are initially incentivized to join FAM because of the free access to food, this motivation shifts as they gain knowledge and skills on how to nutritionally manage their diseases.

Knowledge and Skills

"We can hand them as much food as we want to, but if they don't really start to learn and understand the benefits, how to cook these items, um, and the educational lessons, it's not going to reinforce why they're doing this and what it's for" - FAM staff

Attending the quarterly Nutrition and Teaching Kitchen classes provide participants with the foundational knowledge and skills to make changes to their food-seeking behaviors.

Understanding the link between food and chronic disease

FAM programming teaches participants the connection between specific foods and hypertension and diabetes indicators. Staff note how participants come to them overwhelmed with information on eating fads which can cure diabetes like "keto diet, vegan, intermittent fasting". To help educate the patient given the plethora of nutrition information they may have observed in other settings, staff start from the basics of "what carbs are", "how diabetes works and how nutrients feed into that". This foundational education supports participant understand

why they receive advice to “eat fiber… eat protein… plant based or plant, um carbs” and the benefit of healthy long-term eating habits verse restrictive eating. Participants learn from class which foods have “more or less nutritional value”, are “high or low risk” to their disease, can be beneficial for specific body system, and can help manage or disrupt hypertension and diabetes. A participant with chronic kidney disease noted learning that consuming beans and leafy vegetables can keep the kidneys healthy. A participant states she’s learning a “natural way” to combat hypertension and diabetes by reducing sugar, salty and greasy foods. Another participant echoes this, stating they like FAM because it’s “focused on changing the salt intake, the sugar intake, things that could cause congestive heart failure or diabetes or death or stroke”. FAM staff also instruct participants to note foods which make their blood pressure or blood sugar rise, so they can make informed decisions in the future, shown by a participant stating “if I eat something and then my blood sugar, my sugar just skyrocket. That means, no, I don't need to eat that anymore”.

Participant disease indicator tracking

A pillar of the FAM program is to empower participants to know their hypertension and diabetes indicator measurements, including blood pressure, blood sugar, total cholesterol, LDL cholesterol, HDL cholesterol, weight, BMI and waist circumference. A FAM staff insists that “Our patients have to know their numbers. If they don't know their numbers, they're in the dark about what's happening with their health and wellbeing.” The Teaching Kitchen has created a “Report Card” consisting of the most recent indicator measurements for each participant that are reviewed before and during the class. The Teaching Kitchen manager or GSU Nutrition Graduate student will review the report card with the patient, call out any measurements which are outside of a standard range and talk through nutrition strategies with the participant on how to manage that indicator. Participants are motivated by nutritionists holding them accountable for their

disease indicators once they come in for class. By tracking and reviewing participants indicators throughout the program, the FAM staff aim to “help people to see you have control.. as a part of your treatment team.. You are the captain of your team”.

Toolkit of feasible nutrition strategies

Recognizing the perceived complexity of eating with a chronic diet-related disease, staff aim to provide participants with a “toolkit which they can pull from” of easy nutrition strategies. Participants are taught to consider how they are procuring food, creating meals, and engaging in daily actions for managing diabetes. Participants note how the program is “teaching me how to make better choices.. on eating and preparing and buying foods”.

FAM places a large emphasis on understanding the nutritional content of pre-made or canned foods. Many participants note learning from the Nutrition Class how to interpret the nutritional information on food labels including the amount of sodium, sugar and carbs as well as suggested serving size. A participant learned in the class that canned food was loaded with salt “and that’s all I ever ate”. Participants are taught that even though a meal says “lean cuisine” or “low sodium, sugar free or fat free”, they still need to read labels in the store before buying it “because sometimes it contains a lot of sodium or high levels of sugar or something that you shouldn't have”. Many participants discuss how a clear soda-bottle filled only with the amount of sugar in a typical bottle of soda had a lasting impact on looking at sugar on a nutrition label. One participant notes the mental benefit of learning how to read ingredient labels, as “now I know what to look for. I don't have to be overwhelmed about it. Just knowing what I'm doing and being cognizant of what I'm consuming”.

The nutrition class also emphasis daily portion control and calorie counting. A participant learned that “You supposed to have no more than 2000 calories a day”. Most participants are not

willing to track every calorie consumed in a day, and more likely to look at use total calories from one meal as a general guidance for that meal's portion size and their food consumption the rest of the day. Participants acknowledge that moderating their portion sizes helps them to stay in control of hypertension and diabetes levels.

Staff place a large emphasis on daily plant-forward eating and teach participants to "crowd out their diet with plant foods" filled with fiber. Participants note learning that they do not need to just eat vegetables for one meal, but to "try to stretch it through the day. Have something green, you know, for lunch and dinner and possibly even something green in your breakfast". They also learn the important of having bright colors on your plate when eating. Many participants also discuss learning about using less fatty types of cooking oil like olive oil. A participant confidently notes that coconut oil can spike sugar, another stating that "when you sit [coconut oil] still, it gets hard and thick, and that can't be good". Many participants note that they learned to not add salt and sugar to foods they are cooking which a participant notes helps "to control my highs and my lows".

Hands-on plant-based culinary education

As patients gain the nutrition education and knowledge from the classes, they can put it into practice in the Teaching Kitchen. Staff describe the Teaching Kitchen activities as culinary medicine, "an intersection of food, nutrition, culinary arts and science. And culinary medicine answers the question, *how do I eat to manage my diet related condition?*" Participants note that throughout the lessons, the teacher "always brings us back to, the reason we are there is because we've had problems with our diabetes and high blood pressure, and we need to learn how to do it [cook] a better way". Once participants review their customized report cards, they receive an educational lesson on topics including safety in the kitchen, building a balanced plate, make over

my recipe, and portions and servings. The safety in the kitchen lesson resonated with many participants, who recall components of the lesson like not tasting food being prepared for many people with the cooking ladle, being more careful when using and laying knives down, and securing and washing a cutting board while using it. Participants also recall learning how to minimize food waste at home by using undesirable parts of vegetables to create a home-made broth as well as recycle certain foods from one meal to the next.

FAM Staff proudly note that cooking at "The Teaching Kitchen is where the magic happens". FAM program components are tied together by utilizing the weekly food from the food pharmacy to create "side dishes which are low sodium, low fat, low saturated fat, high fiber" and support disease management. Class cooking always starts with handwashing and practicing knife safety with chopping vegetables. Oil is measured onto each participant's skillet with a reminder to also measure oil when cooking at home given the high calories and fat in one tablespoon of olive oil. There is a large importance placed on consuming fiber as the "number one weapon against inflammation", and all the foods used to cook in the teaching kitchen are plant-based. Commonly prepared dishes in the Teaching Kitchen are a lentil stir fry, spicy collards, and sauteed cabbage. An important element of the class is teaching patients how to layer foods with flavors instead of salt using vegetables like onions, garlic, and green peppers. Other methods of adding salty flavor to foods taught are with acidic flavors like balsamic vinegar or lime. In the Teaching Kitchen, participants learn new styles of cooking in a support environment, which staff hope will translate to preparing these foods at home as "It shows them in a safe way how they can alter certain recipes to make it healthier and still have it taste really good.. if we're going to take out the salt and add in all these other spices that you've never used before, well, now guess what? You know how to use it. So you're going to use it more often."

Participants appreciate how the hands-on learning component of the Teaching Kitchen supports their journey in healthy eating. A participant values how “they actually let you cook and prepare something for yourself, or they will walk you through everything and, you know, like, you can substitute this or you can leave that out”. The Teaching Kitchen utilizes vegetables participants receive from the food pharmacy which they may not know how to cook. Participants like that “they don't assume that, hey, just because we give it to you, you know what to do with it”. The culinary messaging from the Teaching Kitchen resonates with participants cooking practices at home, as a participant notes “You start thinking olive oil. Not butter, but olive oil because that's what y'all are using in here”.

