DOWNSTATE
HEALTH SCIENCES UNIVERSITY

SPH Doctoral Dissertation and Dissertation Defense Approval Form

I. INSTRUCTIONS

Upon completion of submission of the doctoral thesis and subsequent defense, the student's Committee Chair will coordinate completion of the form and all signatures and will submit the form to the SPH Doctoral Program Committee via email to Daniel.Ehlke@downstate.edu with subject line "Dissertation Approval Form". Decisions regarding acceptance of the form and accompanying dissertation will be sent to the student and committee chair via email with a copy to the chair of the department. The dissertation must be successfully defended by April 1st and sections 1 though VI of this form must be received, along with the final accepted version of the dissertation, by April 15th in a given academic year in order to graduate that year. It is the student's responsibility to ensure that all documents are completed and sent on time and that receipt of acknowledgement is documented.

II. STUDENT INFORMATION

Student Name:	
Student ID #:	
Concentration:	

III. DISSERTATION TITLE, ABSTRACT, AND DEFENSE DATE

Title:	
Abstract:	
Date of Dissertation Defense:	

IV. ASSESSMENT RUBRIC AND OUTCOME

The Doctoral Committee Chair will obtain consensus from the committee on each section of the rubric. Detailed comments are required when a 'not satisfactory' is given in any section. It is expected that any 'unsatisfactory' ratings will result in an outcome of major revisions or a failure in section V, and an additional form will be submitted upon submission of accepted modifications.

	Assessment	Comments
Background: The written product and presentation demonstrate clear knowledge and depth of understanding of the selected public health area. The literature review reflects a rigorous synthesis of the topic area.	☐ Satisfactory ☐ Unsatisfactory	
Significance and objectives: The objectives addressed in the written product are clearly linked to the background and identify a focus with clear public health applicability.	☐ Satisfactory ☐ Unsatisfactory	
Approach: The design of the project(s) and the methods used to address the primary objectives are clearly articulated and sufficiently described. The approach is adequate to address the study aims.	☐ Satisfactory ☐ Unsatisfactory	
Outcomes: Results are clearly, concisely, and accurately conveyed. Results are interpreted in the context of strengths and limitations of the approach.	☐ Satisfactory ☐ Unsatisfactory	
Implications of the project(s) for public health practice: The results are described in relation to their implications for public health practice. Additional steps needed for translation of findings to public health practice are considered.	☐ Satisfactory ☐ Unsatisfactory	
Written product: The document is clearly written and organized, free from grammatical errors, and with citations, tables, and figures organized per SPH requirements.	☐ Satisfactory ☐ Unsatisfactory	
Oral presentation: The oral presentation is clear, organized, and professionally presented. The presentation demonstrates synthesis of doctoral competencies and depth and breadth of knowledge of the chosen topic.	☐ Satisfactory ☐ Unsatisfactory	
Synthesis of competencies: DrPH competencies are clearly articulated and integrated in the written product. Three DrPH competencies, at least one of which is foundational and another which is concentration specific are synthesized. Competencies should be the same as those included on the approved Dissertation Proposal Form. The written document and presentation should demonstrate a clear application and synthesis of the selected competencies. Below please add each competency addressed.		
Competency 1 (paste below):	☐ Satisfactory ☐ Unsatisfactory	
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Competency 3 (paste below):	☐ Satisfactory ☐ Unsatisfactory	

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V. OUTCOME OF REVIEW

It is expected that doctoral students will not defend their dissertation until all committee members feel that the written product is in acceptable condition and does not require major revisions. When an outcome is for major revisions or a failure, a revised form must be submitted when the document is accepted.

Outcome of Dissertation Defense and Written Product:	☐ Accepted, no / minor revisions ☐ Accepted, pending major revisions ☐ Not accepted - Failure
Summary of Major Revisions or Reasons for Failure. A summary is not required when minor revisions are requested.	

VI. STUDENT AND DISSERTATION COMMITTEE SIGNATURES

The student and all committee members confirm by signing below that they agree on the content of this review. If there are more than three committee members, please submit an additional form with signature.

Student signature and date:	
Committee chair signature and date:	
Committee member signature and date:	
Committee member signature and date:	

VII. SPH DEAN SIGNATURE

This section is completed when the dissertation is in its final accepted version and is submitted with the committee-approved document. By signing below, the SPH Dean confirms agreement with the doctoral committee's recommendation.

SPH Dean signature and date:	

To be completed by the Chair of the SPH Doctoral Program Committee:

Doctoral Review Outcome: ☐ Approved ☐ Not Approved
(Summarize required modifications below)

Signature and date:

A PILOT EVALUATION OF A VIRTUAL 21-DAY WHOLE-FOOD PLANT-BASED DIETARY INTERVENTION IN NEW YORK CITY RESIDENTS

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Dissertation submitted to
The Faculty of the School of Public Health
Of the SUNY Downstate Health Sciences University

In partial fulfillment of the requirements for the degree of
Doctor of Public Health
May 2024

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Abstract

Background: Chronic diseases have a substantial impact on global health. Plant-based diets, which are abundant in fiber and antioxidants, consistently demonstrate advantages in mitigating cardiovascular risks, controlling diabetes, decreasing cancer rates, and facilitating healthy weight maintenance.

Methods: This study evaluated the feasibility, acceptability, and initial efficacy of a 21-day virtual whole-food plant-based (WFPB) dietary intervention, implemented by the non-profit organization Plant Powered Metro New York, among 139 participants. The intervention consisted of weekly educational and mentorship sessions. A mixed-methods study design was used to evaluate the program. Feasibility was assessed based on program attendance. Acceptability was assessed based on self-reported program satisfaction on survey and key informant focus group responses. Pre- and post-program surveys measured changes in perceptions and knowledge of WFPB nutrition, self-efficacy in cooking, adherence to the diet, health-related quality-of-life metrics, and mental health (Patient Health Questionnaire-9 and Generalized Anxiety Disorder-7). Changes in anthropometric measures, including BMI, waist circumference, HbA1c, LDL, total cholesterol, and blood pressure, were measured in a subsample of participants. Pre- to post-program changes were assessed using Wilcoxon signed-rank, McNemar, or McNemar-Bowkers tests. Inductive content analysis was used to assess qualitative data obtained from the focus group participants.

Results: Participants attended an average of 73% of the educational sessions, and 89.9% of participants found the program to be satisfactory, describing the experience as “Excellent” or “Good.” Statistically significant improvements were found in self-reported WFPB nutrition

knowledge and perceptions regarding challenge, cost, and the ability to adopt and cook a WFPB diet. Participants from the focus group identified program benefits, such as education and improved health, and challenges, such as scheduling issues and misconceptions about WFPB diets. Recommendations include addressing cost misconceptions and providing culturally relevant recipes to enhance program acceptance. There were also statistically significant self-reported improvements in health-related QoL metrics, including pain (other than headaches), headaches, mobility, breathing, skin, gastrointestinal symptoms, hormonal symptoms, sleep, energy, moodiness, mental clarity, and cravings for unhealthy food. There were median decreases of 2.85 points on the PHQ-9 and 1.82 points on the GAD-7, 1.16 kg/m2 in BMI, and 1.65 inches in waist circumference (all p=<0.0001). No significant changes were observed in HbA1c, LDL cholesterol, total cholesterol, or blood pressure levels.

Conclusion: The 21-day program was associated with improvements in participants' perceptions of knowledge and self-efficacy regarding WFPB nutrition, self-reported quality-of-life, mental health, and anthropometric measures, including BMI and waist circumference. Future research is needed to assess the long-term results of the program, and to assess the program in patient populations with specific chronic diseases.

Acknowledgments

The Center for Sustainable Health Care Quality and Equity partially funded this study.

Introduction

Consumption of processed foods is associated with the risk of developing chronic non-communicable diseases (NCDs) [1]. NCDs are currently the leading cause of death and disability globally and in the United States of America (US) [2]. Chronic diseases account for 41 million premature deaths annually, equivalent to 71% of all global deaths, with cardiovascular diseases, cancer, respiratory diseases, and diabetes accounting for 80% of this burden [3].

