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_____ _____

David H. Denton Date

A mixed methods analysis to explore retention in the Fruit and Vegetable Prescription (FVRx) program from Grady Hospital, Open Hand, and Wholesome Wave Georgia

By

David H. Denton
Master of Public Health
Hubert Department of Global Health
Rollins School of Public Health
Emory University

Amy Webb Girard, PhD, RN
Committee Chair
Hubert Department of Global Health
Rollins School of Public Health
Emory University

Unjali Gujral, MPH, PhD
Committee Member
Hubert Department of Global Health
Rollins School of Public Health
Emory University

Karen Andes, PhD
Committee Member
Hubert Department of Global Health
Rollins School of Public Health
Emory University

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By
David H. Denton
Master of Public Health
Hubert Department of Global Health
Rollins School of Public Health
Emory University

Bachelor of Science
Biology
Virginia State University
2011

Thesis Committee

Amy Webb Girard, PhD, RN
Committee Chair

Unjali Gujral, MPH, PhD
Committee Member

Karen Andes, Ph.D
Committee Member

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Abstract

A mixed methods analysis to explore retention in the Fruit and Vegetable Prescription (FVRx) program from Grady Hospital, Open Hand, and Wholesome Wave Georgia

Food insecurity is defined as the lack of physical, social, and economic access to sufficient, safe, and nutritious food. In 2019, 10.5% of US households were food insecure at some point. The Fruit and Vegetable Prescription Program at Grady Health System (G-FVRx) is a program managed by Wholesome Wave to increase access to affordable produce among food insecure communities in Atlanta, Georgia. A mixed method approach was used to describe strategies for recruitment and retention in the program and presents predictors of loss to follow-up. Baseline characteristics were compared between those who graduated from the program to those who did not using chi squared tests. Logistic regression was used to examine the association between baseline age, sex, BMI, controlled diabetes, hypertension, employment status, education level, food security scores, SNAP benefits, income status, and attitudes around food intake and cooking behaviors and loss to follow up. Cohort clinic site (P=0.007), age (P=0.001), BMI (P=0.037) and baseline food security (P=0.0243) showed a statistically significant difference between those who graduated and those lost to follow up. Older age (p=0.0035) and being enrolled at any cohort clinic site compared to Grady Infectious Disease Program (P=0.0243) were protective against loss to follow up, while having “very low” food security compared to “high” food security was predictive (P=0.0299). Qualitative data was collected via key informants from different partners and participants in the G-FVRx program to understand factors of retention, as well as to identify areas of improvement for future programming. The main topics that emerged included patient centered approach, social support, challenges to program implementation, external barriers and recommendations and programmatic improvements. Recommendations for next steps include increasing focus on cultural relevance and diversity within the G-FVRx course content and cooking sessions to address food choices, partnering with local grocery stores to provide produce for participants which would increase access to healthy foods, provide shuttles or carpools for participants to attend classes and appointments, enhance peer support groups and peer champions, and future qualitative and quantitative analyses including participants who were lost to follow up to gain further perspectives as to ways to improve retention.

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CHAPTER 1: EXECUTIVE SUMMARY

Project Context: The Fruit and Vegetable Prescription Program (FVRx) is one of two main programs managed by Wholesome Wave to increase access to affordable fruits and vegetables among food insecure communities in Georgia. Wholesome Wave Georgia's FVRx program started in 2015 in one hospital system in Augusta, GA and quickly expanded to include sites in Atlanta and Athens by 2019. In Atlanta, the Grady Health System conducts several FVRX cohorts each year (G-FVRx). The success of the G-FVRx program is evident through the continued improvements in retention rate - defined as % graduating from the program -- from 81% in 2018 to 90% in 2019. Recruitment and retention are key elements to success for programs promoting healthy nutrition and other lifestyle behavioral changes in low-income populations. This study used a mixed methods approach to describe strategies for recruitment and retention in the program and presents predictors of retention in the 2018 and 2019 G-FVRx program.

Project Aims: 1) Present predictors of participants lost to follow up and overall retention in the 2018 and 2019 G-FVRx programs using quantitative statistical analyses. 2) Investigate program factors and best practices leading to successful in retention in the G-FVRx program in 2019 by interviewing key stakeholders and participants involved in program implementation. 3) Elicit perspectives as to opportunities for improvement related to retention rates for future program iterations by interviewing key stakeholders involved in program implementation. 4) Create awareness regarding food insecurity, highlight the voices of community members in food insecurity research and communicate the findings of qualitative research using of arts-based methods.

Methods: Quantitively, baseline characteristics were compared between those who graduated from the program compared to those who did not using chi squared tests. Logistic regression was then used to examine the association between baseline age, sex, BMI, controlled diabetes, hypertension, employment status, education level, food security scores, SNAP benefits, income status, and attitudes around food intake and cooking behaviors and being lost to follow-up. Qualitative data was also collected via key informant interviews from different partners and participants in the G-FVRx program to understand factors that led to high retention, particularly in the year 2019, as well as to identify areas of improvement for future programming. Key informant (n=8) and participant (n=17)

interviews were conducted. Data from the interviews were analyzed by thematic analysis identifying the key concepts inline with the main key indicators of interest.

Key Findings: Based on the descriptive analysis, cohort clinic site (P=0.007), age (P=0.001), BMI (P=0.037) and baseline food security (P=0.024) showed a statistically significantly difference between those who graduated and those who were lost to follow up in the program. Amongst those who graduated, there were a higher proportion of individuals who were from older age groups, reported having higher food security, and who attended the Primary Care Center (PCC) compared to those who were lost to follow up. In bivariate logistic regression models older age (p=0.004) and being enrolled at any cohort clinic site compared to Grady Infectious Disease Program (IDP) (P=0.024) were protective against loss to follow up, while having "very low" food security compared to "high" food security was predictive of loss to follow up (P=0.030). Lastly, in multivariate logistic models, after adjusting for age and sex, there were not variables that significantly predicted loss to follow up. Regarding the qualitative analyses, the main topics that emerged from interviews with key informants and participants included patient centered approach, social support, challenges to program implementation, external barriers and recommendations and programmatic improvements. Key factors for influencing retention either positively or negatively included: having personnel teach the nutrition classes that are not only qualified but culturally appropriate, encouraging participant interaction among each other and with staff throughout the course of the program, positive effects on health outcomes, high demand at Metropolitan Atlanta Rapid Transit Authority (MARTA) markets and limited access to produce, and innovative strategies to increase participation and health eating.

Recommendations: From the analysis, recommendations for next steps include increasing focus on cultural relevance and diversity within the G-FVRx course content and cooking sessions to address food choices, partnering with local grocery stores to provide produce for participants which would increase access to healthy foods, providing shuttles or carpools for participants to attend classes and appointments, enhancing peer support groups and peer champions, and future qualitative and quantitative analyses including participants who were lost to follow up to gain further perspectives as to ways to improve retention amongst those who did not complete the program.

List of Acronyms

FVRx- Fruit and Vegetable Prescription Program

WWG- Wholesome Wave Georgia

G-FVRx- Grady Fruit and Vegetable Prescription

USDA- U.S. Department of Agriculture

U.S.- United States

MARTA- Metropolitan Atlanta Rapid Transit Authority

CDC-Centers for Disease Control and Prevention

FNS- Food and Nutrition Service

SNAP-Supplemental Nutrition Assistance Program

NSLP-National School Lunch Program

SBP-School Breakfast Program

WIC-Special Supplemental Nutrition Program for Women, Infants, and Children

FMNP- Farmers Market Nutrition Program

SFMNP- Senior Farmers' Market Nutrition Program

CACSFP- Child and Adult Care Food Program

CSFP- Commodity Supplemental Food Program

FFVP- Fresh Fruit and Vegetable Program

BMI- Body mass index

BP- Blood Pressure

HEI- Healthy Eating Index

HFSSM- Household Food Security Survey Module

IDP- Grady Infectious Disease Program

PCC- Primary Care Center

RD- Registered Dietitians

CHAPTER 2: LITERATURE REVIEW

The problem of food insecurity

Food insecurity is defined as the lack of physical, social, and economic access to sufficient, safe, and nutritious food for an active and healthy life. [1] According to the U.S. Department of Agriculture (USDA), in 2019, 10.5% of United States (U.S.) households were food insecure at some point. [2] More specifically, 35.2 million people reported living in food-insecure households. [2] The USDA is responsible for aiding the most food-insecure populations in the U.S. while providing dietary guidelines such as the recommended daily consumption of fruits and vegetables. However, according to the Centers for Disease Control and Prevention (CDC), currently only 1 in 10 adults meet the federal guidelines for fruit or vegetable consumption. [3] There are several national initiatives through the Food and Nutrition Service (FNS) helping to address the lack of access to healthy and affordable foods amongst food insecure populations. Such programs include the Fresh Fruit and Vegetable Program (FFVP), the Supplemental Nutrition Assistance Program (SNAP), the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), the Farmers Market Nutrition Program (FMNP), the Senior Farmers' Market Nutrition Program (SFMNP), the National School Lunch Program (NSLP), the Child and Adult Care Food Program (CACSFP), the Commodity Supplemental Food Program (CSFP), and the School Breakfast Program (SBP), to name a few.

Food insecurity does not exist in isolation. Instead, factors determining food insecurity are multifaceted and there is a large intersection between food insecurity and many underlining social determinants of health such as education, affordable housing, preexisting health conditions, access to and type of transportation, high healthcare costs, low wages, poverty, and unemployment. Therefore, it makes it difficult to address food insecurity with a single intervention alone. The association between underlying social determinants of health and inconsistent access to sufficient healthy food options is often systemically interconnected. [4,5,6] To conceptualize food insecurity as a public health problem, we must acknowledge that it creates and exist because of health disparities that have a greater effect on predominately low-income communities. These neighborhoods tend to have significantly fewer supermarkets with healthier food options than higher income neighborhoods which can then lead to increases in health disparities. [7,8] Furthermore, the historic relationship between food insecurity and race and ethnicity is a

complex one due to the various systemic economic and social structures continuing to marginalize people of color throughout the U.S. In 2019, 19.1% of African Americans, and 15.6% of Hispanic households reported lacking access to enough food to live a healthy lifestyle. [2] Furthermore, marginalized communities of color were twice as likely to face food insecurity than white communities. [8] There is a clear correlation and intersectional perspective on health disparities and one's access to healthy foods. If access to healthy and affordable food options are increasingly limited, additional barriers can be created for already at-risk individuals and families to eat more healthy foods and be properly educated on how to maintain a healthy well-balanced lifestyle.

The relationship between food insecurity, nutritional status, and chronic disease risk

There has been extensive research reviewing the association between food insecurity, nutritional status, and its influence on chronic disease risk. [14,15,16] In a study examining the association between nutritional status and chronic disease risk among a sample of 5,094 food insecure and food secure adults in the U.S., the results noted that adults living in food-insecure households had a 21% higher risk of clinical hypertension compared to adults living in food-secure households ($P = 0.02$). In addition, research indicates that adults living in food-insecure households had a 50% higher risk of clinical diabetes when compared with adults living in food-secure households (crude $P = 0.03$; adjusted $P = 0.09$). [14] In another study using surveys completed by 2580 individuals from both food insecure and food secure households, it was reported that in individuals living in food-insecure households, obesity risk was higher (48.1%) than amongst those living in food-secure households (35.1%, $P < .001$). [15] Lastly, a similar case-control study among 201 Latinas, found that participants who were classified as "very" low food secure were 3.3 times more likely to have type II diabetes compared to participants who were classified as low food secure/food secure (OR =3.33, 95% CI= 1.34-8.23). [16]

Although these studies show a significant association between nutritional status, food insecurity, and chronic disease risk, other studies have reported conflicting results. For example, in a study assessing dietary intake and household food security status amongst 222 low-income caregivers with children ages 2-4 years in an obesity prevention program, found that household food insecurity was not associated with child Body mass index (BMI) percentile and that the dietary intake patterns of children from food-insecure households did not differ from children from food-secure households. [17] Therefore, there needs to be more extensive research to examine the

association between food insecurity, nutritional status, and increased risk for chronic diseases due to the lack of sufficient data and the inconsistencies in literature.

Consequences of long-term inadequate access to healthy foods and health education are significant underlying drivers for increased risk of chronic diseases such as obesity, diabetes, hypertension, and cardiovascular disease, particularly amongst individuals and populations living in food insecure areas. [18] More than 133 million Americans or roughly 45% of the population are living with chronic diseases. [19] Data also estimates that the number of Americans living with chronic diseases will reach 170 million by 2030. [20] Chronic diseases are the leading causes of death in the U.S specifically, 1 in every 4 deaths or roughly 655,000 people die yearly due to heart disease. [21,22] What is particularly concerning is that chronic diseases are more common among poor and low-income populations who often tend to come from race/ethnic minority groups. [23] Specifically, in 2018 African American adults in the U.S. had a 30% higher risk of dying from heart disease and 40% higher risk of hypertension and a 60% higher risk of Diabetes when compared to than non-Hispanic Whites. [24,25] In addition, race/ethnic minorities also suffer from lower wages and insufficient health insurance coverage, thereby limiting access to adequate chronic disease treatment and health resources. [23] While chronic diseases can be effectively mitigated and prevented through improved diet and increased physical activity, the rates of chronic diseases have not significantly decreased among minority and low-income communities, implying that interventions to improve diet and increase physical activity in these groups may be inappropriate or inadequate. For example, Wilson-Frederick et. al researched differences between racial disparities in physical inactivity among urban low-income Blacks and Whites living in a similar area found that although living in an integrated community, Blacks had poorer health status and had higher adjusted odds ratio of physical inactivity compared to Whites (OR =1.40; 95% CI =1.30–1.51). A similar study, Hawes et. al also researched disparities in physical activity and found similar results of Black populations who lived in either integrated, predominantly Black, or predominantly White neighborhoods had significantly lower odds of physical activity compared to Whites who lived in predominantly White neighborhoods (OR = 0.40; 95% CI = 0.29–0.55, OR = 0.60; 95% CI = 0.37–0.97, and OR = 0.58; 95% CI = 0.42–0.80, respectively). [26] To elicit perspective regarding the differences in barriers to physical activity, some studies utilized interviews and focus groups with African American adults. For example, Sanderson et. al found that socioeconomic levels and lack of time influenced the increased levels of physical activity among African American

women.[27] Similarly, in another study, limited finances and time constraints were also highlighted as well as unsafe neighborhood, cultural and gender norms, lack of awareness and engagement as factors of physical inactivity amongst Low-income African American and Latina adults.[28] In terms of dietary interventions to mitigate chronic diseases, it has been shown that race/ethnic minorities are disproportionately affected by limited access to culturally appropriate interventions and healthy food options. One study that discussed the current gaps in interventions that targeted African Americans inflicted with obesity and diabetes noted that implementing cultural adaptations can result in increased effectiveness of the program.[29]Another study reviewing the implications to diet related disparities of minority groups found demographic characteristics, cultural preferences, environmental factors, and psychosocial factors as multifaceted contributors to diet related disparities. The authors suggested that in order to identify differences in dietary intake among minority groups, there is a need to design effective multi-component interventions.[30] The intersection between health status, physical inactivity, race, and social economic status remains a challenge when developing health interventions. Therefore, a deeper understanding as to how social context contributes to racial differences in physical activity and dietary interventions especially in lower-income communities is needed.[31]

Implementation Science

As described previously, it can be extremely difficult for individuals to maintain healthy lifestyles, especially those who are living in low-income and marginalized communities. There are many gaps, opportunities, and challenges when examining interventions focusing on nutrition, food insecurity, diet related chronic diseases and lifestyle behavioral change methods. For example, the relationship between lifestyle modifications, food insecurity, and chronic disease risk intersect on many levels such as the social, neighborhood and individual.[33] However, it can be difficult to effectively measure multi-level strategies and life course interventions. Therefore, there is a great need to strengthen the implementation of these interventions through knowledge sharing, evidence-based strategies and conceptual frame works to improve nutritional health outcomes.[34,35,36] Implementation science is a field of evidence-based research in real-world practice created to addresses such gaps and challenges as it is designed to understand the factors that influence the successful implementation of proven interventions.[36,37] Implementation science takes into consideration the numerous factors that can impact an intervention, such as its

characteristics, delivery, relevance, ethics etc. This involves the study of different implementation and intervention approaches, frameworks, and methods to achieve positive population-level health impact. [34,35,36] Specific recommendations for lifestyle behavioral changes include frameworks such as the socioecological model, and the use of interventions that build capacity. [36,37,38]

Social Ecological Model

Evidence indicates that individual's intention to fully engage in a certain behavior or action is based on their perceived control and self-efficacy. [39] Understanding why a person is eating unhealthy foods is one step toward a successful healthy food consumption intervention, [39,40] and assessing an individuals' behaviors and promoting positive change is necessary to fully guide that person to improve their overall health. [40] Therefore, for diet related interventions to be sustainable, the focus must be on providing educational tools and skills to encourage and promote healthy eating and healthy living to effectively drive behavioral change.

Social ecological models of health behavior acknowledge the influence of individual, interpersonal, community, environmental and policy factors on food insecure populations. Individual factors may include a lack education for healthy food choices and therefore, the decision to choose unhealthy foods becomes subconscious or normalized. [41] Interpersonal factors influencing dietary practices may include learned behaviors from peers and family members while community factors may include lack healthy food options within neighborhoods and schools, as well as a lack of curricula around healthy eating habits and physical education. In addition, organizational and policy factors may include increased food prices, as well as inconvenient grocery store locations thereby hindering access to healthy foods. Lastly, ineffective government nutrition programs and policies such as the marketing relating to increased and easy access to unhealthy food options also play a role in individual dietary practices and patterns. The Social Ecological model describes multiple levels where food insecurity may be influenced and identifies clear distinctions and interactions between each of the levels. Traditionally, nutrition interventions have been known to be vertical meaning focusing on a single issue and attempting to address it from a national to a community level thereby reducing community interest. Instead, future program may benefit from transitioning towards a more multi-sectoral approaches that include, addressing a variety of issues rather than one, and use community collaboration strategies in designing comprehensive interventions to improve people's diets

in a sustainable manner. [42] This can be done by not only focusing on the individual level but also on the built environments, community, and cultural norms, and governmental polices. [43,44] Furthermore, while these interventions must operate on multiple levels, they must also be applicable on the individual level to obtain self-efficacy. [45] Given the many factors impacting behavioral health, a substantial amount of time and research is necessary to design the most effective dietary interventions and to address the myriad root causes influencing dietary practices.

In terms of food insecure neighborhoods and lack of food access, a simple assumption may be that a lack of access to fresh fruits and vegetables is the main driver. Therefore, a simple solution would be to solely focus on providing better access to grocery stores and markets in food insecure neighborhoods. However, it can be argued that simply providing people with increased healthy food options may not serve to improve nutrition and health outcomes nor create individual ownership towards making lifestyle changes. For example, a study performed by the National Bureau of Economic Research, specifically looked at the food-based purchasing habits of 114,286 holds across the U.S. between 2006 and 2011. The researchers analyzed food purchasing habits to identify whether nutritional disparities were a matter of access and availability or merely preferences for certain foods. The results of this study found that households who had lower levels of income and education but lived in more affluent areas and had steady access to healthy foods still purchased similar foods to household who also had lower levels of income, and education but lived in significantly poorer neighborhoods with less access to heathy foods. [46,47] The authors of the study determined that even when healthy food options were introduced into supermarkets in low-income neighborhoods, residents still purchased the same items as they did prior to the introduction of these healthier items. [46] Since 2011, the Healthy Food Financing Initiative (HFFI) disbursed approximately $500 million to help provide resources and encourage healthy food retailers to relocate to areas with inequitable heathy food access, financing over 300 projects across the country. [48] Yet, in the U.S. there is still a growing epidemic of chronic diseases and a food insecurity crisis. This is likely due to the notion that the HFFI as well as the National Bureau of Economic Research study did not truly consider every level of an individual's decision-making process or every barrier faced when purchasing food items. Therefore, by implementing health and behavioral change theories and social ecological frameworks into the intervention, initiatives and studies can better understand behaviors, to develop the most effective interventions. [45,46] When the HFFI failed to achieve significant impacts on

fresh fruits and vegetable consumption, the initial reaction was to place blame on the community's lack of will to shift behaviors. However, instead the response should have been to assess the much larger food insecurity problem affecting the communities and use the research to influence policies to reduce nutritional disparities. By attempting to improve healthy food access through encouraging the relocation of food retailers, it did not resolve the root causes of food insecurity. There are many differences across socioeconomic groups that must be taken into consideration as factors when developing nutritional interventions such as income status, education level, familiarity to foods, cultural norms, lack of trust, habitual eating patterns to explain the variation in demand across socioeconomic groups. [46]

The National Bureau of Economic Research study noted, that improving people's diets not only requires accessibility, availability, and affordability, but also a shift in buyer's perceptions and habits about their diets and health outcomes. [46,47] Therefore, without nutrition education, healthy eating skills and buy in from the communities, solely building grocery stores will not lessen chronic diseases risk or reduce health disparities. By reviewing relevant research and utilizing the social ecological model, state and local governments could incorporate a range of evidence based and effective interventions that provide individuals and families in food insecure areas with the tools and skills to encourage healthier eating, improve access to healthy foods, improve mental and physical health, and encourage self-control and efficacy.

