Distribution Agreement

In presenting this thesis or dissertation as a partial fulfillment of the requirements for an advanced degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis or dissertation in whole or in part in all forms of media, now or hereafter known, including display on the world wide web. I understand that I may select some access restrictions as part of the online submission of this thesis or dissertation. I retain all ownership rights to the copyright of the thesis or dissertation. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

Signature:

_____ _____

Taylor Lee Chong Date

Understanding Georgia Food 4 Health Client Experiences (GF4H) with the Virtual Platform

By
TAYLOR LEE CHONG

Master of Public Health
Hubert Department of Global Health
Rollins School of Public Health
Emory University

_____

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

Understanding Georgia Food 4 Health Client Experiences (GF4H) with the Virtual Platform

By
TAYLOR LEE CHONG

Master of Public Health
Hubert Department of Global Health
Rollins School of Public Health
Emory University

Bachelor of Science
Biochemistry and Nutrition
University of Miami
2019

Bachelor of Arts
Religion and Healthcare
University of Miami
2019

Thesis Committee

Amy Webb-Girard, PhD
Committee Chair

An abstract submitted to the Faculty of the Hubert Department of Global Health Rollins School of Public Health of Emory University in fulfillment of the requirements for the degree of Master of Public Health 2021

Abstract

Understanding Georgia Food 4 Health Client Experiences (GF4H) with the Virtual Platform

COVID-19 led to the physical closure of businesses, schools and sporting activities worldwide. In an attempt to adapt to new conditions, many of these activities migrated to an online platform. Similarly, the Georgia Food for Health (GF4H) program shifted to an online learning platform in order to maintain a safe environment for the participants and the instructors. The GF4H program is a "Food As Medicine" interventions that involve medically tailored meals, medically tailored groceries and produce prescriptions, and is delivered through the healthcare system. The goal of these interventions is to improve nutrition, prevent, manage and treat chronic diseases and reduce the number of hospital admissions via improved diet quality. However, although there have been studies which have evaluated general online learning programs, as well as the "Food As Medicine" (FAM) interventions, there have not been any studies which have evaluated online "Food As Medicine" (FAM) interventions. Hence, a process evaluation was performed in order to provide the GF4H program's implementing partners with feedback from participants' experiences with the online format of the GF4H program. This feedback will be beneficial for making modifications to the program's delivery for the 2021 cohort.

By
TAYLOR LEE CHONG

Understanding Georgia Food 4 Health Client Experiences (GF4H) with the Virtual Platform

By
TAYLOR LEE CHONG

Master of Public Health
Hubert Department of Global Health
Rollins School of Public Health
Emory University

Bachelor of Science
Biochemistry and Nutrition
University of Miami
2019

Bachelor of Arts
Religion and Healthcare
University of Miami
2019

Thesis Committee

Amy Webb-Girard, PhD
Committee Chair

A thesis submitted to the Faculty of the Hubert Department of Global Health Rollins School of Public Health of Emory University in fulfillment of the requirements for the degree of Master of Public Health 2021

Acknowledgements

First and foremost, I would like to thank Dr. Amy Webb-Girard, for her patience, kindness, and immense expert knowledge on food security that guided me throughout the writing and data tool creation process. I would also like to thank the Georgia Food for Health (GF4H) team at Grady Health System, Wholesome Wave Georgia and Open Hand Atlanta, for providing me with the opportunity to work on the GF4H project. I would like to also give a special thanks to the GF4H program's Registered Dietitian Nutritionists (RDN's) at Grady Health System, as well as Katie Mooney, the Manager of Community Benefit & Population Health at Grady Health System, for the assistance during the participant recruitment, data tool development and data collection processes for the process evaluation of the GF4H program's 2020 cohort. Finally, I would like to thank my parents, siblings, and friends, for their understanding and encouragement over the past two years.

Table of Contents

I. Preface

List of Acronyms

ED	Emergency Department
FAM	Food As Medicine
FAO	Food and Agriculture Organization of the United Nations
GF4H	Georgia Food for Health
IRB	Institutional Review Board
RDN	Registered Dietitian Nutritionists
SNAP	Supplemental Nutrition Assistance Program
SNAP-Ed	Supplemental Nutrition Assistance Education Program
USDA	US Department of Agriculture
WHO	World Health Organization
WIC	Supplemental Nutrition Program for Women, Infants, and Children

II. Introduction

Rationale

The Georgia Food for Health (GF4H) program is a component of the Food as Medicine program at Grady Healthcare. GF4H is implemented in partnership with Wholesome Wave Georgia, Open Hand Atlanta, and Grady Healthcare. The fundamental hypothesis underlying the program is that improving food security for lower income individuals supports shifts to a healthier dietary pattern and helps prevent disease. In 2017, greater than 50% of Grady's primary care patients were determined to be food insecure, and a significant proportion of these patients battled with chronic diseases (United Healthcare Community & State, 2020). Dietary interventions have proven to reduce the incidence of chronic diseases (Ojo, 2019). Therefore, the GF4H program at Grady Health System couples hands-on cooking classes guided by the evidence-based Cooking Matters model, with initiatives that improve access to fresh produce through fruit and vegetable prescriptions and Medical Nutrition Therapy (MNT) for chronic diseases.

Problem Statement

Inaccessibility to nutritious food is a multifaceted issue, which is not only fueling the global obesity crisis, but is also contributing to food insecurity and hunger worldwide (Dietz, 1995). Worldwide obesity has more than doubled since 1980 (Fox, Feng, & Asal, 2019). Its rapid growth and widespread consequences has become a public health epidemic in both developed and developing countries worldwide (Hruby & Hu, 2015). Programs such as the GF4H program, that are delivered through the healthcare system, offer a unique opportunity to tackle both issues of chronic disease incidence and food insecurity.

Traditionally, the GF4H program has been delivered in-person. However, due to the COVID-19 pandemic, the education components of the program shifted to an online-learning platform. The need to maintain a safe environment for both the participants and the instructors influenced this decision. The 2020 cohort experienced lower enrollment rates and higher dropout rates than previous in person versions. Therefore, with the program model differing significantly for this cohort compared to previous cohort, there is a need to understand to understand participant perceptions of the new format and factors that contributed to the higher dropout rate. This will allow for timely and appropriate changes to be implemented prior to the next cohort.

Purpose Statement

The primary purpose of this study is to provide the GF4H program's implementing partners with feedback from participants' experiences with the online format of the GF4H program. This feedback will be beneficial for making modifications to the program's delivery for the 2021 cohort. The components of the program that were explored include:

1. Participant experiences with the educational component of the GF4H program such as the educational material, classroom environment and experiences with the instructors.
2. Participant experiences with the food deliveries.
3. The role that technology played with participant participation during the GF4H program.
4. The role that personal factors such as health-related issues, work schedules and family life played with regard to participant participation during the GF4H program.

Significance

COVID-19 led to the physical closure of businesses, schools and sporting activities worldwide. In an attempt to adapt to new conditions, many of these activities migrated to an online platform. Similarly, the GF4H program shifted to an online learning platform in order to maintain a safe environment for the participants and the instructors. Online learning involves the use of the Internet to create, delivery and manage educational material and programs (Fry, 2001). There have been numerous studies that have evaluated online learning in nonmedical contexts. Online learning platforms have been determined to result in cost-saving benefits of nearly 50% versus traditional learning. These cost-saving benefits were attributed to reduced instructor training time, institutional infrastructure, and travel and labor costs (Ruiz, 2006). However, other studies have indicated that fully virtual learning programs have worse outcomes than traditional learning due to factors such as high dropout rates, a lack of physical face to face interaction and activities, as well as a lack of accountability for students and instructors (Ahmed, 2010). Hence, there is a need for organizations to understand the benefits and limitations associated with online learning, in order to increase the effectiveness and efficiency of participants' learning experiences (Hrastinski, 2008).

Through a process evaluation of the GF4H program at Grady Healthcare, other community organizations and healthcare systems can better understand how to implement a comprehensive food security program with primary care patients living with chronic diseases. Wholesome Wave Georgia, Open Hand Atlanta, and Grady Healthcare will use these process evaluation results to understand the factors that affected participant participation and areas where improvement is needed. This process evaluation will also provide a springboard for a more comprehensive impact evaluation of the program and future grant funding for programs. With

the knowledge gained from this project, the GF4H program can increase the quality of the services offered. These findings will help the GF4H programs collaborative partners become closer to its goal of reducing chronic disease incidence amongst primary care patients by increasing their access to affordable, nutritious and culturally relevant foods and promoting behavioral change through educational efforts.

III. Literature Review

Food Security in the US

The US Department of Agriculture (USDA) defines food insecurity as "a household-level economic and social condition of limited or uncertain access to adequate food" (USDA Economic Research Service, 2020). In 2019, an estimated 10.5% of American households were food insecure at least once for the year. These food insecure households accounted for 35.2 million adults and 5.3 million children (USDA Economic Research Service, 2020).