The hands-on cooking creates an engaging learning environment for participants. Staff note how during this cooking time “patients have epiphanies, they have these aha moments. There's a lot of fun. There's a lot of laughter.” In addition to the learning and the fun, staff note that the participants start to cultivate a community among themselves during these cooking sessions “when we're just talking, sometimes people will really open up their heart and they might get emotional. And then everyone rallies around that person.”

Culturally specific diet modifications

As participants learn nutrition education to support their chronic disease, FAM staff emphasize the importance of making modifications to existing dietary patterns, specifically culturally specific foods. Staff recognize participant’s fears in cutting out foods they have enjoyed their whole life and tell their participants “if you want to eat your grits and if you want to eat your, um, you know, fried chicken and mashed potatoes, tell me what you like to eat that you're afraid to cut out. And let me find you an alternative for how you can still enjoy that without it impacting your sugar as much”. The Teaching Kitchen leads a “make over your meal”

class where they makeover meals which are commonly enjoyed and exchange or reduce the quantity of non-nutritious ingredients. When remaking a mac and cheese recipe, participants are encouraged to consider switching almond milk for whole milk, reducing or removing salt, and using whole grain or wheat pasta instead of white. Knowing that participants may have a hard time adhering to health-conscious diets during the holidays, another Teaching Kitchen class focuses on modifying "rich southern dishes on the table" during the holiday season. A participant notes learning how to make a sweet potato hash as a holiday meal "instead of doing one of the maybe more sugary dishes you might have done".

Another component of food modifications is learning alternative ways to get similar tastes of foods without adding unhealthy components. Many participants provide examples of how they traditionally boil greens with meat like ham hock or smokey turkey. However, in the Teaching Kitchen they learn new techniques to get that smokey flavor like adding liquid smoke to cooked greens. A participant discusses amping up her cabbage greens with vegetables like she learned in class "I kind of like with my cabbage, I do it with olive oil instead of trying to do it with a piece of all boiled meat. Why not cut a lot of onions and put, you know, uh, bell peppers and put it and, you know, and adjust it? So that's that been good. Mhm… Why not do it the way nutritionist do it".

While the FAM program emphasizes plant-based eating habits to combat chronic disease, participants note how meat may be an important part of their diet and they want the skills to prepare it in a way to support their diseases. Some FAM staff try to educate participants who regularly eat meat on healthy ways to do so "talking about the protein options being like, you can go for more lean cuts of meat, you can go for fish, you can go for shrimp, you can do chicken. Um, and if you do red meat, just don't do as much of it." Participants appreciate this and a

Hispanic participant's daughter notes how in their household, they have "changed the beef stew [to replace] the beef with chicken" in support of her father's health.

Change Resistance

Once participants have the access to food, nutrition education and skills to cook, they should theoretically have what they need to engage in food-seeking behavior change. However, participants face barriers and resistance to change which may make this challenging. Staff note that when participants who dropped out of program were interviewed, they point blank stated "we're not ready to change… you're doing everything you're supposed to do. It's us. We're not ready to change". This unwillingness to change is explained by participants as feelings of hopelessness and incapability of changing your health status because "it's just too much work". Another explanation provided by staff is that participants may be experiencing depression or anxiety which can hinder their ability to get out of bed in the morning, none the less cook a healthy meal. Staff try to support patients by having a peer specialist talk about mental health to Teaching Kitchen classes and register patients who need additional support.

Another barrier to changing food-seeking behavior are the long lengths of time between FAM classes. A staff mentions the impact of the lack of program continuity being "having [nutrition classes] so far apart just kind of leaves them feeling, for lack of better words, stranded". Staff recognize long gaps between classes makes it challenging to create significant changes to chronic disease indicators. Patients resonate with this challenge, noting how before their upcoming classes they have to "fight hard to get [sugar levels] back down". Staff note that it's unfair to gauge a change in patient measurement, like their weight, as a metric to demonstrate program impact, given there are many reasons why someone cannot lose weight especially when they are not coming into the program for education at a consistent frequency. This challenge can

be amplified for participants when they experience a lack of family support at home to eat nutritiously. A staff accounts a common message heard from participants “Maybe the woman has an old man who he's like, why are you trying to cook healthy? I don't want that. So then the wife feels like I have to cook this food for him, so I might as well eat it too”.

Having sufficient time to grocery shop and prepare foods at home can be another barrier to adopting new food-seeking behaviors. A participant describes her hectic life as a working mother, and even though she knew she was supposed to be eating a certain way, didn’t mean she had the time to do so “But when you're in it and you're working, trying to make your money, that don't mean you going to eat right. You really don't. You're just trying to consume something and keep it going or whatever, because you're trying to raise a family and then you neglect yourself. You know, the basic, you know what you supposed to do, but knowing what you supposed to do and doing it are two different things.” A staff acknowledges hearing this message from many busy and tired working participants, who claim “It's just easier to go out and, you know, go to Mickey D's or Chick fil A”.

Health Empowerment

Participants now have increased access to foods, nutrition knowledge and culinary skills to prepare nutritious foods. Before sustaining learned food-seeking behaviors changes, participants describe a mindset shift they undergo towards health empowerment. A health empowerment mindset is a participant’s belief that they have control over their health outcomes through the foods they prepare and consume. The health empowerment perspectives which participants undergo that push them towards sustaining behavior changes are: 1) Nutritious foods support my chronic disease 2) I am open to trying new ways of eating 3) I know how to cook healthy food that tastes good and 4) I can modify my cooking to meet my health goals.

Nutritious foods support my chronic disease

Once participants accept that eating nutritious foods supports their chronic disease management and eating unhealthy foods fuels their disease, they are more prepared to make a change in their behaviors. Participants note having to choose between getting healthy or remaining on track to being so ill they will be unable to change their physical conditions in the long-term "I choose to, you know, be healthy. And if it means for me to cut back on a lot of stuff, then I have to do that because I want to be here a long, you know, time. And I don't want to see myself… I don't see myself in a position where I can't help myself". Another participant similarly notes the turning point when they decided to commit to the program when they understand the potential severity of their diabetes "And I don't want my limbs cut off. But if I keep doing, all that stuff is not good for me. I'm going down. [My limbs] going to get cut off too, so that this is serious. That was a turning point."

While noting that unhealthy eating habits can lead to dangerous health outcomes, participants knew and saw the potential health benefits of eating healthy. "I really wanted to, uh, uh, change the way I think about food, because food can be like… A draw. Uh, it can be good for you." Participants listen to their bodies more to understand how different foods impact their energy levels and overall wellbeing. They make "a shift from doing less of what makes you sick to more what makes you feel better.." Participants start to align food intake with the direction they want their chronic disease indicators to go in, choosing nutritious food to "make you stronger and make you clear minded" instead of feeling "hoggy and groggy" from other foods. This can also be supported by family members who can hold one another accountable for eating patterns to support their disease, shown by a participant sharing

> "*I know with my grandson who is seven now. Um, we do a lot of cooking together. So he'll come in the kitchen and he'll be like, well, grandma, you know, we shouldn't eat it fried,*

because fried is not good for you. We need to bake it or steam it or, you know, we're going to, um, use the air fryer.. grandma are these wheat crackers, because, you know, we're supposed to be eating wheat crackers!"

I am open to trying new ways of eating

Expanding one's mind to the potential of trying new foods and different styles of cooking than you have done your whole life is a pivotal shift to alter food-seeking behaviors. A staff notes that the largest change they observe in FAM participants is

"they're more open to trying new things.. [and] they're starting to think out of the box, which I think is so important because they've been trained to just follow one path, didn't know anything different. Nobody really taught them how to think about food and nutrition in a creative way."