Fruit and Vegetable Prescription programs (produce Rx)

Throughout the U.S., there have been a variety of incentive programs such as SNAP and WIC that have been implemented to increase the intake of fruits and vegetables. In 2018, through the Agriculture Improvement Act, the U.S. proposed the allocation $4 to $6 million for produce Rx pilot programs for each fiscal year from 2019 through 2023. [50] Many NGOs, research institutions, and healthcare facilities have since developed their own initiatives by partnering with farmer markers and grocery stores to implement fruit and vegetable prescription programs also known as produce Rx programs. These programs were designed to change behaviors related to unhealthy eating habits, mitigate chronic disease risk, manage financial burdens, and improve diet quality by encouraging health care providers in food insecure communities to write prescriptions for fresh fruits and vegetables. Participants received the prescriptions in the forms of vouchers to use as payment for fruits and

vegetables and were able to use them to purchase produce at partnered local farmers' markets, and grocery stores. [51]

Wholesome Wave Rx (Fruit and Vegetable Prescription Program - FVRx)

Wholesome Wave is a national nonprofit that aims to make fresh produce more affordable to the public.[52] One of their premier programs for doing so is the Wholesome Rx (formerly known as the Fruit and Vegetable Prescription Program - FVRx). Since 2010, Wholesome Wave has partnered with doctors and other healthcare providers to pilot the Fruit & Veggie Prescription Program in Massachusetts. [53] This initiative aimed to give prescriptions for free fruits and vegetables to participants who live with chronic diseases, many of which are related to poor diet quality. [54] Participants were able to then redeem their prescriptions at participating retailers and "refill" their prescription at subsequent clinical visits. In 2013, Wholesome Wave launched an FVRx four-month pilot program in New York city funded as part of part a Healthy Food and Community Change initiative. [55] Participants attended monthly FVRx clinical visits to set goals and discuss nutrition and the importance of healthy eating. At these clinical visits, participants received their prescriptions and had their health indicators collected. At the end of the pilot, 40% of the children enrolled in the program had a lower BMI and more than 50% of the families reported increased food access. [56] Since then, Wholesome Wave has implemented this program throughout 10 different states, including Washington, D.C., and Navajo Nation.

Wholesome Wave Georgia's FVRx program was founded in Augusta, Georgia and piloted in 2015 at one site in partnership with Grady Memorial Hospital, Open Hand Atlanta, and The Common Market. [59,60] Since then, it expanded to three sites in 2016, six in 2017, and seven in 2018 and 2019.[60] A major component of the program are the Cooking Matters classes, which consist of a six-week nutrition education and hands-on cooking class, empowering participants with the knowledge and skills to better prepare healthy meals on a budget to increase fruits and vegetable consumption. These sessions are intended to increase participant's self-efficacy thereby creating a positive and sustained impact through increasing one's confidence and encouraging lasting behavior change. Georgia's FVRx aims to increase access to healthy foods and improve nutrition literacy for low-income Atlantans.[59] Participants received monthly clinic visits with nutrition counseling, six Cooking Matters classes, four nutrition education classes, six weeks of fresh fruits and vegetables provided during cooking classes, and four and

a half months of FVRx prescriptions worth $1 per family member per day for redemption at four local food retail sites.[59]

Impacts and challenges of produce Rx programs.

Fruit and vegetable prescription programs were designed to not only mitigate barriers of access but also provide additional nutrition education, effective budgeting, and cooking skills. There have been several studies assessing the impact of fruit and vegetable prescription programs on food security specifically by improving the consumption of healthier food, which is correlated to better purchasing practices, diet quality, mitigation of various health outcomes and economic benefits. Studies have also reviewed redemption and retention rates of these programs to assess its impact and sustainability. A review of the literature identified 14 peer reviewed articles published on the fruit and vegetable prescription programs (produce Rx programs) with a range of program designs, participation criteria, methods, and outcomes (table 1).

Studies have shown that the produce Rx program is a promising intervention to increase fruit and vegetable consumption among food insecure populations. Aiyer *et al* conducted a pilot study to examine the attitudes, perceptions, acceptability, and feasibility of a produce Rx program in an area with a high food insecurity rate. Within the study, 172 participants received a variety of nutrition education materials as well as 30 pounds of a fresh produce biweekly over twelve food pantry visits. Participant surveys and key informant interviews were conducted, and the study found that by the end of the program, there was a 94.1% decrease in the prevalence of food insecurity among the participants ($p < .01$). Furthermore, 99% of participants reported eating "all" or "most" of the produce that was provided throughout the program, and 94.5% of the participants perceived that the program helped them eat healthier. [62] However, there were also challenges to recruitment and retention. It was reported that one of the four recruiting health care clinics assessed was removed from the analysis due to challenges in recruiting and retaining participants. Furthermore, to assess the redemption rates, participants who redeemed their vouchers at least once or more were included. However, the average redemption rate throughout each participating clinic was only between 35.4% to 39.4%. The authors discussed challenges in engaging participants in the program and the low redemption rates and concluded that access to only one farmers' market, a lack of clear messaging to participants, and a lack of communication with partners played a major factor in low redemption. [62] A similar study

assessing the impact of a produce Rx program on household food security, reviewed data on 578 low-income families, between 2013–2015 and found that 72% of participants had an increased summative food security score. [63] However, households with participants who dropped out of the program were excluded from this study. It was reported that the average household redemption of prescriptions was 54%. Recommendations for future studies to focus on implementation effectiveness, by specifically reviewing participant support within the program, was expressed. It was also noted that expectations among participants versus the program implementers needs to be addressed. [63]

In another study, medical students at Penn State University serving as nutrition mentors designed a study that focused on 6-week produce Rx program with 9 food insecure families at risk of chronic illness. Results of the study showed that after completion of the program, daily fresh fruit consumption increased from 37.5% to 62.5%. Furthermore, the consumption of green vegetables at least once per week increased from 62.5% to 87.5%, the consumption of weekly of orange-colored vegetables from 38% to 87.5% and 'other' vegetable consumption increased from 13% to 33%. [64] However, in the qualitative analysis, the authors reported that participants expressed difficulty in maintaining a healthy diet post program. The author's recommendations therefore included more collaboration with funded organizations to increase sustainability and participant efficacy which could aid the long-term support and behavioral change. Furthermore, the authors did believe that the relationships between the medical students and participants were important to the program's success and encouraged future programs to enhance a "patient centered approach". [64]

Several studies assessing produce Rx programs have reviewed participants' perceptions of behaviors and improved self-efficacy as specific outcomes to improving food insecurity. A study by the Washington State Department of Health used a produce Rx program to improve participant engagement in healthy food consumption. The data showed a 54.4% voucher redemption rate and an 88.2% increased consumption of fruits and vegetables by participants and family members who took part in the program. When asked about perceived health benefits, 71.5% of the participants reported improved management of health conditions, and 81.2% showed improvement in achieving diet-related, and nutritional goals. [65] The authors noted that implementing partners throughout the program, helped to increase the attendance and retention of participants in their health care appointments and community-based classes, both of which were where the prescriptions were offered. Lastly, it

was reported that 95% of participants completed the 6-week program, and the overall prescription redemption rate was 54.4%. However, data collection on produce redemption varied among implementing partners therefore making it logistically difficult to get accuracy. [65]A similar study, evaluated the uptake of a produce Rx program on pregnant women who were food insecure. Among the 75 participants, 56% reported redeeming at least one voucher, and 95% reported that the program provided greater awareness of farmers markets and had an impact on their shopping habits. [66] The authors recommended future emphasis on increasing voucher redemption especially in prenatal settings. There was no report regarding retention rates in this study. [66]

Although fruit and vegetable consumption is essential for overall health of the population specifically when it comes to chronic disease prevention, the average American fails to meet daily intake recommendations. [67] Nearly half of all Americans have one or more preventable chronic diseases, such as cardiovascular disease, type 2 diabetes, or high blood pressure.[68] Roughly, two-thirds of adults and one-third of children and youth are classified as overweight and obese. [69] A major risk factors for chronic diseases are inadequate consumption of healthy foods, such as fruits and vegetables. [70,71] In a survey conducted by the Centers for Disease Control (CDC) in 2015, only 12.2% of Americans met the national dietary guidelines for fruit intake and 9.3% met vegetable intake recommendations.[72] Various social determinants of health further complicate the severity of this issue. Men are less likely to adhere to fruit intake guidelines (9.2%) compared to women (15.1%), and fewer adults in living close to or below the federal poverty level met the vegetable intake guidelines (7.0%) than did those in the highest household income category met the (11.4%). [72]

There is strong evidence to suggest that produce Rx programs are successful in not only improving fruit and vegetable consumption, but also in improving health outcomes. A study using a retrospective case control design evaluated a produce Rx program using medical record data of 54 participants. The data showed significant differences in BMI of the intervention and control groups both pre- and post-intervention ($P = 0.02$). Post intervention, the BMI of controls slightly increased by 0.35 units, whereas there was a significant drop in BMI by 0.74 units among intervention cases.[73] However, this retrospective study did not provide data on participants who did not complete the program or who failed to redeem vouchers, so it is unclear if those completing the study differed in outcomes from those who did not. [73] To further support produce Rx programs having an influence on diet quality, Comerford B, Doughty K, Njike V, *et al.* performed a randomized controlled trial with 40 adults in a

worksite setting (n=20 who were enrolled in a produce Rx program for 10 weeks and n = 20 who received the standard worksite wellness). While both groups had improved vegetable intakes, the increase was only significant among adults in the intervention arm (intervention score = 7.85 ± 10.82, $P < 0.05$ vs. control group score = 3.57 ± 9.51, $P > 0.05$). [74]

Several studies have targeted produce Rx programs specifically to those diagnosed with chronic disease. Trapl ES, Smith S, Joshi K, *et al* study evaluated the program's effectiveness on 224 participants from three safety net clinics diagnosed with hypertension. Results of the study showed significant changes in daily increase of fruit consumption, from 1.6 to 2.4 servings ($P < .001$) and vegetable consumption, from 1.7 to 2.5 servings. The authors also found a significant decrease in fast food consumption from 1.3 to 0.7 days per week. Lastly, nutrition counseling sessions significantly increased from baseline to visit 3 ($P < .001$).[75] Participants' weight and blood pressure were unchanged throughout the duration of the study, and prescription redemption and dietary behaviors were not examined for analysis. In terms of retention, 224 participants were enrolled and 137 completed the program, while 86% of participants were reported to have redeemed at least one voucher. However, only 61% of enrolled participants attended the third visit. [75] Another study examined the effect of a produce Rx program on changes in hemoglobin A1C (HbA1C), blood pressure (BP) and weight in participants with uncontrolled type 2 diabetes. This program was held over 13-weeks amongst 65 eligible participants. While the authors noted a significant decrease in HbA1C from 9.54% to 8.83% ($p = 0.001$), there were not significant changes in weight or blood pressure from pre to post program. The authors suggested that produce Rx programs have an impact on participants with type 2 diabetes due to the improved diets playing a significant role in diabetes control, manifesting as lower HbA1C.[76] In terms of participation and retention, 63.1% of the participants in the produce Rx program attended four market visits throughout the 13-week program. The remaining attended either three times, twice or once (16.9%, 6.2%, and 13.8% respectively). Only 9 participants were lost to follow up. The authors recommended future studies to follow-up with participants post program to better understand long-term effects. [76]

Relatively few studies have examined produce Rx programs in pediatric populations. Specifically, the Navajo nation has been a major beneficiary of produce Rx programs due to having more than 70% food insecure households. [77] Jones *et al*. conducted a study amongst Navajo caregivers and children up to 6 years old who were enrolled in a 6-month produce Rx program. A total of 243 program participants attended monthly nutrition sessions

where they also received vouchers to obtain fresh produce. Fruit and vegetable consumption increased significantly, from 5.2 to 6.8 servings per day among children and adults ($P < 0.001$). Furthermore, by the end of the program, 38 % of the participants had a BMI percentile that was in the healthy range. Specifically, the proportion of those with BMI in the unhealthy range decreased from 95.6 to 73.1$P < 0.001$. [77] However, a limitation to the study was missing and incomplete data. Specifically of the 243 enrolled, 31 lacked baseline surveys and only 122 completed the exit surveys. In terms of produce redemption, the authors specifically established a criterion for the participating retailers which included confirming the location to be on the Navajo reservation as well as emphasis on providing local produce and traditional foods. Lastly, it is important to mention that 65% of families post program reported they were still food insecure. [77] Another study by Ridberg *et al* examined the association between produce Rx programs and the changes in healthy food consumption among obese and overweight children aged 2 to 18 years. The authors analyzed data on 883 children who were overweight or had obesity from the National Cancer Institute. Throughout a 4-6-month produce Rx program these children were provided in-clinic nutrition education and obesity treatment counseling. The review demonstrated increased fruit and vegetable consumption by 0.32 cups on average (95% CI: 0.19,0.45) amongst children in the program.[78] However, the authors excluded participants that did not attend at least 2 clinical visits. Similarly, a study by Saxe-Custack *et al,* assessed the impact of produce Rx programs impact on the dietary behavior's children living in an urban food desert community. The data showed that the mean of daily intake of whole fruit increased significantly from the baseline to the 6-month follow-up ($p = 0.029$). Also, 43.5% of children reported an increased whole fruit intake of at least ¼ cup per day, and 34.3% reported an increased whole fruit intake of at least ½ cup per day. [79] Retention or redemption rates were not mentioned in the study.

In addition to studying the effect of produce Rx programs on mitigating food security through an increased consumption of healthy foods, increased diet quality and mitigation of chronic diseases, there have been several studies exploring the influence these programs have on participants' economic constraints. Esquivel MK *et al* conducted a qualitative study to access family motivation towards program participation in order to improve program retention strategies. Three major themes that emerged were that the program influenced "family lifestyle changes", "child lifestyle changes" and "increase affordability and accessibility". Data showed that 67% of the respondents (n=21) noted improved eating habits, and increased interest in the farmers' market due to program

participation. Another 52% of respondents reported a decrease in processed food and increase in fruit and vegetable consumption among children. Lastly, 72% of participants reported that the program resulted in financial help to offset the high costs of fruit and vegetable. [80] The completion rate of the program was 17%. Furthermore, 63% vouchers were at least partially redeemed and 17% of participants redeemed all of their vouchers. However, the authors reported not having adequate resources to properly track participation and implement methods to increase program retention, and they recommend that future studies include better communication methods between program staff and participants and parents, identify barriers to participation, referrals, and family-centered activities. [80] Another study utilized a qualitative approach to elicit perspectives on what aspects of the produce Rx program worked well and what needed improvement, and how participants interpreted and engaged with the program. In several interviews, a theme that emerged was "limited and unstable income" which was reported to have been an influence for participants to remain program. This theme also indicated the role of produce vouchers in providing economic support for participants to increase fruit and vegetable intake. [81] The results of the study noted that almost half of the participants interviewed did not have reliable transportation to get to the program limiting their engagement. The authors recommend that future studies go more in depth as to the participants experience in their daily lives in and outside of the programs to enhance motivation, engagement, and participation. They also suggest enhancing the "structural competency" of programs such as addressing clinical biases, developing, and deepening cross cultural awareness which all can influence how to better understand the participants' needs. [81]

Strategies for retention

The success of nutritional programs like the produce Rx program is contingent upon retention of the participants. Among the studies noted above, there were several that did not analyze retention or prescription redemption rates. Several described participants' completion of the program but did not provide any further information as to why some participants did not complete the program. Other studies have developed effective strategies and methods to increase retention in nutritional based programs. A study conducted amongst 25 key informants aimed to provide insights in retention in community health programs that focused on increasing physical activity and nutrition. Results of the study showed that encouraging self-efficacy by which participants

had a sense of ownership in their own health outcomes was vital to the program's success. [82] Another study suggested that to successfully retain participants in physical activity interventions, focus must be placed on an entire ecological framework that is culturally relevant. [83] Despite using recommended strategies, and best practices, there are still many barriers and challenges in nutritional programs retention.

Conclusion

Overall, several studies indicated that produce Rx programs increased fruit and vegetable consumption, improved knowledge and attitudes regarding healthy diets and behavior changes, increased access and economic stability, and improved chronic disease management. Some studies also reported improved clinical outcomes. Despite these positive outcomes, studies noted multiple limitations to these programs. Sustainability was a theme in terms of partnership, and lack of long-term funding and follow ups were reported to be barriers in program success. Despite significant findings and impacts of the produce Rx programs, it was noted that participants who were loss to follow up were reportedly due to faulty data collection systems, lack of transportation among participants, limited or inconvenient locations of participating farmers markets, and program schedule conflicts. Produce Rx programs are still relatively new in comparison to other interventions like SNAP or WIC which are also designed to mitigate food insecurity through increased healthy food consumption, improved diet quality, increased economic stability and improved health outcomes. However, given that produce Rx programs are becoming more widespread on city, state, and now national levels, it is imperative that more studies are conducted to truly assess the association between produce Rx program and food insecurity among the most at-risk populations. These studies must determine best practices and measures of sustainability to continue to scale these programs to the most food insecure places in the U.S. and must design efforts to enhance participant retention and voucher redemption in the programs. The use of implementation science to understand participant retention and improve retention strategies requires further investigation. While previous research by our team has documented associations between program participation and reduced chronic disease risk factors, this study evaluates the Grady Fruit and Vegetable Prescription (G-FVRx) through an implementation science lens to understand factors that influence participant retention. In doing so, this thesis seeks to identify specific program

mechanisms that foster or undermine retention and identify sustainable approaches to improve participant retention and hence program effectiveness.

Table 1: Comparison of peer reviewed fruits and vegetable prescription program study evaluations

Source	Program Name	Location	Program Length	Date Data Collected	Program and Rx Design	Participant type	No.	Results
Cavanagh, 2017	Veggie Rx	Albany, New York	13 weeks	December 2011	Consisted of a prescription booklet with thirteen coupons for each week worth $7 which is eligible to be redeemed at Capital Roots' Veggie Mobile produce market.	Low-income participants diagnosed with either obesity, hypertension and/or type 2 diabetes	54 participants	A statistically significant difference in mean BMI change (P =0.02) between the intervention and the control group. The intervention group had a mean decrease in BMI of 0.74 kg/m2.
Trapl, 2017	Produce prescription intervention (PRxMoms)	Cuyahoga County, Ohio	4 months	2013	Consisted of nutritional counseling and vouchers worth $40 at monthly prenatal visits.	Food insecure pregnant women	75 participants	56% of participants redeemed vouchers, and 95% reported that program materials were relevant and useful. Providers indicated that program created greater opportunities for healthy dieting, greater awareness about farmers markets, and new shopping habits among participants.

Bryce, 2017	The Fresh Prescription (Fresh Rx)	Detroit, MI	13 weeks	June 2015 - October 2015	Consisted of vouchers worth $40 ($10 per week for up to four weeks) and a $5 incentive offered, if participants redeemed at a specific farmers market (Mercado), and to those that completed health goals worksheets	Low-income participants with uncontrolled type 2 diabetes	65 participants	A statistically significant ($p = 0.001$) decrease in HbA1C was found (9.54% to 8.83%). However, weight and BP did not change from pre- to post-study ($p > 0.05$).
Trapl, 2018	Produce prescription for hypertension (PRxHTN) program	Cuyahoga County, Ohio	3 months	Spring 2015	Consisted of nonphysician provider visits, measuring blood pressure, conducting nutrition counseling, and four $10 farmers market produce vouchers were provided	Participants with hypertension with a positive screening for food insecurity	224 participants from 3 clinics	88% of participants indicated increased visits to farmers markets than prior to program, 88% reported that eating fruit and vegetables became more important, and 82% tried a new fruit or vegetable while in the program. Daily fruit consumption increased from 1.6 servings to 2.4 servings ($P < .001$), and daily vegetable consumption from 1.7 servings to 2.5 servings ($P < .001$).