According to the Food and Agriculture Organization of the United Nations (FAO), food insecurity is influenced by 4 components: access, availability, utilization and stability. Availability refers to the availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports. Access refers to households having enough resources to obtain food in sufficient quantity, quality and diversity for a nutritious diet. On the other hand, stability refers to having access to adequate food at all times, while utilization refers to consumption of food through adequate diet, clean water, sanitation and health care that helps individuals attain a state of nutritional well-being where all physiological needs are met (Napoli, M. et al., 2011).

Food Security in the Atlanta Metro Area

In 2018, 1.32 million Georgia residents were considered food insecure, and 127,960 of those residents resided in Fulton County. However, since the declaration of the pandemic, these statistics have drastically increased due to high unemployment rates. Statewide, food insecurity prevalence rose 42%; from 13% pre-pandemic to 18% by May 2020. In Fulton county; food

insecurity increased by 39.8%; from 12.5% pre-pandemic to 17.5% by May 2020 (Feeding America, 2020).

A widespread shift to an online learning environment contributed to high unemployment rates and loss of household earnings globally. COVID-19 affected individuals' ability to work because their employers closed or lost business due to the pandemic, and many workers were not paid for missed work. There are studies, which illustrate a negative correlation between unemployment and a household's food security status. High unemployment rates among low-income populations, inhibits their ability to meet basic household food needs (Nord, 2007). This not only affects adults, but also affects children. Food security rates are higher amongst children with unemployed parents when compared to those with employed parents. Children with unemployed and disabled parents comprised of 15% of households with food insecurity among children and 23% of households with very low food security among children (Nord, 2009).

Social & Structural Determinants

There are many social and structural factors that affect the 4 components of food insecurity. Compared to 2019's national average of 10.5%, 34.9 percent of households with incomes below the Federal poverty line were food insecure. Therefore, the risk for food insecurity increases when money to buy food is limited or unavailable. Furthermore, food insecurity rates were substantially higher among single-parent households, and for Black and Hispanic households. Moreover, neighborhood conditions can affect individuals' physical access to food. Evidence from the USDA's 2019 population survey indicated that food insecurity was more prevalent in large cities and rural areas than compared to suburban areas (USDA Economic Research Service, 2020). This can be attributed to limited access to supermarkets; a phenomenon

known as food deserts. In the US, there is an estimated 23.5 million Americans live in food deserts, which subsequently affects the quality, cost, and variety of foods available to these individuals (USDA Economic Research Service, 2020).

Health Outcomes

The World Health Organization (WHO) estimates that low fruit and vegetable intake is the primary contributor to 16 million disability-adjusted lost years of life and accounts for 2.8% of deaths worldwide annually (WHO, 2003). Food insecurity increases one's risk for negative health outcomes. There is a large body of research, which illustrates the impact of food insecurity on health outcomes, and many diet-related diseases have been associated with food insecurity.

Diabetes

The literature indicates that food insecurity results in poor glucose management and is therefore a risk factor for diabetes (Seligman et al, 2007; Seligman & Schillinger, 2010). A large-scale longitudinal survey, which compared American adults' diabetes risks in food-secure households and food-insecure households, indicated that food-insecure adults' diabetes risk increases by 50% (Seligman et al, 2010). Despite controlling for risk factors such as income and employment status, supporting evidence indicates that food-insecure adults remain two to three times more likely of developing diabetes than adults who are food-secure (Fitzgerald et al., 2011). Food insecurity also affects the health of pregnant women, as their risk for gestational diabetes increases with worsening food security status (Laraia et al, 2010). Typical diets in food-insecure households comprise of refined carbohydrates, saturated fats, processed foods and high

sugar intake; food groups which are significant contributors to increasing their risk for diabetes onset (Morales & Berkowitz, 2016; Seligman et al., 2010). Nonetheless, despite these associations between diabetes onset and food insecurity, more longitudinal studies are needed to establish a more comprehensive relationship between both components.

Obesity

Studies have also illustrated that food-insecure adults may be at an increased risk for obesity (Pan, L. et al., 2012). A study was conducted by Pan et al., to determine the association between food insecurity and obesity amongst non-institutionalized individuals in 12 states. The findings indicated that food insecure adults had a 32% increased risk of being obese compared to those who were food secure (Pan, L. et al., 2012). Although there is a need to understand the causal factors that result in a relationship between food insecurity and obesity, there are two dominant hypotheses in the literature. The literature indicates that there is an association between obesity and increased food insecurity due to either high calorie palatable food being consumed by low food secure populations, or low food-secure populations' limited knowledge, time and resources limit their ability to engage in healthy eating and lifestyle practices (Drenoski & Darmon, 2005; Kendall et al., 1996).

Hypertension

Studies have established that there is an association between food insecurity and hypertension. Using data from the 2011-2015 National Health Interview Survey (NHIS), Gregory & Coleman-Jensen quantified the prevalence of hypertension amongst adults in households with high, marginal, low, and very low food security. Hypertension prevalence was

determined to be 19.7, 23.6, 28.0, and 36.1 percent for adults with high, marginal, low, and very low household food security, respectively (Gregory & Coleman-Jensen, 2017). Furthermore, from this study, Gregory & Coleman-Jensen quantified the risk of developing hypertension in severe food insecure households as 10.5% (Gregory & Coleman-Jensen, 2017).

Similarly, there have also been studies that studied the association between food insecurity and hypertension amongst children. Using data from the 2007-2014 National Health and Nutrition Examination Survey (NHANES), South et al., studied the association between hypertension and food insecurity. From this study, South et al. determined that obesity promotes the association between hypertension and food insecurity in low-income settings. South et al. indicated that one in five children ages 8-17 lived in a food insecure household, and the hypertension prevalence amongst children living in food insecure households was 14.4% rather than 11.6% for children living in food secure households (South et al., 2019).

Therefore, these studies have illustrated that one's risk of being hypertensive increases amongst food insecure individuals when compared to normotensive individuals who were food secure. Nonetheless, there is a need for future research to examine the role that lifestyle and environmental factors play in increasing food insecure individuals' risk of developing hypertension.

Mental Health

A study conducted across 149 countries by Dr. Jones, determined that food insecurity worsened specific psychosocial stressors such as anxiety, resulting in poorer mental health. These findings were associated with the difficulty to acquire sufficient food and were determined independent of individuals' socioeconomic status. Furthermore, this study also illustrated the

relationship between food insecurity and mental health in severe food insecurity conditions. Jones illustrated that under severe conditions individuals may resort to acquiring food in socially unacceptable ways that invoke the feelings of shame and guilt (Jones, 2017). These sentiments, amongst individuals coping with severe food insecurity, can exacerbate pre-existing anxiety caused by mild food insecurity, resulting in poorer mental health conditions (Jones, 2017). Hence, these findings indicate that addressing mental health issues such as depression may be an important factor in reducing the experience of food insecurity (Hur et al, 2015).

Strategies Used to Address Food Security

Federal Programs

Voucher Programs

Federal voucher programs such as Supplemental Nutrition Program for Women, Infants, and Children (WIC) and Supplemental Nutrition Assistance Program (SNAP), aim to increase individuals' access to healthy food. SNAP transfers cash benefits onto an Electronic Benefits Transfer card to qualified low-income Americans, which they can use to purchase food. On the other hand, WIC provides food supplements and nutrition counseling to low-income pregnant and lactating women and children up to 5 years old.

Studies have shown that federal nutrition assistance programs such as WIC and SNAP are effective. Benefits such as reduced infant mortality and improved maternal health and weight status, birth outcomes, and childhood school readiness, are associated with enrollees in WIC and SNAP programs (Bruening, M. et al., 2017; Jackson MI, 2015; Metallinos-Katsaras, E. et al. 2015). However, these programs have been unable to improve the affordability of healthy food for low-income families. Furthermore, another great flaw of these programs is the eligibility

requirements of retailers. The current requirements stipulate that eligible retailers must offer at least three varieties of each staple food group. Hence, many neighborhood food stores are ineligible, resulting in individuals travelling long distances to SNAP and WIC authorized retailers for healthy food.

School-Based Programs

School-based federal programs such as the School Breakfast Program (SBP), National School Lunch Program (NSLP) and Fresh Fruit and Vegetable Program (FFVP) are federal programs that aim to address childhood nutrition. The NSLP and SBP both work in a similar manner; participating schools receive cash subsidies from the USDA and in return, they provide nutritionally balanced, low-cost or free meals to eligible children every school day. On the other hand, while the NSLP and SBP serve K-12 children, the FFVP serves elementary school children. The goal of the FFVP is to provide free fresh fruits and vegetables to children every school day. These school-based federal programs are fundamentally based on the notion that introducing children to healthier foods will result in improved child nutrition and health, as well as school attendance, attentiveness, and cognitive abilities (Frisvold, DE, 2015; Zenebe, M. et al., 2018)

Educational Programs

Educational programs such as nutrition education and cooking classes, involve teaching individuals the nutritional value of and how to cook safely with produce at home. Evidence supports that educational programs are helpful in increasing individuals' knowledge and value of healthy foods, and reducing health outcomes associated with malnutrition (Fernández-Barrés, S,

et al., 2017; Hamulka, J, et al., 2018). However, the greatest criticism of this approach is that teaching people how to prepare healthy foods does not necessarily indicate that they would purchase healthier food. This is due to the challenges associated with behavior change in a physical built environment that reinforces alternative practices. This phenomenon is prevalent in food deserts, where individuals have to travel to distant neighborhoods where the healthy food they have learned how to prepare, is readily available (Bettinghaus, EP, 1986; Dahlgren G, et al., 1992; Ingham R, et. al., 1992; Swinburn B, et al., 1999).