An older participant emphasizes the importance of shifting away from the eating trends she has had her whole life, telling her senior group "we don't have to keep eating the way we've done all our lives just because we've done it that way all our lives". This shift can be supported by families willing to co-adopt food-seeking behaviors, as patients whose children modify food for family holidays encourage her to adhere to healthy eating habits and she is "looking forward to a good Thanksgiving this year".

A participant's husband speaks on his shifting taste buds which are developing during his healthy eating journey, as he trains his preferred tastes to move away from needing salt and get used to different spices and herbs. He's gone from thinking "This [healthy] food tastes terrible, right? Does it really taste terrible, or is it just not what you were accustomed to in the past?" Participants who are well established on their journey in engaging in nutritious eating habits resonate with this sentiment, and while food may no longer taste how they liked to have it

previously, “I had to do what I got to do”. Multiple participants even spoke on being open to utilizing plant-based proteins instead of meat for some meals, as “Some of the plant-based to me substitute meat… Because you don't have to eat meat all the time to be okay. Because with the vegetables and stuff it put that protein in you too”.

I know how to cook healthy food that tastes good

While participants may be open to the idea of healthy eating, it can be daunting to do so without the skills to cook healthy food which tastes good. Many participants note the benefit of receiving recipes from FAM; one struggled to utilize vegetables received like eggplants because they did not know how to cook it but this changed once they received an eggplant-based recipe. The education provided on cooking using spices and aromatic vegetables which enhance the taste of nutritious foods nudges participants towards implementing cooking changes. Participants recall the many different types of spices and vegetables which they utilize to make their meals tasty instead of salt and high-fat frying techniques. A participant notes that unlike others around them, they no longer crave fried meats “because the vegetables satisfy the taste. And it don't make me crave meat like I used to. They crave that fried. You know. It don't cause me to just want it just because it's there.”

The program also instilled or amplified existing passions for cooking. Participants describe with gleams in their eyes how they cooked innovative meals since being in FAM like sweet potato souffle, home-made pickles, and vegetable soups which their families enjoyed. Participants note that they enjoy cooking but want to do so in a way that supports their health “I took away that it can be fun cooking. It is fun! It's an art, because I love cooking. But I want to do it the right way.” Women patients who are the primary chefs in the homes discuss their desire for their families to enjoy the tastes of the foods they eat which fuels their motivation to learn

how to cook nutritious and flavor-enhanced meals. And “The good thing about it, preparing the food and the way I've been preparing it, they [my family] said it's excellent”.

I can modify my cooking to meet my health goals

Participants learn from FAM that they do not have to start from ground zero with their cooking skills but are empowered to modifying their existing meals by reducing unhealthy components or adding additional healthy ingredients. Participants discuss “vegetizing” meals by adding vegetables to meals which they wouldn’t have considered doing before, like broccoli to mac and cheese. African American participants discuss learning from their peers in FAM how to modify meals which are commonly prepared in their homes to align with health goals.

As men are not traditionally the head chef of their households, it’s especially helpful when their family is onboard with making adjustments to home-based meals. A male participant’s daughter who does the majority of the household cooking with her mom says they “have adjusted most of our recipes for dad and we got used to it”. She has learned to implement healthy cooking habits for their family meals like awareness of the amount of oil she uses when cooking, making vegetable juices, using the oven instead of frying, and scrambling eggs with vegetables.

Food-seeking behavior change

Once participants obtain improved access to plant-based foods which they can prepare in a tasty and health-conscious way, they are equipped to utilize learned skills to implement food-seeking behavior changes of food procurement, cooking styles and eating habits.

Food procurement

The preliminary shift in food procurement is away from eating out at restaurants and towards cooking foods at home. Participants recognize that the foods regularly procured from fast food restaurants are comprised of the high-risk ingredients which detracting from their

healthy eating journey. Recognizing that eating such foods can put participants in trouble with their disease, there is a movement towards cooking meals at home. Participants begin to take healthy snacks with them as they leave their house so they're not tempted to "run by Burger King and get a Whopper". This even stretches to the grocery store, where one participant notes how she's shifted from purchasing her favorite "chickens under the hot light at Walmart" to instead boiling a chicken and making home-made BBQ sauce instead. Another participant similarly shifted from regular habits of buying fries at McDonalds to cooking potato or veggie fries at their homes. These are critical examples of nutrition education fueling food procurement and cooking habits to manage chronic disease for food-insecure individuals.

Participants undergo a shift in grocery store food procurement habits to focus on purchasing the items which they *need* to support their chronic disease management, not those which they may *want* that detract from their larger goal of living a long and healthy life. Participants implement navigation strategies learned from their nutrition classes to intentionally shop on the outside aisles of the grocery store where fresh ingredients are found before quickly scanning the processed foods in the middle aisles for pantry staples. This approach supports enables focus on fresh produce instead of processed foods, shown by a patient asserting "I try to get the fresh, you know, vegetables. Mhm. Instead of getting the canned stuff". When participants do inevitably buy canned and pre-made meals, they are very conscious of reading food labels and being informed on nutritional composition, specifically sodium, sugars and carbs, before making purchases. Participants acknowledge this makes their grocery shopping take more time as they review the nutritional components of foods purchased, even those with arbitrary labels of being nutritiously conscious.

In addition to navigation techniques, participants are making shifts to the specific items which they are purchasing from the grocery store. There was a consensus among participants of no longer purchasing soda bottles or cartons as they had done for years. A Hispanic participant notes shifting away from the large saucepans of beef, pork, and bacon commonly consumed in their household and instead purchasing more chicken and vegetables for their meals. This is in line with a general movement among participants to purchase less meat from the grocery store. Participants are also more likely to purchase produce which they had previously not known about but since joining FAM had enjoyed from the Food Pharmacy. Participants mention many vegetables which they were exposed to and now knew how to cook through FAM that they had a newfound inventive to purchase at the grocery store including collard greens, cabbage, spaghetti squash, acorn squash, butternut squash, green beans and eggplant.

Cooking Changes

There are many changes to cooking techniques which participants implement to manage their chronic disease. New cooking habits can be fueled by excitement to cook new foods instead of preparing "the same old thing over and over again". Changes are made in overall cooking styles, like no longer "salting foods down" or "weighing it down with butter and margarine", not "flouring everything", and not frying foods or using fatty oils like lard. Instead, participants utilize more health-conscious cooking techniques like boiling, baking and sautéing. At this point, participants develop a newfound understanding that cooking healthy food does not require many hours of one's time and they can simply modify timely cooking habits like boiling cabbage for hours to sautéing it quickly with olive oil and other vegetables.

A participant demonstrates the important shift to cooking with plant-based foods as before FAM she "knew how to cook, but not as meaningful as getting those ingredients to cook

so they can benefit me like medicine". Participants replace salt with a variety of flavorful spices like onion powder, cinnamon, cumin, turmeric, paprika, parsley, and bay leaves which provides the flavor needed to enjoy modified cooking. Natural sweetness from produce like sweet potatoes is also enjoyed instead of using sugar. Participants describe ingredient modifications including using spaghetti squash instead of regular noodles for pasta, wheat-based carb products instead of white, low-salt products like butter, and non-dairy milk alternatives.

Participants engage with food preservation behaviors during and after cooking meals at home; many participants note new patterns of freezing vegetable waste and boiling collected parts to make a healthy home-cooked broth. If they receive too much product from the food pharmacy then they think they will use in 2 weeks, participants note chopping up the produce and freezing it for later use or sharing it with their community. There is also a general movement to store leftovers from meals including recyclable ingredients like rice to use for a later meal.