Ridberg, 2019	Wholesome Wave's pediatric Fruit and Vegetable Prescription Program (FVRx)	12 clinical sites in Connecticut, Maine, Massachusetts (3), New Mexico, New York (4), Rhode Island, and Washington, DC.	4 to 6 months	2012 - 2015	Consisted of In-clinic nutrition education and obesity treatment counseling, 6 clinical visits, voucher prescriptions allocated by household size worth $0.50–$1.00/per household member daily	Children who were overweight or obese	883 participants in the analytic sample	An increase of 0.32 cups for each additional participant visit. An equal portion of the change-score increase attributed to vegetable and fruit consumption (β = 0.16 for each).
Ridberg, 2019	Pediatric fruit/vegetable prescription program	9 clinical sites (1 each in Maine, Massachusetts, New Mexico, Rhode Island, and the District of Columbia and 4 in New York),	4 to 6 months	2013 - 2015	Consisted of nutrition education, prescriptions allocated by household size worth $0.50 to $1.00/person daily	Low-income families	578 families	72% of households increased the summative food security score from start of the program to completion. Participating families with high/marginal food security increased from 58% to 76%, families experiencing low food security decreased from 33% to 22%, and very low food security from 9% to 1%.
Forbes, 2019	Fruit and vegetable prescription (FVRx)	Hershey, PA	6 weeks	2015	Consisted of educational modules and weekly prescriptions	Existing participants in the Penn State Health system at risk for any	10 families	Among participants daily fresh fruit consumption increased from 37.5% to 62.5%. Green vegetable consumption increased from

					worth $40 for produce at partnering farmers markets	chronic or metabolic disease.		62.5% to 87.5%, orange-colored vegetable consumption from 38% to 87.5%.
Schlosser 2019	Produce prescription program for participants with hypertension (PRxHTN)	Cuyahoga County, Ohio	3 months	March 2016 - August 2016	Consisted of counseling sessions to improve diet, control blood pressure and prescribed produce vouchers worth $40 per month for 3 months to be redeemed	Low-income adults with hypertension	224 participants (a total of 23 participants were interviewed)	Results noted economic hardship as a barrier to participation and sustainability. Theme identified, (i) transportation issues (ii) limited and unstable income (iii) personal or perceived motivations
Aiyer, 2019	Food prescription program (Food Rx)	North Pasadena, TX	9 months	September 2016 - May 2017	Consisted of nutrition education materials and a “Food Rx” card, worth $12.20 per participant every 2 weeks for up to 12 redemptions	Adult participants and parents of pediatric participants	242 participants	Participants reported a 94.1% decrease in the prevalence of food insecurity ($p < .01$) at completion. 99% of participants reported eating “all” or “most” of the food provided.

Marcinkevage, 2019	Fruit and vegetable prescription program	Washington State	6 weeks	July 2016 - June 2018	Consisted of vouchers worth $10 to be redeemed at any one of 169 participating supermarkets.	-	144 participants	88.2% of participants reported eating more fruits and vegetables during and after program completion 54.4% of participants consistently redeemed vouchers
Saxe-Custack 2019	Fruit and vegetable prescription program (FVPP)	Flint, Michigan	6 months	August 2018	Consisted of prescriptions worth $15 for every child during each office visit.	Caregiver–child dyads	108 pediatric participants	Child daily intake of whole fruit increased from the baseline to follow-up ($p = 0.03$) 44% of children reported an increased intake in fruit of at least ¼ cup per day, and 30% reported an increase of at least ½ cup per day.
Comerford, 2019	Fruit and vegetable "prescription" (FVRx) programs	Southern Connecticut	10 weeks	-	Consisted of 45-minute cooking courses, nutrition education sessions, and a weekly voucher worth between $15–$25.	Healthy adults employed at a community hospital in southern Connecticut	40 participants (20 participants received FVRx program and 20 received standard worksite wellness offer)	FVRx group significantly increased their HEI-2010 score for vegetable intake ($P < 0.05$) and reduced their HE-2010 score for empty calories $P < 0.01$) and improve their overall HEI-2010 score from baseline ($P < 0.05$) when compared to control. No differences in body composition, HbA1c blood lipids, or blood pressure were noted between groups.
Jones, 2020	Navajo Fruit and Vegetable	Navajo Nation	6 months	May 2015 - September 2018	Consisted of vouchers worth $1 per	Children classified as overweight or	243 participants	Among participants, fruit and vegetable consumption significantly increased from

	Prescription (FVRx)				household member per day, maximum of $5 daily, monthly health coaching sessions for prevention of childhood obesity	obese at baseline		5.2 to 6.8 servings per day (P < 0.001). Households reporting food insecurity decreased from 82% to 65% (P < 0.001). Among children classified as overweight or obese at baseline, 38% obtained a healthy BMI z score (P < 0.001).
Esquivel 2020	Keiki Produce Prescription (KPRx) Program	Honolulu, Hawaii	3 months	July 2018 - April 2019	Consisted of vouchers worth $24 per month for 3 months and an additional $25 gift certificate for completing the final interview.	Children ages 2 to 17 years with "poor nutrition,"	125 participants	Results of the interviews reported (1) streamline referrals, (2) enhance retention, (3) quantify program impact, and (4) identify barriers to participation.

CHAPTER 3: MANUSCRIPT

A mixed methods analysis to explore retention in the Fruit and Vegetable Prescription (FVRx) program from Grady Hospital, Open Hand, and Wholesome Wave Georgia

AUTHORS

David Denton [1], Unjali Gujral [1], Miranda Cook [2], Emily Ogutu [1], Ahad Bootwala [1], Casey Costello [1], Karen Andes [1] Amy Webb Girard [1]

[1] Hubert Department of Global Health, Rollins School of Public Health, Emory University, Atlanta, GA

[2]Nutrition and Health Sciences Program, Graduate Division of Biomedical and Biological Sciences, Laney Graduate School, Emory University, Atlanta, GA

ABSTRACT

Food insecurity is defined as the lack of physical, social, and economic access to sufficient, safe, and nutritious food. In 2019, 10.5% of US households were food insecure at some point. The Fruit and Vegetable Prescription Program at Grady Health System (G-FVRx) is a program managed by Wholesome Wave to increase access to affordable produce among food insecure communities in Atlanta, Georgia. A mixed method approach was used to describe strategies for recruitment and retention in the program and presents predictors of loss to follow-up. Baseline characteristics were compared between those who graduated from the program to those who did not using chi squared tests. Logistic regression was used to examine the association between baseline age, sex, BMI, controlled diabetes, hypertension, employment status, education level, food security scores, SNAP benefits, income status, and attitudes around food intake and cooking behaviors and loss to follow up. Cohort clinic site (P=0.007), age (P=0.001), BMI (P=0.037) and baseline food security (P=0.0243) showed a statistically significant difference between those who graduated and those lost to follow up. Older age (p=0.0035) and being enrolled at any cohort clinic site compared to Grady Infectious Disease Program (P=0.0243) were protective against loss to follow up, while having “very low” food security compared to “high” food security was predictive (P=0.0299). Qualitative data was collected via key informants from different partners and participants in the G-FVRx program to understand factors of retention, as well as to identify areas of improvement for future programming. The main

topics that emerged included patient centered approach, social support, challenges to program implementation, external barriers and recommendations and programmatic improvements. Recommendations for next steps include increasing focus on cultural relevance and diversity within the G-FVRx course content and cooking sessions to address food choices, partnering with local grocery stores to provide produce for participants which would increase access to healthy foods, providing shuttles or carpools for participants to attend classes and appointments, enhancing peer support groups and peer champions, and future qualitative and quantitative analyses including participants who were lost to follow up to gain further perspectives as to ways to improve retention.

INTRODUCTION

Food insecurity is defined as the lack reliable and sufficient access to affordable, and nutritious foods due to limited social and economic resources amongst individuals or households. [1] Based on data from the Economic Research Service within the U.S. Department of Agriculture (USDA) in 2019, a total of 35.2 million Americans lived in food-insecure households. Of those, 9 million adults lived in households that were considered to be "very low" on the food security index. Furthermore, 5.3 million children lived in food-insecure households. [2] Food insecurity is a complex public health issue that disproportionately affects households that are impacted by other social determinants of health such as a lack of education, health care, affordable housing, transportation, income, and employment. The prevalence of food insecurity has been found to be higher among Black and Hispanic households, than white households as well as higher in lower-income households compared to higher-income households. [8]

In Healthy People 2020, the U.S. initiated goals of reducing food insecurity by 6%, eliminating "very low" food security among children to 0%, and increasing the consumption of fruits and vegetables by persons aged 2 years and over to 0.56 cups per 1,000 calories. [9,10] Despite these goals and existing nutrition programs, the overall rates of food insecurity have either increased overtime or have had little change since the annual measurement of household food insecurity began in 1995. [11,12] In 2019, the U.S. spent $92.4 billion on USDA nutrition assistance programs such as Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), the Supplemental Nutrition Assistance Program (SNAP), and the National School Lunch Program. [13] Historically, these interventions aim to minimize inaccessibility and improve affordability of food resources. However, such

programs have encountered challenges such as participant motivation and commitment, have ignored social, behavioral, and cultural contexts relevant to program participation, specifically participants attitudes, beliefs and level of food knowledge, relevancy of foods participants consume compared to foods used in the program, and physical determinants such as built environments which affects accessibility and affordability of healthier foods. [32]

Over the past decade, more comprehensive interventions have been piloted and have indicated that including nutrition education and incentives within programs can influence and increase healthy behaviors and better food choices among food insecure populations. [49] On such example is the Fruit and Vegetable Prescription program (FVRx) (also called the produce prescription program). In 2018, through the Agriculture Improvement Act, the U.S. proposed the allocation of 4 to 6 million US dollars toward produce Rx pilot programs for each fiscal year from 2019 through 2023. [50] This allocation encourages doctors, and other healthcare providers nationwide to give prescriptions for free fruits and vegetables to participants who live with chronic diseases, many of which are related to poor diet quality. [51] Additionally, participants are enrolled by physicians, nutritionist and/or registered dietitians in monthly clinical visits lasting between 6 weeks to 6 months at a time to set personal goals, discuss nutrition and the importance of healthy eating and engage in participatory cooking classes. Participants can then redeem their fruit and vegetable prescriptions at participating retailers such as farmers markets or specific grocery stores.

There is a strong evidence base that suggests FVRx programs are successful in improving fruit and vegetable consumption as well as health outcomes. Research indicates that increased fruit and vegetable consumption may mitigate the risk of diet related chronic diseases and improve BMI and Healthy Eating Index (HEI). For example, a vegetable Rx program in Albany, NY among low-income adults (n=54) showed significant differences in BMI between the intervention and control groups both pre- and post-intervention ($P = 0.02$). Post intervention, the mean BMI of the control group slightly increased by 0.35 kg/m2, whereas there was a significant drop in the mean BMI by 0.74 kg/m2 among those in the intervention group. [73] In addition, a review of 4–6-month FVRx programs for obese and overweight children in low-income households (n=883) demonstrated increased fruit and vegetable consumption amongst participants by 0.32 cups per additional clinical visit ($P < .001$). [78] In order to experience these health benefits, the assumption is that the prescriptions for fruits and vegetables will be

redeemed at various retail partners. A study by the Washington State Department of Health showed a 54.4% voucher redemption rate and an 88.2% increased consumption of fruits and vegetables by participants in a produce Rx program and their family members. In addition, when asked about perceived health benefits, 71.5% reported improved management of their health conditions, and 81.2% showed improvement in achieving diet-related, and nutritional goals. [65]

There are minimal studies focusing on the retention of FVRx programs, which is a vital component of their success. In this study, retention refers to the ability to retain participants until completion of the program. Given the limited number data on retention within FVRx programs, it is challenging to determine the most effective strategies to implement for retention. The use of implementation science in maximizing participant retention requires further investigation and there is a need to evaluate specific FVRx program components to understand and address the gaps in knowledge as to factors that affect retention and participation at various levels. This study is an evaluation of the effectiveness of the Grady Fruit and Vegetable Prescription (G-FVRx) program. Our objective is to better understand the use of implementation science, specific program mechanisms of action, areas for program improvement, and to assess sustainable measures to improve program retention. In this comprehensive study we will use the information on retention rates from the Grady Evaluation Reports in 2018 and 2019 to achieve the following aims:

1. Identify predictors of loss to follow up and overall retention in the 2018 and 2019 G-FVRx programs through statistical methods.
2. Investigate program factors and best practices leading to successes in retention rates in 2019 by interviewing key informants and participants involved in program implementation.
3. Elicit perspectives on opportunities for improvement related to retention rates for future program iterations by interviewing key informants involved in program implementation.
4. Create awareness regarding food insecurity, highlight the voices of community members in food insecurity research and communicate the findings of qualitative research using of arts-based methods.

METHODS

Study Sites

Wholesome Wave G-FVRx began in metro-Atlanta in 2015 at one site in partnership with Grady Memorial Hospital, Open Hand Atlanta, and The Common Market. Since then, the G-FVRx has expanded to three sites in 2016, six sites in 2017, and seven sites in 2018 and 2019. This 6-month intervention aims to increase access to healthy foods, reduce food insecurity and manage diet related chronic illness for low-income Atlantans. [60] Participants are first recruited from within the Grady healthcare system and enrolled in the program if eligible and interested. In order to be considered for participation, individuals must present a positive food insecurity screening within the past 12 months determined by the USDA 2-item food security questionnaire, [57] be aged 18 years or older, be currently enrolled in the Grady Healthcare system, have completed four introductory nutrition education group classes with a nutritionist at their perspective Grady clinic and demonstrate a willingness to commit for the 6-month duration of the program. For the first six weeks of the course, participants take part in monthly clinic visits with nutrition counseling, six Cooking Matters classes delivered by dieticians, and four nutrition education classes. These classes cover basics regarding meal preparation while providing information on cooking tips, efficient ways to grocery shop, food budgeting, nutrition literacy, the importance of exercise, and gardening for growing food. Participants are also provided with six weeks of fresh fruits and vegetables provided during classes, and four and a half months of G-FVRx prescriptions providing a food subsidy worth $1 per family member per day for redemption at four local food retail locations including fresh MARTA markets and local farmers markets throughout the metro-Atlanta area. Baseline, midline, and end line program surveys were administered to record sociodemographic information, height, weight, blood pressure, diet practices, attitudes, and confidence with selecting, purchasing, and preparing healthy food options.

Data from the G-FVRx program suggest the intervention improves health outcomes by increasing fruit and vegetable consumption, improving positive nutrition practices, and decreasing unhealthy food consumption. [59,60] Over the years, the program has experienced major success as indicated by high retention rates. In 2018, the overall retention rate, defined as completion of three or more-monthly clinical visits, was 81%. In 2019, the overall retention rate was 90%. [61]Table 1 shows the distribution of retention rate across each clinic site.

Research design

In 2019, the FVRX program retention rate was higher than in previous years and there was a desire to understand the best practices and contributions to the high retention rates to inform future programming. We therefore used a cross-sectional explanatory research design to understand the program factors and best practices which contributed to high retention rates in 2019 as well as opportunities for improvement for future programming. For our quantitative analyses, we used baseline data from all participants in the 2018 and 2019 cohorts of the G-FVRx program (N= 288 participants, graduates=248, loss to follow up=40). Data was used to compare factors between participants who graduated from the program and participants who were loss to follow up from the 2018 and 2019 cohorts of the G-FVRx program. The rational was to review relevant factors or variables that may have influenced or predicted a participant's decision to drop out of G-FVRx program. We also collected qualitative data through key informant interviews from different partners involved in the G-FVRx prescription program, as well as with participants in the 2019 G-FVRx cohort to understand participant perspectives on retention and identify strategies to improve retention. Observations were also conducted at two MARTA market locations.

Sample size and sampling strategy for qualitative research

We selected key informants from the partner organizations who understood the program well and had participated in at least one round of program implementation. The partner organizations included Wholesome Wave Georgia, Grady Hospital, Open Hand and Emory and Grady Infectious disease program. To ensure representation of all the partner organizations implementing the G-FVRx prescription program, we selected at least one representative from each organization to be involved in the interviews. We interviewed a total (n=8) key informants with a range of specialties and participation levels in the program. Key informants interviewed included social workers, registered dietitians, nutritionists, managers, and administrators. We applied purposive sampling to identify seventeen 2019 G-FVRX participants who graduated the program for in depth interviews.

Recruitment of interviewees

Key informant interviews were conducted between February and March 2020, while participant interviews were conducted between May and June 2020. One week before the scheduled interview time, key informants were contacted via email and participants were called and asked if they were willing to be interviewed. Prior to the interview time, follow up calls were made to key informants and participants to confirm the interviews. While all

interviews were initially planned to be conducted in person, due to the COVID-19 pandemic, some interviews were conducted virtually after consultation with the key informants. Furthermore, all participant interviews were conducted over the phone in compliance with current social distancing guidelines. Some interviews also had to be rescheduled due to the disruptions caused by the COVID-19 pandemic. For example, one key informant did not complete her scheduled interview as she stopped working with the organization which she was to represent. She was replaced however, with another key informant within the same organization. Prior to conducting the interviews, verbal consent was provided by all key informants and participants. Moreover, participants who conducted an interview, received a $20 gift card, mailed to their preferred address. Program staff provided a list of participants who were lost to follow-up to be contacted for interviews. For each of these participants, a maximum of three calls were made to invite them to schedule interviews. Due to changed or disconnected numbers, lack of response, or inability to schedule an interview, we were not able to recruit anyone from this participant pool. After expanding criteria to include participants lost to follow-up from previous years' cohorts, the issue remained.

Data collection instrument

Interview guides were developed based on key indicators of interest derived from the 2019 G-FVRx evaluation report, which showed great success in participant retention. Interview questions were reviewed by supervisors who ensured readability and cultural appropriateness. Interview guides included questions which were directed towards understanding the influences of these indicators as well as eliciting perspectives on program impact, strategies to addressing logistic challenges faced by staff and participants as well as the general areas of programmatic improvement, see Appendix A and Appendix B.

Quantitative analysis of determinants of retention

Survey data from the 2018 and 2019 cohorts were collected at enrollment, post Cooking Matters course (6 weeks) and end line (at the end of the 6-month period when participants graduated from the program). At baseline, information regarding participant demographics, food security, fruit and vegetable consumption, eating habits, attitudes and beliefs towards healthy food consumption and confidence in preparing healthy meals was collected. Food security was assessed using the USDA 6-item Household Food Security Survey Module, [58] and fruit and vegetable consumption was assessed using non-quantitative participant recall of all fruits and vegetables consumed

the day before. At midline, the same information was collected excluding demographics, and at end line additional information regarding general health, medication use and purchasing behavior was obtained. This study used baseline enrollment data to assess determinants of retention.

In this program, loss to follow up was defined as a participant not completing 3 or more visits. We explored the following potential factors based on their potential to influence a participant's experience, competing priorities for participation, potential barriers to participation and attitudes towards participation. Such indicators included:

- Cohort clinic site
- Sex
- Age
- BMI
- Hypertension
- Controlled diabetes
- Education level
- Employment status
- Income status
- Food Security Scores
- Enrollment attitudes towards fruits, vegetables, and cooking
- SNAP benefits.
- Transportation methods

Sex and Age variables were included as potential confounders. Age was collapsed into two categories: ≥50 years old and ≤ 49 years old. BMI was collapsed into four categories: Underweight (≤ 18.5 kg/m2), normal weight (18.5 to 24.9 kg/m2), overweight (25.0 to 29.9 kg/m2), and obesity (≥ 30 kg/m2). High blood pressure was defined as 130/85 mm Hg or greater. Diabetes was defined by HBa1c greater than or equal to 6.5%. Education, employment, and income status variables were included due to prior research suggesting that low education attainment and low income may have a greater impact on one's ability to participate in nutritional programs thus creating barriers to completion. [84] Employment was collapsed into 4 categories: fulltime, retired, not working, on disability/other. Education was collapsed into 3 categories: high school or less, some college/technical school and 4 years of college/or more. Food security scores, program enrollment participant attitudes towards fruits, vegetables and cooking and SNAP benefits variables were included due to a large percentage of the target population classified as having low or exceptionally low food insecurity as well as being SNAP recipients. The food security scores based on responses to the USDA 6-item Household Food Security Survey Module (HFSSM), [58] and reflected the

past 1-month experience. Using methods outlined by the USDA we categorized participants into high / marginal food security, low food security and very low food security. Enrollment attitudes towards fruits, vegetables and cooking consist of 9 variables where participants respond to whether fruit and vegetables were easy to find and affordable, their willingness to try new foods, whether they like to eat vegetables and fruits, and whether the deem cooking as fun, taking too much time or frustrating. Studies have shown there to be a relationship between food insecurity, dietary patterns, and loss to follow-up. Increasing prevalence of food insecurity has led to interest in addressing it to improve health outcomes. [85, 86] The largest program to combat food insecurity in the US is SNAP, which is reasoning to see its impact in this program's retention success. [85] Transportation variables, including for example use of public transit, paid services, own car or obtaining rides from friends / family were also included.