Approximately 40% of New Yorkers suffer from chronic diseases such as asthma, arthritis, cancer, obesity, and heart disease, accounting for 23% of hospitalizations [4]. approximately 1.7 million people have been diagnosed with diabetes, with an estimated half million cases of diabetes remaining undiagnosed. An additional 5.2 million have prediabetes or a blood sugar level higher than normal [5]. Central Brooklyn, particularly East Flatbush, has adult obesity (34% vs. 27%), diabetes (15% vs. 12%), and hypertension (HTN) (36% vs. 29%) rates higher than the rest of New York City [6]. This medically underserved population relies significantly on The University Hospital at Downstate and NYC Health + Hospitals/Kings County to receive care for their chronic diseases. In 2020, over 700,000 outpatients, 25,000 hospital admissions, and 150,000 emergency room cases were managed at The State University of New York (SUNY) Downstate Medical Center (DMC) and Kings County [7,8]. According to the American Community Survey (2015-2019), over 80% of the community in which SUNY DMC and Kings County serve, identify as Black and more than 50% of them have a household income less than $60,000 [9]. This section of Brooklyn is known as ‘Little Caribbean,’ the largest and most diverse Caribbean immigrant population globally [10].

The SUNY Downstate Family Practice Clinic, which serves a patient population representative of the local community, reported a high prevalence of hypertension and diabetes in Black (41.9% and 21.8%, respectively) and Latino (41.2% and 23.2%, respectively) patients. There were much higher infection and mortality rates in this community during the COVID-19 pandemic due to unequal access to healthcare, underlying health conditions, and disproportionate economic impacts compared to whiter and wealthier neighborhoods, highlighting health disparities between people of color and low socioeconomic status in Brooklyn and White and wealthier New Yorkers, exemplifying the need for policies and programs for the prevention and management of chronic diseases [11]. Such initiatives require multi-faceted approaches to address key risk factors such as the consumption of unhealthy diets, inequities in access to healthy food, inequities in access to healthcare commodities such as needed medications, and cultural foodways [12].

Plant Powered Metro New York (PPMNY), a local non-profit organization serving NYC, was founded in 2019 to become the prime organization for education on plant-based nutrition and health empowerment in Greater New York. PPMNY provides programs and services, including health empowerment seminars and retreats, mentorship/community support, Food for Life classes (series of 4-8 interactive classes on health and disease topics, meal prep demos, and recipes), Wellness Challenge 360 (a 7-week dietary change program), and PPMNY Jumpstart [13]. This dissertation focuses on evaluating PPMNY's 21-day Plant-Based Jumpstart Program designed to help participants transition to a whole-food plant-based (WFPB) diet. A WFPB diet comprises unprocessed or minimally processed plant-based foods, while minimizing animal-based foods [14].

This study evaluated PPMNY's 21-day Plant-Based Jumpstart program among community-dwelling individuals. This project assesses the results of a special implementation of

the Jumpstart program among Black community leaders in Central Brooklyn. The knowledge gained from this project can inform future plant-based dietary intervention programs tailored to the needs of patients of color and low socioeconomic status in New York City.

Aims

1) To conduct a program evaluation of PPMNY's 21-day Plant-Based Jumpstart program by assessing program feasibility and acceptability from participant feedback on surveys and a key informant focus group, intervention-related changes in actual knowledge and self-reported perceptions of knowledge, self-efficacy, barriers, difficulty, and expense of whole-food plant-based eating, and clinical health outcomes.
2) To utilize the PRECEDE-PROCEED model to evaluate the planning and implementation processes of the Jumpstart program and generate recommendations for the scalability and sustainability of this public health intervention.

Literature Review

According to the World Health Organization, chronic diseases are long-duration and slow-progressing conditions that require ongoing action and long-term management [15]. Although chronic diseases may have different etiologies, they share the characteristics of slow development, absence of age-specificity, negative impacts on quality of life, and potential for severe limitations in daily activities. Chronic conditions include diabetes mellitus, cancer, chronic kidney disease, chronic pain, cardiovascular disease, stroke, and lung disease [2].

Substantive changes in dietary behavior are crucial for the prevention and management of chronic diseases. Plant-based diet (PBD) is an umbrella term that describes nutritional patterns that emphasize consuming foods from plant sources while excluding or limiting foods derived from animal sources [16]. PBDs include vegetarian, semi-vegetarian (or partial vegetarian), vegan,

Mediterranean, and WFPB diets. WFPB nutrition emphasizes healthy PBDs, which focus on consuming high-quality plant foods such as fruits, vegetables, legumes, nuts, seeds, and whole grain products. In contrast, unhealthy PBDs include a high proportion of low-quality plant-derived diets, such as refined cereal products and processed plant-based meats [14]. Furthermore, WFPB nutrition prioritizes fiber-filled foods, which are naturally rich in minerals and vitamins and lower in protein, fat, and caloric density, while emphasizing reducing or excluding processed foods made with refined grains, sugar, salts, fats, and oils [17]. A typical WFPB diet comprises 75 – 80% carbohydrates, 7 – 15% fat, and 10 – 15% protein [18].

An increase in the consumption of whole, unprocessed, and animal-free foods has health benefits. Research reviews and randomized control trials indicate that vegan, vegetarian, and pescovegetarian diets are associated with a lower risk of inflammation, cardiovascular disease, type 2 diabetes, cancer, and premature death [19–21]. Table 1 presents descriptions of the various diets.

Table 1: Comparison of different diets (adapted from Kent and others and Gibbs & Cappuccio [14,16].

PLANT-BASED DIET TYPE	DEFINITION
Vegetarian	Includes vegetables, grains, fruits, nuts, seeds, beans, and pulses with or without dairy and eggs, excluding meat and fish with or without dairy and eggs.
Lacto vegetarian	A plant-based diet that excludes meat, fish, and eggs but includes dairy.
Ovo vegetarian	A plant-based diet that excludes meat, fish, and dairy but includes eggs.
Lacto-ovo vegetarian	A plant-based diet that generally excludes meat and fish but includes dairy and eggs.
Semi vegetarian (Flexitarian)	Plant-based foods and animal products such as fish, meat, poultry, dairy, and eggs but with minimal intake of red meat.
Vegan	Includes only plant-based foods such as vegetables, fruits, grains, nuts, seeds, beans, and pulses, excluding all animal and animal-derived products.
Raw vegan	Includes uncooked fruits, grains, vegetables, nuts, seeds, beans, and pulses. Exclude all animal and animal-derived products and cooked foods.
Whole food vegan	Includes unprocessed fruits, vegetables, grains, beans, pulses, seeds, and nuts. Excludes all animal and animal-derived products and processed foods.
Whole-food low-fat vegan	Includes unprocessed and low-fat vegetables, fruits, grains, pulses, and beans. Excludes all animal and animal-derived products and processed and high-fat plant foods such as nuts, oil, and avocado.

Pescatarian	Plant-based foods, fish, eggs, and dairy products, excluding meat and poultry.
Mediterranean	Moderate consumption of meat and dairy with emphasis on some plant-based components, such as olive oil, nuts, and olives, and a moderate intake of red wine.
DASH (Dietary Approaches to Stop Hypertension)	Emphasizes the intake of fat-free/low-fat dairy over full-fat dairy products. It also emphasizes the consumption of poultry and fish in preference to red and processed meat. Additionally, it encourages the limited consumption of sugar-sweetened foods, beverages, and sodium.

The Standard American Diet (SAD) consists of processed, ultra-processed, refined foods (63%), animal-based foods (25%), and plant-based foods (12%). French fries account for half (6%) of the calories obtained from plant-based foods. Thus, only 6% of the calories from SAD are derived from fruits, vegetables, nuts, seeds, and whole grains [22,23]. The consumption of ultra-processed foods contributes to excessive intake of added sugars.