Community-Based Food Strategies

Accessibility to nutritious, high quality and affordable food has long been a challenge in low-income and rural areas in the US; an issue which is further exacerbated in food deserts. However, community-based strategies such as community gardens and farmers markets are popular strategies, which have been proven to be beneficial in improving food access in communities. Community-based food strategies differ from other food strategies due to their emphasis on three main components: consumer relationships with producers, incentivizing food purchases from local producers and maximizing the purchasing power of low-income consumers.

Farmer's markets not only increase the availability of produce available to communities, but can also provide nutritional education and information on optimizing shopping and food preparation activities. Due to its ease to implement, low costs and relatively small space requirements, farmers' markets are a USDA recommended community-level intervention to improve food accessibility in food deserts (Ahn, S, et al., 2014; Ghosh-Dastidar, B et al., 2014). Similarly, a growing body of research indicates that community gardens improve health, produces adequate amounts of food, and provides multiple forms of ecosystem services.

Similarly, findings indicate that a community garden improves the availability of fruit and vegetables within a community. Community gardens are especially beneficial in communities where geographic and economic barriers to fresh foods exist (Iuliano et al., 2017).

Outpatient Nutrition Programs

The healthcare system offers a unique opportunity to tackle both issues of chronic disease incidence and food insecurity. Evidence suggests that nutrition interventions delivered through the healthcare system, improves health outcomes, reduces the use of healthcare services and improves one's food security status (Downer, S, et al., 2020). Integration of food and nutrition interventions into the healthcare system is an initiative known as "Food As Medicine" (FAM). The components of outpatient nutrition programs include nutrition education, nutrition counseling, and cooking demonstrations. Nutrition education and counseling involve one-on-one consultations with Registered Dietitian Nutritionists (RDN's) that are created to address the specific nutritional needs of the patient that will result in lasting lifestyle changes. RDN's can help the participant address many health issues including digestive problems, high blood pressure, diabetes, cardiovascular disease, etc. On the other hand, the goal of cooking demonstrations for "Food As Medicine" interventions, is to provide nutritional information and hands-on practice with preparing healthy meals and recipes (Maclellan & Berenbaum, 2003; Maclellan & Berenbaum, 2006).

Food As Medicine Model

"Food As Medicine" interventions involve medically tailored meals, medically tailored groceries and produce prescriptions. The goal of these interventions is to improve nutrition,

prevent, manage and treat chronic diseases and reduce the number of hospital admissions via improved diet quality. These interventions are directed by clinicians through the healthcare system, and are usually offered for free or at a subsidized cost to the patient. A nationally validated, two-question food insecurity screening is used to identify food insecure patients in the healthcare system (Hager et al., 2010). Once identified by their healthcare provider, patients are referred to the program and additional resources. RDN's are responsible for designing and preparing the meals, which participants will cook in the program. RDN's propose a treatment plan of non-prepared produce items for the patients or provide professionally prepared meals by an RDN; a component known as the medically tailored groceries. Then, the healthcare facility provides patients with vouchers or discounts to purchase the produce. Programs that follow this model also have an educational component whereby patients are taught how to prepare meals using the produce and dietary guidelines given by the RDN's.

An evaluation of a FAM intervention amongst patients in the Southeastern Pennsylvania and the Lehigh/Capital region, indicated that patients had lower HbA1c levels, emergency room (ER) utilization, inpatient admissions and primary care physician (PCP) and specialist visits, following completion of the program (Health Partners Plans, 2017). However, findings can be improved by improving the rigor of evaluations of FAM interventions via larger randomized clinic trials. Moreover, apart from using biological data and medical records, qualitative research is equally important in the evaluation of the "Food As Medicine" model. Qualitative research allows us to understand participant experiences and perspective, which can help to guide future program design (Patient-Centered Outcomes Research Institute, 2019).

Effectiveness of Virtual Nutrition Programs

Nutrition education programs such as the Supplemental Nutrition Assistance Education Program (SNAP-Ed) are traditionally taught in-person. However, virtual alternatives of nutrition education programs provide a greater reach, lower program costs and flexibility for participants. Computer literacy, access to technology devices and Internet accessibility, are imperative for virtual learning platforms. However, issues associated with virtual learning, exceed equity and accessibility to technology. Other common issues include lack of social interaction and lack of student engagement. Nonetheless, all of these issues hinder programs' ability to induce significant behavioral change.

There is a lack of rigorous studies comparing traditional in-person nutrition education programs with virtual nutrition education programs for low-income individuals. However, a study conducted on Indiana SNAP-Ed participants was one of the first of its kind to compare nutritional behavioral changes amongst in-person nutrition education programs and virtual nutrition education programs, using a randomized trial approach. Overall, results from the study indicated that there were significant improvements of most nutrition behaviors except those associated with nutrition facts label reading for the online format. Although reasoning was not provided for this weakness, a feasible option may be to have hybrid components or optional in-person meetings that would help reinforce teachings for those respective components (Neuenschwander, LM, et al., 2013).

Summary

The "Food as Medicine" program at Grady is a coined the Georgia Food for Health program (GF4H). All Grady patients are screened for food insecurity using the nationally validated, two-question food insecurity screening that helps to identify food insecure patients in the healthcare system. If determined to be food insecure, the Grady patient is connected to resources depending on their health status and referred to the GF4H program. Apart from screening positive for food insecurity (USDA 2-item screener), other eligibility criteria for participating in the GF4H program include being 18 years or older and currently receiving healthcare from the Grady health system.

The "Food as Medicine" program at Grady comprises of a Food Pharmacy and Teaching Kitchen to enhance patients' ability to manage chronic conditions and make healthy lifestyle changes. These services a part of a comprehensive Food Prescription Program that includes fresh produce pickup, nutrition education and cooking classes. Food prescriptions provide patients with access to the Food Pharmacy biweekly for the duration of the program, which is typically 3-6 months. At the Food Pharmacy, patients receive a proportionate amount of fresh fruits, vegetables, healthy starches and grains, according to the size of their household. In addition to food provisions, GF4H participants are enrolled in nutrition and cooking classes that are administered by an RDN and cooking instructor. These components provide GF4H participants with the knowledge and skills to achieve healthy diet changes and manage their health conditions. Participants are also required to complete weekly food journals, which involve documenting their experiences applying the knowledge that they have learned from class to their meals at home, and completing a short quiz that tests their recollection of the nutritional material learned during the nutrition and cooking classes.

The GF4H program has been successful with reducing hospitalization time, reduce blood pressure, cholesterol and sugar levels, and result in many health improvements, and the program has been consistently gaining popularity. The success of the "Food as Medicine" program at Grady relies on the collaborative effort between various local organizations within the metro Atlanta area. Open Hand Atlanta and Wholesome Wave Georgia are responsible for providing fresh produce to the "Food as Medicine" program, as well as providing access to benefits outreach screeners that help connect patients to benefits programs such as WIC and SNAP. On the other hand, Grady provides the expertise needed for nutrition education, nutrition counseling and administering the cooking class demonstrations.

From 2015-2019, the GF4H program had a total of 853 participants, and 243 of these participants accounted solely for the 2018 cohort. From 2015-2019, the program was traditionally delivered in-person. However, following the decision to deliver the program using an online format due to the COVID-19 pandemic, enrollment rates significantly decreased to 68 participants. Along with the lower than usual enrollment rates, dropout rates were also unusually high for the 2020 cohort. Although there has been rapid COVID-19 vaccine development, vaccine access still remains an issue (Shen et al., 2021). Furthermore, the COVID-19 vaccine is not a cure following post-inoculation (Amanpour, 2021). Hence, it is still imperative to continue practicing preventative measures such as social distancing, hand washing and wearing a mask (Amanpour, 2021). Hence, due to the 33% increase in dropout rates, there is a need to understand the factors that led to the higher dropout, especially since the COVID-19 in-person restrictions are still being adhered to in many healthcare settings.

IV. Methods

Study Design

A process evaluation of the GF4H program was conducted to understand participant perceptions of the online format and factors that contributed to patient retention and dropout. The process evaluation followed a cross-sectional exploratory design, whereby data collection occurred within a population at a specific point of time. Process evaluations help to determine whether program activities have been implemented as intended by identifying gaps between program design and real-life delivery, and factors that led to a successful outcome. Overall, process evaluations can help professionals understand the barriers and best practices associated with implementing interventions. Information from process evaluations is critical to understanding how to design programs, and modify future programs that improve the effectiveness and efficiency of the intervention, and result in the desired change.