Data analysis and management

All audio records were downloaded from the recording instrument and uploaded into a password protected folder shared only by the researchers. The recordings were then deleted from the recording instruments after verifying download. Among the key informant interviews, detailed notes were generated from the audio recordings. Additionally, 3 recordings from the key informant interviews were fully transcribed to validate completeness and comprehensiveness of detailed notes. All participant interviews were transcribed verbatim. All transcripts and detailed summaries were de-identified prior to analysis. The team met frequently to discuss evolving themes during the analysis. A matrix was developed to house data from the detailed notes based on the key indicators of interest. Data from the detailed notes were analyzed through common theme generation ensuring that all issues arising related to the key areas of interest were captured. As needed, recordings were used to capture supporting quotes for key themes. The participant transcripts were analyzed using MAXQDA2020. A codebook was developed with deductive themes, which focused on domains addressed in the discussion guide, and inductive themes which emerged from the transcripts, and was used to label the data.

Descriptive analysis of enrollment data included chi-square to assess differences between participants who graduated from the program compared to participants that dropped out (were los to follow up). Bivariate logistic regression was used to assess the associations between enrollment characteristics such as age, sex, education, employment, SNAP enrollment, income level, food security scores, and attitude variables and the odds of graduating from the G-FVRx program. Additionally, multivariate logistic regressions were conducted to further

assess the associations between enrollment characteristics and the odds of graduating from the G-FVRx program after adjusting for age and sex. Variables controlled for in the final model include age, education, SNAP enrollment, food insecurity, employment status, income status and cohort site. Analyses were limited to participants who attended a minimum of 3 sessions and completed baseline and end line surveys. Statistical significance was considered as $p<0.05$. Beta coefficients and 95% confidence intervals are reported for all measures assessed. Statistical analysis was conducted in SAS v.9.4.

Strategies for protection of human right

All participants were verbally consented prior to participating in the interviews. The verbal response was audio recorded. The consent was read to all participants and the interviewers ensured that they understood the consent before proceeding with the interviews. All participants were assured of confidentiality as well as their anonymity during the data collection, processing, and dissemination. In person interviews were conducted in a closed and confidential space which was identified by the help of participants. Because this research is considered a process evaluation and results are specific to the G-FVRX program, this study was deemed exempt from Emory IRB approval. However, additional approvals from Emory IRB and Grady Research Ethics committee were obtained for data collection with participants. Irrespective of approvals, we adhered to ethical guidelines for human subject's research including ensuring appropriateness of materials and informed consent protocols and putting protocols in place to maintain confidentiality, privacy and to ensure respect for participant autonomy.

RESULTS

Participant characteristics

Table 2 describes the descriptive characteristics of those who were lost to follow up compared to those that graduated from the program. A majority of participants within the program were female (70.1%), 50 years or older (74.2%), had a high school diploma/GED (36.8%), food insecure (60.7%), had an annual income of less than 25,000 (89.0%) and were obese (74.9%). Race/ethnicity was homogenous with 93.19% of the participants being Black/African American.

There was significant difference in the cohort clinic site distribution (P=0.007) between those who were lost to follow-up and those who graduated. Amongst those who were lost to follow-up, 37.5% were from the Grady Infectious Disease Program (IDP) clinic while 12.5% were from the Asa Yancy clinic. Among those who graduated, the majority of the participants attended Grady's Diabetes center, Asa Yancy or Primary Care Center (PCC), while fewer attended IDP. We found a significant difference in the age (P=0.001). Amongst those who graduated, there was a higher proportion of participants who were 50 years and older (77.2%) compared to those who were lost to follow-up (54.1%). We found a significant difference in BMI (P= 0.037) between those who graduated and those who did not. There was a higher prevalence of obesity amongst graduates (76.9%) compared to those who were lost to follow-up (62.5%). We found a significant difference in the baseline food security categorical score (P=0.024) between those who graduated and those who did not. Among those who graduated, there was a higher proportion of participants classified as having "high or marginal food security" (41.5 %) compared to those who were lost to follow up (25.6%). There were no significant differences in the distribution of race, employment, education, income, SNAP, food insecurity dichotomous score, enrollment attitudes towards fruits, vegetables, and cooking, hypertension, and controlled diabetes between those who graduated and those who were lost to follow up. However, regarding the food insecurity dichotomous score, there was a higher distribution of food insecure participants among those who were loss to follow up in when compared to graduates (74.4% vs 58.5%). In addition, while not significant, among those who were graduated, there was a higher proportion of participants who stated that they "always" liked fruits and vegetables, food was "always" easy to find in their neighborhood, and cooking was "always' fun and "never" frustrating. There was also a higher proportion of those who used MARTA as their main form of transportation in the group that was lost to follow-up compared to those who graduated at, 41.67% and 32.16% respectively. However, these differences were not statistically significantly.

Indicators of loss to follow up.

Bivariate logistic regression models were used to describe indicators associated with loss to follow up (Table 3). Participants 50 years and older had 65% lower odds of loss to follow up compared to participants 49 and younger (OR: 0.35, 95% CI: 0.170 - 0.706, P=0.004). Regarding cohort clinic sites, participants at Asa Yancey (OR: 0.21, 95% CI: 0.071 - 0.635), Diabetes (OR: 0.36, 95% CI: 0.150 - 0.869), and PCC (OR: 0.25, 95% CI:

0.094 - 0.674) had lower odds of loss to follow up compared to IDP. We observed no differences in loss to follow up between the East Point clinic and IDP. The baseline food security category score was also significantly associated with loss to follow up. Participants with "very low" food security had over 3 times the odds of loss to follow up when compared to those with "high or marginal" food security (OR: 3.32, CL:1.345 - 8.169, P=0.009). We observed no difference between "low" food security and "high or marginal" food security. Lower BMI at enrollment was also associated with loss to follow up (P=0.057). Compared to being normal weight having Obese was protective from being lost to follow-up (OR=0.24, CI 95%= 0.074 - 0.763, P=0.016). The results also showed that having hypertension or controlled diabetes was protective against drop out. Participants who were retired or on disability when compared to those working full time had increased odds of loss to follow up although not significant. Participants who believed that food was "always" easy to find in their communities, "always" willing to try new foods, "always" liked fruits and vegetables had decreased odds of loss to follow up although not significant. Lastly, although not significant, driving your own car and using other forms of transportation were shown to decrease the odds of loss to follow up when compared to MARTA as the main means for transportation.

Multivariate logistic regression models were used to describe the indicators associated with loss to follow up after adjusting for age and sex (Table 4). After adjusting for sex and age, participants at Asa Yancey (OR: 0. 0.23, 95% CI: 0.067 - 0.796), and PCC (OR: 0.34, 95% CI: 0.119 - 0.994) had lower odds of loss to follow up compared to IDP. Though not statistically significant in adjusted models, those who were retired or on disability, those with some college, those with higher annual income and those who had high / marginal food security exhibited lower risk of loss to follow (table 4). BMI, chronic disease status, SNAP enrollment, attitudinal variables, transportation, were not significantly associated with loss to follow up after age and sex adjustment.

Qualitative Analysis

When considering the sustainability within the G-FVRx program, the goal is for future developments to ensure effective implementation and improve recruitment and retention strategies to positively impact beneficiaries. The problem of program participants who are loss to follow up is an extraordinarily complex issue which not only involves programmatic components but more importantly individual factors. To support the quantitative findings reviewing variables that may have predicted whether a participant decided to remain in the

program or drop out, qualitative research was conducted to elicit perspectives and best practices on program retention. Key informant interviews were comprised of staff members who varied in positions within the G-FVRx program. Program participants who completed interviews were mostly middle-aged (mean: 58.7 years) African American (100%) and both male and female, 41% and 58 % respectively. Lastly, 47% of the program participants who were interviewed were classified as food insecure. These characteristics of participants in the interview sample largely mirrored the sociodemographic characteristics of the overall group of G-FVRx participants. In this section, *key informants* include the program staff such as instructors, registered dietitians (RD), administrators, and managers who we interviewed during this process. *Participants* refer to the 2019 program beneficiaries who graduated the program and peer champions who refer to ambassadors of the G-FVRx program who completed the program previously and assist current participants.

In key informant and participant interviews, several themes were highlighted as playing a role in program retention. Table 5 outlines themes identified from the interviews, including: (1) patient centered approach, (2) social support, (3) challenges to program implementation, (4) external barriers, and (5) recommendation and programmatic improvements. These themes focused on influences of high retention rates such as support groups and participant interactions and administrative and participant challenges such as the lack of diversity among staff members, high demand at MARTA markets, and program unsustainability.

Patient Centered Approach

Over several years there have been many adaptations to the implementation process of the G-FVRx program that have led to its success. A major change discussed by key informants was the utilization of RDs to teach Eat Well Live Well classes rather than Medica Doctors or residents. This was noted as one positive change to help engage participants because RDs are educated specifically to talk about nutrition and creating diet plans for individuals who are food insecure or have chronic health conditions. Involving RDs helped to build rapport with participants which led to increased trust in the program and furthermore potentially increasing the retention. Each RD became responsible for their own cohort of participants as well as the topics they implemented which included discussion on food portions, exercising, gardening and herb uses, holiday eating, and alternative ways of eating such as vegetarian, plant base, vegan etc.

Under this model, program components became individualized, and significant attempts were made to tailor interventions specifically to the participants needs, concerns, beliefs, preferences, and values. A patient-centered approach enabled participants to play an active role in their own health management and in the decision-making process regarding their daily diets and nutrition goals. This has been an important theme for the success of the G-FVRx program where both key informants and participants describe the many impactful processes that helped influence program engagement and retention. Several strategies were employed to enhance the patient centered approach and are described below.

Staff-Participant Interaction

It was discussed by the key informants that doing general checkups on participants such as calling or emailing helped to ensure that they understood the program and what they were getting into daily. RD noted that attending Cooking Matters classes and accompanying participants through the prescription redemption process helped to build a stronger relationship and encouraged interaction.

> *"I am generally interested in them and um, how they are doing so every time they come I always give them a praise up and tell them thank you for showing up for yourself because they are not showing up for me they are doing it for themselves. And if I notice like hey, like someone hasn't been coming then making sure to call him and say like hey what is going on and um, a lot of our dietitians are really good about that…our patients [participants] really know that we care a lot about them and I think because of that, um, they are more invested in it" ~ RD.*

A peer champion which is defined by one key informant as "a person who had graduated from the program previously" discussed their efforts along with staff members to conduct reminder or check in calls with participants to keep them updated and to remind them of the program.

> *"We have to remind people by calling each person and in most instances, texts are very beneficial as well. Of course, they have their materials that's given to them at the beginning of class. They're given a schedule for the entire year, but I don't think that staff should only give that to them and expect for them to just remember, just based off of that, I definitely think that it's important for staff to go out of their way to try to – well, not only verbally remind them every time, but also when the program isn't actively going on, when they're not actually in class to send reminders. that's definitely very important, because some people are really busy, and others are just really forgetful." ~ Participant*

As mentioned, program staff and participants interaction are strongly associated with building sustainable relationships which is vital to the success of programs such as G-FVRx as it fosters increased motivation and encouragement. Participants also described the importance of the interactions that they had with various staff within the program.

"[staff member] is such a good person and she calls you and she checks on you. I mean and she's always looking out for you as far as trying to get different things for you. They did a real good job. She did a really good job." ~ Participant

Flexibility and Fault Tolerance

One positive aspect of the implementation of the G-FVRx program that was cited multiple times was the idea of being flexible and working with the participants by meeting them where there were mentally, physically and emotionally. The idea of "fault tolerance" was newly integrated into how flexible and accommodating staff could be. The understanding that "life happens" and that flexibility was part of the reason why the retention rate was so high. There were complications that arose for many different participants, but with added flexibility and fault tolerance, the key informants found this helped improve retention.

"*I have had people who have gotten jobs, I have had people who maybe get sick, you know we still kind of found a way. Like hey, let's do individual sessions with you, let's see what we can do to make this work." ~ Instructor.*

Familiarity with foods

While discussing the "Cooking Matters" courses, the concept of participants familiarity with foods were expressed. Many key informants discussed ways the programs attempted to promote healthy foods effectively and ethically while still trying to factor in participants' cultural preferences. Key informants discussed not trying to change or discourage participants from eating the cultural foods they like while also introducing them to new types of food in the program.

"Because it's not about forcing someone to try kale who's never had kale before. Like if you like your collard greens, then instead of using a fat base let's try a turkey base. So using something that you're familiar with and changing it to give you a health benefit." ~RD

Based on some perspectives, there may have been some aversion by participants towards certain foods as well as an inability to relate to some of the foods in the recipes taught in the Cooking Matters courses. Due to the fact that RD's in each clinic taught the same content but tailored it to reach their specific audience, each "Cooking Matters" class was therefore taught differently, there was not one clear way to incorporate culturally relevant foods into the recipe curriculum. However, the consideration to include foods that participants were comfortable with was heavily weighed.

"...I try literally to listen a lot to them.... yeah where you grow up under cultural competence really plays a key because we have some dietitians who will say like "yeah you should like start eating quinoa like not this is not the patient [participant] population that you should start talking about quinoa you gonna lose your patients that way when they think that you just want then to come eat "white people's food" ~ RD.

Familiarity of foods was also a theme among the participants. They expressed gratitude for healthy eating skills and tools which have influenced their behaviors. With participants expressing *"I've learned lot of different vegetables, about different vegetables that I didn't eat before."* However, some participants also described the absence of the addition of spices and herbs that are prevalent in their daily lives in the Cooking Matters classes as well as alternatives to some greens. Different aspects of the program can continue to benefit from utilizing some more cultural foods that participants are familiar with and eat frequently.

"... I just usually just put a little, you know, spice and flavor in mine, and that was something that I noticed was missing in the group. I added some chives to it, and to add some parsley, add some thyme, add, you know, a little basil here, add, you know, not just to add it for appearance or flavor, but its nutrition value as well. turmeric was an anti-inflammatory. You know, thyme. Thyme I think is an anti-histamine or good for sinuses, nasal – and different things like that I think should be incorporated, because even though we – it's focused on fruits and vegetables, the herbs and spices are an extension of that." ~ Participant

<u>Individualized retention strategies</u>

Key informants employed different innovative approaches to ensure retention of their participants in the program for its duration. These strategies ranged from conducting the Eat Well Live Well classes on the same day as the cooking classes, incorporating the participant's own recipes into the cooking demonstrations to devising ways in which participants would consistently collect the produce from the MARTA market.

"So, I came up with this plan and somebody called it loving logic, or they call it the other way. So, here is the plan, closer to I think we had 3 sessions left, I said I will be giving out every week, every month these prescriptions, right. I said today, I am gonna give them to the people who have been consistently using them, other people, it is optional for you." ~ Instructor.

Social Support

Another theme discussed that played a role in influencing retention was social support. This was described as happening as a result of earlier program adaptations and has become increasingly important in maintaining engagement and changing participant behaviors. As demonstrated above, participant interaction is a direct motivator of social support but has a program specific scope whereas social support refers to this event happening beyond the confines of the program.

Support from Instructors

In utilizing a more "patient centered approach", instructors noted their commitment to supporting and prioritizing the participant's needs which they believe had an influence on the retention rate. This led to having a strong relationship and ongoing rapport between program staff and participants beyond the program which was a large aspect of continued engagement. In doing so, instructors provided emotional and technical support to participants.

> *"The fact that they saw me at the farmers- MARTA market...I had an ongoing relationship with them for 6 months, it wasn't just for the first 6 weeks." ~ RD.*

Participants also brought unique and important perspectives describing what was conducive to their ability to succeed during and after the program. They described in depth the various factors such as motivation and guidance that were present within the relationships they formed with their instructors and expressed that this support was a reason for their knowledge about the programs and decisions to engage.

> "*when she came to me initially, I had made up in my mind, I said well that is going to be my goal is to lose this weight and to get off these medications. That was my goal for 2020. That's my goal….I was there at the clinic for an appointment, and she approached me, and she was like well, I want to invite, and it's just oh my God, she made me cry because I didn't expect it. So I didn't even know how I was going to start my goal." ~ Participant.*

Peer Champions

Incorporating peer champions also contributed to the high retention rate through their involvement in offering mentorship to the participants as well as helping the instructors with activities like providing clarity on questions, taking attendance and other hands-on work during the sessions.

> *"They give encouragement and support and can lead the class if I am not there, like if I am doing something else, then he can do that, then he can sometimes fill out time, preview if the biometrics was done, anything that happens, it is a good place." ~ Instructor*

One peer champion who was a graduate of the 2019 cohort described their role and how it has benefitted the participants but also themselves as they reflect on the program.

> *"I definitely think that the relationship development aspect was very powerful, and it was definitely very, very clear. I could see it even clearer as a peer champion." ~ Participant*

Support groups

One of the most cited benefits of the G-FVRx program were the small group design of the Eat Well, Live Well and Cooking Matters classes. It offered a sense of social support for participants which extended beyond the clinic at times and was not restricted to participants in the same cohort.

> "*Organically our participants were attracted to one another, they kind of created small groups and exercised together outside of classes and shopped together," ~* RD.

These observations were cited by the RD's to recommend support groups being included in future iterations of the G-FVRx program more formally. Allowing participants to connect with each other increased support, which then improved retention in the program. The ability for participants to build connections with each other was an unexpected outcome and Key informants said that the programs helped them to recognize that they were not alone.

> *"They're generally going through the same thing, so they connect better...participants really enjoy the social support, and it continues after the program. We didn't intend to see that." ~ RD.*

Some key informants have identified generating greater social connection as a goal. It was noted that social interaction and connecting participants with each other through activities might benefit them. Social interaction was seen as an opportunity to enable participants to have an exchange of ideas, facilitate adherence and improve self-care.

> *"It's been received wonderfully. The participants really enjoy it like the sessions are very interactive and they get a lot of support with all of the other participants. They go shopping together to redeem their vouchers. Outside of the education they receive, it's like a support group of people who go through the same challenges." ~ RD.*

Participants directly describe their relationships with others in the program and how it helped minimize stress and provide encouragement to continue the program.

> *"I got to meet some new friends, some good lasting friends that we still keep in contact with. It helped me to even improve my diets that I thought I had known all of it, you know, because I was like, okay, I'll just go ahead and do this. There's nothing that I'm going to learn, but I was wrong. I learned quite a bit. So I am so thankful for it, and I'm so thankful for the friendships." ~ Participant*

Challenges to Program Implementation

Participant literacy, support, motivation, involvement, efficacy, emotional well-being, and access to resources has played an important role in the success, adaptation, and sustainability of the program. The program has been successful adapting to a more "patient centered approach" and providing greater opportunities to enhance

social support subsequently increasing retention rates. However, important unforeseeable and unavoidable challenges have affected both the staff and participants, in some cases making it difficult for the participants to access the full benefits of the program.

Instructor Challenges

One aspect that was mentioned by a variety of key informants was the fact that the program was a large time commitment, with some instructors and RDs feeling "stretched thin." This program tends to be an additional commitment on top of their normal job responsibilities. Staff mentioned that they only had limited amount of time to get through all the components of the program with their participants. The increased number of cohorts also resulted in less time for the program staff to work with each of the participants on nutrition education. In 2019, the program operated with 7 cohorts, was increased from the 5 cohorts that were enrolled in previous years.

> *"have to spend about 6-8 hours a week on top of what I already do for this program...don't get me wrong, we love doing this, but time is a big factor." ~ RD.*

Language was a barrier between participants and program staff as well, especially within the Spanish speaking population. The program was focused on an English-speaking population as opposed to those speaking other languages. Lack of space was also a recurring challenge for staff being that it can impact the number of participants who can participate in the program. Additionally, there often needed to be a separate location for classes due to lack of space,

> "*the challenges are more of finding space to do it because we can't cook at [the hospital], so we have to find space in the community." ~ Instructor.*

The idea of lack of space was also echoed by a participant as program factor that needed to be addressed for future programs.