Previous studies have indicated that PBDs are associated with a reduced risk of diabetes, cancer, ischemic heart disease, and beneficial blood lipid values [24]. Campbell and Campbell reported that plant-based nutrition could also contribute to the reversal of cardiovascular diseases, certain relatively advanced cancers, and diabetes [25]. Similarly, Esselstyn et al. reported that plant-based interventions can contribute to reversing coronary artery disease (CAD) [26]. There is also evidence that WFPB nutrition can benefit other medical conditions, including heart diseases and autoimmune disorders [27]. The reported effects of WFPB nutrition on chronic diseases include delays in disease progression and reduction in disease incidence [18]. The non-beneficial effects of strict plant-based diets have also been reported, including a higher risk of bone fracture, lower protein quality, and nutritional deficiencies, especially vitamin D, zinc, iodine, iron, and vitamin B12 [28].

The following sections provide more detailed evidence of the association between PBDs and improved outcomes in specific chronic diseases.

a. Chronic Kidney Disease

Chronic kidney disease (CKD) is one of the leading causes of disability and death worldwide, and its incidence is rapidly increasing in the United States. CKD affects more than 10% of the global population, the equivalent of 843.6 million individuals as of 2017 [29]. This condition is more prevalent in older adults, women, racial minorities, and those living with other chronic diseases, such as diabetes, heart disease, and hypertension. CKD is a serious and costly public health issue, and significant investments have been made in its prevention and treatment [29].

A few studies have investigated the relationship between WFPB nutrition, incidence of CKD, and its risk factors. The National Kidney Foundation has stated that adherence to WFPB nutrition may slow the progression of CKD by reducing inflammation and cholesterol levels, which delays kidney failure and the initiation of dialysis [30]. WFPB nutrition is also associated with a decreased incidence of obesity, type 2 diabetes, and cardiovascular diseases, which are risk factors for and comorbidities of CKD development [18,25].

Campbell and Liebman reported the case of a 69-year-old man with hypertension, type 2 diabetes, stage 3 CKD, hyperphosphatasemia, and borderline hyperkalemia. The participants were placed on a strict WFPB diet without calorie restrictions or compulsory physical exercise [31]. After 4.5 weeks, the patient's insulin requirement decreased by over 50%. Furthermore, his weight, blood pressure, and cholesterol level significantly improved. In addition, his estimated glomerular filtration rate increased from 45 to 74 ml/min, his phosphorus level returned to the normal range, and microalbumin/creatinine ratio reduced from 414.3 to 26.8 mg/g. Although this is an anecdotal example for illustrative purposes, several additional findings suggest that WFPB nutrition may benefit patients with CKD[18].

A prospective study of 1,639 adults aged ≥ 27 years from the Tehran Lipid and Glucose Study examined the association between protein sources (total protein, animal protein, and plant protein) and the incidence of CKD. The results indicated an inverse relationship between plant protein intake and the risk of CKD, suggesting a protective effect [32]. Semi-quantitative food frequency questionnaires (FFQs) were administered to each participant, with subsequent calculations and grouping of the total, animal, and plant proteins into tertiles. In this study, investigators defined CKD as a glomerular filtration rate of less than 60mL/min/ 1.73 m^2. After adjusting for age, sex, BMI, hypertension, physical activity, smoking, fiber and energy intake, and dietary fat, the results indicated no statistically significant association between total and animal proteins and CKD incidence. However, those who consumed the most plant protein (the highest tertile) had 71% lower odds of CKD than those in the lowest tertile of consumption (OR 0.29;95% CI: 0.15–0.55; p = <0.001). [32].

In concordance with these findings, a cross-sectional study of 5,316 non-diabetic adults with CKD, which used validated FFQs to examine the association between macronutrients and CKD, found that after adjusting for serum triglycerides, cholesterol, BMI, and hypertension, CKD risk was lower for those in the highest quartile of plant protein consumption compared to the lowest quartile (OR: 0.70, 95% CI: 0.51-0.97). Conversely, the risk of CKD increased in those in the highest quartile of animal protein consumption compared to the lowest quartile (OR: 1.37, 95% CI: 1.05-1.79). This study provides evidence that animal protein is a potential risk factor for CKD in adults, irrespective of diabetes and hypertension diagnosis [33].

Shivam, McMacken, and Kalantar-Zadeh reviewed the known reasons for the protective role of PBDs in CKD, as listed in Table 2.

Table 2: The Role of Plant-based Diets in CKD [34].	
Causes of CKD	
Hypertension	Well-established effect of rapid lowering in blood pressure with the consumption of plant-based foods.
Type 2 Diabetes	The combined effect of weight loss and improved insulin sensitivity with the consumption of plant-based foods.
Obesity	Lower energy density and higher fiber content facilitate weight loss.
Treatment of Kidney Disease	
Disease Progression	Plant-based diets tend to be lower in protein and avoid protein excess, which may prevent hyperfiltration and temper the rate of GFR loss; treatment of complications (as listed below) may also affect disease progression.
Complications of Kidney Disease	
Metabolic acidosis	Plant-based foods have natural alkalis.
Hyperphosphatemia	Plant-based foods have lower bioavailability of phosphorus compared with animal-based and processed foods.
Hypertension	Improved sodium to potassium ratio, weight loss.
CVD	Plant-based diets may reduce the risk for several cardiovascular risk factors.
Uremic Toxins	Plant-based diets appear to generate fewer uremic toxins, which may be due to changes in the microbiome and fiber content.

Research findings indicate that the Mediterranean diet lowers the incidence of CKD in a multiethnic cohort. Additionally, young and middle-aged adults in the United States who highly adhered to the Dietary Approaches to Stop Hypertension (DASH) diet experienced a reduced incidence of CKD [35].

b. Obesity

In the US, obesity continues to be a public health issue, with a rapidly increasing incidence rate, resulting in a transcendent epidemic that shows no evidence of slowing down. The current prevalence of obesity in the US is approximately 42%, which is significantly higher than the 14% prevalence in 1980 [36]. Furthermore, the prevalence of obesity has increased by 3% during the first year (2020 – 2021) of the COVID-19 pandemic [37]. In 2019, the estimated medical cost of obesity was approximately $173 billion, and for each obese patient, medical expenses were $1,861 higher than those for normal-weight individuals [38]. Obesity is usually a comorbid complement

to other chronic diseases, such as type 2 diabetes, cardiovascular diseases, and several cancers. Thus, obesity has also been associated with lower quality of life and shorter life expectancy. [38,39].

There are many dietary approaches to help people lose weight, but reviews cannot always clarify their comparative effectiveness [39]. However, the findings indicate that WFPB nutritional interventions are associated with significant weight loss. For instance, in a clinical trial by Wright et al., 65 individuals were randomized to a non-energy-restricted low-fat WFPB diet with vitamin B12 supplementation. Patients in the control group received routine care. The subjects were between the ages of 35 and 70 years, classified as either obese or overweight, and diagnosed with ischemic heart disease, hypertension, hypercholesterolemia, or type 2 diabetes. Measurements were taken at six and 12 months. This study found significant reductions in body mass index (BMI) and cholesterol levels in the intervention group. Specifically, the mean BMI reduction was greater at six months in the intervention group (4.4 km/m^2). At 12 months, the mean reductions for the WFPB nutrition group were 4.2 (±0.8) kg/m^2 for BMI and 0.55 (±0.54) mmol for total cholesterol. Given the notable effectiveness of the intervention, it was offered to the control group after the 6-month endpoint for ethical reasons [39].