Eating Changes

Participants are ultimately empowered to feed their bodies in a way which allows them to manage their chronic disease. Participants chose to eat foods made of ingredients that support rather than harm the development of their chronic disease. There is a general recognition of how unhealthy food can cause physical discomfort and long-term damage. All participants note an intentional shift in eating habits away from foods which are fried and canned, red meats, and sugary, and move towards high-fiber diets rich in fruits and vegetables which "keep my blood pressure down... [and] benefit my diabetes just like insulin can".

An important part of sustained nutritious eating changes is participant empowerment to eat nutritiously within their communities. Participants determined to stick to beneficial eating habits bring nutritious ingredients and selectively eat in community settings. One participant

shares how at her children's house she takes on cooking responsibilities to ensure there are foods available for her, stating "If I go to my daughter in law house and they have a lot of starch, they cook a lot of. (..) rice and starch, corn. So when I'm there, I kind of like cook, you know? To have something, a vegetable and not a whole lot of starchy food." Similarly, a Hispanic participant notes how he brings vegetables to the traditionally meat-heavy community asada (cookout) "and if [others] don't want to eat them, they don't have to".

Participants recognize that one-off meals will not make or break their disease indicators, but long-term habits will ultimately move their health in specific directions. They adopt habits which can help them to eat less like drinking water before eating a meal. Recognizing that food cravings will inevitably occur, participants work to eat those in moderation rather than binge-eating. They will still 'cheat' and eat a piece of fried chicken, but are eating in moderation and not making these "an everyday thing like it was". Participants recognize their imperfection with eating habits but overall commitment to their long-term goals "I may cheat a little bit. Mhm. Yeah. I may eat one of those little uh snack size Snickers… But I basically try to do the right thing. Mhm. Because I know it's better for me. Mhm. And it's… Longer life. And being healthy."

Long-Term Benefits

Chronic disease management is one of many multiplying benefits which food-seeking behavior change can create in someone's life.

Physical

All participants who have been in FAM for over six months noted significant reductions in their HbA1c and fasting blood sugar levels since being in the program. A woman who started taking the Grady nutrition classes two years ago and transitioned into FAM noted that before she started classes her HbA1c was a 13, and by "managing it with medicine and exercise, healthy

eating, um, talking to experts, talking, you know, working with my doctor and all the, the teachers and my [FAM] classmates" her most recent HbA1c reading was a 7.6. This same participant also lost 52 pounds over the course of her journey with the nutrition classes and FAM. Participants recognize the significance of these changes on their long-term health, one noting "this program literally saved my life and helped me get that A1C under control". Before one participant started FAM, he was so sick from diabetes that he was hardly eating, only lying down, and incapable of doing anything during the day. After being hospitalized, without taking any medication, he changed his eating habits and over the last year was able to get his diabetes levels under control. In his current improve health status, it's hard for him to recognize the dramatic impact to his body and he often feels like "nothing even happened".

On a smaller scale, participants recognize that since being in the program they 'feel healthier' and have more energy daily. This translate to participants being able to walk longer distances without stopping and carry more weight as they walk. Participants also enjoy the clear minded feelings from eating healthy foods instead of feeling "hoggy and groggy" or "sluggish" from less nutritious foods.

Mental health

Many participants also note improvements to their mental health, notably anxiety and self esteem, once they move away from previous eating habits and towards foods which support their health. A participant notes that when she's eating unhealthy "You don't feel good about yourself. And you constantly worry about what's going on in the inside". Another participant saw significant changes in their A1C levels over time and felt assuaged as the new numbers "Means less complications. I don't have to get my A1C checked every three months. That means I don't have to worry about my kidneys shutting down or any other organs being affected by my

diabetes". A male participant with schizophrenia and depression notes that since being in FAM he's noticed significant mental health shifts as "I'm not as much agitated. Usually I would shut down my.. my mood swings have changed. I'm not as groggy."

Participants also recognize that taking classes with FAM peers improves their mental health. One participant mentions their pre-existing anxiety with talking to people they don't know, however FAM has "helped me to get out of that shell a little bit, to be communicative and to talk to people". This participant recognizes that while it's challenging to be vulnerable about their physical and emotional struggles with diabetes and high blood pressure, the support received from like-bodied FAM participants has been helpful in their journey. FAM also teaches participants how to engage in conversations about food which they plan to continue to use after they finish the program in their daily lives. Other participants feel an improved self-esteemed when they can share their thoughts and comments related to healthy eating with other FAM participants in classes. FAM staff have unfortunately seen this community aspect of sharing be a double-edged sword in cases when a participant shares an unhealthy eating habit and another participant retorts that they need more 'willpower', dissuading them from returning to the class.

Financial

Participants encounter financial benefits from adopting healthier eating habits. Financial gains start with not spending as much money eating out at restaurants. Gains are amplified through reduced spending at the grocery store from shifts in food procurement. Participants note that their reduced purchase of costly meat saves them money on a regular basis. Cooking shifts like freezing vegetables for future use and recycling meal components to make new meals in the future are also money-saving habits. As participants graduate from FAM they are also provided a

list of local resources where they can go to access foods, supporting their long-term ability to access free or reduced cost foods.

Spill-Over

Changing food-seeking behaviors of FAM participants has other beneficial 'spill over' impacts on a participant's community. Participants share what they have learned with their family and friends to support health-conscious behaviors in other's lives. They lovingly note how they are working together with their families to collectively change their eating habits and recognize that healthy eating "not only helps you, but it kind of helps the whole family unit in general". Participants acknowledge the arduous journey they went through to change their perceptions on healthy eating and try to support those around them to be open to new foods. Many participants encourage their communities to shift eating patterns along with them by sharing health-conscious recipes and meals with them. An older participant accounts how senior church group was adamite that "[they] just don't do vegetables, they taste so blah…" so she cooked the sweet potato hash she had learned from the Teaching and "It was colorful. It was good. It tasted well, and they like just looking at it. So, um, and, you know, that made me feel good." One participant proudly notes that she is "an advocate for healthy eating" and loves to encourage her friends to try different nutritious foods which she has been taught can positively contribute to health. Many participants note the joy which they experience when they can share healthy meals they have cooked with people in their lives.

Family unity is another positive benefit of long-term cooking and eating changes. Coming together to cook and share meals together can bring a family closer together. One participant notes with a smile that "with the preparing of food, it's actually brought me closer to my family because me and my daughter cook together. Me and my grandson cook together and

sometimes, cook with my son". An older participant talks about how her children have spent years worrying about her battle with diabetes, and her change in eating habits has reduced their concerns about her overall health.

Long-term sustainability

While the overall sentiment among participants is that they do not want their involvement in the FAM program to come to an end, participants who have been in the program for over 8 months feel prepared to continue their food-seeking behavior changes after graduation. Participants note that they have the flyers, ingredients, doctors, and knowledge needed to continue to manage their hypertension and diabetes. Participants learn budget friendly options for procuring nutritious foods in the grocery store by not only focusing on costly 'diabetic' labeled foods and how to spend their food stamp money on nutritious foods. After 12 months of program engagement, participants will graduate from FAM and receive a package of resources to support healthy eating including cooking knives, recipe binder, a plate labeled with suggested proportions of food categories, and a large produce bag. A participant who has just graduated from FAM but wants to continue learning about nutrition has enrolled in the "Better Bites" classes with more targeted nutrition education. Recognizing the lingering problem of food security upon FAM graduation, Grady has created a new Neighborhood Program with Atlanta Community Bank to provide food to any food insecure Grady patient or staff, and FAM participants are eligible to receive food after program graduation.