> *"The space, yeah, needs to be a little bigger, because sometimes we might have not –where we had it, we didn't have enough room. ~Participant*

Participant challenges

Key informants also detailed certain challenges they heard from participants regarding the program. Given that the G-FVRx program requires a 6-month commitment and classes are held during the day, it was especially challenging for those participants working jobs during traditional working hours.

> *"we also need you to go to the MARTA market at least once a month or...four times a month and then with cooking matters the way it works is the first two months, you are here every week once a week...then after that we see you once a month, right, that is a big time commitment."* ~Instructor

Transportation and financial constraints were also challenges that arose multiple times during the interview process. As a way to help alleviate this barrier, carpools and shuttles were arranged to help transport people from clinic sites to the Cooking Matters classes. Additionally, the program has *"funding to provide them with MARTA cards so they got 2 MARTA cards every month"* in order to make getting to the MARTA markets more accessible for program participants.

Among participants, many of them addressed several challenges they faced that were also echoed by the key informants. Although many participants express their beliefs on the importance of the G-FVRx program and shared overwhelming appreciation, many of them also indicated that reasons for missed sessions and nonattendance was due to scheduling conflicts and transportation barriers which inevitably increased their inability to fully benefit from the program.

> *"Like I was so upset (laughs) when I realized I had to miss a class because my work schedule actually started when – And I couldn't. So finally, when they gave us the class schedule for the month or whatever I was would just go in and I looked at it, and I told my employer, okay, I have to come in late this day." ~ Participant*

Participants also expressed concerns with the implementation of the program, specifically with having issues navigating the prescription vouchers. Some participants indicated that the system was not easy to comprehend for everyone and that it limited their access to produce. This is themed as challenge to redemption rates which could affect retention.

> *"Oh, you've got to use them within time too. You have to use them within that date. You can't wait until the following month and still have – I mean, with the tokens you can, but once you have the voucher you've got to use it within a certain time." ~ Participant*

<u>Lack of Diversity</u>

Cultural relevance is a critical component in program implementation. Key informants agreed that cultural relevant components contribute to successful uptake of any program. Some of the factors that they referenced were the diversity of implementers, familiarity of food and knowledge dissemination. Although the program was tailored to the participants needs, it was noted that the values, beliefs, racial diversity amongst key informants was one of the important considerations mentioned to address in order to enhance program uptake and retention given that beneficiaries of the program were from diverse racial backgrounds. Key informants indicated there may be difficulties experienced and it is important to incorporate diverse racial representation and the views of the

participants to enhance the feeling of belonging and indicate appreciation for the effort they were putting into the program.

> *"Having staff who are similar to patients [participants] helps a lot. It adds integrity, it adds, you know, a sense of this is not me as a Caucasian that I am trying to tell you to. We are trying to be evidence based, and when they hear that from people like them, I feel like it takes it a step further" ~ Administrator.*

> *"Open hand does our program and I never thought of the fact that none of the RDs are black or people of color." ~ Instructor.*

Although there have been several challenges noted, the program retention was not impacted which meant that the strengths of the program such as patient centered approach, social support, staff flexibility and other program strategies have been working effectively to retain participants. However, some of the internal challenges such as time constraints, lack of space, underrepresentation can be mitigated, and the program staff recognizes that they need to remain committed by concentrating efforts on the development of more comprehensive and integrated strategies to continue to improve the program outcomes. These challenges must be taken into consideration as factors that can negatively influence characteristics of the intervention although the retention rates are high. Addressing these challenges will help to spark innovative and transformative components that could positively impact the retention of future programs.

External Barriers

In addition to internal challenges, organizational structure and external barriers were mentioned by key informants in a broader context as factors that influenced the program's success.

Administrative Challenges

Working within a large health system such as Grady may present challenges. The G-FVRx program is considered a smaller program and did not always receive adequate attention from program administration. It was noted by several staff that navigating a small program within a large hospital system was at times difficult. Other challenges included purchasing MARTA tickets and the logistics of getting the tickets distributed to participants.

> "*it's difficult to navigate Grady for legal matters and purchase orders...we're so big but this program is so small so sometimes we don't get the attention that we always want*." ~ *Program manager.*

Communication and Collaboration

With numerous stakeholders involved in the G-FVRx program, communication is necessary to ensure seamless program implementation. E-mail and phone calls were the most common method of communication between stakeholders. Communication from Open Hand was also done mainly through e-mail to communicate logistical information about Cooking Matters classes. More informal communication was also a major part of the strategy, with RDs texting one another to provide updates on the classes and participant attendance at the markets. The entire G-FVRx staff strived to present themselves *"as a unified team...we weren't like two separate programs so that really helped" ~ Instructor.*

Wholesome Wave Georgia (WWG) maintained communication with the lead RDs for each cohort on a weekly basis. This space allowed for RDs to provide any feedback about the program and identify future areas for improvement. Aside from check-ins with the RDs, WWG aimed to have Open Hand, Common Market and Grady staff on the same call or in the same room on a bimonthly basis. A site plan was created by WWG in collaboration with these stakeholders yearly in order to organize implementation of the program. However, communication challenges with WWG also existed due to leadership changes in recent years. The Executive Director changed twice in two years which negatively impacted WWG communication.

> *"Direction of organization was sometimes shifting, and it wasn't clear to the partners...establishing a relationship is hard when people come and go," ~ RD.*

Program Budgeting was another integral component of the program ensuring that the resources were provided and used not only efficiently but effectively to achieve the specific objectives. Key informants discuss their frustrations with conflict of interest, and expectations but being limited to due budget delays.

> "*This year because of our success, they wanted to keep seven but because the budget hasn't been approved yet, and this is the time we are supposed to be starting, we are like we don't have the ability to do 7 in the timeframe you are giving us so we gonna reduce it back down to 5," ~ RD.*

<u>Effects on Health</u>

G-FVRx helps provide low-income participants, often with chronic health conditions, with access to affordable, nutritious foods while promoting better health. Therefore, the effect of the program on the health of the participants is of interest. These participants have daily challenges due to their health conditions which plays a role in how they attend and engage. It is unclear to what extent program retention rates are associated with

participant chronic health conditions. However, patterns emerged which indicated that poor health led to a greater risk of participant drop out.

> *"One big reason for high dropouts is because the underlying health concerns become too much because, you know, they're either admitted to the hospital for something major and literally cannot continue with the program" – Administrator.*

High Demands at MARTA Markets

MARTA markets represent one of the food sources for fresh fruits and vegetables at which participants could redeem their prescriptions. There are five locations placed within MARTA stations in the Atlanta area (Bankhead, West End, Five Points, College Park, and H.E. Holmes). Each market operates one-day per week where participants were expected to redeem their vouchers for fresh fruits and vegetables from one of the markets closest to them. Due to the large populations served by these markets, key informants felt that there was a need to expand the outlet markets. It was noted that markets would run out of produce which led to participants not being able to redeem their vouchers.

> *"you had the risk of challenges of running out of produce at the beginning because basically we had such high participation and retention rate, but the market was not prepared. Um, so there would be days where they would run out of food and people would come early, people would come at 3 when it opens because they knew they would run out." ~ RD.*

Another challenge that arose multiple times was the treatment of participants in the program at the MARTA markets. Those using G-FVRx prescriptions were sometimes separated from other MARTA market users during the checkout process.

> *"there is also like a stigma where it's like if you had a prescription, you kind have got to wait in this line, whereas if you had cash or credit card or whatever and you weren't a part of the program…. the patients [participants] thought they got a special treatment." ~ Instructor.*

Market demands was also a theme among participants as they described the challenges they faced during their visits and how this impacted their access to produce. It was common that markets either ran out of food, had spoiled foods, or was overly crowded.

> *"There were moments and experiences where some markets I went to they had stuff and some of the stuff were either spoiled, not in the best condition, or had damage from riding in a hot vehicle to where they were for – they just were sold out" ~ Participant*

As mentioned previously, there have been many positive adaptations to get the program to where it is today. There have been efforts over the last several years to increase communication between administration and external partners to help further drive participant engagement. All these challenges directly affect the participants

just as internal challenges and may be avoidable in the future with more stability in leadership and more effective program design and management.

Recommendations and Programmatic Improvements

While the patient centered approach and other innovative strategies work effectively and retention has increased in recent years, many challenges still occurred throughout the program. In the effort to continue to strengthen the program, there were recommendations provided by the key informants and participants to support future cohorts. These recommendations targeted improvement at the program level as well as the participant level.

Recommendation for retention

Program specific recommendations included planning before the program is rolled out, extension of the recruitment period as well as continued support from partnerships. Individual targeted recommendations included provision of incentives like gift cards to well performing participants and increasing the transportation budget.

> *"Like a gift card, even if it is like 10 dollars, that would be amazing. Even if you know, every time you showed up you get this gift card, I am kind of a person who doesn't like to incentivize everything we are doing in the program but just a supplement, it would be great." ~ Instructor*

Several participants also provided some recommendations from expanding the program to weekends, helping those who have schedule conflicts, to increasing "accountability buddies" such as peer champions ensuring support and encouragement. Participants provided innovative ways to help alleviate burdens and challenges which can increase participation and better sustain retention.

> *"I think some of the people had commitment issues just in general, and something that I believe that if [inaudible 15:48] was an accountability partner. I know we – that's something that we lightly suggest, but maybe in the future we could heavily recommend that, and because you know, the – usually the participants [patient] all have at least a few things in common, and some of them know each other. So if you have that peer who is able to check up on you, who is also a part of the program or who has been through the program, then I definitely believe that that would help people stay in the program."~ Participant*

Partnering with grocery stores

Key informants agreed that working with local farmers through the MARTA markets have benefits such as fostering the connection between local farmers and participants, which not only supports the livelihoods of farmers, but also ensures that participants have access to healthy foods to control their underlying medical conditions. However, a potential change to the G-FVRx program that was suggested was greater collaboration with local grocery stores due to the participant familiarity.

"I do wish that we used grocery stores because our participants are more used to them……. The MARTA markets helped our participants get connected with local produce which you know we talk about the importance of good nutrition but also supporting local farmers so they can continue to provide us with nutritious food. So, it's still a bit of a give and take there," ~ RD.

Program sustainability

Sustainability of the program can be viewed through two separate lenses: sustainability of behavior changes and sustainability of program activities. It remains unclear as to the sustainability of behaviors, which will become much clearer once follow up data and observations of participants in future can be obtained. The sustainability of program activities will be dependent on funding and cooperation from WWG. The program staff are optimistic that funding will continue but expressed that the situation will change year by year. Although it was noted that the common determinant of program sustainability will be funding.

Participants also describe their idea of sustainability based on both lenses. Many participants described the benefits of the program and how it impacted their eating and shopping habits, better management of health issues and personal relationships with others.

"It was good. It was very educational for me and stuff like that. I lost a couple of pounds, and it taught me how to eat a lot of vegetables and stay positive and stuff" ~ Participant.

Other participants discussed their inability to continue to eat healthy after the program due to financial burdens and lack of resources. Although the program is not designed to change one's financial status, it still impacts the effectiveness in terms of improving accessibility and affordability of produce consistently. Participants expressed feeling limited in their ability to eat healthy once the program ended, largely because of cost and affordability.

"once we completed the program, you really have no resources to, you know, you can't come back to the program. So it kind of puts you back in the same situation you were in before." ~ Participant

TABLES

Table 1: Retention Rate Across Clinic Sites in 2019

Site	Enrolled	Graduated	Endline Surveys Collected	Retention rate	Survey completion rate
Asa Yancey	27	26	24	96.0	88.9
Diabetes 1	24	20	20	83.0	83.3
Diabetes 2	24	22	20	92.0	83.3
East Point	24	22	22	92.0	91.2
IDP	22	19	19	86.0	86.4
PCC 1	26	24	23	92.0	88.5
PCC 2	26	23	23	88.0	88.5
Total	173	156	151	90.0	87.3

Table 2: Descriptive Characteristics of the 2018 and 2019 G-FVRx Participants by Graduation Status

Table 1: Descriptive Characteristic % (N) ***HbA1c was only collected from participants attending the Diabetes Clinic.** **** Transportation data was only collected from the 2018 cohort**	**Full Sample % (N=288)**	**Loss to Follow Up % (N=40)**	**Graduates % (N= 248)**	**Chi-square p-value**
Cohort clinic site				**0.007**
IDP	17.4 (50)	37.5 (15)	14.1 (35)	
Asa Yancey	20.8 (60)	12.5 (5)	22.2 (55)	
Diabetes	28.5 (82)	27.5 (11)	28.6 (71)	
PCC	25.0 (72)	17.5 (7)	26.2 (65)	
East Point	8.3 (24)	5 (2)	8.9 (22)	
Age				**0.001**
<18	0.4 (1)	2.7 (1)	0.0	
18-29	2.5 (7)	5.4 (2)	2.1 (5)	
30-39	6.5 (18)	13.5 (5)	5.4 (13)	
40-49	16.5 (46)	24.3 (9)	15.3 (37)	
50-59	41.2 (115)	32.4 (12)	42.6 (103)	
60+	33.0 (92)	21.6 (8)	34.7 (84)	
Sex				0.381
Female	70.1 (199)	64.1 (25)	71.0 (174)	
Male	29.9 (85)	35.9 (14)	29.0 (71)	
Race				0.446
Black/AA	93.2 (260)	92.1 (35)	93.4 (225)	
White/Caucasian	2.2 (6)	5.3 (2)	1.7 (4)	
Hispanic/Latino	1.4 (4)	0.0	1.7 (4)	
Other	3.2 (9)	2.6 (1)	3.3 (8)	
BMI				**0.037**
Underweight	2.1 (6)	5.0 (2)	1.6 (4)	
Normal weight	4.9 (14)	12.5 (5)	2.6 (9)	
Overweight	18.1 (52)	20.0 (8)	17.8 (44)	
Obese	74.9 (215)	62.5 (25)	76.9 (190)	
Hypertension				0.452
Yes	37.9 (109)	32.5 (13)	38.7 (98)	
No	62.2 (179)	67.5 (27)	61.3 (152)	
***HbA1c >= 6.5%**				0.235
Yes	59.1 (68)	47.6 (10)	61.7 (58)	
No	40.9 (47)	52.4 (11)	38.3 (36)	
Education				0.745
<HS degree	14.3 (40)	21.1 (8)	13.2 (32)	
HS or GED	36.8 (103)	31.6 (12)	37.6 (91)	

Two-year college or tech degree	25.7 (72)	23.7 (9)	26.0 (63)	
Some college but not graduate	13.9 (39)	15.8 (6)	13.6 (33)	
College degree	7.5 (21)	7.9 (3)	7.4 (18)	
More than college degree	1.8 (5)	0	2.1 (5)	
Employment				0.655
Working full-time	6.4 (11)	6.3 (1)	6.4 (10)	
Working part-time	11.6 (20)	0.0	12.8 (20)	
Retired	28.5 (49)	37.5 (6)	27.6 (43)	
Student	0.6 (1)	0.0	0.6 (1)	
Not employed/Homemaker	9.9 (17)	6.3 (1)	10.3 (16)	
On Disability	39.0 (67)	50.0 (8)	37.8 (59)	
Other	4.1 (7)	0	4.5 (7)	
Income				0.928
<25k	89.0 (242)	89.5 (34)	88.9 (208)	
25-35k	7.4 (20)	7.9 (3)	7.3 (17)	
>35k	3.7 (10)	2.6 (1)	3.9 (9)	
SNAP Benefits				0.600
Not receiving	44.5 (77)	50.0 (8)	44.0 (69)	
Receiving	55.5 (96)	50.0 (8)	56.1 (88)	
Baseline Food Security Categorical				**0.024**
High or Marginal Food Security	39.3 (112)	25.6 (10)	41.5 (102)	
Low Food Security	42.1 (120)	41.0 (16)	42.3 (104)	
Very Low Food Security	18.6 (53)	33.3 (13)	16.3 (40)	
Baseline Food security dichotomous				0.060
Not Food Insecure	39.3 (112)	25.6 (10)	41.5 (102)	
Food Insecure	60.7 (173)	74.4 (29)	58.5 (144)	
Attitudes Variables				
Foods easy to find				0.634
Never	30.2 (84)	35.1 (13)	29.5 (71)	
Sometimes	21.6 (60)	16.2 (6)	22.4 (54)	
Always	48.2 (134)	48.7 (18)	48.1 (116)	
Food affordability				0.076
Never	14.3 (40)	13.5 (5)	14.4 (35)	
Sometimes	45.4 (127)	29.7 (11)	47.7 (116)	
Always	40.4 (113)	56.8 (21)	37.9 (92)	
Try new foods				0.363
Never	28.2 (79)	37.8 (14)	26.8 (65)	
Sometimes	36.4 (102)	29.7 (11)	37.5 (91)	
Always	35.4 (99)	32.4 (12)	35.8 (87)	
Like fruits				0.308
Never	32.4 (91)	40.5 (15)	31.1 (76)	

Sometimes	11.7 (33)	5.4 (2)	12.7 (31)	
Always	55.9 (157)	54.1 (20)	56.2 (137)	
Like vegetables				0.083
Never	36.3 (102)	46.0 (17)	34.8 (85)	
Sometimes	12.1 (34)	18.9 (7)	11.1 (27)	
Always	51.6 (145)	35.1 (13)	54.1 (132)	
Cooking is fun				0.296
Never	24.0 (67)	33.3 (12)	22.6 (55)	
Sometimes	27.2 (76)	19.4 (7)	28.4 (69)	
Always	48.8 (136)	47.2 (17)	49.0 (119)	
Cooking too much work				0.524
Never	34.8 (98)	27.0 (10)	35.9 (88)	
Sometimes	43.3 (122)	46.0 (17)	42.9 (105)	
Always	22.0 (62)	27.0 (10)	21.2 (52)	
Cooking too much time				0.600
Never	30.5 (85)	24.3 (9)	31.4 (76)	
Sometimes	42.7 (119)	43.2 (16)	42.6 (103)	
Always	26.9 (75)	32.4 (12)	26.0 (63)	
Cooking is frustrating				0.325
Never	38.5 (107)	27.8 (10)	40.1 (97)	
Sometimes	40.3 (112)	44.4 (16)	39.8 (96)	
Always	21.2 (59)	27.8 (10)	20.3 (49)	
****Transportation**				0.723
MARTA	36.5 (42)	41.7 (10)	35.2 (32)	
Driving own car	27.0 (31)	20.8 (5)	28.6 (26)	
Other	36.5 (42)	37.5 (9)	36.3 (33)	

Table 3: Bivariate Factors Associated with Loss to Follow-Up Amongst 2018 and 2019 G-FVRx Participants

Table 2: Bivariate Logistic Regressions ***HbA1c was only collected from participants attending the Diabetes Clinic.** ****** **Transportation data was only collected from the 2018 cohort**	**Unadjusted Odds Ratio**	**95% CI**	**P values**
Age (>50 vs. <=49)	**0.35**	**(0.170 - 0.706)**	**0.004**
Sex (Male vs. Female)	1.37	(0.675 - 2.792)	0.382
BMI			**0.057**
Underweight vs Normal weight	0.90	(0.120 - 6.778)	0.919
Overweight vs Normal weight	0.33	(0.087 - 1.234)	0.099
Obese vs Normal weight	0.24	(0.074 - 0.763)	**0.016**
Hypertension			0.453
Yes vs No	0.76	(0.375 - 1.550)	
***HbA1c >= 6.5%**			0.239
Yes vs No	0.56	(0.218 - 1.462)	
Cohort clinic site			**0.012**
(Asa Yancey vs. IDP)	**0.21**	**(0.071 - 0.635)**	**0.006**
(Diabetes vs. IDP)	**0.36**	**(0.150 - 0.869)**	**0.023**
(PCC vs. IDP)	**0.25**	**(0.094 - 0.674)**	**0.006**
(East Point vs. IDP)	0.21	(0.044 - 1.018)	0.053
Employment			0.550
(Retired vs. Working)	4.19	(0.479 - 36.580)	0.196
(Not working vs. Working)	1.77	(0.104 - 30.052)	0.695
(On disability/other vs. Working)	3.64	(0.435 - 30.391)	0.233
Education			0.945
(Some college/technical school vs. HS or less)	0.96	(0.467 - 1.976)	0.914
(4 year or more college or technical degree vs. HS or less)	0.80	(0.220 - 2.922)	0.738
Food Security (Food Insecure vs. Not Food Insecure)	2.05	(0.959 - 4.402)	0.064
Food Security			**0.030**
(Low Food Security vs. High or Marginal Food Security)	1.57	(0.680 - 3.620)	0.291
(Very Low Food Security vs. High or Marginal Food Security)	**3.32**	**(1.345 - 8.169)**	**0.009**
Income			0.929
25-35k vs. <25k	1.08	(0.300 - 3.882)	0.907
>35k vs. <25k	0.68	(0.084 - 5.538)	0.719