Similarly, Campbell, Fidahusain, and Campbell reported significant reductions in BMI for subjects who participated in their short-term (8-week) WFPB nutrition intervention study [40]. Among the 78 participants, those with a higher BMI at baseline lost a greater percentage of body weight. The total body weight loss for the normal, overweight, and obese participants was 3.0% ± SD: 2.1%, 5.8% ± 2.8%, and 6.4% ± 2.5%, respectively. In addition, 21 (26.9%) participants could stop at least one chronic medication, in contrast to two (2.6%) participants who required an increased dose. However, the present study did not include a control group. Therefore, it is difficult

to assess whether weight changes occurred solely as a result of the intervention or due to other confounding factors, such as unaccounted-for lifestyle changes or natural fluctuations in health metrics over time. Finally, Brown, Rose, and Campbell reported a weight loss of 4.4 kg, SD = 1.8 in a study with 17 participants after six weeks of a WFPB nutrition intervention [41]. This study also lacked a control group, which risks bias and other confounding factors. Some examples include participant motivation, adherence to intervention protocol guidelines, and changes in unaccounted-for behaviors. Without a control group, the generalizability of the findings is limited.

c. Hypertension and Cardiovascular Diseases

Hypertension is a risk factor for cardiovascular diseases. A large body of evidence supports the use of PBDs to reduce the prevalence and incidence of hypertension, and previous research indicates that blood pressure is significantly lower in people following a PBD than in those following an omnivorous diet [42]. Pettersen et al. conducted a cross-sectional study that assessed vegetarian diets among 500 White participants in the Adventist Health Study-2 (AHS-2). Participants from Adventist churches across the US and Canada were classified as omnivores, partial vegetarians, Lacto-ovo vegetarians, or vegans in this study [43]. After multivariable adjustment, systolic and diastolic blood pressures were lower among vegans ($\beta = -6.8$, $P < 0.05$, and $\beta = -6.9$, $P < 0.001$) and Lacto-ovo vegetarians ($\beta = -9.1$, $P < 0.001$ and $\beta = -5.8$, $P < 0.001$) than among omnivores. Additionally, vegetarians and, even more so, vegans were less likely to be on antihypertensive medications. Compared to omnivores, the odds ratio (OR) of hypertension among vegans was 0.37 [95 % CI: 0.19 - 0.74], for lacto-ovo vegetarians 0.57 [95 % CI: 0.36 - 0.92], and for partial vegetarians 0.92 [95 % CI: 0.50 - 1.70], after adjusting for BMI [43].

In another study that also used the Adventist Health Study-2 (AHS-2) dataset, Matsumoto et al. examined the association between vegetarian diets and cardiovascular disease (CVD) risk factors in non-Hispanic Whites in AHS-2 (N=650). The groups observed were vegans, lacto-ovo vegetarians, pesco-vegetarians, and nonvegetarians. After adjusting for confounders, the prevalence of HTN, high total cholesterol, and high low-density lipoprotein C (LDL-C) levels was lower in vegans, lacto-ovo vegetarians, and pesco-vegetarians than in nonvegetarians. The prevalence ratio (PR) for Lacto-ovo vegetarians was 0.57 [95 % CI: 0.45 – 0.73] for HTN, 0.72 [95% CI: 0.59 – 0.88] for total cholesterol and 0.72 [95% CI: 0.58 – 0.89] for LDL cholesterol. The prevalence ratio remained statistically significant, even after adjusting for BMI. For HTN, vegans had a PR of 0.46 [95% CI: 0.25 – 0.83], and pesco-vegetarians had a PR of 0.62 [95% CI: 0.42, 0.91]. Adjustment for BMI attenuated these findings to borderline significance. [44].

Fraser and colleagues compared cardiovascular risk in 592 Black vegetarians and nonvegetarians enrolled in the Adventist Health Study-2 (AHS-2). Of these individuals, 25% were vegan or Lacto-ovo vegetarians; this group was considered ‘vegetarian/vegans’ compared to pesco-vegetarians (13%) and nonvegetarians (62%). After adjusting for age, sex, education, physical activity, and sub-study, vegetarians had an odds ratio of 0.56 [95 % CI: 0.36 – 0.87] for hypertension, 0.48 [95 % CI: 0.24 – 0.98] for diabetes, 0.42 [95 % CI: 0.27 – 0.65] for high blood total cholesterol, and 0.54 [95 % CI: 0.33 – 0.89] for high blood LDL-cholesterol when compared to nonvegetarians. Compared to nonvegetarians, vegetarians had an odds ratio for obesity of 0.43 [95 % CI: 0.28 – 0.67] and pesco-vegetarians, 0.47 [95 % CI: 0.27 – 0.81]). The diet yielded a similar protective effect against abdominal obesity (0.54 [95 % CI: 0.36 – 0.82] for vegetarians/vegans and 0.50 [95 % CI: 0.29 – 0.84] for pesco-vegetarians compared to

nonvegetarians. There was no statistically significant difference between pesco-vegetarians and nonvegetarians for other variables [45].

Previous studies have found positive correlations between WFPB nutrition and improvements in cardiovascular indices. For example, Esselstyn et al. used a long-term WFPB nutritional intervention to treat 198 patients with established coronary artery disease (CAD). Most participants were men (91%) with an average age of 62.9 years and were followed up for three years and seven months. A total of 177 (89%) participants adhering to the WFPB nutritional intervention had a CAD-related recurrent event rate of 0.6%. In contrast, 13 (62%) of the 21 nonadherent participants experienced adverse events [26].

In another study, Jakse and colleagues studied 151 male and female adults with CVD. Participants covered six Slovenian regions and had been participating in the authors' whole-food plant-based (WFPB) lifestyle intervention program for 0.5 to 10 years. The study lasted from June to August 2019, dividing participants into three categories: short term (those in the program for 0.5 to <2 years), medium term (2 to <5 years), and long term (5 to 10 years). Interventions included nutrition, physical activity, and support systems [46]. The study outcome was the percentage of participants who reached guideline-recommended targets for cardiovascular indices, including low-density lipoprotein cholesterol (LDL-C), triglycerides, and systolic and diastolic blood pressure. Compared to males, females had a higher mean total cholesterol [3.8 (SD 0.7) vs. 3.4 (SD 0.9), $p = 0.002$] and HDL-cholesterol [1.5 (SD 0.3) vs. 1.1 (SD 0.2) mmol/L, $p < 0.001$)]. Conversely, females had lower systolic BP (blood pressure) [(113 (SD 11) vs. 120 (SD 10) mmHg, $p = 0.001$)] when compared to males. The two groups did not show diastolic BP. Additionally, more females achieved target triglycerides [(99% vs. 91%, $p = 0.021$)] and systolic BP [(92% vs. 79%, $p = 0.046$)] when compared to males. Similarly, males and females achieved

LDL-cholesterol [(94% vs. 91%, $p = 0.500$)] and diastolic BP [(93% vs. 100%, $p = 0.107$)] targets with no statistically significant difference between the two groups. At the end of the study period, guideline-recommended targets were reached for LDL-C, triglycerides, and systolic and diastolic blood pressure in 93%, 97%, 88%, and 95% of participants, respectively.

Using data from a sample of 73,710 women from the Nurses' Health Study (NHS: 1984-2012), 92,329 women from the Nurses' Health Study 2 (1991-2013), and 43,259 men from the Health Professionals Follow-up (HPFS: 1986-2012), Satija et al. examined the association between type of plant-based diets and coronary heart disease incidence. The authors created three plant-based diet indices: overall, unhealthful, and healthful. Positive scores were assigned to plant-based foods, whereas the overall index for animal-based foods received reverse scores. The healthful plant-based index (hPDI) gave positive scores for more healthy plant foods such as whole grains/fruits/vegetables, etc.) and reverse scores for less healthy plant foods (sweetened beverages, refined grains, etc.) and animal foods. The unhealthful PDI gave positive scores for less healthy plant foods and reversed scores for healthy plant foods and animal foods. This assessment utilized semiquantitative food frequency questionnaire data [47].

The participants were chronic disease-free at baseline. The results showed that 8,631 participants developed CHD at follow-up. In a pooled multivariable-adjusted analysis, PDI showed an inverse relationship with CHD (hazard ratio [HR], 0.92; 95% CI: 0.83–1.01; p=0.003). This inverse relationship was stronger among those who ate healthier plant-based foods (HR: 0.75, 95% CI: 0.68–0.83; p<0.001). In contrast, there was a positive association between those who ate unhealthy plant-based foods and CHD, suggesting that eating more whole plant foods can decrease the risk of CHD, but eating processed plant foods can increase CHD risk [47].