Gaps and Suggestions for Improvements

While participants and staff acknowledge the impact of the FAM program on participant's food-seeking behaviors and other long-term benefits, they identified some gaps and potential suggestions for improvement. Staff and participants both note the ethical challenges

behind teaching them about how the free food provided supports their chronic disease management and then taking it away after they may have sustained behavior change one year later. There is a large desire across FAM to continue to provide access to food to participants once the program is complete. Sometimes the participants were not aware that the nutrition classes at Grady are a part of the FAM program, and staff resonate with the feeling of disjointedness across the different FAM programmatic components. Staff wish there was more communication across the program to coordinate educational topics and increase program cohesion. In previous years of the FAM program, participants moved through the program as a cohort to be "a support group amongst each other". Staff recognize that this structure encouraged mental and physical wellness through community-building. Participants and staff both recognize the long periods of time in-between FAM classes which could detract from a participant's ability to adhere to behavior change patterns. While the cohort program component was dropped because of high patient volume, staff suggested re-introducing it.

All FAM staff note that the most significant challenge with running the program is that they have a severe staffing shortage. Staff recount having to teach very large classes and not being able to provide patient-specific engagement as they wish, or having their schedules completely booked out so they are unable to fit in patients who need to be scheduled for their FAM classes. This detracts from patient's experience and compliance in the program, as this forces staff to "just push patients through" their program requirements. Staff report challenges with getting enough support to bag the thousands of pounds of food which goes through the Food Pharmacy as well, and over-exertion while bagging has led to physical injuries of program staff. The FAM staff is working tirelessly to reach FAM patients "wholeheartedly" which is challenging to do with the massive volume of FAM participants and minimal number of full-time

Grady employed staff. Staff are fearful that this could lead to “burning out” among staff if they do not receive any additional staffing support.

FAM staff would also like to create a public website to upload resources and share FAM successes with the rest of the world. Staff acknowledge the hard work they put into creating an engaging program and assert “We want to put our recipes out there. We want to put our education. We want to let people know.” Even though they have asked for this website in the past, it has not been approved by Grady. Staff are concerned with this, questioning “Why are we keeping it a secret? Why do people still not know about this program? Why, for this marginalized community, why don't we have these things in place?” Staff have a perceived lack of support from Grady Hospital, fueled by a desire to disseminate findings but no avenues to do so. Patients share staff desire to spread the FAM gold mine, suggesting posting educational videos on social media platforms and doing nutritional community outreach around Atlanta.

Securing transportation to and from FAM classes and to pick up food can be challenging for participants. While it’s possible to schedule the Grady mobility bus to collect participant, taking the mobility bus home requires waiting multiple hours at the hospital after the class has finished. Participants also note that the many pounds of food received are very heavy, and elderly patients in-particular struggle to transport them from Grady to their homes. Only a portion of FAM participants receive a cart from the program to transport the food. Within the classes, there are challenges for people who English is not their first language to understand what is happening in the classes or engage in the discussion if a Spanish interpreter is not scheduled to support them. A Spanish-speaking participant notes that unfortunately “I don’t participate in speaking because all of the discussion is completely in English”.

Some participants have issues with the plant-based education and food items received from FAM. Folks want to learn about cooking meat and fish which are not commonly discussed in the Teaching Kitchen. Participants who rely on meat in their diets suggest widening class discussion on healthy ways to consume non-plant based proteins. Participants also note that while they receive education to limit the amount of carbs they consume in their diet, they are receiving an excess amount of pasta and rice from the Food Pharmacy. FAM staff acknowledge this struggle with receiving nutrient-rich foods from the Atlanta Food Bank, which has a mission to distribute as much food as possible regardless of nutritional status. FAM staff continues to negotiate with the Food Bank to receive foods, specifically dried goods, which align with hypertension and diabetes management. Some participants note specific food items often received from the Food Pharmacy which they have allergies or dislike for in their household, forcing them to give the foods away to community members. One participant suggests to provide culturally sensitive foods for participants from different racial demographics in line with research on which foods support distinct racial backgrounds and reduce potential waste, saying “if you're going to do a medicine program give me the right medicine. There's food for medicine - give me the right food for me”.

Chapter 5. Discussion, Recommendations & Conclusion

There is an inextricable link between food insecurity and chronic diet-related diseases including chronic hypertension and diabetes. This qualitative study explores the process of creating sustainable food-seeking behavior change among adult recipients of the Grady Memorial Hospital Food as Medicine program and how to improve program components to enhance chronic disease management among participants.

Alignment with Stages of Change (Transtheoretical) Model

The findings shown in **Figure 1** demonstrate that engaging in food-seeking behavior change is not an isolated event but occurs as a step in a greater process of behavior change. The pathway which FAM participants who are successful in adopting food-seeking behavior change aligns with the Stages of Change Model, which outlines the process of behavior change using data from a self-change smoking cessation study. The five stages of behavior change described by the Stages of Change Model are precontemplation, contemplation, preparation, action and maintenance (Prochaska, J. O et. Al, 1983). FAM staff move through parallel stages of change as they transition from being interested in trying to change their food-seeking behaviors to trying to maintain nutritious food-seeking behavior change habits. **Figure 2** below maps the alignment of FAM participants with the Stages of Change model. The graphic shows that adopting nutritious eating habits among food-insecure individuals with diet-related chronic disease is a lengthy process which takes time, self-work and continued reinforcement to achieve and maintain.

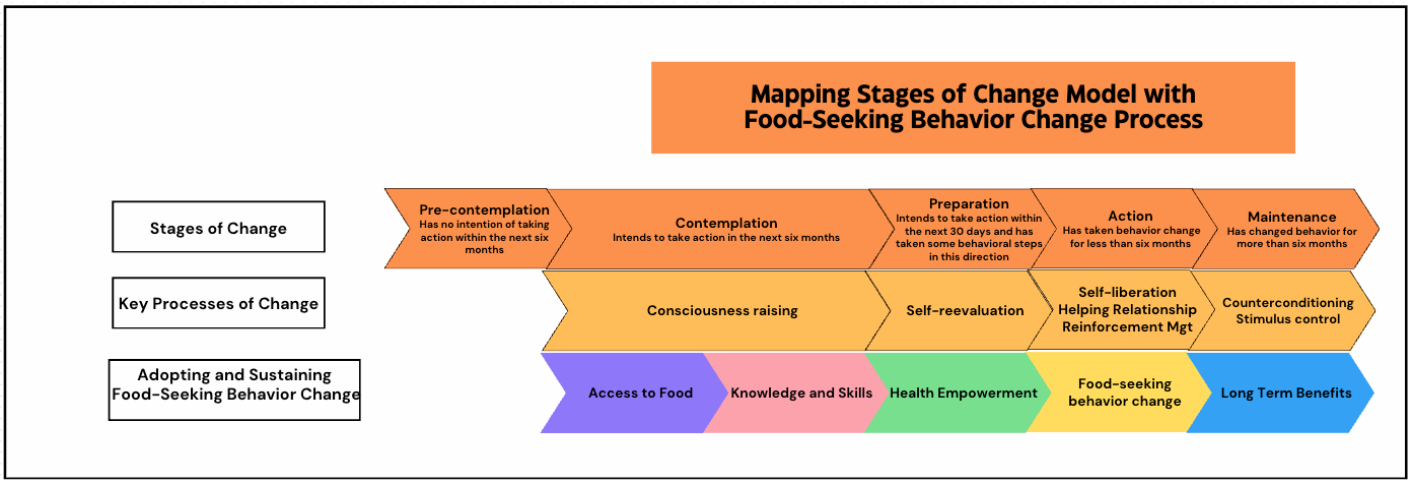

Figure 2. Mapping Food-Seeking Behavior Change Adoption and Sustainability Process with Prochaska's Stages of Change Model