Study Location & Population

A total of 68 participants enrolled in the GF4H program's 2020 cohort. A process evaluation was conducted using 14 of those participants that enrolled in the program. The study population consisted of participants from the following locations of the Georgia Food for Health (GF4H) program's 2020 cohort: East Point, Oncology, Asa Yancey and Ponce de Leon location. A total of fourteen in-depth interviews were conducted. Three of those interviews were participants that dropped out of the program and eleven interviews were participants that completed the program. In this study, the participants' ages ranged from 34 to 78. Four of the participants were male while ten were female.

Participant Recruitment

RDN's that worked with the GF4H participants from the following Grady locations: East Point, Oncology, Asa Yancey and Ponce de Leon locations were a critical of the recruitment process. Due to their pre-existing established relationship with the participants, they served as gatekeepers for participant recruitment. The dieticians contacted all participants from the GF4H program inquiring about whether they will be interested in participating in an interview about their experiences with the program. A $10 Kroger gift card was used as an incentive for participants that complete the interview. Interested participants then provided the dieticians with their typical weekly availability to conduct the interview. Then, interested participants' names, contact information and availability were compiled into a single encrypted spreadsheet.

Development of Data Collection Tools

Despite developments with COVID-19 vaccine development and distribution, COVID-19 in-person restrictions are still being adhered to in many healthcare settings. This is due to the fact that the COVID-19 vaccine is not a cure after contracting virus post-inoculation and only 20% of the American population has been fully vaccinated. Therefore, since there is a high probability that the 2021 GF4H cohort will be administered online, multiple discussions were conducted with the GF4H's program partners to determine their evaluative needs. These discussions provided insight on the different components involved in the delivery of the GF4H program, and areas which the program's collaborative partners wanted to gain insight on from the participants' perspective. Using this knowledge, an in-depth interview guide was created via an iterative review process from the program's collaborative partners.

Outcomes of Interest

The in-depth interview guide focused on 4 central themes. These included:

1. Participant experiences with the educational component of the GF4H program such as the educational material, classroom environment and experiences with the instructors.
2. Participant experiences with the food deliveries.
3. The role that technology played with participant participation during the GF4H program.
4. The role that personal factors such as health-related issues, work schedules and family life played with regard to participant participation during the GF4H program.

However, the emerging theme of diversity arose during participant discussions about the GF4H program.

Data Collection & Management

In-depth interviews were conducted over the phone. Informed consent was acquired after the participant was provided with sufficient knowledge about the interview, its purpose and how the information collected would be used. All interviews were recorded following participant consent on another Apple device using the Voice Memo app. Following completion of an interview, the recording was stopped and the interview was transferred to a qualitative analysis software called MaxQDA.

Data Analysis

Coding of data was completed using the qualitative analysis software MaxQDA. Seven transcripts were read and memoed twice, and were memoed to capture emerging themes. This was done in order to determine if modifications of the interview guide were needed to tailor the

guide to the interviewees' experiences with the GF4H program. Inductive and deductive codes were applied. Following this process, detailed summaries were conducted for the remainder of interviews.

Ethical Considerations

Study procedures were deemed exempt from human subjects review by the Emory University Institutional Review Board (IRB) and Grady Research Oversight Committee. All participants provided informed consent, and all transcripts and detailed summaries were de-identified prior to analysis.

V. Results

Overall, participants had a positive experience with the program, regardless of whether the completed or dropped out of the GF4H program. Out of the fourteen participants that were interviewed, eleven participants completed the program and three participants dropped out. Furthermore, only one of the dropout participants expressed that they had a strongly negative experience with the program. Participants described a variety of factors that influenced their positive or negative experiences with the GF4H program. The most common emotions described by participants were technology, difficulty and workload of assignments, time, classroom environment, food deliveries, diversity of food, recipes and instructors, unfamiliar foods and convenience versus choice.

Technology

Thirteen out of fourteen participants stated that they mostly used a portable technology device such as a phone or tablet to access the synchronous and non-synchronous class materials; only one participant used a computer for the Zoom class and educational materials. When questioned about the driving factors that influenced their decision to drop out or stay in the program, all three dropout participants stated that technological issues played an integral role in their decision to end their participation in the program. When describing their grievances with the online platform, all three participants concurred that they had the most issues with accessing Zoom for the synchronous weekly class, and one participant stated that they also experienced issues navigating the Healthie App to upload their food diaries. Access to Internet or Wi-Fi connectivity did not play a role with these technological issues:

"Before this class, I never used Zoom… I had access to the Internet but I had so many problems logging into the class."

"I live with my elderly parents and they do not use the Internet that much… The Wi-Fi connection was never a problem for me. The problem was getting onto the class. I tried for over ten minutes and still couldn't get on to the class."

"I never used an app like the Healthie App before… Uploading the pictures of the meals was very difficult for me."

However, when participants who dropped out of the GF4H program had technical difficulties, they expressed their concerns to the instructors:

"If I had a problem, I would always reach out to [cooking instructor]. She really tried to work with me…. I would call her and ask her to help me but the problem was still there… I just couldn't fix it so they sent someone to give me a tablet."

However, one of the dropout participants stated that the coupling of the technological issues and their experiences with the instructors and learning atmosphere compounded their decision to cease their participation the Georgia Food for Health (GF4H) program. This participant stated that how the instructors handled their technical problems, created a negative classroom environment for the participant:

"I had difficulty getting on to Zoom for the first class but reached out to [cooking instructor and RDN] and told them about my situation… They told me it was fine so I decided to attend the next class… I encountered problems again but was able to fix it on

my own. But when I got onto the class the [RDN] singled me out infront of the entire class about my technical difficulties… That made me feel so embarrassed so I stopped going to the class after that."

It is important to note that dropout participants were all over the age of 55 years old and only one participant had prior online class experience during a Master of Divinity (M. Div) degree program.

On the other hand, all participants that completed the program stated that they did not have technical difficulties using the Healthie App. However, two participants that completed the program expressed that they experienced technical issues due to either using their phone's mobile hotspot or a public Wi-Fi connection that day.

Assignment Difficulty / Workload

Homework for the Georgia Food for Health (GF4H) program comprised of two components. For homework, participants were required to watch nutritional videos and take a quiz testing their knowledge on the material; they also were required to cook the meal of the weak and upload pictures of the meal to the Healthie App, which served as a food diary. No participant expressed concerns with the nutritional video homework requirement. However, three participants expressed concerns with the tedious nature of the food diary homework component. Of these three participants, two dropped out while one completed the program. When discussing their frustrations with this component of the program, the theme of trust was introduced. These participants expressed that they perceived the requirement of having to upload a picture to their food diary, as a safety mechanism for the instructors that will ensure that participants are

completing tasks. They perceived the food diary requirement as a means of showing proof that they completed the assignment and expressed that they felt that the instructors did not trust that they would cook the healthy and nutritious meal if they were only told to.

> *"On top of coming to class every week, watching the videos at home, making sure that someone's at home to collect the food and working five days per week and seeing about my family, you guys want me to take pictures to show y'all that I'm cooking the recipes?...You guys are asking a lot from me."*

> *"I like to try new foods and if it's healthy, I'll try to cook it at least once… So why the need for a photo requirement? I'm enrolled in this program because I want to improve my health so the instructors should at least have some faith in me."*

Time

Overall, most participants were satisfied with the times available for synchronous classes and the length of the classes. Those that weren't satisfied with the times available for synchronous classes were predominantly working individuals with dependents that required care. These participants recommended that the evening classes be approximately 1 hour later, since they found themselves rushing home from work to take care of their dependents before class:

"I've got kids and when I get home, I have to clean up ad cook dinner really quickly so that they don't bother me during the class."

Moreover, all participants explicitly stated that they were satisfied with the length of the synchronous Zoom classes. Nonetheless, participants expressed that there were issues of time-wasting during the beginning of the synchronous Zoom classes. They stated that technical troubleshooting was the main contributing factor to this issue, and would result in material that was already covered, having to be covered again for participants that missed it:

> *"When one person had technical difficulties, it would keep back the whole class when the jump onto the class…The instructors would repeat everything they already covered at the beginning of class, even for just one person."*

Classroom Environment

All participants stated that instructors were readily accessible outside of class and all but one indicated that they had an amicable relationship with the instructors. The one participant that had a strongly negative relationship with the instructors dropped out of the program:

However, all participants expressed a lack of interaction between fellow participants. Although each participant stated that the instructors would ask the class questions such as "What new recipes did you make this week?" that would help to facilitate discussion, participants felt like the discussions did not lead to the building of meaningful relationships with other participants:

> *"The teachers would ask question like, what new recipes did you make this week? This didn't really do a lot to get everyone talking since it was the same people [classmates] talking each class."*

Participants stated that they only had a cordial relationship with other fellow participants:

"I never had an issue with the other people in the class. But I can't say that I got to know any of them… I would tell them hello and that's it."

"We didn't really have a lot of activities to build relationships with other people in the class…. No breakout rooms… We just listened to the teachers talk and prepare the meals."