In a large prospective cohort study, Thompson et al. examined a subset of individuals from the United Kingdom (UK) Biobank, a large-scale population-based study. They examined 126,394 UK Biobank participants' adherence to healthful vs. unhealthful plant-based diet indices (hPDI vs. uPDI) from 24-hour dietary assessments. Participants received positive marks on their assessments for eating minimally processed whole foods. By contrast, those who documented eating more processed and animal-derived products received negative marks, all contributing to the final score. The primary outcomes were the hazard ratios (HR) and 95% CIs of mortality for CVD, cancer, and fracture across healthful and unhealthful indices quartiles. The results showed that greater adherence to healthy plant-based diets was associated with lower risks of all-cause mortality (HR [95% CI]: 0.84 [0.78 – 0.91]), cancer (HR [95% CI]: 0.93 [0.88 – 0.99]), and cardiovascular disease (HR [95% CI]: 0.92 [0.86 – 0.99]). In contrast, those in the lowest quartile of uPDI had increased risks of total mortality (HR [95% CI], 1.23 [1.14 – 1.32]), cancer (HR [95% CI], 1.10 [1.03 – 1.17]), and CVD (HR [95% CI], 1.21 [1.05 – 1.20])[48]. These results corroborate the existing evidence that diets consisting of whole plant foods are protective against several non-communicable diseases. Fracture risk was not associated with hPDI vs. uPDI. [48].

d. Type 2 Diabetes

Currently, approximately 537 million adults worldwide live with diabetes. In the US, an estimated 37.3 million adults had diabetes in 2019, of which 90-95% mainly had type 2 diabetes [49]. In addition, about 96 million American adults have pre-diabetes [50], and 1.4 million develop diabetes yearly [49]. Type 2 diabetes is a costly medical condition for both affected individuals and the government. In 2017, the total cost of diagnosed diabetes in the United States was $327 billion, including $237 billion for direct medical expenses and $90 billion in reduced productivity [49].

Dietary modification is a critical aspect of treatment regimens for individuals with diabetes. Research has demonstrated the benefits of PBDs in treating type 2 diabetes and reducing significant complications [42]. Evidence indicates that consuming WFPB diets is highly beneficial for preventing and treating type 2 diabetes. Additionally, evidence supports that WFPB nutrition increases insulin sensitivity and enhances glycemic control. [42]. The consumption of whole foods, which are protective and tend to prevent insulin resistance, has been associated with the positive effects of WFPB nutrition on type 2 diabetes. In a randomized controlled trial, individuals with type 2 diabetes (T2D) were assigned a low-fat vegan diet (N=49) or a conventional diet (N=50) that adhered to the 2003 American Diabetes Association guidelines. Participants were followed over 74 weeks, and their A1c and weight were measured. Regarding weight, differences were observed within each group but not between them (−4.4 kg in the vegan group and −3.0 kg in the conventional diet group, p = 0.25) and related to A1c. Compared to baseline, A1c reductions for the vegan arm were -0.34, and for the conventional diet arm, -0.14 and -0.40 (vegan) and 0.01 (conventional) before medication adjustments. Prior to altering lipid-lowering medications, the low-fat vegan diet improved glycemia and plasma lipid levels (total cholesterol: -20.4 mg/dL, LDL cholesterol: -13.5 mg/dL) more than the conventional diets (total cholesterol: 6.8 mg/dL, LDL cholesterol: -3.4 mg/dL) despite both diets showing reductions in weight and plasma lipid concentrations. This was statistically significant for both measures.

A meta-analysis of 17 cohort studies conducted by Yao et al. found that increased dietary fiber consumption was associated with a reduced risk of type 2 diabetes [51]. The 17 prospective studies included 19,033 cases and 488,293 participants [51]. The researchers obtained studies from EMBASE and PubMed from 1966 to 2013. The combined relative risk (RR) showed that higher fiber intake was associated with a reduced risk of T2D: total dietary fiber intake (RR:0.81, 95%

CI 0.73 to 0.90), cereal fiber (RR:0.77, 95% CI 0.69 to 0.85), fruit fiber (RR:0.94, 95% CI 0.88 to 0.99), and insoluble fiber (RR:0.75, 95% CI 0.63 to 0.89). Plant foods such as whole fruits and vegetables, whole grains, nuts, and legumes are high in fiber, whereas processed foods are fiber deficient [52,53].

The American College of Lifestyle Medicine (ACLM) released an expert consensus statement in 2022 regarding type 2 diabetes remission and using diet as a primary intervention. The Delphi method, a systematic technique used to answer research questions(s) based on the consensus of panel experts, was used to determine the role of nutrition in T2D remission. Among other key issues, experts have agreed on diet as a primary prevention method for T2D remission in adults. However, they noted the dependency of this positive outcome on the intensity of the intervention, adoption of whole plant-based food diets, and avoidance of meat and animal product counterparts [54].

e. Pain

A study by Towery et al. assessed the effectiveness of a plant-based nutrition intervention on chronic musculoskeletal pain and functional restrictions that affect activities of daily living (ADLs) among a small sample (n=20) of participants. The participants completed baseline health measurements, the Numeric Pain Rating Scale (NPRS), and the Short Form Health Survey (SF-36). The intervention included the provision of an accessible dietician to educate the participants on plant-based nutrition. Additionally, participants used phone applications to count calories and access dietitians for support [55]. Of the 20 participants, 14 completed the program. Health measurements and the Patient Global Impression of Change Scale were repeated post program. Perceived pain decreased by an average of 3.14 points on a 10-point scale (p=0.0001), and SF-36 scores improved by approximately 25 points on a 100-point scale (p=0.0001). Additionally, on

average, ten (89%) of the 14 participants adhered to the intervention. Participants' adherence depended on the types of foods they consumed from the 'allowed' list and their completion of food logs [55].

f. COVID-19

Sodium toxicity is associated with inflammatory immune responses and severe acute respiratory symptoms of COVID-19, such as shortness of breath, pulmonary edema, fever, and nasopharyngeal infections. There was an association between WFPB nutrition and a reduced risk and severity of COVID-19. Low sodium intake, increased sodium excretion, and reduced sodium toxicity mediated the beneficial effects of WFPB nutrition on COVID-19 prevention [19]. In a recent study conducted by Kim et al., researchers surveyed the dietary habits and COVID-19 outcomes of 568 healthcare providers and 2,316 controls with high exposure to COVID-19 patients in six different nations (United States, United Kingdom, France, Germany, Spain, and Italy) [56]. Research subjects who followed plant-based diets had 73% (OR: 0.27, 95% CI: 0.10 to 0.81) lower odds of developing moderate to severe COVID-19 than participants who did not. Those who followed ‘plant-based diets or pescatarian diets’ had 59% lower odds of moderate to severe COVID-19 [OR: 0.41, 95 % CI: 0.17-0.99)]. In contrast, there was a 48% greater odds (OR: 1.48, 95% CI: 0.89 to 2.49) of developing moderate to severe COVID-19 among those who consumed low-carbohydrate, high-protein diets [56].

g. Mental Health

There are conflicting findings on the relationship between PBDs and mental health outcomes. For example, Iguacel et al. conducted a meta-analysis to explore mental health-related outcomes associated with PBDs. It comprised 13 studies (N=17,809), six of which had a sample of vegetarians, two had samples of vegans, and the remaining five studies incorporated both. Two

of those studies reported that vegan and vegetarian diets increased the risk of depression (OR=2.14, 95% CI: 1.11 - 4.15), yet seven studies reported lower anxiety scores (mean difference=-0.85, 95% CI: -1.68, -0.02) among the vegan/vegetarian population using various forms of assessment including the Depression Anxiety Stress Scales (DASS), Mini-International Neuropsychiatric Interview (M-CIDI), Coping Styles and Strategies Inventory (CCEI), the Personality Scale (P-Scale) and more [57].