SNAP (Not receiving vs. Receiving)	0.78	(0.280 - 2.195)	0.643
Food easy to find			0.637
Sometimes vs. Never	0.61	(0.217 - 1.700)	0.342
Always vs. Never	0.85	(0.392 - 1.834)	0.674
Food affordability			0.084
Sometimes vs. Never	0.66	(0.216 - 2.040)	0.474
Always vs. Never	1.60	(0.559 - 4.567)	0.382
Try new foods			0.369
Sometimes vs. Never	0.56	(0.240 - 1.315)	0.184
Always vs. Never	0.64	(0.278 - 1.476)	0.296
Like Vegetables			0.091
Sometimes vs. Never	1.30	(0.486 - 3.457)	0.604
Always vs. Never	0.49	(0.228 - 1.065)	0.072
Like fruit			0.327
Sometimes vs. Never	0.33	(0.071 - 1.515)	0.153
Always vs. Never	0.74	(0.358 - 1.528)	0.415
Fun to cook			0.304
Sometimes vs. Never	0.47	(0.172 - 1.260)	0.132
Always vs. Never	0.66	(0.293 - 1.465)	0.303
Cooking too much work			0.527
Sometimes vs. Never	1.43	(0.621 - 3.270)	0.404
Always vs. Never	1.69	(0.660 - 4.337)	0.273
Cooking too much time			0.603
Sometimes vs. Never	1.31	(0.550 - 3.126)	0.541
Always vs. Never	1.61	(0.637 - 4.062)	0.315
Cooking is frustrating			0.332
Sometimes vs. Never	1.62	(0.699 - 3.741)	0.262
Always vs. Never	1.98	(0.772 - 5.075)	0.155
****Transportation**			0.725
Driving own car vs. MARTA	0.62	(0.187 - 2.027)	0.425
Other vs. MARTA	0.87	(0.314 - 2.429)	0.794

Table 4: Age and Sex Adjusted Factors Associated with Loss to Follow-Up Amongst 2018 and 2019 G-FVRx Participants

Table 3: Multivariate Logistic Regressions **(controlling for Age, Sex)** ***HbA1c was only collected from participants attending the Diabetes Clinic.** ****** **Transportation data was only collected from the 2018 cohort**	**Adjusted Odds Ratio**	**95% CI**	**P values**
Site			0.143
(Asa Yancey vs. IDP)	**0.23**	**(0.067 - 0.796)**	**0.020**
(Diabetes vs. IDP)	0.49	(0.189 - 1.275)	0.144
(PCC vs. IDP)	**0.34**	**(0.119 - 0.994)**	**0.049**
(East Point vs. IDP)	0.37	(0.068 - 1.947)	0.238
BMI			0.355
Underweight vs Normal weight	0.92	(0.110 - 7.744)	0.941
Overweight vs Normal weight	0.48	(0.110 - 2.102)	0.330
Obese vs Normal weight	0.35	(0.094 - 1.298)	0.116
Hypertension			0.676
Yes vs No	0.86	(0.410 - 1.783)	
***HbA1c >= 6.5%**			
Yes vs No	0.68	(0.237 - 1.933)	0.466
Employment			0.383
(Retired vs. Working)	6.40	(0.648 - 63.271)	0.1121
(Not working vs. Working)	1.98	(0.112 - 34.873)	0.6415
(On disability/other vs. Working)	4.31	(0.501 - 37.077)	0.1832
Education			0.961
(Some college/technical school vs. HS or less)	0.97	(0.454 - 2.061)	0.932
(4 year or more college or technical degree vs. HS or less)	0.83	(0.219 - 3.117)	0.779
Food Security (Food Insecure vs. Not Food Insecure)	1.79	(0.820 - 3.929)	0.144
Food security			0.268
(Low Food Security vs. High or Marginal Food Security)	1.61	(0.690 - 3.773)	0.270
(Very Low Food Security vs. High or Marginal Food Security)	2.19	(0.834 - 5.733)	0.111
Income			0.896
25-35k vs. <25k	1.31	(0.353 - 4.819)	0.690
>35k vs. <25k	0.79	(0.094 - 6.584)	0.825
SNAP (Not receiving vs. Receiving)	0.69	(0.241 - 2.000)	0.499

Food easy to find			0.448
Sometimes vs. Never	0.50	(0.164 - 1.499)	0.214
Always vs. Never	0.89	(0.400 - 1.986)	0.778
Food affordability			0.307
Sometimes vs. Never	0.62	(0.198 - 1.954)	0.417
Always vs. Never	1.17	(0.391 - 3.488)	0.781
Try new foods			0.6685
Sometimes vs. Never	0.67	(0.267 - 1.677)	0.392
Always vs. Never	0.91	(0.369 - 2.249)	0.840
Like Vegetables			0.433
Sometimes vs. Never	1.16	(0.404 - 3.333)	0.782
Always vs. Never	0.64	(0.280 - 1.441)	0.277
Like fruit			0.555
Sometimes vs. Never	0.47	(0.097 - 2.266)	0.346
Always vs. Never	1.09	(0.488 - 2.426)	0.838
Fun to cook			0.438
Sometimes vs. Never	0.53	(0.189 - 1.459)	0.22
Always vs. Never	0.68	(0.293 - 1.562)	0.36
Cooking too much work			0.925
Sometimes vs. Never	1.18	(0.502 - 2.788)	0.701
Always vs. Never	1.07	(0.380 - 3.016)	0.897
Cooking too much time			0.883
Sometimes vs. Never	1.25	(0.515 - 3.026)	0.624
Always vs. Never	1.11	(0.409 - 2.999)	0.840
Cooking is frustrating			0.723
Sometimes vs. Never	1.41	(0.598 - 3.322)	0.433
Always vs. Never	1.34	(0.482 - 3.739)	0.573
****Transportation**			0.883
Driving own car vs. MARTA	0.74	(0.211 - 2.590)	0.636
Other vs. MARTA	0.81	(0.252 - 2.627)	0.731

Table 5: Summary of Key Qualitative Themes

Theme	Code/Sub Theme	Example Quote
Patient Centered Approach		
	Staff-Participant Interaction	*"... as the dietitian you are responsible for like some data entry, um, we lead the nutrition education classes, we will- I reach out to my own patients [participants]. Other cohorts have interns or whoever else reach out and do like patients [participants]calls and reminders and something like that but I do all that personally, um, we are the contact point" ~ RD.*
	Flexibility and Fault Tolerance	*"we were really flexible. Like ooh, you couldn't have made it on this one day; that is fine...come back sometime next week and that is why our retention rate was really high." ~ RD.*
	Familiarity with foods	*"there was one particular group at one meeting that was basically just briefly touched bases on it, but in my opinion I would like to see people learn more about herbs and spices. For example, because it was all about well-being" ~ Participant.*
	Strategy	*"So, I came up with this plan and somebody called it loving logic, or they call it the other way. So, here is the plan, closer to I think we had 3 sessions left, I said I will be giving out every week, every month these prescriptions, right. I said today, I am gonna give them to the people who have been consistently using them, other people, it is optional for you., ..." ~ Instructor.*
Social Support		
	Support from Instructors	*"that kind of engagement and relationship, I think that is critical." ~Administrator*
	Peer Champions	*"They give encouragement and support and can lead the class if I am not there, like if I am doing something else, then he can do that, then he can sometimes fill out time, preview if the biometrics was done, anything that happens, it is a good place." ~ Instructor*
	Support groups	*"One thing that would make them feel more comfortable are their fellow participants who I know, the stronger their connection they have with them, then that's just one more extra thing that will keep them coming back" ~ Participant*
Challenges to program implementation		
	Instructor Challenges	*"I only have a four-hour block for the cooking matters class and for the actual eat well, live well class," ~ Instructor. F*
	Participant challenges	*"Maybe the transportation got to be really hard with people." ~ Participant*
	Lack of Diversity	*"... I have given out articles on eating differently, I have given out articles about black veganism as advocacy because I want them to just understand especially like southern food, how they impact with culture..." ~ Instructor.*
External barriers		
	Administrative Challenges	*"It was cumbersome to try to buy the MARTA tickets...we had to get them at the vendors, then we had to order them, and when they come through here...things just get lost easily, so getting the tickets to the right people...that's a big challenge." ~ Administrator.*
	Communication and Collaboration	*"From Grady, our team, we kind of kind of have meetings, we had meetings once a month just to kind of get everybody in the same page, we are always e-mailing each other about stuff, um, so we have like my director and then we have the community benefits manager, they go to a*

		lot of these meetings and whatever they get they just email us and keep us all looped in," ~ RD.
	Effects on Health	*"Lowest retention rate was present for the diabetes clinic and that might be because of diabetic complications that got them admitted to the ER and the recovery time made them ineligible to graduate from FVRx program" ~ RD.*
	High Demands at MARTA Markets	*"There were moments and experiences where some markets I went to they had stuff and some of the stuff were either spoiled, not in the best condition, or had damage from riding in a hot vehicle to where they were for – they just were sold out" ~ Participant*
Recommendations and programmatic improvements		
	Recommendation for retention	*"We're just trying to think about how we're trying to incorporate some sort of stress management technique into the program, you now" ~ Participant*
	Partnering with grocery stores	*"I do wish that we used grocery stores because our participants are more used to them……. The MARTA markets helped our participants get connected with local produce which you know we talk about the importance of good nutrition but also supporting local farmers so they can continue to provide us with nutritious food. So, it's still a bit of a give and take there," ~* RD.
	Program sustainability	*"I learned a lot, and I passed it on to my friends and my family, let them know, you know, what the program was doing for me, and you know, before you get to the – if you're dealing with diabetes before you get to the, you know, past the borderline, you know, try to get it in order." ~ Participant*

CHAPTER 4: ARTS BASED APPROACH TO UNDERSTANDING FOOD SECURITY EXPERIENCES

ARTS BASED RESEARCH

Addressing approaches to sustainable change in food insecurity demands a more participatory approach to deliver desired results to the beneficiaries. Arts-based research can be used as a tool for creating spaces with food insecure communities to communicate their lived experiences and for participants and researchers to better understand how to address food insecurity. [87,88] The intent of arts-based research is to open alternative forms of communication among individuals who are food insecure and lack resources and allow for deeper research insight, interpretation, and creative expression to examine participant experiences in new ways. [89] By using art to connect to one's daily life, we will visualize what these participants are going through physically, mentally, and emotionally and may be able to better understand their challenges in order to encourage self-efficacy. [88,90] This study uses arts-based methodologies to analyze and communicate the findings of qualitative data and encourage conversations around the creation of actionable solutions in personal lives to address food insecurity. Specifically, by using in-depth interviews, art was developed to display participants experiences in a visual way as they discussed challenges such as financial constraints when grocery shopping, stress eating unhealthy foods, the feeling of helplessness and instability once the program completed. Participants also discussed some positive experiences such as a sense of belonging and social support, increased fruit, and vegetable intake that were also displayed through art.

ARTWORK

In the Beginning, 2021

Oil paint and canvas

"Kind of being supportive of one another. It was good support in there." ~ Participant

"I loved it. I loved it for several reasons. One, the benefit of the fruits that it provided for [lost signal] two, it gave me a chance for social interaction". ~ Participant

"I think people stayed in for the social support, like they liked that part, not just with me but with each other too." ~ Instructor

"In the beginning" represents a major component of any nutrition program which is "patient centered approach" consisting of social support, transfer of knowledge, and self-efficacy. It also signifies the introduction to healthier foods. Social support within the program was displayed through staff to participant and participant to participant interactions and appeared to enhance program engagement and retention through providing a sense of belonging. In the interviews, participants and key informants discussed informal social support and positive interactions that helped shaped one's ability to be successful in the program because they had the ability to share their experiences, challenges, discourse, and sentiments while providing a support system for each other.

"In the beginning" is inspired by Michelangelo Buonarroti's, "Hand of God", 1509 which depicts the gift of life but also the idea of being the extension of another. Michelangelo was a prominent painter, and sculptor who many people say is arguably considered to be the greatest artists of the Renaissance period. What was adopted

from the "Hand of God" was not so much the religious commentary but instead the desire to co-exist with each other and that what we do individually impacts someone else. "In the Beginning" takes a unique perspective in terms of not knowing which one of the hands are providing or receiving the gift, which is meant to shift the historic narrative of one person providing a handout to another. Instead, this piece is meant to show that within these programs there is a shared interest and benefit. Although the title has some biblical underpinnings, it really means that nutritional programs should include and promote the idea of social support "in the beginning" to truly achieve a sustainable outcome.

This is your brain…off FOOOD!, 2021

Oil paint and canvas

"…I'm wondering just by talking to you if that's playing a part in my addiction. Because when I first stopped getting high, I used to binge on a lot of candy and stuff like that, because that was filling the void, no the sweets was filling the void. And I'm kind of wondering right now if that's what I'm going through…. Because it could be. You're drawing a parallel to addiction, but addiction to food." ~ Participant

"P: Yeah. Yeah, because when you -- okay, say if you're used to eating sugar every day, something sweet every day, it's just like a withdrawal when you don't eat it. It's just like, okay, a drug person, if he's coming down off a high trying to do withdrawals from being high, it might give him shakes or your mind might say, ooh, you know you want that, you know you want that..." ~ Participant.

"This is your brain...OFF Foood", adapts the *"This Is Your Brain on Drugs"* anti- narcotic campaign by the Partnership for a Drug-Free America (PDFA) non-profit organization that was launched in 1987. As a public health initiative, PDFA used an advertisement suggesting that the effect of drugs on a person's brain was compared to a cracked egg on a hot pan. This led to the idea that while one is on drugs, their brain is "fried". I found it interesting that they used a food item to display how one's brain looked while on drugs and became intrigued to recreate that same imagery to address how sodium and sugars are just as addictive as notable drugs.

During the interviews, participants went in depth when describing what they eat and how it affected more than just their bodies but also their mental wellbeing. In this process, many participants equated foods with increased sugar and sodium to drugs with some even referencing words such as addiction, withdrawal and chemicals when describing the types of foods, they ate and how they were affected. "This is your brain...OFF Foood", depicts several characters as they are dealing with food stress both externally and internally. Both characters also show guilt, struggle, and pain which all could be due to binge eating unhealthy foods, not eating at all, or not eating enough adequate meals. The paint splats coming out of the skull represents the expression "mind blown" triggering emotions like disbelief and shock at the fact that food insecurity is still a massive issue disproportionally affecting the most at risk. It is also a mind blown expression at the fact that we do not classify sugar and sodium the same as other drugs when it has been proven to have severe negative impact on one's health outcome. The paint splats also signify brain imaging and how addictive drugs creates a euphoric reaction. The eggshells display the concept of "walking on eggshells" and our way of not fully addressing the root causes to the problem of food additives and how they impact our health and wellbeing.

The hands that feed you…the low hanging fruit, 2020

Acrylic paint and cardstock

P: It makes you feel helpless. I can't help myself. I can't provide for myself. I can't, you know, do anything to change my situation. I'm stuck…. ~ Participant

"The hands that feed you…the low hanging fruit" is an abstract piece that expresses the feeling of being overwhelmed, helpless and have immense struggle to provide for oneself. The contrast in the colors is meant to show the shifts in daily emotions from dark to sad to numb signifying the deep feeling of burning inside yet displaying a cold facial expression. In addition, this piece is meant to display chaos and confusion as some of the participants in the program express how greatly they were affected by inadequate resources.

These participants describe their personal experiences with feelings of helplessness and hopelessness when it came to food access. Many stated that they do not even know where their struggles even began and alluded to not knowing where they will end up next due to instability. The fiery orange and yellow colors are meant to depict this idea of being in a dessert, in this case "food dessert" and how the signs of liberation and breakthrough may be an optical illusion, in this case a "mirage". As stated previously, as beneficial as these programs are, they eventually end and causes participants to remain in this vicious cycle that is systemically enforced.

"The hands that feed you…the low hanging fruit" is influenced by both Pablo Picasso's "The Weeping Woman", 1937 and Emilio Villalba's "deprivation", 2016. This piece adopted a variety of distorted facial expressions that continue to represent distress as you rotate the piece clockwise.

THE Grocery List, 2021

Oil paint and canvas

"It's like – It's like if I want these groceries, but I've got to pay a bill, it's like let me call this company and let them know I'm going to be $20, $50 short, because I know I've got to have something to eat." ~ Participant

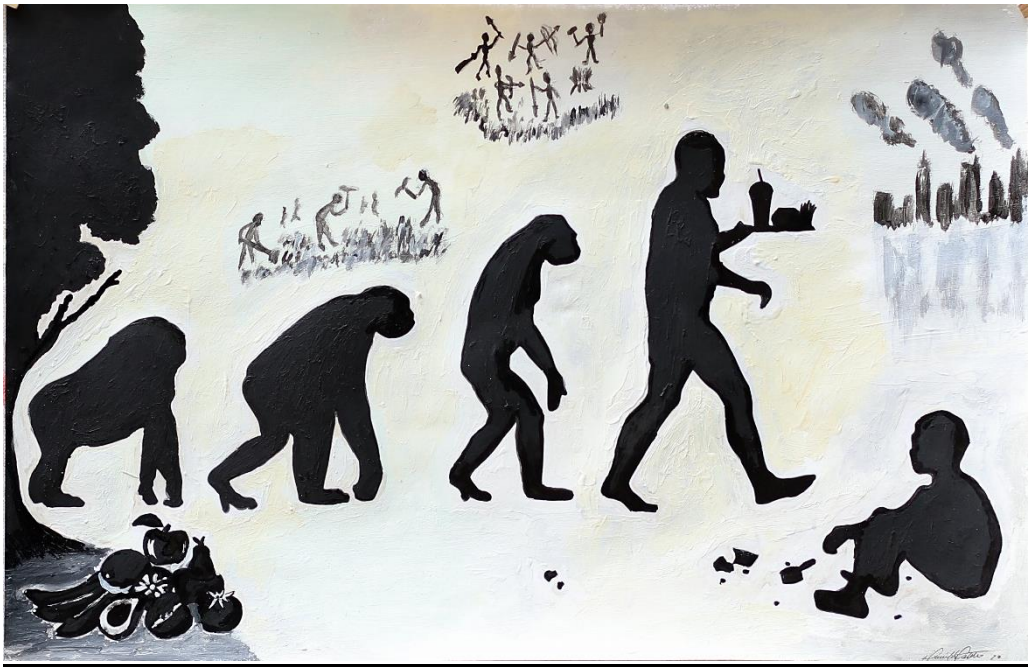
"…But that was the – the cost evaluation that I had to do bargaining off. I'd have to – When I go to the grocery store, it's not in and out. It's not just walking down the aisle and pulling off the shelf. No, there's a serious cost evaluation for every item that I pick up." ~ Participant

" I'm on disability, and it's a fixed income, and with that fixed income it's just barely enough to pay my bills and there's not much left extra to buy groceries. Much less healthy groceries. And so when it comes for the time you use to buy groceries, cost is a factor. So if I can't afford and fruits and vegetables are not on sale or they're out of season, I have to resort to either a cheaper version, which is a canned fruit or vegetable……. I kept getting denied for food stamps. I just got approved for food stamps somehow, you know, and it's only $16 a month. How that stretches or makes a difference, I don't know, but yeah" ~ Participant

"THE grocery List" is an example of body mapping which is an arts-based research tool used to explore ones physical and mental feelings as well as emotions through self-observation and self-inquiry. In the interviews, participants described their experiences grocery shopping or developing a grocery list. Many participants who are food insecure or lacking financial resources, described this process as a stressful task and discussed in depth the idea of making trade-offs to buy the foods they needed for their families, and paying their electricity, water, and even insurance copays. I began to understand that the experiences of food insecure individuals going grocery shopping is more than just a struggle to access foods because when someone spends money on food, they are making conscious decisions not to spend that money on something else just as important. To me, this piece represents chaos and I wanted to capture what a participant may feel while they are inside of a grocery store or creating their grocery list deciding on items, they need most, but have make compromises to get it.