The Stages of Change Model demonstrates the *processes* of change which individuals undergo as they navigate the various *stages* of change. Individuals do not consider behavior change (i.e. smoking cessation/nutritious food consumption) during the **Precontemplation** stage. FAM participants do not actively seek behavior change prior to the program when exhibiting the same nutrition habits for decades. This is accompanied by a sense of hopelessness in their inability to create change in their eating patterns or disease management. During the **Contemplation** to take action stage, individuals experience a 'consciousness raising' and think about themselves in relationship to the problem behavior, making them more likely to respond to feedback and education on behavior change. This is reflected in FAM participants as they begin to gain awareness of the impact of their chronic disease on their overall health, and how their diet can contribute to either disease acceleration or management. Participants start to see how nutritious diets make them feel less sluggish, provide them with more energy, and ultimately improve disease indicators. Prochaska's data was unable to determine what supported individuals to transition from smoking cessation pre-contemplation to contemplation, however data from the FAM qualitative evaluation indicates that providing food-insecure individuals with diet-related

chronic disease with access to nutritious food, nutrition and culinary education can stimulate this shift for food-seeking behavior change. As participants make **Preparation(s)** to take action, individuals undergo a 'self-reevaluation' when they acknowledge that eating unhealthy foods makes them feel disappointed in themselves because it makes them feel physically ill and detracts from their health goals, ultimately reducing their potential life span.

As participants shift to take **Action** in engaging in the behavior change, individuals experience 'self-liberation', 'helping relationships' and 'reinforcement management'. In self-liberation, individuals convince themselves they can sustain the behavior change. FAM participants must develop a health-empowering mindset of willingness to try new foods and the capacity to prepare and modify nutritious meals to adopt new food-seeking behaviors. The participant empowerment from self-liberation to manage their disease through nutrition behavior change is the necessary link between preparation and action and should be emphasized throughout all nutrition interventions. Helping relationships are people who can listen to individuals speak about their challenges with adopting behavior change, demonstrated in this study by the support of health change champions (FAM staff, peers and participant's families). Being rewarded by others for adhering to behavior change through reinforcement management is seen in FAM as participants are motivated to adhere to nutritious food practices shift when discussing their disease indicators with FAM staff and receiving praise from other participants when their indicators have improved. Once behavior change has been adopted and individuals move into the **Maintenance** phase, 'counterconditioning' and 'stimulus control' can support behavior sustainability. Counterconditioning is doing something other than the harmful behavior to bring comfort, and FAM participants discuss newfound joys and unity with their families in cooking and eating nutritious foods. Participants practice stimulus control of removing things

reminding them of non-nutritious food habits in FAM when they reduce going out to eat at restaurants and ensure that they bring nutritious foods for themselves to community events.

Alignment with other Nutrition Program Evaluations

Findings from the FAM qualitative evaluation align with results from other Nutrition Program evaluations. A study of a Canadian fruit and vegetable prescription (FVRx) service found that participants perceived their team dietitian and family physician as directly helping them with their health by prescribing food (Johnson et. Al, 2023). FAM participants echo this sentiment regarding the impact of the supplemental produce and nutrition-based disease management skills learned from the FAM staff which are beneficial for their health. Participants from the FVRx study noted positive effects on physical and mental health (Johnson et. Al, 2023), which is seen in FAM participants in their improvements in chronic disease indicators, energy levels, anxiety, and self-esteem. A limitation in the FVRx program was that participants wanted a choice in the type of produce received instead of receiving a set box to improve meal planning and food autonomy (Johnson et. Al, 2023). FAM participants also acknowledged that they may receive foods from the program not normally consumed in their household and wish to have more of a say in the foods received to reduce food waste.

The nutritional education and culinary medicine follow-up components of FAM support nutritious food intake among program participants which is also demonstrated in other studies. In an Ohio Produce Prescription program, consistent messaging from nutrition counseling teams about overall diet and increasing daily fruit and vegetable consumption correlated with increased daily servings of fruit and vegetables and a decrease of eating fast foods among hypertensive participants (Trapl et. Al, 2018). Similarly, FAM participants spoke about how the education learned from the Nutrition and Teaching Kitchen classes about the daily crowding their diets

with plant-based foods and monitoring calories and portion sizes has increased fruit and vegetable intake. FAM participants also reduce the frequency of eating out at fast food restaurants, fueled by the nutrition education that the high-risk foods from these restaurants will detract from their long-term chronic disease management goals.

Having a collaborative learning environment when teaching chronic disease management has also shown to have a positive impact on diabetes management. A meta-analysis of group-based diabetes self-management education for adult type-2 diabetes with active participation in educational approaches (group discussions, empowerment, and goal-setting) saw a decreased HbA1c levels in patients by 0.76% at immediate follow-up, 0.26% at 1-3 month follow-up and 0.26% at ≥ 4 months of follow-up (Steinsbekk et. Al, 2012). These results resonate with the findings that collaborating with other FAM participants in class, one-on-one participant disease indicator tracking, and participant health empowerment supports diabetes management. Another literature review on behavior change facilitators for people with diabetes emphasizes the need for personal relevance of educational messaging, so health advice provided fits the personal characteristics of an individual including their gender, ethnicity, age and resources (Hood et. Al, 2015). This highlights the importance of FAM nutritionists teaching culturally specific food modifications to patients so they can prepare nutritious meals aligned with their personal and cultural background.

A study in the UK on fruit and vegetable coupon distribution coupled with nutrition counseling demonstrated the use of the coupons when purchasing fruits and vegetables but did not see a change a significant change in consumption or purchasing behavior in the short or long term (Buyuktuncer et. Al, 2013). Reported barriers to consumption and purchasing were the "quality of fresh fruits and vegetables" and "money available to spend on food". As FAM

participants consistently report eating increased produced since being in the program, perhaps FAM overcomes the barriers to increased vegetable consumption due to the high quality of produce from the Atlanta Food Bank which participants enjoy. The financial barrier of produce purchasing may be an indicator of the challenges which FAM participants will face when attempting to maintain nutritious food-seeking behaviors after graduation. The Grady team hopes to address this barrier through their newfound Neighborhood Program which will provide produce to FAM participants after graduation. Additional research is needed to see whether the Neighborhood program is a long-term food-insecurity supporter for graduated FAM participants.

Public Health Implications and Recommendations

The barriers which FAM participants face in adopting and sustaining behavior change are key areas which FAM administration can focus on to improve impact on program participants. As participants who have dropped out of the program tell staff they are 'not mentally ready' to commit to the outlined behavior changes, there is an apparent need to provide participants with a stronger support system to encourage their utilization of the nutritional knowledge and skills learned. Participants can also feel isolated on their behavior-change journey during the lengthy time gaps between scheduled Nutrition and Teaching Kitchen classes and lose track of their long-term disease management goals. Participants may also be overwhelmed with other responsibilities like work and their families, making them feel like they do not have the time to go to the grocery store and cook nutritious meals. A suggestion which FAM staff raised that could support struggling patients in addressing all these issues is to re-create the cohort model for FAM participants as they move through the year-long program. This could help participants hold one another accountable for behavior change during trying times and in the lulls outside of scheduled classes. As participants have highlighted their FAM peers as health change champions

in their disease management journeys, creating group cohorts and providing support to patients both inside the classroom and in their daily lives could help participants overcome barriers faced in adopting nutritious food-seeking behaviors.