Food Deliveries (Quality & Quantity)

The food delivery component of the Georgia Food for Health (GF4H) program was one of the areas where participants saw the greatest need for improvement. Most participants stated that they experienced issues with the quality of the produce box in the beginning of the program. When, asked to elaborate on quality issues, participants stated that the poor quality of the produce seemed to have been incurred during transit; these participants ensured that the produce was not spoiled but was damaged during transit. Participants stated that these issues occurred mostly during the beginning of the program, and when these issues occurred, they contacted the instructors and were sent another delivery box to rectify the issue:

"I know spoilt produce when I see it so the produce was definitely not spoilt. However, it was bruised. The delivery guys needs to take better care of the produce."

Participants also expressed concerns about the quantity of produce in the delivery box. However, these concerns varied according to age and household size. Older participants, who tended to live alone, stated that there was ample produce in the delivery box to last them the intended time of two weeks. However, those with family members living with expressed concerns that the amount of food in the produce box was not sufficient to last their families two weeks. This population stated that the produce would only last for a maximum of ten days.

Convenience vs. Choice

With respect to the theme of convenience vs. choice, I asked all participants whether they would have preferred to choose their own produce at the farmer's market at Grady, or if they would've preferred to have their produce chosen by the GF4H staff and delivered to their homes. All but one participant stated that they would prefer to choose their own produce. Those in favor of choosing their own produce, stated that this method ensures that wastage of foods that they either didn't like or didn't know what to do with them, does not occur:

> *"I know what I like and that's what I'll eat... When you guys give me foods that I hate like eggplant, I'm not going to make it. The texture is off-putting so it just ends up staying in my fridge and then I have to throw it away."*

The one participant that preferred to have the produce delivered was a working father with a disabled dependent. Therefore, he appreciated the convenience since most of his time is spent either at work or caring for his dependent:

"I'm working a lot and then I have a disabled kid… Therefore, I liked the food deliveries… All I had to do was make sure that I'm home on the day that it was delivered. Easy and simple."

Unfamiliar Foods

Participants noted there were several times when they received foods and they didn't know what to do with them because they were not provided with instructions on how to prepare these foods in-class or in the recipes provided. The most popular options for managing unfamiliar foods included 1) calling a friend or family member and asking them how to cook it or 2) giving away the unfamiliar food to a person that knew how to prepare it. However, several participants admitted that the unfamiliar foods either spoiled in their refrigerators because they didn't know what to do with them or they would throw them away:

"I got something in my produce box and I had no clue what it was… We didn't even learn about it in class. So I looked it up online and couldn't find it. Then I asked my neighbor about it and she knew what it was so I gave it to her… If I kept it, it would've ended up rotting in my fridge."

Diversity

Diversity was introduced in a variety of ways such as with the food, recipes and instructors. Most program participants were people of color. Participants stated that they would have appreciated seeing more foods familiar to their populations and cultures such as collard greens, cabbage, etc.:

"Why couldn't we get some okra, more collard greens… That's the stuff we Black people like and grew up on… I'm sure there are ways to make those foods healthy."

Participants also stated that there were a lot of apples and that they would have liked more variety with the fruits:

"Oh my god… There were just too many apples. With every box, we would get apples. Like c'mon. Give me some other fruits."

This need for diversity also transcended into the recipes as participants stated that they would've liked to seen more culturally catered recipes. A small minority of the participants, i.e., two dropout participants and one participant that completed the program, indicated that these problems with diversity could possibly be attributed to the lack of diversity amongst instructors. These participants viewed instructors as individuals with the authority to create and modify lesson plans, learning materials, recipes, activities, and ensure that ethnic and cultural considerations are incorporated during the program development process:

"The recipes were fine. One was teaching us to make healthy tacos… That's a Mexican dish and I don't like Mexican flavors. So if the instructors could make Mexican food healthy, why couldn't they teach us how to make healthy Black people food…But the teachers won't understand because they're not like us [Black]."

Chapter 5. Discussion, Conclusions & Recommendations

In this section, the major findings of the process evaluation of the GF4H 2020 cohort will be discussed. The program will be assessed for the overall implementation of services offered and determine how successfully the project was implemented and identify program delivery gaps, based on participant experiences. Findings will be discussed in terms of common themes which GF4H participants thought influenced their participation in the program. The implications of these findings for the effectiveness of the program will also be discussed as it pertains to an online environment. Recommendations for improvement of the program will be made to increase the effectiveness of the program and improve dropout rates. Finally, the chapter will conclude with strengths and limitations and the importance of this process evaluation for a non-traditional delivery of FAM interventions.

Food Delivery

Grady's GF4H program involved participants learning how to cook nutritious and healthy food by participating in the synchronous Zoom class and completing the non-synchronous learning materials such as the Healthie app assignment. In order to apply their knowledge to action and upload pictures of the meals that they were required to prepare into the Healthie app, participants were provided with the necessary produce. Traditionally, there would be an outdoor market biweekly, whereby GF4H participants would be given vouchers to choose produce items of their liking. However, due to COVID-19 social distancing and in-person restrictions, produce was delivered to participants' homes instead. The GF4H program is based on the "Food as Medicine" interventions, with the goal to improve participants' diets and reduce chronic disease incidence. There is a gap within the "Food as Medicine" literature that evaluates food deliveries

on diet and chronic disease. However, a study conducted by Berkowitz et al., sought to evaluate the effects of a medically tailored meal delivery program on diabetics' dietary quality. Overall, diabetic participants from the Berkowitz et al. study experienced improvements in dietary quality. However, similar areas of limitations arose with regards to whether food choice vs. convenience played a role in reducing the positive impact of the study (Berkowitz, 2019).

Nonetheless, there have been studies, which have evaluated the effectiveness of convenience vs. choice in promoting healthy eating patterns. The GF4H program's delivery model is similar to the food distribution model of a direct feeding program whereby food products and meals are delivered directly to the participant. However, a limitation of this model is that it reduces food choice and causes issues of cultural acceptability or palatability to arise (Windham, 2009). All but one GF4H participant stated that they would prefer to choose their own produce. Furthermore, all participants in favor of being able to choose their own produce stated that they would make accommodations with their schedule to choose their own produce using a similar model to the Farmer's Market at the Grady locations, from previous years of GF4H program. However, if the program is unable to implement an in-person Farmer's Market, one possible alternative could be to send the participants a list with a variety of possible food items that participants could choose from for that particular week, and allow the participants to submit their choices prior to the day of delivery. A study conducted by Adams et al. 2016, proposes that a moderate to high level of individual agency is necessary to improve the effectiveness of interventions that are components of the GF4H program such as dietary counseling for patients with chronic diseases, cooking classes for older patients, nutrition education for individuals residing in deprived areas, and vouchers for free fruit and vegetables for low-income populations (Adams et al., 2016).

Food quality and quantity are also important factors when implementing "Food as Medicine" interventions. Findings from the process evaluation of the 2020 cohort of the GF4H program indicated that greater consideration must be taken into account, with regard to household size. Although 1-2 person households stated that the amount of food was sufficient for two weeks, households of greater sizes expressed that the quantity was inadequate for two weeks. Hence, this finding suggests that revisions need to be made to the metric scale used to allocate the amount of food items per person, especially for larger households. Involvement of household members is detrimental to the success of promoting healthy dietary and behavioral changes amongst patients. Not only does family involvement promote support for the participant, but it also improves the quality of the participant's lived food environment since household members are accounted for when determining the quantity of food delivered per participant (Fulkerson et al., 2018).

Moreover, quality issues with the produce box, were prevalent during the first month of the rollout of the GF4H program. These participants stated that they believe that quality was affected during delivery. However, participants stated that these issues were rectified quickly and did not progress later on in the program. Nonetheless, along with the pre-existing measures undertaken by those in-charge of the delivery component of the program, measures need to be implemented during transportation that will help to ensure the preservation of the produce's quality for the 2021 cohort. Food appearance and presentation is just as essential to the success of a dish as its taste and flavor. A study conducted by Van der Laan et al. used cognitive scientific reasoning to support the notion that food selection is firstly guided by the visual system (Van der Laan et al, 2012). Therefore, preservation of the produce's quality during deliveries is essential to influencing behavioral change and promoting participants to consume the produce.

Food Delivery Recommendation

The following are recommendations to improve the food delivery component of the GF4H program:

1. Provide an option where participants can choose what's in their produce boxes
2. Improve food quantity in produce box for larger households
3. Preserve produce quality during delivery

Education

Participants expressed a need for structure when it came to trying new foods. They stated that if they knew more about the foods that they were unfamiliar with and taught how to cook it from the learning materials, recipes or synchronous Zoom class, then they wouldn't have given the food item away or thrown it away. An evaluation of online nutrition education programs tailored towards low-income individuals indicate that skill-based visual education methods such as recipes, cooking videos, and step-by-step teaching tools are critical for effectively promoting dietary behavioral changes (Stotz et al., 2017). Hence, I recommend that the food items in the produce box be incorporated into the learning materials, recipes and synchronous Zoom class. Increased knowledge on all foods in the produce box, will better equip the participants with the necessary skills and tools to make these new dietary lifestyle changes.