In the cross-sectional LIPOKAP study, Haghighatdoost et al. assessed the dietary habits of 2,033 Iranian adults using three versions of the plant dietary indices (PDI): overall PDI, health PDI (hPDI), and unhealthy PDI (uPDI), and mental health outcomes using the validated Iranian version of the Hospital Anxiety and Depression Scale (HADS). The results indicated that an unhealthy plant-based diet was associated with a higher risk of anxiety and depression based on scores on the HADS [OR: 1.56, 95% CI: 1.14, 2.14, p=<0.0001 (anxiety), OR: 2.07, 95% CI: 1.49, 2.87, p=<0.0001 (depression) and 1] in the crude model. In contrast, the adjusted model did not reveal any association between PDI, uPDI, and anxiety or depression [58].

A systematic review and meta-analysis [59] of 10 observational studies reported no association between a vegetarian diet and symptoms of depression (pooled effect size: 1.02, 95% CI: 0.84 - 1.25, p=0.817) or anxiety (pooled effect size: 1.09, 95% CI: 0.71 - 1.68, p=0.678)[60]. Therefore, the relationship between PDs and other mental health disorders merits further investigation.

h. Health-related Quality of Life

Baden et al. followed women from the Nurses' Health Study (N=50,290) and Nurses' Health Study II (N=51,784) over eight years to assess PBD quality, categorized by the overall plant-based diet index (PDI), healthful PDI (hPDI), unhealthful PDI (uPDI), physical health-

related quality of life (HRQoL), and mental HRQoL. To assess physical and mental HRQoL, physical and mental health component scores (PCS and MCS, respectively) of the 36-SF Health Survey were used. The investigators evaluated the association between the 4-year changes in PDI and HRQoL. They found improvements in PCS (0.07 [95 % CI: 0.01 – 0.13]) and MCS (0.11 [95 % CI: 0.05 – 0.16] for every 10-point increase in PDI. Subsequently, every 10-point increase in hPDI was associated with improvements in PCS (0.13 [95 % CI: 0.08 – 0.19]) and MCS (0.09 [95 % CI: 0.03 – 0.15]) while uPDI was associated with decreases in PCS (-0.07 [95 % CI: -0.12 – -0.02]) and MCS (-0.10 [95 % CI: -0.16 – -0.05])[61].

A separate study involving postmenopausal women experiencing symptoms assessed the effectiveness of low-fat PBD in combination with whole soybeans. Participants (N=38) were randomly assigned to a low-fat PBD and half a cup of cooked soybeans, or did not have to change their diet over 12 weeks. They recorded the severity of hot flashes and administered the Menopause-Specific QoL Questionnaire to assess vasomotor, psychosocial, physical and sexual symptoms. All hot flashes decreased by 79% in the intervention group and by 49% in the control group (p=0.002). These differences between groups (p=0.01) were also observed, and a similar trend for moderate-to-severe hot flashes was found. The results of the questionnaire showed statistically significant reductions in vasomotor (p=<0.0001), psychosocial (*P*=0.04), physical (*P*=<0.002), and sexual (*P*=0.01) domains in the low-fat PBD group compared to the control group [62]. Although this was a small sample, it warrants further investigation.

i. Current Hospital Initiatives

The New York City (NYC) Health + Hospitals, Bellevue, piloted an outpatient lifestyle medicine initiative to help patients transition to a PBD and engage in other activities related to the pillars of lifestyle medicine (WFPB diet, physical activity, stress management, sleep, social

connections, and avoidance of risky substances) [63]. This initiative aimed to reduce the risk of chronic diseases, such as heart disease and diabetes, among a patient population of safety-net beneficiaries with pre-existing chronic disease [64–66]. Patients worked with an interprofessional team that included a plant-based physician, dietician, and health coach [67]. Each patient had a program tailored to their needs and was referred to programs like the Supplemental Nutrition Assistance Program (SNAP) if they could not afford healthier food options. McMacken and colleagues surveyed 109 participants at baseline and 84 participants six months later to examine motivators and barriers to lifestyle changes among participants. Some motivators included weight loss, a reduction in prescribed medications, and an increased sense of control over one's life. Identified barriers included being able to meet with providers during work hours only, constantly having to visit the clinic, and financial challenges [64]. The pilot study established that the program was feasible in this hospital setting. As a result, the mayor of NYC and NYC Health + Hospitals will expand lifestyle medicine clinics to six new public healthcare sites: Jacobi, Lincoln, Woodhull, Elmhurst hospitals, Gotham Health, Vanderbilt, and Downstate's neighbor, NYC Health + Hospitals/Kings County [68].

Rahman et al. implemented a 12-week plant-based nutrition program in a large healthcare system (Kaiser Permanente, Mid-Atlantic States). Of the 408 patients participating, 214 attended regular sessions with the medical doctor, dietitian, and nurse educator. Among the regularly participating subpopulation, the average reductions in total cholesterol were 11.0 mg/dL; in LDL cholesterol, 8.1 mg/dL, average weight loss were 2.2 kg. Further, there were reductions in primary care physician visits over nine months (-3) and unique medications filled (-3) [69].

Chwyl et al. conducted a pilot study to assess the feasibility and acceptability of remotely delivered WFPB nutrition and integrated behavioral weight loss. There were 15 overweight or

obese participants in the United States, aged 18–75 years. The study was conducted over 12 weeks. The researchers administered three surveys at baseline, midline, and end of the program. Program satisfaction served as a measure of acceptability. Participants rated the program an average score of 4.4 out of five (SE: 0.18). Attrition was low, and over 50% of the participants lost 5% of their body weight, as determined by an intention-to-treat analysis (mean, 5.89; SE, 0.68 kg) [70].

j. PRECEDE-PROCEED Framework

The PPM is a systematic cost-benefit evaluation framework for assessing the health needs of a community. This model is the most comprehensive and one of the most widely used for health promotion [71]. Lawrence Green developed the PRECEDE aspect of PPM in 1974, while Green and Kreuter added the PROCEED aspect in 1991. PRECEDE stands for Predisposing, Reinforcing, and Enabling Constructs in Educational and Environmental Diagnosis and Evaluation, while PROCEED stands for Policy, Regulatory and Organizational Constructs in Educational and Environmental Development. The PPM consists of eight steps to determine, develop, implement, and evaluate proposed health interventions.

The PRECEDE component of the PPM consists of four steps:

- **Social Assessment:** This involves the identification of desired outcomes.
- **Epidemiological Assessment** involves identifying and setting priorities for a specific community problem and the behavioral and environmental determinants that hinder the achievement of desired results. (Specific Aim 1)
- **Education and Ecological Assessment:** This involves identifying the predisposing, enabling, and reinforcing factors that can affect the behavior, attitudes, and environmental factors prioritized in Step 2. (Specific Aim 1)

- **Administrative and Policy Assessment and Intervention Alignment:** Identification of administrative and policy factors that govern implementation. (Specific Aim 1)

The PROCEED component of the PPM consists of four stages:

- **Implementation**: This stage involves the design and execution of the proposed intervention.
- **Process Evaluation:** This assessment ensures that the intervention process aligns with the planned actions. (Specific Aim 2)
- **Impact Evaluation:** This step examines whether the intervention has the desired impact on the target population. (Specific Aim 2)
- **Outcome Evaluation:** At this stage, an assessment determines whether the intervention leads to the desired outcomes. (Specific Aim 2)

The five characteristics of PPM define its methodology as follows.

- It is sociological, explicitly focusing on the effects of the physical, social, and political environments on population health.
- It is population-centered.
- It is participatory.
- It focuses on quality of life.
- Its approach is grounded in field experience, with ongoing revisions and refinements.

The Use of PPM in a Community-Based Health Intervention

Translating the PPM steps into action can help address the specific health needs of a community. Achieving this goal involves the following steps:

PRECEDE (Figure 1)

- **Defining the ultimate outcome:** This starts with collecting demographic data presented to the targeted community members to help them decide on their priorities. For example, surveys, focus groups, interviews, and questionnaires can be used to identify the perspectives of community members. The insights gathered from these perspectives will subsequently determine the desired outcomes for the proposed intervention.
- **Identifying the problem:** This phase identifies the factors that influence the desired outcomes identified in the first step. The influencing factors can be behavioral, environmental, or lifestyle-related.
- **Examining the factors influencing behavior, lifestyle, and responses to the environment:** This phase identifies the predisposing, reinforcing, and enabling factors that create desired behavior and environmental changes.
    - Green and Kreuter referenced several frameworks and models that influenced the identification of causal factors in PPM's predisposing, enabling, and reinforcing categories. These frameworks and models include the Health Belief Model (HBM), Social Cognitive Theory (SCT), Theory of Reasoned Action, the early phases of the Stages of Change Model (also known as the Transtheoretical Model), and motivational interviewing (MI). We illustrate these frameworks in Figure 1 [71–74]. Predisposing factors focus more on the individual, such as knowledge and attitudes. Enabling factors highlight the resources needed to achieve the population health objectives outlined in the first phase [71]. Finally, reinforcing factors are the community's support or lack thereof that promotes or hinders healthy living [75].