The family support provided by FAM participants to encourage food-seeking behavior change is another important thread across the adopting and sustainability pathway that can be built on by FAM administration. Family history of T2DM predisposes individuals to developing diabetes (Wagner et. Al, 2013); patients who have a 30-70% increased risk of developing T2DM if they have first-degree relatives with the disease (Cederberg et. Al, 2014). Participants continuously report that family involvement in their nutritious food procurement, cooking and eating habits is a major source of encouragement on their journey. The increased risk of developing T2DM if first-degree relatives have the disease along with the important support of family investment on sustaining food-seeking behavior change demonstrates that it is worth including participant families in some element of FAM programming. If resources are available, participants could bring FAM participants to one class with them. Alternatively, participants could receive a home-work assignment to teach their families about a nutrition topic of interest (e.g. sodium levels) and create a meal which adheres to their nutritional education (e.g. low-sodium mac and cheese dish). Generating buy-in from participants families to adopt nutritious food-seeking behaviors will help participants cultivate a supportive home-environment to implement learned disease management strategies.

Staff have made it clear that it would be valuable to have a website for FAM resources to be publicly shared. Staff invest time and energy into making creative educational resources and recipes which people living with diet-related chronic diseases everywhere can benefit from. The resources which FAM staff are creating and lessons learned from program implementation have

the potential to create movements across the country for other FAM programs. Investing in a website to showcase the work which FAM is doing for the Atlanta community, share resources and provide steps for setting up FAM programs in other healthcare systems could greatly benefit food security among chronic disease patients nation-wide.

Finally, there are not enough FAM staff to optimally run the program. There is only one nutritionist leading the cooking classes, one leading the Food Pharmacy distribution, and two leading the nutrition education classes. The two leading the nutrition classes are not full-time FAM staff and facilitate nutrition education classes and consultations with chronic-disease participants throughout Grady. Staff within FAM leading the Teaching Kitchen, Food Pharmacy and Nutrition classes do not have bandwidth to have regular meetings, which is missing a key opportunity to harmonize program materials to reinforce one another. While all FAM staff are invested in the success of their participants, they are unable to provide the best support possible because they are overburdened with the volume of patients and inadequate amount of staff. This results in the suffering of program participants who must wait many months to be scheduled for classes or are just 'pushed-through' without meeting program requirements. Only one of the full-time staff who started with the FAM program in 2019 is still employed with the program, and current staff are afraid that the volume of work and patients will lead to burn-out. To sustain the growth and life-changing impact of the FAM program, it is vital that Grady Hospital employs additional full-time staff for the FAM program.

It is important to note that the recommendations made to optimize program delivery of returning to the cohort model and increasing staffing require initial financial support from Grady Hospital. Hiring another staff member would require Grady to fund an employee's salary. In the long-term, having this additional staff member would reduce Grady costs because current staff

will not become overworked and may remain in their positions for longer. Additionally, increased personal care for patients from more frequent visits will likely cause improved participant adherence to food-seeking behavior change and reduce frequency of disease-related hospital admissions. Re-introducing the cohort model may increase staff strain at first as staff would need to overcome the initial hurdles of adopting a new process, specifically figuring out scheduling for cohorts. Once a scheduling process is in place, this new model should reduce strain on staff as participants will become a larger change support system for one another inside and outside the classroom.

Limitations

There were a few limitations which may have introduced bias into this study. As the primary researcher of this study, I was also a volunteer in the Teaching Kitchen from July 2023-November 2023.This facilitated building rapport with the program participants and FAM staff and provided access to recruit participants from class. However, this has the potential to introduce bias as participants may view me as a FAM facilitator and want to provide positive feedback on the program. Program participants were only recruited from the Wednesday Teaching Kitchen class between October – January 2023, which could also introduce bias into the data. Lastly, most participant interviews were conducted in-person but one conducted on Zoom, which could have decreased participant comfort in speaking to me. All the staff interviews were conducted through Zoom considering the busy schedules of program staff.

Conclusions

The findings from this qualitative evaluation highlight a potential pathway to change food-seeking behaviors for food-insecure patients living with chronic hypertension and/or diabetes. Free diverse nutritious food can incentivize participants to commit to long-term nutritious programming. Nutrition education and culinary medicine can provide the knowledge and skills needed to engage in food-seeking behavior change, however these changes will be sustainable only if participants undergo a mindset shift towards health empowerment. Fear of life-threatening damage from chronic disease fuels participant motivation to adopt and sustain the learned behaviors. Recommendations to improve behavior change adoption among participants are to adopt a cohort model of participation and encourage family inclusion in programming. Grady Hospital should also invest in a FAM website to share education resources and the hiring of additional FAM programming staff. Overall, the three components of the FAM program individually and collectively work to create food-seeking behavior change among program participants.

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Appendix A: Food as Medicine Program Evaluation Participant In Depth Interview Questionnaire

IDI #:
Interview Date:
Interview Location:
Gender:
Age:
Time spent in FAM program:
Chronic Disease Status (Hypertension, Diabetes or Both):
Education Level:
Insurance Status (private/employer/ACA; public; uninsured)

Thank you for taking part in this interview today. My name is Nalini Peres-da-Silva and I am supporting Grady Memorial Hospital to conduct an evaluation of how the Food as Medicine program has influenced the eating and cooking habits of program participants. During this interview I will ask you to share a bit about yourself, what you have learned from the Food as Medicine Program, how it has influenced your eating habits and suggestions you have to improve the program. Your insights are invaluable to understanding what the impact of the program is and how the program can be improved to better support Grady patients. You are the expert here and I'm thankful you are sharing your experiences with me (*pause*).
Being a part of this interview is optional and you may skip answering questions if you need to. If you choose not to participate in this interview, you can still participate in the Food as Medicine program. This interview will take about one hour. In order to make sure I don't miss any details and I can keep up with you, I would like to audio record and write notes down during the interview. All responses and notes will be kept completely confidential; your name will not be linked to what we talk about today, nor will this recording be shared with anyone. No staff at Grady or the Food as Medicine program will know what we spoke about today.

Do I have your consent to proceed with this interview? (*pause*)
Is it okay with you if I record this interview so I can refer to it for my notes later? (*pause*)

Introduction

1. Can you start by telling me about yourself?
    a. Probe: How old are you?
    b. Probe: Where are you from?
    c. Probe: How many people do you live with?
    d. Probe: Do you have children?
    e. Probe: Do you have a partner?
2. Could you tell me about your personal experience with chronic diet-related diseases (either hypertension or diabetes)?
    a. Probe: How long have you been managing this/these conditions?
3. What did you know about (hypertension or diabetes) before starting the Food as Medicine program?
    a. Probe: How were you managing your (hypertension or diabetes) before starting the Food as Medicine program?

4. On a scale of 1-5, how easy was it for you to buy/get the fruits and vegetables you wanted to eat when you wanted them before starting the FAM program?
    a. Probe: (*Based on participant's response*) Why not lower? Why not higher?
5. Before starting the program, were you able to regularly access fresh produce like fruits and vegetables?

Overview of Food as Medicine Program Experience

6. Can you tell me about your experience in the Food as Medicine program?
    a. Probe: How long have you been in the program?
    b. Probe: How did you find out about the program?
    c. Probe: What motivated you to be involved in the program?
    d. Probe: What were your expectations when you joined the program?
    e. Probe: What dietary recommendations have you received from the program to manage your (diabetes or hypertension)?
7. What has been the most significant change in your life as a result of the FAM program?
8. How has the Food as Medicine program affected your ability to manage your hypertension or diabetes?
    a. Probe: Have you observed any changes in your (diabetes or hypertension) management since joining the program?
9. Could you share specific examples of how the program has influenced your food-seeking behaviors, like the types of food you buy or prepare?