Moreover due to the concerns expressed about the food and recipes' lack of cultural consideration, it is recommended that the program development team account for the cultural and ethnic backgrounds of their participants. Research has shown that food choices are strongly influenced by the culture of an individual's community or country (Enriquez & Archila-Godinez,

2021). Compounded by the fact that this program is trying to change participants' eating patterns, the GF4H program can be perceived as daunting for some participants. However, there are changes, which can be made at the program development stage for the 2021 cohort, that would make the participants feel at ease and valued. Possible areas where this can be achieved are by making healthy modifications to recipes that these communities are familiar with, and providing healthy produce options that they're familiar with such as leafy greens like collard greens. The type of education, how it is delivered and who it is targeted to are also important factors when trying to influence healthy food decision choices. Therefore, conducting focus groups with participants from previous years' cohorts prior the implementation of the upcoming GF4H cohort, can help to guide the development and incorporation of recipes and foods that are culturally-relevant to the target population (Eyles et al., 2009).

Education Recommendations:

The following are recommendations to improve the education component of the GF4H program:

1. Teach participants how to prepare the foods that they are receiving in the produce box.
2. Improve diversity of food and recipes

Participation

Elderly participants were in favor of a hybrid program. However, working participants preferred the online session. Working professionals tended to have dependents and stated that they preferred an online delivery of the GF4H program as opposed to an in-person format. Popular reasoning for this preference included factors that promote participant flexibility such as avoiding traffic while driving to their respective Grady location for the class, as well as being

able to take the class in the comfort of their homes and being able to readily respond to any concerns that their dependents had (Sinclair et al., 2015). An evaluation of the University of Massachusetts Worcester's School of Nursing indicates that offering courses and course activities either fully online or hybrid, led to increased student enrollment for typically low-enrollment courses and resulted in cost-savings for the school (Parker & Wassef., 2010). Therefore, these results show promise for the implementation of a hybrid or online delivery of the GF4H program, and its ability to result in increased enrollment rates in a non-pandemic setting.

If participants are not allowed to have a face-to-face interactive class at Grady, I suggest that breakout rooms be incorporated into the online synchronous Zoom sessions due to the common consensus centralizing on the lack of interaction amongst GF4H participants during the synchronous sessions. Adoption of this recommendation is fundamentally based on evidence that student presence and participation in online-based courses is related to learning outcomes (Ammenwerth et al., 2019).

Participation Recommendations

The following are recommendations to improve participant participation in the GF4H program:

1. To implement a hybrid program
2. To incorporate breakout rooms in synchronous sessions

Time

Working professionals stated that they would prefer an evening class that is approximately one hour later, since they found themselves rushing home from work to take care

of their dependents before class. A typical work schedule starts at 9:00am and ends at 5:00pm. Therefore, there is a need to account for working professionals by incorporating later class times for the 2021 GF4H cohort. Online classes accommodate both the participant and teacher, by providing both parties with the flexibility to attend the class from the comfort of their homes (Dhavan, 2020).

Moreover, although participants stated that were satisfied with the length of the synchronous Zoom class, they did express that there were issues with time management at the beginning of class, which led to time wastage. In order to maximize productivity during the synchronous Zoom sessions, the instructors can utilize a variety of time management skills. One possible solution is to host office hours after class in order to cover or answer questions about missed materials from the beginning of class. Evidence suggests that office hours help learners feel more connected, enhance their learning motivation, foster instructor-student rapport and helps instructors communicate efficiently with students and address questions and concerns (Guo et al., 2011). However, these findings were from the evaluation of traditional in-person office hours. Hence, there is a need for future research to determine the effect of online office hours for educational and nutritional programs like the GF4H program.

<u>Recommendations:</u>

1. To implement a later class time for working professionals
2. To improve time management at the start of class

Length of Program

Each participant, except the one participant that was extremely dissatisfied with the program, indicated that they would like a continuation of the program. Satisfied participants agreed that they acquired a lot of knowledge in a short time span, but believed that the length of the program was insufficient to induce true change. Thirteen of the participants stated that they were willing to learn more and although it's uncertain what a continuation of the program would look like, two participants suggested that even if there isn't enough resources for a continuation of the GF4H program, there should at least be a follow-up segment similar to "Where are they now?", in order to determine if individuals were successfully applying the knowledge to their daily lives. For those that lost their way, they suggested that this follow-up segment help to get these participants back on track.

Participants' desires for a continuation of the GF4H program offer an opportunity to implement long-term education programs. Participants' weight loss is a health indicator for the GF4H program. The program's 2018 impact evaluation indicated that body mass index and waist circumference decreased by 1.4% and 3.3% respectively. As previously established, there is a strong association between obesity and chronic disease incidence (Pan, L. et al., 2012). Additionally, evidence from the Dobbs et al. study that focuses on promoting adolescent weight loss, indicates that long-term, and multidisciplinary interventions are required to promote large weight loss reductions (Pan, L. et al., 2012; Dobbs et al., 2014). Hence, implementation of a long-term model of the GF4H program offers an opportunity to promote greater weight loss via improved nutrition education and food choices. This would subsequently result in reduced chronic disease incidence and more long-term results for the program.

Recommendations:

1. Implement a continuation of the program
2. Incorporate breakout rooms in synchronous sessions

Strengths & Weaknesses

A strength of this process evaluation of the 2020 cohort for the GF4H program is that the in-depth interviews were conducted by an researcher in order to mitigate bias. Program or clinic staff might want to prove that a program is working effectively, resulting in their interview responses being biased during the interview process. Therefore, since a researcher that was not affiliated with the program's instructors and implementers conducted created the data collection tool and performed the interviews, bias was minimized.

The flexibility of the interview format is also another strength of this study that helps to mitigate bias. In-depth interviews do not follow a rigid structure. Therefore, the interviewer is able to tailor the order of the questions and the wording of the questions, and ask follow-up questions to clarify interviewees' responses.

For this study, the RDN's served as gatekeepers for participant recruitment. In clinical studies, gatekeepers can be beneficial in facilitating access to potential participants by introducing the study to them and gaining their consent to participate in the program. Moreover, patients approached about research by their familiar healthcare provider are more likely to participate than those who were approached by someone unfamiliar to them or who saw advertisements about the research (Andoh-Arthur, 2019). Therefore, gatekeepers are critical in influencing participants' willingness to participate in the study.

However, a limitation that may arise with the recruitment method used in this process evaluation. The sample population recruited may not be representative of the entire GF4H program population due to selection bias. Subsequently, this can result in inaccurate inferences that negatively affect the validity of the conclusions made (Singh & Wassenaar, 2016).

Another limitation of the study design used for the process evaluation of the 2020 GF4H program, is that verbatim transcripts were not conducted for all interviews. Verbatim transcription involves transfers every verbal sound from an audio file to a text format. Verbatim transcription ensures that all themes and details regarding the participants' experiences are recorded for the researcher to analyze (Britten, 1995). Hence, specific details and themes could've been omitted during data analysis since only seven interviews were recorded verbatim.

Furthermore, data saturation during collection can also be a limitation. This issue focuses on whether the sample size was sufficient in order to evaluate all components of the GF4H program. Data saturation limitations can cause limitations of whether the interviews conducted are diverse and representative of the program's total participants (Saunders et al., 2018; Vasileiou et al., 2018). Moreover, the emergence of new themes later in the data collection process can also be a limitation. This can result in important themes not being captured, which could inform changes to the GF4H program that would lead to improved enrollment and dropout rates (Guest et al., 2020).

Conclusion

The process of evaluation of the GF4H program's 2020 cohort has illustrated the components of the program that were successful and the gaps that need to be addressed in order to ensure that the program's desired change occurs. Currently, program evaluations exist for programs that adopt the traditional in-person FAM model. However, as more community partners and hospitals begin to expand initiatives tailored after the FAM model in a peri- and post- COVID-19 setting, this process evaluation will be beneficial to helping them understand challenges which organizations face in the process of implementing programs using an online format. This information is also useful for potential funders to see the work that has been done to create programs.

Appendix

Table 1. Codebook

Code	Description	Example
Delivery Quantity	Statements that describe the amount of food in the produce boxes that were delivered to the GF4H participants biweekly.	"The amount of food in the produce box was not enough to last my family 2 weeks."
Delivery Quality	Statements that describe the quality of food in the produce boxes that were delivered to the GF4H participants biweekly.	"One time when I got the box, I checked the produce and some of them looked bruised."
Convenience vs. Choice	Statements that describe participants' preferences for choosing their own produce or having the produce box delivered to their homes.	"I would prefer to choose my own produce because that would ensure that I had foods that I liked and would be more likely to use them. Sometimes they would give me foods which I don't like… and those foods ended up spoiling in my fridge or I would have to give them to a neighbor."