Figure 1: PRECEDE component of PRECEDE-PROCEED Framework

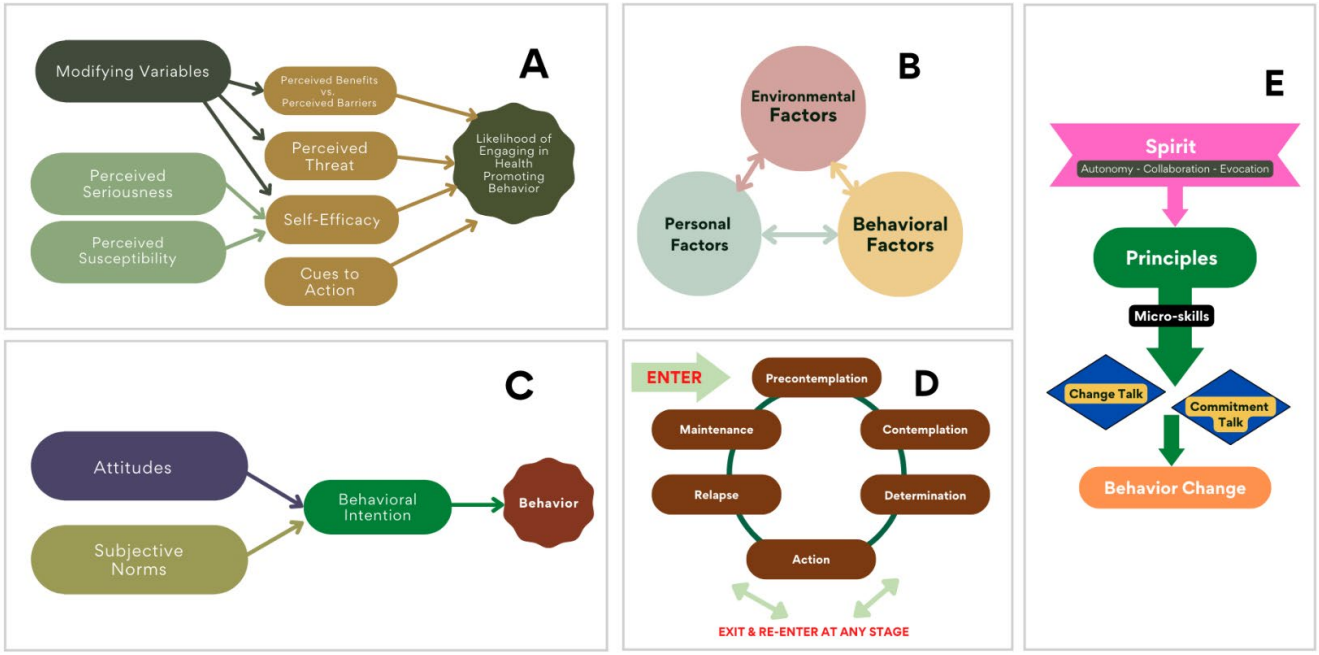

Figure 2: A: Health Belief Model; B: Social Cognitive Theory; C: Theory of Reasoned Action D: Transtheoretical Model (stages of change); E: Motivational Interviewing.

- **Identifying best practices for intervention design and administrative and policy issues that can influence implementation:** This stage involves analyzing the organizational issues affecting the proposed health intervention. The tasks in stages 3 and 4 led to devising a specific health intervention based on the analysis of the collected data.

PROCEED

- **Implementation:** This step involves setting up and implementing the planned intervention. The subsequent three phases occur as the intervention progresses, and the intervention is monitored and adjusted to maximize its effectiveness.
- **Process evaluation:** In this step, the health intervention procedures are examined to ensure that they align with the intended plan.

- **Impact evaluation:** This involves evaluating the initial success of the health intervention to determine whether the intervention has the desired effect on the identified behavioral factors.
- **Outcome evaluation:** This step determines whether the health intervention works to achieve the desired outcome.

Several studies have used the PRECEDE-PROCEED model for health promotion to conduct community health needs assessments and community-based participatory research (CBPR) [76–79]. Therefore, evaluating the WFPB nutrition intervention program will focus on the PRECEDE-PROCEED model.

Methods

Study Design

The 21-day jumpstart program was delivered to the participants using the Zoom web conferencing platform. The study employed a mixed-methods approach, incorporating self-administered pre- and post-intervention questionnaires and a key informant focus group. The key informant focus group aimed to obtain study participants' feedback on their experience with the Jumpstart intervention and how to improve program delivery for future cohorts. The key informants of this focus group consisted of self-identified Black community leaders living or working in Brooklyn, NY. This intervention was implemented between September 2021 and October 2023. The program evaluation procedures and protocols were approved by the SUNY Downstate Medical Center Institutional Review Board [ID: 1800527].

Study Population

To participate in the Jumpstart program, participants must be 18 or older, English speaking (for these Jumpstarts, as PPMNY does offer Spanish-speaking Jumpstart programs), have access

to the internet and Zoom web conferencing, and be willing to commit to a WFPB diet and attend sessions for the 21-day program to the best of their ability. The PPMNY team recruited program participants using various marketing materials. PPMNY posted flyers and brochures on their social media pages to market the program to individuals and encouraged those interested in registering and participating. Marketing posts were made on Facebook, YouTube, and their website (https://www.plantpoweredmetrony.org/jumpstarts.html). PPMNY also marketed the Jumpstart to community partners such as JewishVeg, Rise Up East New York, churches, community centers, and more. Those registered in PPMNY's program (n=581) had to pay a fee to participate. Participant rates are listed in Table 3.

In some cases, partnering organizations absorbed the fees to sponsor participants. Of those who registered, 295 consented to participate in the study. Individuals with end-stage renal disease (ESRD) were excluded from the study.

Table 3: Rates for participation in the Jumpstart program.

TYPES OF PARTICIPATION	RATE
Sponsor *(Supports participation for you and one other)*	$250
Sustainer *(Pays for your participation)*	$150
Community *(Discounted price)*	$50

Intervention

Before beginning the program, the study participants had the option of meeting with PPMNY's medical officer to discuss their current medical concerns and medications. Whenever appropriate, participants were counseled to communicate with their primary care physician about reducing medications as needed throughout the program.

During the 21-day intervention period, the participants were expected to follow a WFPB diet that included the ad libitum consumption of fruits and vegetables (starchy, non-starchy, leafy green), whole grains and legumes, flax seeds, and chia seeds, with limited consumption of high-fat, whole foods like avocado, nuts, and other seeds. Participants were asked to exclude all animal products, oils, and refined or ultra-processed foods from their diets.

The program consisted of an orientation session, prep sessions (introduced in later cohorts), educational sessions, and group mentorship sessions (for all cohorts except the first, which received one-on-one mentorship) that varied in quantity across the seven cohorts. The orientation (which sets the foundation for participants' journey in the program), prep sessions (equipping participants with practical skills and knowledge to implement plant-based eating in their daily lives), and educational sessions resulted in an average of 14 virtual contact hours, three of which were dedicated to cooking demonstrations. Participants were offered mentorship from the PPMNY network community of volunteers to provide them with extra support and guidance on WFPB diet implementation. These mentorship meetings were scheduled, resulting in three additional 3 virtual contact hours.