"THE Grocery List" is Influenced by Jean-Michel Basquiat who is one of the most important artists of the modern art period and happens to be my favorite artist. His art displays a sense of vulnerability that I believe comes from self-expression and identity which provoked his willingness to challenge social and political issues. Because of this, he was not only just a phenomenal artist but a great storyteller. "THE Grocery List" adapts two of his notable pieces both canvas-based: "Untitled (Skull)", 1982, which features a skull with a dispirited expression, reflective frown, and full of stitches suggesting pain. When I look at this piece, I feel struggle, sadness and unhappiness and believe it is a depiction of Basquiat's own internal stressors. However, the meaning is still the topic of many debates. The other, "The Italian version of Popeye has no Pork in his Diet", 1982 features part of a body and the arm extending its hand. Basquiat used the intersection of art and food in many of his works.

Food with a capitalism F: The missing link, 2020



Acrylic paint and card stock

"P: Yeah. Mhm. I mean, it's easier than me trying to go into Kroger to purchase, and then I've got to go home and break it down, and I've got to cook it, okay, boom. McDonald's, burger, fries, you know, soda, take a shower, boom, in bed. It's just an easier choice." ~ Participant

"Food with a capitalism F: The missing link" depicts the mainstream human evolution design better known as the Road to Homo Sapiens, 1965 which revealed a linear sequence of human evolution over the course of 25 million years. This concept has been adopted over time in which displays a past to present directionality of various imagery. In this adaptation, I also utilize the present looking back at the past embedded into the piece. It shows how at one-point humans had access to fresh fruits and vegetables and have transitioned to fast foods. It also shows not only the progression of eating habits but also societal changes that have influenced these habits specifically how and what we eat such as agriculture to hunting to food industrialization. Participants described this idea of fast food being an easier and more convenient option primarily due to the lack of access to affordable healthy foods. In general, it has been proven that areas with high levels of poverty tend to be associated with a lack of healthcare resources and food deserts. These areas then lack grocery stores with healthy food options and usually have an abundance of fast-food chains which then causes upticks in chronic diseases.

“Food with a capitalism F: The missing link” is inspired by two artists. The first, Kara Walker who is known for her cut-paper silhouettes that includes many powerful, and controversial images of black figures against a white wall, which addresses the history of American slavery and racism. This piece draws inspiration from two of her prominent work: “The Means to an End...A Shadow Drama in Five Acts”, 1995, and more recently “Confectionary”, 2014 in which she also utilizes a type of sequence and progression to explore a historical context of black slaves and their painful reality.

The second artist that “Food with a capitalism F: The missing link” draws inspiration from is Banksy an anonymous street artist who uses stencil to paint imagery that possess political and social commentary, provokes perspectives, and encourages acts of resistance. This piece utilizes concepts from two of his pieces, first “Trolly Hunters”, 2006 which displays cave men hunting grocery store shopping carts which depicts the past and present occurring simultaneously and tends to be more synonymous. Second, “Burger King Kid”, 2006, which displays the intersection of unhealthy foods and homelessness.

The grass is greener on the other side…. GENTRIFIED, 2020

Acrylic paint and canvas

"The only thing is that I think that initially they said, well, once we completed the program, you really have no resources to, you know, you can't come back to the program. So it kind of puts you back in the same situation you were in before" ~ Participant

"I'm on disability and – but all the problems I see I just go pray, and right now I'd say I don't have a pray to live [? 16:45] [inaudible 16:46] like that and I live like that because I cannot afford to live "~Participant.

"we are introducing them to fresh foods, and we are giving them tons of practice in cooking and free food and we are reducing their barrier to access and then we are taking away the free food and now they have to start paying for them again" ~ Instructor.

"The grass is greener on the other side…. GENTRIFIED" is painted to portray the built environments that greatly affect the participants beyond the program. These environments lack access to adequate resources especially healthy foods and are often left out of the discussion when attempting to develop nutritional interventions to get people to eat healthier. In terms of food insecure neighborhoods and lack of food access, a simple assumption may be that a lack of access to fresh fruits and vegetables is the main driver. Therefore, a simple solution would be to solely focus on providing better access to grocery stores and markets in food insecure neighborhoods. However, it can be argued that simply providing people with increased healthy food options may not serve to improve nutrition and health outcomes nor create individual ownership towards making lifestyle changes. When organizations fail to achieve significant impacts on fresh fruits and vegetable consumption, the initial reaction is to place blame on the community's lack of will to shift behaviors. However, instead the response should have been to assess the much larger food insecurity problem affecting the communities and use the research to influence policies to reduce nutritional disparities.

A major theme in the interviews was this idea of program sustainability in terms of measuring whether participants maintain the healthy behaviors that they have developed throughout the course of the program once it has completed. Participants discussed their inability to continue to eat healthy after the program due to financial burdens and lack of resources. The "coming soon" signifies two meanings. One is gentrification which tends to exacerbate hunger in low-income communities by increasing the economic value making it more difficult for current residence to maintain housing, while also changing food retailers which can limit access by increasing the prices and overall. Lastly it changes the cultural and racial identity of these communities. Some argue that

gentrification is purely positive, but accidently brings about harmful consequences to marginalized people in the process whereas I argue that gentrification is just another method to disenfranchise communities of color.

The other concept of "coming soon" also represents false promises and misguided advertisements made by larger corporations that influence consumers to believe that their health and wellbeing is prioritized. Far too often, these communities are affected by corporations, researchers, organizations who markets certain products or interventions taking advantage of the people who live there.

Strangest Fruit, 2021

Oil paint and canvas

"Strangest Fruit" utilizes historic Black characters like uncle Ben and Aunt Jemima displaying the misrepresentation and denial of Black identity for centuries. These characters are depictions of longstanding stereotypes that are rooted in racism to portray servitude. Participants described their experiences of being forced to eat unhealthy food which were marketed to them and alluded to how structural racism contributes to the creation and persistence of lack of access to healthier options. In Black communities, food racism is prevalent, and people

haven't only been talking about the problematic images on food products but how unhealthy processed items are exclusively sold in increasing amounts within these marginalized neighborhoods.

I blurred out the faces to give the identity back to those who it was stolen from but to also show that this could have been any person of color because for far too long many have suffered from food racism and food apartheid. "Strangest Fruit" in part is influenced by Andy Warhol, one of the most significant artists of our time. Warhol's work introduced new meanings and forms of expression through showcasing commercial goods. "Strangest Fruit" adopts one of his notable works: "Campbell's Soup Cans", 1962 which demonstrates one way his art provided a basis from which social commentary and critique could both be conveyed and interpreted. As an expressionist myself, his art taught me that the relationship between the artist and audience is synonymous. The audience provides a deep understanding of how the art can have a significant impact, regardless of the intention of the artist. While explaining his reasoning for "Campbell's Soup Cans", Warhol stated,

> *"I used to drink it. I used to have the same lunch every day, for 20 years, I guess, the same thing over and over again."*
>
> *"America started the tradition where the richest consumers buy essentially the same things as the poorest….A Coke is a Coke, and no amount of money can get you a better Coke than the one the bum on the corner is drinking."*

Personally, I do not agree with his messaging that the poorest person and the richest person has the same access to the same foods let alone healthier foods and wanted to depict how some of the most racist foods have been marketed specifically to poorer populations. I also believe that privilege and choice to consume certain items plays a major role in how we view those items. Many of the participants, don't have the choice to eat healthier food items and are left with products out of necessity whereas others with privilege can consciously decide whether or not they will consume a certain product.

It's STILL LiFE: Fruit Pure-Amid, 2020

Acrylic paint and cardstock

"…I'm looking at how much I'm putting on my plate, what time I'm eating, portion size. I'm looking at all of those things. And when I -- before I didn't look at that. I would just fill my plate up with food, not even thinking about how much I was eating, what time of day I'm eating, how much sodium is in this or that. It's just a different experience. It's just a different -- I've been conformed or transformed by the program." ~Participant.

"Its STILL LiFE: Fruit Pure-Amid" is an adaptation and modern iteration of traditional still life with fruit imagery from the 19th and 20th century. One goal of still life art was to lead the audience to what the artist thought was most important. Painting fresh fruit specifically, typically represented life, wealth, and abundance.

The G-FVRx program is designed to change behaviors related to unhealthy eating habits and improve diet quality by providing prescriptions for free fresh fruits and vegetables. Many participants expressed that during the program they demonstrated increased fruit and vegetable consumption and learned valuable information regarding food portions, and health benefits. As the program attempts to identify the effectiveness of its interventions, it is expected that more attention will be given to the dissemination and diffusion of these interventions to truly promote dietary change as shared by participants.

This piece is a play on the a food pyramid which represents the recommended number of servings of each food groups to be consumed daily. The word "pure" means something that's not mixed with anything and the word

"amid" means during or in the middle of. This represents that during the G-FVRx program, is when participants began to find moments of epiphany where they began redefining their life and taking ownership over what they consumed. They become conscious of the benefits to healthy eating and dieting and learn effective ways such as portion sizes to do so.

This piece is inspired by many of Vincent Van Gogh still life paintings depicting fruit such as "Still life with Apples Pears Lemons and Grapes, 1887. As an impressionist, Van Gogh is known for experimenting with different lights and colors, in an effort to focus on the emotion within the art.

Green Eggs and Ham: Hip Hop Rap Snacks, 2020

Collage (acrylic and cardstock)

"..we look at those people that are obesely overweight, and the underlying problem seems to be emotional distress or things that they haven't dealt with from their childhood or things that have happened to them." ~ Participant

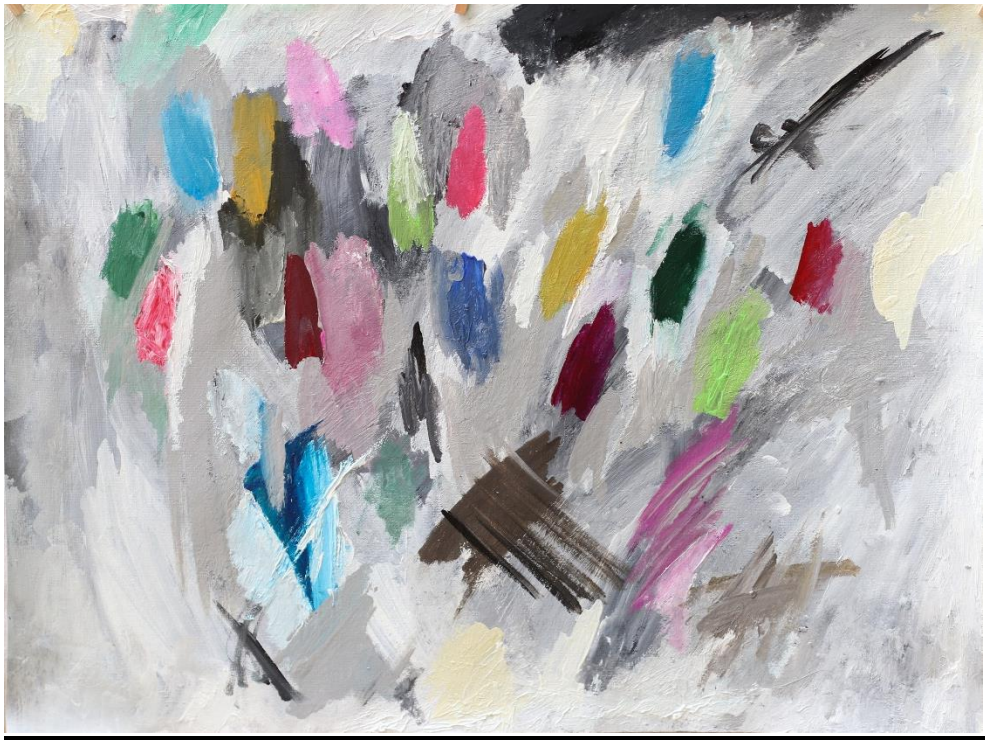
"…when I first found out because it's a history of diabetes in my family on my mom's side. Diabetes ran real rampant in her family." ~ Participant

"I just don't let them like, you know, [inaudible 35:38] going to lose their apartment, they ain't got nothing to feed the kids and where's their next meal going to come from and all this here. [inaudible 35:57] and it stresses me out too." ~ Participant

This piece draws influence from the classic children's book "Green Eggs and Ham" by Dr. Seuss which is an early introduction for children to discuss their experiences and attitudes towards certain foods. Although its playful with rhyme pattern, the main character Sam-I-Am is refusing to eat green eggs and ham because he does not know what it is. This was interesting as I personally believe that our perception of certain foods is impacted by culture, experiences, and upbringing. In my own life, I have noticed that where I grew up and how I was raised has influenced my perception of what I consumed and considered to be a risk almost more than my own personal interactions with certain foods and risk. Although the many social and political underpinnings in this piece is not meant for children, it still provides an understanding using a similar rhyme pattern as Dr. Suess did to help raise awareness to parents regarding the effects of certain foods on their children.

Participants talked about generational effects of food insecurity and chronic disease risk. They mentioned how they were affected and wanting to prevent their children from suffering. These participants are at an extreme economic disadvantage which make it more difficult to access care, healthy foods, and exercise regularly and therefore, have an immense impact on their children's health outcomes and general quality of life.

FRESH Market Lights, 2021



Oil paint and canvas

"I still continue to visit the market and continue to go weekly, because I like the fresh produce and the fruits and so forth" ~Participant.

"The staff at Five Points, it was – they were real amenable and courteous. Bankhead, they were real amenable and courteous, and you know, like [inaudible 3:32] park at Five Points, with all the other stations they would help you take your food and stuff to the car" ~Participant.

Although many participants described their challenges with the MARTA markets in terms of wait times, and high demands, many spoke about how beneficial the markets were. They also referenced going to the markets even after the program finished. In the interviews and during observations of consumer experiences at the MARTA markets, many participants stated that they were attracted to the markets because of the friendliness of the staff and the convenience of fresh produce. They also expressed that the markets were where they connected and built social support systems by shopping together. "FRESH market lights" is an abstract piece signifying what attracted participants to the market and what made them continue to come back.

Food Just is, Food Justice, 2021

Oil paint and canvas

"Food just is, Food justice" is a piece that represents an array of food issue or disparities that directly and indirectly affects participants in the program. Some of these issues consist of GMO's, lack of food sovereignty, food apartheid, global hunger, and the poor treatment of farmers and food workers. This piece displays that every food issue or disparity are interconnected and by uniting through protests and striving for food justice, we can help transform our food systems collectively instead of fighting for individual siloed issues.

This piece is inspired by Mahatma Gandhi, who was preeminent global leader. He utilized fasting as a way to demand unity, equity, equality, and reuniting. Globally, food is pivotal aspect of everyday life and has been used to raise awareness of social issues. While Gandhi's methods of fasting were not directed towards having a limited access to food, it still revolved around changing the way people all over thought about the use of food and the many issues rooted in food injustices.

GRAS Fed (Generally Recognized as Safe), 2021

Photography

This is a collaborative art piece with another artist named Hannah Ranson to address the intersection of distrust and food insecurity. The original idea behind this photo was focused primary on food accessibility as far as food cost and the types of foods that are available in low-income areas. It highlights typical foods that may not be the most nutritious but are the lowest in cost such as ramen noodles and can foods. The orange is a symbol for an unattainable option and that while food insecure people who are low income are expected to eat healthy, they have difficulty accessing it. Therefore, it is presented in between other unhealthier options. The paint on the fruit signifies it not being no longer edible where the participants discussed the limited produce that they did have access to were at times spoiled. Participants also describes their inability to access healthy foods, so they were forced to settle with unhealthy alternatives.

GRAS is a term that describes that certain substances that does not require authorization in order to be used. If a substance acquires the GRAS status companies are not obligated to inform the Food and Drug Administration of its use and the level of assumed risk to the population. This greatly affects marginalized and

food insecure communities due to the increased in unhealthy options that exist in those areas. The essence of the photo is that substance is present but at times empty.

SirREAList, 2021

Photography

This piece is a replication of Rene Magritte "The Son of Man", 1946. Since the original image is surrealism, the meaning is interpreted differently and still debated. I was inspired by Magritte's perspective on invisibility and the concept of not being able to see beyond what is in front of yourself. Also, at times we are distracted. In the original painting, the character is not holding the apple and instead it is floating in front of their face. This is interesting because there is a lack of control that the character has because they cannot see beyond the apple and also, we have a difficulty seeing who the character really is behind this apple, so their identity is somewhat stripped from them. In this replication, the character is holding the apple which in a sense gives the control back to the character and allowing them to make the decision for themselves of how they want to be seen. This piece also signifies, having fresh fruits right in front of you but not being able to access it. Society tends to

place the expectation on the people to undo the issues they are facing and then blame them when nothing changes. As of right now I feel like we have partial commitment to fixing the problem of food insecurity as we do not fully commit to the fact that food is a right, and instead it is a privilege. We expect people to be fed and somehow have an adequate amount of nutrients needed to survive but cannot see beyond what we do to may contribute to their inability to do so. This piece also discusses the business of food and how we tend to conform to the norms of today's society. It is also interesting that the "green apple" in this original piece utilized art in consumerism by inspiring the likes of the Beatles and Steve Jobs to name products.

CHAPTER 5: DISCUSSION AND RECOMMENDATIONS

Summary of Key Findings

The results of our study found significant differences between cohort site, age, food security and BMI among those who graduated compared to those loss to follow up. Our findings regarding age were similar to previous studies that found that younger age was a predictor of dropout in lifestyle interventions trials. [91,92] It has been expressed that there is a need to improve strategies to retention, especially for younger program participants. Our results are also similar to those of other studies that noted that lower educational attainment as a predictor to dropout. [91, 93] However, other studies, have found that being female was also predictor to dropout, [91] which was not the case in our study. This could be due to the large sample of female in the program which made the odds of graduating protective.

In most studies having a higher BMI is a predictor of drop out. [94.95] In our study, lower BMI was a predictor of drop out and one hypothesis as to why participants with a higher BMI remained in the program could be due to the fact that participants who are obese are more motivated to stay in the program and redeem vouchers. There were some studies that found low BMI as a predictor of drop out. [96, 97] In our study, having a diagnosis of hypertension and diabetes were protective against drop out. [97] This was similar to several studies where they found lower risk of hypertension to be a predictor of drop out. Again, we hypothesize that, these participants were more motivated and already apart of the Grady Health system obtaining treating for their chronic conditions.

Similar to our study, other produce prescription programs also describe transportation barriers faced by participants and how they impact one's ability to access program classes and farmers markets. [80, 81] Transportation barriers to health access are well documented and cited as a social determinant of health that disproportionately affect poorer participants dealing with chronic health conditions. [98, 99] Although not significant, driving one's own car was associated with lower odds of loss to follow-up compared to using MARTA primarily. The lack of significance could have been due to the small sample size of the cohort and larger studies are needed to assess the role of transportation in produce Rx programs. Qualitatively, it was also noted by both key informants and participants that transportation was a barrier that could have led to program incompletion and was stated as a reason for missed sessions and the inability to redeem vouchers.

A patient centered approach including instructor flexibility, fault tolerance, and ongoing support appeared to be greatly beneficial for the participants. By being involved with each segment of the program, instructors were able to build rapport with participants and demonstrated unification. It was found that there was success in participants building rapport with each other in which informal, support groups were formed. By offering a sense of social support for participants, as well as consistent check-ins, encouragement and motivation, participants began demonstrating more self-efficacy and promising results were seen in their overall health and wellbeing. A patient centered approach is a strategy that has appeared to help drive engagement and retention in other produce prescription programs when used within the curriculum. [100] For example, one study piloting a produce program, utilized mentors to interact with participants daily to address their needs. It was expressed by both mentors and participants that involved interactions and building one-on-one relationships were the strongest component of the program. [64]

The concept of diversity can be incredibly challenging, and we recognize that it would be ideal to have staff members who can culturally and ethnically identify with the participants and communities served. It is very possible that recruitment and retention rates would increase, by including diversity throughout every component of the program. Previous studies report the use of an ethnically diverse staff and culturally relevant curriculum as a strategy for recruitment and retention. [101] Diverse staff members, with similar perspectives and backgrounds as the participants, can be more relatable to participants which in turn can benefit engagement and build understanding between participants and program staff. Implementation science strategies therefore recommend that multilevel research must be culturally appropriate to achieve program objectives. [102] The concept of diversity was also a factor in the familiarity of foods the participants consume and ensuring program staff incorporate culturally relevant foods into the Cooking Matters courses and well as the availability of those foods at the MARTA markets. Although some participants had a sense of appreciation for the existing staff members and began to learn how to utilize new types of food introduced to them by staff members, there may be greater productivity and engagement from the participants if they identified with staff members who not only looked like them but ate similar foods and were from similar backgrounds.