Unfamiliar Foods	Statements that describe whether people were familiar with the foods in the produce box, and what they did with those food items.	"There were a few times that I got some foods that I didn't know what to do with them. I didn't know what it was but I asked my neighbor and she knew what it was and how to cook it so I ended up giving it to her."
Diversity	Statements that describe the diversity of food, recipes and instructors.	"I wish they had more collard greens and cabbage for black folks like myself…We love those types of food." "The recipes were good but I wish that they did a healthy spin on foods that we (black people) like." "If they had more representation with people like ourselves as instructors, there may not have been issues with types of foods and recipes they gave us."
Classroom Relationships	Statements that describe the	"I didn't have any issues with

	relationships that participants had with their instructors and other participants.	the instructors or the participants… they were all nice. However, I didn't get to know them well like that so I can't really say I had a relationship with them."
Time Availability	Statements that describe participants' perceptions about the available times.	"The evening class worked perfectly with my work schedule."
Class Length	Statements that describe participants' perceptions about the length of synchronous classes	"The people that had technical difficulties with the online class really kept us back. Ms. Jen would have to repeat what was already covered for those persons when they were finally able to get on to the class."
Assignment Difficulty/Workload	Statements that describe the difficulty and amount of workload for the educational component of the program.	"The assignments were easy to do." "The requirements were not a lot for me. I felt like the amount of things that they wanted me to do was

		sufficient."
Trust	Statements that describe the lack of trust between participants and the instructors due to the compulsory educational requirements which were necessary to complete the GF4H program.	"This program was a lot…I had to watch the videos, do a quiz, cook the meals and upload a picture of the meal to show that I did the work and attend classes once per week… It's like they didn't believe that I would do the work on my own without making all of those requirements mandatory."

Literature Cited

Adams J, Mytton O, White M, Monsivais P (2016) Why Are Some Population Interventions for Diet and Obesity More Equitable and Effective Than Others? The Role of Individual Agency. PLOS Medicine 13(4): e1001990.

Ahn S, Johnson K, Lutton M, Otudor I, Pino J, Yu C. (2014). Examining disparities in food access and enhancing the food security of underserved populations in Michigan. Natural *Resources and Environment*. University of Michigan.

Andoh-Arthur, J. (2019). Gatekeepers in Qualitative Research. In P. Atkinson, S. Delamont, A. Cernat, J.W. Sakshaug, & R.A. Williams (Eds.), *SAGE Research Methods Foundations.*

Amanpour S. (2021). The Rapid Development and Early Success of Covid 19 Vaccines Have Raised Hopes for Accelerating the Cancer Treatment Mechanism. *Archives of Razi Institute*, *76*(1), 1–6.

Ammenwerth, E., Hackl, W. O., Dornauer, V., Felderer, M., Hoerbst, A., Nantschev, R., & Netzer, M. (2019). Impact of Students' Presence and Course Participation on Learning Outcome in Co-Operative Online-based Courses. *Studies in health technology and informatics*, *262*, 87–90.

Berkowitz, S. A., Delahanty, L. M., Terranova, J., Steiner, B., Ruazol, M. P., Singh, R., Shahid, N. N., & Wexler, D. J. (2019). Medically Tailored Meal Delivery for Diabetes Patients with Food Insecurity: a Randomized Cross-over Trial. *Journal of general internal medicine*, *34*(3), 396–404.

Bettinghaus E. P. (1986). Health promotion and the knowledge-attitude-behavior continuum. *Preventive medicine*, *15*(5), 475–491.

Britten N. (1995). Qualitative interviews in medical research. *BMJ (Clinical research*

ed.), *311*(6999), 251–253.

Bruening, M., McClain, D., Moramarco, M., & Reifsnider, E. (2017). The Role of SNAP in Home Food Availability and Dietary Intake among WIC Participants Facing Unstable Housing. *Public health nursing (Boston, Mass.)*, *34*(3), 219–228.

Dahlgren G, Whitehead M. (1992). Policies and Strategies to Promote Equity in Health. Copenhagen, Denmark: World Health Organization Regional Office for Europe.

Dhawan S. (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis. *Journal of Educational Technology Systems*, 0047239520934018.

Dietz, W. H. (1995). Does hunger cause obesity? *Pediatrics, 95*(5), 766-767.

Dobbs R, Sawers C, Thompson F, Manyika J, Woetzel J, Child P, et al. (2014). Overcoming obesity: an initial economic analysis: McKinsey Global Institute. http://www.mckinsey.com/insights/economic_studies/how_the_world_could_better_fight_obesity.

Dovey, T. M., Staples, P. A., Gibson, E. L., & Halford, J. C. (2008). Food neophobia and 'picky/fussy' eating in children: a review. *Appetite*, *50*(2-3), 181–193.

Downer, S., Berkowitz, S. A., Harlan, T. S., Olstad, D. L., & Mozaffarian, D. (2020). Food is medicine: actions to integrate food and nutrition into healthcare. *BMJ (Clinical research ed.)*, *369*, m2482.

Drewnowski, A., & Darmon, N. (2005). The economics of obesity: dietary energy density and energy cost. *The American journal of clinical nutrition*, *82*(1 Suppl), 265S–273S.

Eyles, H., Mhurchu, C. N., Wharemate, L., Funaki-Tahifote, M., Lanumata, T., & Rodgers, A. (2009). Developing nutrition education resources for a multi-ethnic population in New Zealand. *Health education research*, *24*(4), 558–574.

Feeding America. (2020). Map the Meal Gap 2020. https://map.feedingamerica.org/county/2017/overall/georgia

Fernández-Barrés, S., García-Barco, M., Basora, J., Martínez, T., Pedret, R., Arija, V., & Project ATDOM-NUT group. (2017). The efficacy of a nutrition education intervention to prevent risk of malnutrition for dependent elderly patients receiving Home Care: A randomized controlled trial. *International journal of nursing studies*. *70*: 131–141.

Fitzgerald, N., Hromi-Fiedler, A., Segura-Pérez, S., & Pérez-Escamilla, R. (2011). Food insecurity is related to increased risk of type 2 diabetes among Latinas. *Ethnicity & disease*, *21*(3), 328–334.

Fox, A., Feng, W., & Asal, V. (2019). What is driving global obesity trends? Globalization or "modernization"? *Global Health, 15*(1), 32.

Frisvold D. E. (2015). Nutrition and Cognitive Achievement: An Evaluation of the School Breakfast Program. *Journal of public economics*, *124*, 91–104.

Fry, K. (2001). E-learning markets and providers: Some issues and prospects. *Education+ Training* , *43* (4/5), 233–239.

Fulkerson, J. A., Friend, S., Horning, M., Flattum, C., Draxten, M., Neumark-Sztainer, D., Gurvich, O., Garwick, A., Story, M., & Kubik, M. Y. (2018). Family Home Food Environment and Nutrition-Related Parent and Child Personal and Behavioral Outcomes of the Healthy Home Offerings via the Mealtime Environment (HOME) Plus Program: A Randomized Controlled Trial. *Journal of the Academy of Nutrition and Dietetics*, *118*(2), 240–251.

Ghosh-Dastidar, B., Cohen, D., Hunter, G., Zenk, S. N., Huang, C., Beckman, R., & Dubowitz,

T. (2014). Distance to store, food prices, and obesity in urban food deserts. *American journal of preventive medicine*, *47*(5), 587–595.

Gregory C & Coleman-Jensen A. Food Insecurity, Chronic Disease, and Health Among Working-Age Adults, ERR-235, U.S. Department of Agriculture, Economic Research Service, July 2017.

Guest, G., Namey, E., & Chen, M. (2020). A simple method to assess and report thematic saturation in qualitative research. *PloS one*, *15*(5), e0232076.

Guo, R., Li, L., Finley, J., & Pitts, J.P. (2011). Which is a better choice for student-faculty interaction: synchronous or asynchronous communication?

Gundersen C, Kreider B. (2009). Bounding the effects of food insecurity on children's health outcomes. J Health Econ. 28(5):971-983.

Gundersen, C., & Ziliak, J. P. (2015). Food Insecurity And Health Outcomes. *Health affairs (Project Hope)*, *34*(11), 1830–1839.

Hager, E. R., Quigg, A. M., Black, M. M., Coleman, S. M., Heeren, T., Rose-Jacobs, R., Cook, J. T., Ettinger de Cuba, S. A., Casey, P. H., Chilton, M., Cutts, D. B., Meyers, A. F., & Frank, D. A. (2010). Development and Validity of a 2-Item Screen to Identify Families at Risk for Food Insecurity. Available at: https://childrenshealthwatch.org/wp-content/uploads/EH_Pediatrics_2010.pdf.

Hamulka, J., Wadolowska, L., Hoffmann, M., Kowalkowska, J., & Gutkowska, K. (2018). Effect of an Education Program on Nutrition Knowledge, Attitudes toward Nutrition, Diet Quality, Lifestyle, and Body Composition in Polish Teenagers. The ABC of Healthy Eating Project: Design, Protocol, and Methodology. *Nutrients*, *10*(10), 1439.

Health Partners Plans. (2017), Food As Medicine Model: A Framework for Improving Member

Health Outcomes and Lowering Health Costs. https://www.healthpartnersplans.com/media/100225194/food-as-medicine-model.pdf Accessed Jan 30, 2021.

Hrastinski, S. (2008). Asynchronous and synchronous e-learning. *Educause Quarterly* , *31* (4), 51–55.

Hruby, A., & Hu, F. B. (2015). The Epidemiology of Obesity: A Big Picture. *Pharmacoeconomics, 33*(7), 673-689.