I would now like to dig a bit deeper into specific parts of the Food as Medicine program including the Food Pharmacy, Teaching Kitchen and Nutrition Classes.

Food Pharmacy Experience

10. Tell me about your experience with receiving food from the Food Pharmacy
11. How has the Food Pharmacy impacted your eating habits?
    a. Probe: How has receiving food from the Food Pharmacy impacted your access to nutritious foods?
    b. Probe: How has receiving food from the Food Pharmacy impacted your cooking and food preparation habits?
12. How easy was it for you to use and retrieve food from the Food Pharmacy?
    a. Probe: What could be done to make the food Pharmacy easier for patients to use?
13. If you were in charge, what would you do to improve the Food Pharmacy?
    a. Probe: What improvements or changes could make the Food Pharmacy more effective or helpful in accessing nutritious food?

Teaching Kitchen Experience

14. Tell me about your experience with taking classes at the Teaching Kitchen
    a. Probe: What has been the most valuable information which you have learned at the Teaching Kitchen?
15. How has attending the Teaching Kitchen classes impacted your eating habits?
    a. Probe: How has attending the Teaching Kitchen classes impacted your cooking and food preparation habits?
16. How easy was it for you to use and access the Teaching Kitchen?
    a. Probe: What could be done to make the Teaching Kitchen easier for patients to

access?

17. If you were in charge, what would you do to improve the Teaching Kitchen classes?
    a. Probe: What improvements or changes could make the Teaching Kitchen classes more effective or helpful when learning about cooking and food preparation habits?

Nutrition Classes Experience

18. Tell me about your experience with Nutrition classes at Grady Memorial Hospital
19. How has attending the Nutrition classes impacted your eating habits?
    a. Probe: How has attending the nutrition classes impacted your cooking and food preparation habits?
20. How easy was it for you to use and access the Nutrition classes?
    a. Probe: What could be done to make the Nutrition clasess easier for patients to access?
21. If you were in charge, what would you do to improve the Nutrition classes?
    a. Probe: What improvements or changes could make the nutrition classes more effective or helpful when learning about recommended nutrition and dietary habits?

Moving forward

22. What motivates you to be in the FAM program and lower your chronic disease status?
23. How has the community aspect of the program influenced your experience?
24. How do you think you'll be able to continue purchasing healthy foods after the program is over?
25. As you've gone through the Food as Medicine program, have you experienced any challenges in participating in the program? (If participant has provided challenges throughout interview, recount challenges and ask "Are there any other challenges you've experienced in the FAM program in general or it's different components? How did you overcome them?" OR "You've mentioned a lot of changes/improvements like… if you could chose one of these that would have the greatest impact, which would you choose? Why that one?"
    a. Probe: Have you experienced challenges in implementing the information which you have learned through the Food as Medicine program? If so, have you been able to overcome any of the challenges?
26. How have you been able to teach others in your community (i.e. family members, children) about what you have learned in the Food as Medicine program?
    a. *Probe*: Have you been able to use the information which you learned to prepare nutritious food for your family and community? Is so, please give examples.
27. After you are done participating in the Food as Medicine program, how will you continue to use the information which you learned to manage your (diabetes or hypertension)?
28. Do you have any final thoughts which you would like to share about the Food as Medicine program?

Thank you so much for sharing your experiences and thoughts with me today! If you think of anything else you'd like to share or have any questions for me after this interview, please feel free to contact me at Nalini.peres-da-silva@emory.edu

Appendix B: Food as Medicine Program Evaluation: Staff In-Depth Interview Questionnaire

IDI #:
Interview Date:
Interview Location:
Gender:
Age:
Educational Background:
FAM program sector:
FAM staff role:
Amount of time spent working for FAM program:

Thank you for taking part in this interview today. My name is Nalini Peres-da-Silva and I am supporting Grady Memorial Hospital to conduct an evaluation of how the Food as Medicine program has influenced the eating and cooking habits of program participants. As a part of this, we are also interviewing staff to understand your perceptions of the Food as Medicine Program, how it impacts the patient population, the impact of the specific program you work on, and suggestions you have to improve the program. Your insights are invaluable to understanding how the program is run and can be improved to better support Grady patients. I'm thankful you are sharing your experiences with me.
Being a part of this interview is optional and you may skip answering any questions. If you choose not to participate in this interview, it will have no impact on your job. This interview will take about one hour. In order to make sure I don't miss any details and I can keep up with you, I would like to audio record and write notes down during the interview. All responses and notes will be kept completely confidential; your name will not be linked to what we talk about today, nor will this recording be shared with anyone. No staff at Grady or the Food as Medicine program will know what we spoke about today.

Do I have your consent to proceed with this interview? (*pause*)
Is it okay with you if I record this interview so I can refer to it for my notes later? (*pause*)

Introduction

29. Can you start by telling me about your academic and career background?
    a. Probe: What is your educational background?
    b. Probe: What career roles have you held prior to coming to the Grady FAM program?
    c. What prior experiences do you have supporting people living with diet-related chronic diseases?
30. What motivated you to work for the Grady Food as Medicine program?

Impact of Food as Medicine on Program Participants

31. Could you tell me about your role and work in the Grady FAM program?
    a. Probe: How long have you been working at the Grady FAM program?
    b. Probe: What has your experience been working with program participants?

32. Please provide an overview of the FAM program (i.e. Food Pharmacy, Teaching Kitchen, Nutrition Classes) which you work in.
    a. Probe: What are the primary objectives of the (*FAM program which you work in*) in terms of helping participants with diet-related chronic disease?
33. From your perspective, how does the FAM program impact participants food-security and access to fresh fruits and vegetables?
    a. Given this impact, how does the FAM program support healthy food acces after the program has finished?
    b. Probe: What are some other obstacles that FAM patients face which prevent them from managing their chronic disease? This can be outside the scope of anything related to your role in FAM.
34. How does the FAM program which you work in impact the food-seeking behaviors of program participants?
    a. Probe: What education does (*your part of the FAM program*) provide program participants to support them to **change their food-seeking behaviors?**
    b. Probe: Can you provide specific examples of changes or improvements you've observed in **participant's food choices and eating habits** as a result of the FAM program?
35. How does the FAM program affect participant management of diet-related chronic diseases?
    a. Probe: What education does (*your part of the FAM program*) teach program participants to support them to **manage their chronic diet-related disease?**
    b. Probe: Can you provide specific examples of changes or improvements you've observed in **participant's chronic disease management** as a result of the FAM program?
36. What do you think the most impactful component of the Food as Medicine program is for participants?

Successes and Challenges

37. Describe the most rewarding part of your job working at the FAM program.
    a. Probe: What are some successful moments you've experienced in your role within the program?
38. What challenges have you encountered in your role for FAM?
    a. Probe: What kinds of challenges have you encountered when delivering education or services to program participants?
39. What kind of additional support from the Food as Medicine administrative team would be helpful for you to complete your job?

I would now like to talk about potential improvements of the program.

40. Do you see any gaps which exist within the Food as Medicine program?
    a. Probe: Do you see patients struggle to comply with any parts of the program?
    b. Probe: Have patients told you about any challenges they experience with the program?
41. Are there improvements or changes which you think could make the program more effective?
    a. Probe: Are there ways the program could do a better job impacting food-seeking

behaviors of program participants?

Moving forward

1. What do you see as the future for the FAM program?
2. If the FAM program was given a $500,000 grant tomorrow, how would you suggest the money is used?
3. Do you have any final thoughts which you would like to share about the Food as Medicine program?

Thank you so much for sharing your experiences and thoughts with me today! If you think of anything else you'd like to share or have any questions for me after this interview, please feel free to contact me at Nalini.peres-da-silva@emory.edu