Other notable challenges consisted of MARTA Markets at times not having enough produce stocked which hindered the participants steady access to fresh fruits and vegetables. Research has shown that increases in fruit

and vegetable consumption are linked to the wide availability of offerings at farmers markets, particularly those which had a diversified selection of produce and better produce quality. Researchers suggest reviewing the voucher redemption patterns of the participants at farmers markets as a barrier to program participation. [78] Voucher redemption is a major factor in participant engagement and while evaluating fruit and vegetable prescription programs, it was discussed that several participating farmers' markets had limited weekly hours which was challenging for participants to redeem their vouchers. [78]

Limitations

There are several limitations to our research. First, the COVID-19 pandemic prevented us from conducting all interviews in person. However, mobile phone interviews proved to be a viable alternative. Furthermore, restrictions related to the COVID-19 pandemic hindered a complete 2020 cohort which prevented the authors of this paper from physically seeing the interventions taking place. This included the Eat Well Live Well content delivery, cooking matters courses, and participant interaction. We were thus unable to have an objective lens to help answer our research question of what components of the program may have influenced the previously high retention and redemption rates.

Secondly, there was a small sample size (N=288) in the survey data, with little variation due to majority of respondents being African American, low income, and female. Furthermore, the graduation of the program was high overall, which left a smaller sample of people who did not complete the program to analyze. This self-reported survey was also subject to recall bias, and social desirability bias. In addition, only the 2018 baseline survey included information on transportation methods which was removed from the 2019 survey. Furthermore, we did not have information on baseline health insurance status, number of people living in the home, medication intake, public assistance programs aside from SNAP benefits, and eating habits which may be confounders. Furthermore, quantitative analyses were cross sectional which precluded us from making casual inferences.

Lastly, the qualitative data were collected from a small sample of participants of the program (N=17), all of whom graduated from the program. Attempts were made to identify and recruit nongraduates, however we were unsuccessful. While there were observations, we were also unable to speak with MARTA Market managers/coordinators formally due to scheduling and time conflicts. We believe that hearing from the participants

who were not able to complete the program and from MARTA Market managers would have added tremendous value to the findings.

Recommendations

Retention, and sustainability can be major limitations of programs when the interventions solely target the single individual level of the social ecological model. In programs that included fruits and vegetables prescriptions, factors such as neighborhood availability and accessibility of produce or financial instability must be considered as a potential barrier. One implementation science strategy is to integrate multiple levels of the social ecological model when designing an intervention such as the individual and community levels to improve program reach and impact. [103] In most FVRx programs evaluated, the lack sustainable funding was a recurrent theme in which participants displayed a struggle to consistently eat and purchase healthy produce consistently after program completion due to financial constraints. [103] Sustainability is therefore necessary for participants to maintain the healthy behaviors that they have developed throughout the course of the program. Behavior change has not been measured or evaluated over time in the G-FVRx but remains a goal for the future. Programmatic sustainability is dependent on funding from WWG, but it appears that WWG is willing to continue working with Open Hand and Grady and scaling up the program in the future may be possible. Future programs should focus on economic and institutional supports beyond the program components to support sustained behavior change. These efforts have potential to enhance the translation of the G-FVRx programs to the needs of participant's long term. [81]

One recommendation is to incorporate additional food outlets such as grocery stores into the program to ensure that participants can maintain heathy eating behaviors. [103, 104] In this study, while MARTA Markets were a great way for participants to redeem their vouchers, partnering with grocery stores was also discussed as a potential new intervention for the program and has already shown some success with specific clinics utilizing a local Farmers Markets instead of MARTA Markets due to distance. Furthermore, since a lack of distribution and access to healthy foods are underlying causes of food insecurity, implementing partnerships with grocery stores can potentially broaden the food supply for participants which will inevitably promote food security.

In addition, increased focus on cultural relevance and diversity in hiring, program implementation and partnerships may have beneficial effects for the participants. By enhancing the diversity of the program staff and

RD's so that they more closely resemble the different participants and communities they serve and encouraging all instructors to implement cultural practices within their clinic may help increase program retention immensely. In no way is this implying that the current staff members and instructors are not professionally trained, prepared to work in diverse environments, or not implementing culturally relevant content. However, there may be some missed opportunities to better support participants if the concepts of diversity and cultural relevance are not more intentionally discussed and implemented across all components of the program.

It may also be beneficial to integrate more formal support groups into the program itself through encouraging more peer champions to be a part of the program. These peer champions have insight that instructors may not have and could help diversify the support system for the participants. Multiple levels of support can help foster meaningful community development by building the capacity of participants collectively in addressing their common interests. This can continuously engage and empower participants to promote community wide level developments. Peer champions were also participants in the program previously and may come from similar racial/ethnic backgrounds and communities as current and future participants. They may be able to assist with the lack of diversity concerns and be able to resonate with the participants more closely.

Lastly, although forms of transportation were not statistically significant different between those who graduated and those lost to follow-up, both participants and key informants described transportation to be a challenge toward success in the program. It may be useful to have shuttles or carpools set up for participants to get to Cooking Matters and to the MARTA markets in future programs. By providing these as part of the program, the difficulty of travel could be reduced. Also, asking participants about transportation methods was removed from the enrollment survey after 2018. Reincluding this question into future surveys may not only provide a larger sample size but allow future studies to assess differences.

Next Steps

There is strength in the study's design given mixed method approach. To inform future programmatic improvements further insight from past and current participants, both graduates and those loss to follow up is required. It would be of interest to know at what point of the program are participants dropping out. In other studies, it was found that participants are at the highest risk of dropout at the beginning of the program. [105] It would thus be beneficial to survey participants who were lost to follow up to understand their barriers and challenges to

program retention. In addition, adopting “exit interviews” with participants at the end of the intervention can help to gather feedback on recruitment, retention, and programmatic recommendations for future cohorts. Additionally, a 6-month post-intervention survey would help assess behavior change sustainability to see if participants retained what they learned in the program. Further research is necessary to elucidate the impact of the program on the workload for RDs. This may closely align with investigation into the facilitators and barriers of recruiting RDs for this program.

CHAPTER 6: PUBLIC HEALTH IMPLICATIONS

The use of implementation science to understand participant retention strategies requires further investigation. While previous research by our team has documented associations between program participation and reduced chronic disease risk factors, this study evaluated the Grady Fruit and Vegetable Prescription (G-FVRx) through an implementation science lens to understand factors that influence participant retention. In doing so, we have identified specific program mechanisms that foster retention such as patient centered approach and social support. This study has also identified sustainable approaches to improve participant retention and hence program effectiveness.

A major success of the G-FVRx program is contingent upon retention of the participants. This mixed method evaluation highlights the need to incorporate qualitative methods to help contextualize quantitative results to further investigate and evaluate G-FVRx program components to understand and address factors that affect participation at various levels. Despite significant findings and impacts of the program, it was noted that participants who were lost to follow up were reportedly due to lack of transportation, limited or inconvenient locations of participating farmers markets, and program schedule conflicts. In order for the G-FVRx program to continue to support program participation and retention, it must identify these challenges in engaging participants and continue to utilize best practices in nutrition programs. Furthermore, G-FVRx should seek to implement long term follow-up evaluations as a best practice to determine measures of sustainability in maximizing participant retention. Currently, the G-FVRx is not designed to assess the participants food insecurity status beyond the conclusion of the program. Furthermore, future program evaluators should utilize mix method approaches to exploring the nuances in experiences among program participants and program staff.

However, given that Wholesome Wave FVRx programs are becoming more widespread on city, state, and now national levels, it is imperative that more studies are conducted to truly its impact on food insecure populations. Currently, this program is funded through grants that are limited in scope and timeframe. By eliciting further input from participants, program staff and stakeholder, this program may be able to shift policies to obtain more funding in hopes to become more effective once embedded into communities and health care systems in a more sustainable way.

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APPENDICES

Appendix A

Stakeholder Interview Guide

Introduction

Hello my name is [interviewer name]. I am an MPH student at Rollins School of Public Health, Emory University and currently undertaking a Community Engaged Food Security (GH 568) course. We would like to evaluate the previous retention and redemption rates for the FVRx program as part of the class project. If you allow me to interview you today, I would like you to share with me your personal experiences and relationship with the FVRx program and your perceptions on the retention rates.

The interview will last about 60 minutes. Your participation is voluntary, and you do not have to answer any question that you do not want to. Additionally, if you would like to stop the interview at any time, then feel free to do so. With your permission, I would like to record this interview so that I do not miss anything. If there is anything that you would not want to be recorded, then please feel free to let me know and I will pause the recording. I will also be taking notes, but I assure you that all the information will stay within the research team and that your name will not be linked to this interview as well. Do you have any questions for me? (Answer any questions). Would you like to participate in this interview? [Affirmative answer]. Great! Do I have your permission to record this conversation?

Opening question:

1. What is your role in the FVRx program?
    a. Daily responsibilities?
2. What is the sequence of activities in the FVRx program?
    a. Time spent doing activities.
    b. Goals of activities?

FVRx Program Implementation:

Now I would like us to talk about the implementation process of FVRx program.

1. How are the Eat Well, Live Well classes conducted?
    a. Who typically conducts them?
    b. What topics are covered?
    c. What are some of the benefits of these classes that you have experienced/ can talk about?
    d. What are some of the challenges of these classes that participants experience that you see?
    e. Challenges that you experience as a facilitator.
    f. How is Cooking Matters integrated with Eat Well, Live Well material?
2. Who do you collaborate with to implement the FVRx program?

a. How do you communicate with them?
b. Challenges with collaborating?

3. What were some communication challenges for the Eat Well, Live Well program?
    a. Delivery methods?
    b. Challenges with communication with participants?

4. How does the voucher redemption at the MARTA markets work? (**OR East Point Farmers Market for Carli ONLY**)
    a. Barriers/difficulties?
    b. Perception by participants?
5. What have been some general challenges with implementing the FVRx program?
    a. Issues with space?
    b. Accessing vouchers?
    c. Dropouts?

<u>Retention Rate:</u>

Thank you for sharing the information. Now let's talk about the retention rate of the program.

1. What key factors contributed to the high retention rate of the program in 2019?
    a. Gender?
    b. Specific clinics?
    c. Generational differences?
    d. Recruitment methods?
    e. Why do you think these were the key factors?
2. What key factors do you think would increase risk of loss to follow-up?
    a. Family situation?
    b. Education level?
    c. Transportation issues?
    d. Why do you think these are the key factors?
3. What changes has FVRx implemented to help reduce risk of loss to follow-up?
    a. Changes in recruitment methods?
    b. Support for those at risk of loss to follow-up.

<u>Cultural Relevance:</u>

1. How does the FVRx program/classes ensure the material is culturally relevant to the participants? What are your opinions on cultural relevance within the program?
    a. Type of produce offered at markets.
    b. Nutritional education during Eat Well Live Well classes?
    c. Style/methods of cooking during Cooking Matters classes?
    d. Easily reproducible at home?
    e. Impact on retention rate?

Changes and Programmatic Improvements:

1. How has the FVRx program changed since 2017 or since you were involved?
    a. Impact on retention rate, if at all?
2. What kind of an approach or strategies would you recommend for future programs to help improve the retention?
    a. Delivery method?
    b. Topics/Curriculum?
3. Based on your interactions with the patients, how sustainable are the lessons learned from the FVRx program?
    a. Patients adhering to what they learned.
4. What are your perceptions on the sustainability of behavior change after the program?

Objectives:

Investigate program factors and best practices leading to the success of a 90% retention rate in 2019 by interviewing community partners involved in program implementation.
Elicit perspectives on opportunities for improvement related to retention rates for future program iterations by interviewing community partners involved in program implementation.

Appendix B

Participant Interview Guide

Introduction

Thank you for your willingness to participate in this interview. My name [interviewer name] and I am a doctoral student studying Nutrition at Emory University. For this study, I am really interested in learning more about your experiences in the fruit and vegetable prescription program, where you participated in cooking classes and nutrition education and received vouchers for produce. I am interested in what impacts it continues to have on you, if any, and - more generally - about experiences with stress and buying food and how these two things overlap. You are the expert and there are no right or wrong answers; I just want to hear about your experiences. We can skip questions you do not want to answer, stop at any time, or take breaks as needed.

Review Verbal Informed Consent Document with Participant

Do you have any questions before we begin?

Verbal consent is obtained from the study participant before the interview proceeds, or the participant will be thanked for their time and the interview will be cancelled.

Just as a reminder: this recording will be deleted after I take my notes on this interview and your name will never be associated with what you say here today.

Topics	Questions

Overall program experience
• **Benefits**
• **Areas for improvement**
	First, I'm going to ask about your experience with the fruit and vegetable prescription program including benefits and areas for improvement.
	
	What drew you to the fruit and vegetable prescription program.
	• How was your overall experience?
	  ○ If you had to rate it on a scale from 1-10, how would you rate?
	  ○ Why? Can you explain further?
	
	How have your ***food choices*** been impacted by the program?
	• How has the new way of thinking changed the way you **cook, snack, and shop**?
	• Have you faced challenges using the information from the program given the **COVID-19/coronavirus** situation?
	• How do you **use** the nutrition information or cooking skills you gained from the classes in your **day-to-day life**?
	
	What would you ***change about the program***?
	• Examples include topics covered, timing, location, foods cooked, etc.
	• What ***concerns*** do you have regarding this program?
	
	• What ***issues***, if any, have you had using the information you gained in this program?
	
	  ○ Review program components (program graphic) and ask about each piece if needed

	Did you like the ***group setting*** of the program? • Did you **make any friends** from the program? • Do you **still talk to people** you met in the program? ○ What kinds of things do you talk about with them?

Feasibility of remote courses	What would you think of having the ***courses held online?***
	• How do you think this would change the experience?
	  ○ In terms of group dynamics, remembering course content, engagement in course material, relationships with program staff.
	  ○ How is your answer affected by the ***COVID-19/Coronavirus*** situation?
	• For people who **don't have a computer**, do you think they would be willing to use their **cell phones** to watch course-related videos online?
	  ○ What about people with limited **cell phone data plans?**
	• What **recommendations** do you have if courses were to be held online?
	  ○ What parts of the courses would work well online?
	  ○ Which would not? Why not?
	• What **challenges** would you anticipate if they were to be held online?
	  ○ How might the program overcome these?
	• What do you think might be some **benefits** to holding the ***courses online***?
	• If **you** had the opportunity to participate in an FVRX online course right now, would you be able to? Probe- Internet, computing, comfort / skills with computing and online platforms, ect
	• Would you want to? Why / why not

Voucher redemptions	Can you tell me about what it was like to use your fruits & vegetable **prescriptions** or ***vouchers at the market***? • How was your overall experience? ○ In what ways? Can you give me an example? • Describe the overall process for me. • **What would make it easier** to use the vouchers in the future based on your experiences? Have you ***visited the markets since the program ended***? • What are some of the reasons you did/did not?
Stress	***Now I'm going to ask more generally about your experiences with stress. So first:*** What does ***stress mean to you***? • How does ***stress feel***? (e.g. mental worry, physical manifestations, fatigue, etc.) What sort of things **stress you out** (e.g. financial stress, limited time, work related stress, etc.)? • How often do you experience this stress? • How does this affect the rest of your life? What sort of **relationships do you use for support** in tough times? • Who do you call when you're going through a hard time?

	• What kinds of things do the people in your life do to help when you're feeling stressed?
	
	<u>What do you do to relax</u> when you're feeling stressed out?
	• What motivates you to choose that way?
	• What do you find to be the most helpful in managing your stress? Why?
	• What do you find to be the least helpful in managing your stress? Why?
	
	How often do you use those techniques?
	• Do you use them routinely?
	• Do you do them when you experience a higher than usual amount of stress?
	• How could we incorporate that into the FVRx program?
	
	How do you think **stress affects your diet**?
	• What has your experience been with eating and shopping for food when you're stressed?
	• Tell me about the most recent time you were stressed and what sorts of foods you bought and ate.
	  ○ Why do you think you did that?
	• How has this changed since the spread of the COVID-19/Coronavirus?
	  ○ How has your diet quality changed, if at all?
	
	Often people in these programs struggle to afford buying healthy food. What has been **your experience with buying healthy food?**
	• Acknowledgement of answer/restate if necessary.
	  ○ Do you ever worry where your next meal is going to come from? Does that ever happen?
	• What kind of ***challenges*** have you faced with buying healthy food?
	• How have you adapted shopping habits since covid-19/coronavirus to help shop for healthy foods?
	  ○ What makes it ***easier*** to buy healthy food?
	
	The last time you had issues buying food, **what was your mindset like**?
	• How would you ***describe the emotions you experience*** in these situations?
	• How do you deal with those feelings?
	• Is these instances, what are you most focused on?
	
	What sort of ***<u>strategies</u>*** do you use to make your food last between trips to the store?
	• Example: shopping sales, selectively buying ingredients to stretch your food budget
	• How often do you use that strategy?
	  ○ What sorts of things are you doing on the days that your aren't using that strategy?
	
	Tell me about a time recently where you had to make a ***decision*** **<u>or trade-off</u>** about what you would spend money on.

	• Sometimes in those situations people put off the less immediate things. Like putting off a medical check-up or not exercising. Do you ever do anything like that? What sorts of trade-offs have you made? • What would be the first thing to go if you have to make sure you have enough money to eat this week? • How does it ***feel*** to make those decisions? What is your **mindset** like in those instances? In what ways do you think your experiences with food-related stress have affected ***your health***? • Some examples: constant worrying, chronic health conditions, motivation, etc. • In what way? Can you describe it? • *If chronic condition mentioned* -> How did you actively try to alter your diet when you were diagnosed with this condition? o *What challenges have you run into with that?* In what ways did the fruit and vegetable prescription program help out with any of the things we've been talking about – developing strategies, stress, health, or others? • In what ways could it have done **a better job** of addressing these things? • We've talked about adding other things to these programs like stress management topics. What could we add? What other things could we do to address this? • How do you cope with your food-related stress? What could we incorporate into the program to address that? What other ideas do you have for the program? What kind of things would you like to see from these programs in the future? What else would you like to say about your experience in the program?
End	Thank you for your time and your honest answers. Your feedback has been really informative and will be helpful as we think about how to make the program better.

Demographic questions

- Site of FVRx Program Participation: _____
- Participant age: What is your age? _____
- Household size: How many people live in your household? _____
    - Do any children live in your household? _____
    - How many children live in your household? _____
    - What ages are the children in your household? _____
- Who is the primary person responsible for food purchasing in your household?
- Who is the primary person responsible for meal preparation in your household?
- Race: What is your race?
    - Asian or Asian American
    - American Indian/Alaskan Native
    - Black/African American or Caribbean American

- Hawaiian/Pacific Islander
- White/Caucasian
- Other (please specify: _____)

- Ethnicity: Are you Hispanic or Latino? _____
- Education: What is the highest grade or year of school you completed?
  - Less than a high school degree
  - High school or GED certificate
  - Two- Year College or technical school degree
  - Four-year College or technical school degree
  - Some college / technical school but have not graduated.
  - More than four-year college degree
- Marital status: What is your marital status?
  - Single
  - Married
  - Separated
- Employment status:
  - Employed part-time.
  - Employed full-time.
  - On disability
  - Unemployed

Screening Tools

- Food security screener

Screening Tools

For the following questions, please check the box that best fits the way you feel about the food eaten in your household over the last 30 days.

	Often	Sometimes	Never
1. During the **last 30 days**, how often was this statement true: *The food that we bought just didn't last, and we didn't have money to get more.*	☐	☐	☐
2. During the **last 30 days**, how often was this statement true: *We couldn't afford to eat balanced meals.*	☐	☐	☐

	Yes	No
3. In the **past 30 days**, did you or other adults in your household ever cut the size of your meals because there wasn't enough money for food?	☐	☐
If yes, how many days did this happen?	_____days	
4. In the **last 30 days**, did you ever eat less than you felt you should because there wasn't enough money for food?	☐	☐

5. In the **last 30 days**, were you ever hungry but didn't eat because there wasn't enough money for food?	☐	☐