Hur E, Buettner CK, Jeon L. Parental depressive symptoms and children's school-readiness: the indirect effect of household chaos. J Child Fam Stud. 2015;24(11):3462–73.

Ingham R, Woodcock A, Stenner K. (1992). The Limitations of Rational Decision-Making Models as Applied to Young People's Sexual Behaviour. London, UK: Falmer Press.

Irving, S. M., Njai, R. S., & Siegel, P. Z. (2014). Food insecurity and self-reported hypertension among Hispanic, black, and white adults in 12 states, Behavioral Risk Factor Surveillance System, 2009. *Preventing chronic disease*, *11*, E161.

Iuliano, B., A. Markiewisz, and P. Glaum. (2017). Socio-economic drivers of community garden location and quality in urban settings and potential effects on native pollinators. *Michigan Journal of Sustainability* 5:25-50.

Jackson M. I. (2015). Early childhood WIC participation, cognitive development and academic achievement. *Social science & medicine (1982)*, *126*, 145–153.

Jones, A. D. (2017). Food insecurity and mental health status: A global analysis of 149 countries. *American Journal of Preventive Medicine, 53*(2), 264–273.

Kendall, A., Olson, C. M., & Frongillo, E. A., Jr (1996). Relationship of hunger and food

insecurity to food availability and consumption. *Journal of the American Dietetic Association*, *96*(10), 1019–1026.

Kral, T., Chittams, J., & Moore, R. H. (2017). Relationship between food insecurity, child weight status, and parent-reported child eating and snacking behaviors. *Journal for specialists in pediatric nursing : JSPN*, *22*(2), 10.1111/jspn.12177.

Laraia, B. A., Siega-Riz, A. M., & Gundersen, C. (2010). Household food insecurity is associated with self-reported pregravid weight status, gestational weight gain, and pregnancy complications. *Journal of the American Dietetic Association*, *110*(5), 692–701.

Maclellan, D. L., & Berenbaum, S. (2003). Client-centred nutrition counselling: do we know what this means?. *Canadian journal of dietetic practice and research : a publication of Dietitians of Canada = Revue canadienne de la pratique et de la recherche en dietetique : une publication des Dietetistes du Canada*, *64*(1), 12–15.

Maclellan, D. L., & Berenbaum, S. (2006). Dietitians' opinions and experiences of client-centred nutrition counselling. *Canadian journal of dietetic practice and research : a publication of Dietitians of Canada = Revue canadienne de la pratique et de la recherche en dietetique : une publication des Dietetistes du Canada*, *67*(3), 119–124.

Melchior, M., Chastang, J. F., Falissard, B., Galéra, C., Tremblay, R. E., Côté, S. M., & Boivin, M. (2012). Food insecurity and children's mental health: a prospective birth cohort study. *PloS one*, *7*(12), e52615. https://doi.org/10.1371/journal.pone.0052615

Metallinos-Katsaras, E., Brown, L. & Colchamiro, R. (2015). Maternal WIC Participation Improves Breastfeeding Rates: A Statewide Analysis of WIC Participants. *Matern Child Health J* 19: 36–143.

Metcalfe, J. J., Fiese, B. H., & STRONG Kids 1 Research Team (2018). Family food involvement is related to healthier dietary intake in preschool-aged children. *Appetite*, *126*, 195–200.

Morales, M. E., & Berkowitz, S. A. (2016). The Relationship between Food Insecurity, Dietary Patterns, and Obesity. *Current nutrition reports*, *5*(1), 54–60.

Napoli, M., Muro, P., & Mazziotta, M. (2011). Towards a Food Insecurity Multidimensional Index (FIMI).

Neuenschwander, L. M., Abbott, A., & Mobley, A. R. (2013). Comparison of a web-based vs in-person nutrition education program for low-income adults. *Journal of the Academy of Nutrition and Dietetics*, *113*(1), 120–126.

New Atlanta Food Pharmacy and Market Addresses Food Insecurity. (2020, December 2). United Healthcare Community & State. https://www.uhccommunityandstate.com/content/uhccomstate/content/articles/new-atlanta-food-pharmacy-and-market-addresses-food-insecurity.html

Nord M. (2007). Characteristics of low-income households with very low food security: An analysis of the USDA GPRA food security indicator. USDA-ERS Economic Information Bulletin No. 25. 2007.

Nord M. (2009). Food insecurity in households with children: Prevalence, severity, and household characteristics. Washington: USDA Economic Research Service.

Ojo, O. (2019). Nutrition and Chronic Conditions. *Nutrients, 11*(2).

Pan, L., Sherry, B., Njai, R., & Blanck, H. M. (2012). Food insecurity is associated with obesity among US adults in 12 states. *Journal of the Academy of Nutrition and Dietetics*, *112*(9), 1403–1409.

Patient-Centered Outcomes Research Institute. (2019). Methodology standards. https://www.pcori.org/research-results/about-our-research/research-methodology/pcori-methodology-standards#QualitativeMethods.

Parker, E. B., & Wassef, M. E. (2010). Flexible online learning options for graduate nursing students. *Nurse educator*, *35*(6), 243–247.

Ruiz J. Mintzer M. Leipzig R. The impact of e-learning in medical education. *Acad Med.* 2006;81:207–212.

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., Burroughs, H., & Jinks, C. (2018). Saturation in qualitative research: exploring its conceptualization and operationalization. *Quality & quantity*, *52*(4), 1893–1907.

Seligman, H. K., Bindman, A. B., Vittinghoff, E., Kanaya, A. M., & Kushel, M. B. (2007). Food insecurity is associated with diabetes mellitus: results from the National Health Examination and Nutrition Examination Survey (NHANES) 1999-2002. *Journal of general internal medicine*, *22*(7), 1018–1023.

Seligman, H. K., Laraia, B. A., & Kushel, M. B. (2010). Food insecurity is associated with chronic disease among low-income NHANES participants. *The Journal of nutrition*, *140*(2), 304–310.

Seligman, H. K., & Schillinger, D. (2010). Hunger and socioeconomic disparities in chronic disease. *The New England journal of medicine*, *363*(1), 6–9.

Shen, A. K., Hughes Iv, R., DeWald, E., Rosenbaum, S., Pisani, A., & Orenstein, W. (2021). Ensuring Equitable Access To COVID-19 Vaccines In The US: Current System Challenges And Opportunities. Health affairs (Project Hope), 40(1), 62–69.

Sinclair, P., Kable, A., & Levett-Jones, T. (2015). The effectiveness of internet-based e-learning

on clinician behavior and patient outcomes: a systematic review protocol. *JBI database of systematic reviews and implementation reports*, *13*(1), 52–64.

Singh, S., & Wassenaar, D. (2016). Contextualising the role of the gatekeeper in social science research. *South African Journal of Bioethics and Law, 9*, 42-46.

South, A. M., Palakshappa, D., & Brown, C. L. (2019). Relationship between food insecurity and high blood pressure in a national sample of children and adolescents. *Pediatric nephrology (Berlin, Germany)*, *34*(9), 1583–1590.

Stotz, S., Lee, J. S., Rong, H., & Murray, D. (2017). The Feasibility of an eLearning Nutrition Education Program for Low-Income Individuals. *Health promotion practice*, *18*(1), 150–157.

Swinburn, B., Egger, G., & Raza, F. (1999). Dissecting obesogenic environments: the development and application of a framework for identifying and prioritizing environmental interventions for obesity. *Preventive medicine*, *29*(6 Pt 1), 563–570.

USDA, Economic Research Service. (2009). Access to Affordable and Nutritious Food: Measuring and Understanding Food Deserts and Their Consequences.

USDA, Economic Research Service. 2020. Definitions of food security. http://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security.aspx. Accessed Jan 30, 2021.

USDA, Economic Research Service. 2020. Key Statistics & Graphics. https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/key-statistics-graphics.aspx. Accessed Jan 30, 2021.

Van der Laan LN, De Ridder DTD, Viergever MA, Smeets PAM (2012) Appearance Matters: Neural Correlates of Food Choice and Packaging Aesthetics. PLOS ONE 7(7): e41738

Vasileiou, K., Barnett, J., Thorpe, S. *et al.* Characterising and justifying sample size sufficiency in interview-based studies: systematic analysis of qualitative health research over a 15-year period. *BMC Med Res Methodol* 18, 148 (2018).

Webb, P., Stordalen, G. A., Singh, S., Wijesinha-Bettoni, R., Shetty, P., & Lartey, A. (2018). Hunger and malnutrition in the 21st century. *BMJ, 361*, k2238. doi:10.1136/bmj.k2238

WHO. (2003). Promoting fruit and vegetable intake around the world. http://www.who.int/dietphysicalactivity/fruit/en/

Winham D. M. (2009). Culturally tailored foods and CVD prevention. *American journal of lifestyle medicine*, *3*(1), 64S–68S.

Zenebe, M., Gebremedhin, S., Henry, C. J., & Regassa, N. (2018). School feeding program has resulted in improved dietary diversity, nutritional status and class attendance of school children. Italian journal of pediatrics, 44(1), 16.