Educational sessions varied in duration, ranging from 1 to 2 hours. The curriculum accounted for the participants' varying ethnicities by providing culturally appropriate and relevant resources. Educational sessions covered defining a WFPB diet, the role of WFPB nutrition in chronic disease prevention and reversal, the role of dietary factors in health disparities in chronic diseases, strategies to make optimal food choices (e.g., reading food packaging labels), instruction in WFPB cooking via virtual demonstrations, strategies for changing eating behaviors and habits and methods to stick to a WFPB diet in family and social settings. The educational and mentorship sessions resulted in a total of 17 virtual contact hours. At the conclusion of the program,

participants were encouraged to continue engaging with the PPMNY network, events, and activities to sustain the WFPB dietary pattern. Table 4 provides an example of the Jumpstart program schedule and agenda.

Table 4: An example schedule for the launch of a Jumpstart program.

SESSION	DATE	TIME	MODULES	THEME
Mentors' Meeting	Wednesday, October 11	7 - 8:00 PM		
Orientation	Wednesday, October 18	7 - 9:00 PM	Intro to WFPB nutrition, inspiration, logistics, talking to other people about the jumpstart, vision/"why," introduce mentorship, SMART goals, mentor track meet-and-greet	1. Hydrate
Prep Session	Sunday, October 22	3:00 - 6:00 PM	What is a whole food, shopping/label reading, eating on a budget, constructing WFPB meals, kitchen and pantry prep, kitchen skills, and healthy swaps demo, meal planning guidance, fuel focus	2. Satisfy with starches and beans
Mentorship Meetings	Wednesdays, October 25 - November 8	12:00 PM, 7:00 PM	*Three meetings*	
Market Tours	Saturday, October 28 & Saturday, Nov 4	AM time TBA	Farmers' market tours in TBD locations	
Session #1	Sunday, October 29	3 - 5:00 PM	Foundations in WFPB nutrition; culinary demonstration in plant versatility	3. Eat the rainbow & omega-3 seeds
Session #2	Sunday, November 5	3:00 - 4:40 PM / 5:00 - 6:15 PM	WFPB in preventing/treating chronic disease, psychology of food, followed by a public demo with Chef Carole	4. Eat greens with everything
Session #3	Sunday, November 12	3 - 5:00 PM	Q&A with a plant-based physician, living a WFPB lifestyle in family and social settings	

Optional activities for participants included medical intakes, farmer's market tours, and access to the Jumpstart app and other PPMNY social media platforms. Medical intakes were available to all Jumpstart participants; however, they focused on individuals requiring additional support due to high-risk medications or specific chronic conditions. Farmers' market tours, conducted in person, were optional as the intervention was virtual. The Jumpstart app features

recipes, shopping tips, and strategies to aid participants in transitioning to a WFPB lifestyle. Visual representations of the Jumpstart app are shown in Fig. 3.

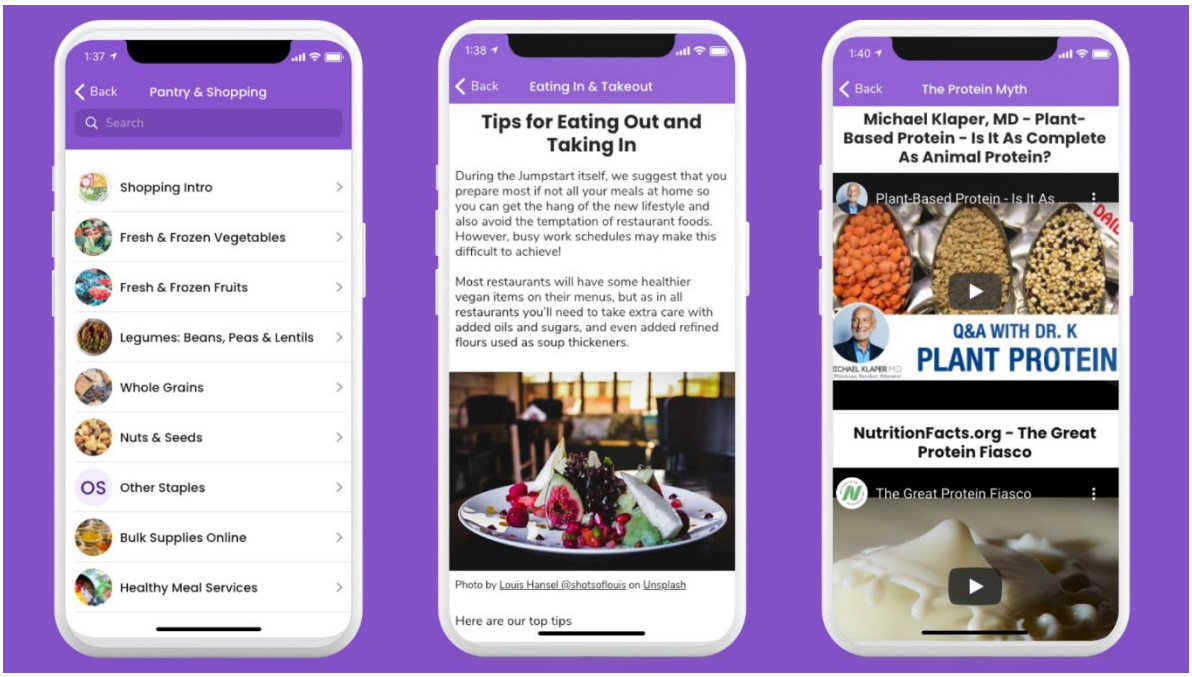

Figure 3: Images from Plant-Powered Metro New York's Jumpstart Program Application

Program Evaluation

The study employed pre- and post-program questionnaires to evaluate outcomes encompassing clinical parameters, quality-of-life (QoL) indicators, mental health metrics, knowledge acquisition, and participants' perceptions regarding WFPB nutrition. Initially, a member of the PPMNY organization disseminated an email concerning the baseline survey, following participant registration. Subsequently, an Investigational Review Board (IRB)-approved researcher distributed a follow-up email containing a unique link generated through REDCap to the enrolled individuals. The same methodology was replicated in the post-program survey. The pre-program survey was administered before the initiation of the Jumpstart program and remained open until its commencement. Conversely, the post-program survey was conducted upon program

completion, with responses accepted up to one month after the conclusion of the Jumpstart program. The program evaluation for the Jumpstart was grouped into four domains: participation, program acceptability, changes in perceptions, and changes in health-related outcomes.

Evaluation Domains

Domain 1: Program Feasibility

The feasibility of the Jumpstart was measured by attendance. To calculate, I computed the proportion of program sessions attended (educational and mentorship sessions combined and educational sessions alone) by each study participant and computed the cohort average for individuals who consented to participate in the study.

Domain 2: Program Acceptability

Survey responses on program satisfaction and willingness to recommend the program to others measured program acceptability. Another way that we measured program acceptability was through a key informant focus group. Nine participants from the Jumpstart program, who self-identified as Black community leaders based in Brooklyn, were recruited. Email communication was used to disseminate information about the opportunity, and the first ten individuals who expressed interest were selected. However, one participant was unable to attend the scheduled focus group session. The key informant focus group aimed to identify the successes and challenges of the Jumpstart program and ways to market it to constituent groups in Brooklyn. The focus group was conducted using Zoom web conferencing with one moderator and one note-taker in attendance. Data was obtained by the facilitation of a discussion and inductive content analysis was employed to analyze the qualitative data of the focus group. Table 5 presents the interview guide used in the key informant focus group. Notes from the focus group were reviewed and

analyzed using an inductive approach. Codes and subcodes were identified and categorized accordingly.

Table 5: Focus Group Discussion Guide.

GOALS	1. Gain insight into the educational, technological, social, and logistical successes and challenges of the 21-day Jumpstart program. 2. Identify how the Jumpstart program can be more marketable to constituents. 3. Identify barriers the participants encountered during the program and ways to mitigate/resolve them.
GUIDE	Opening Question (Icebreaker): Please introduce yourselves and describe your role as a leader in your community. (Be brief). Transition Question: What were some of the program's most meaningful or helpful aspects? • What would you say were some of the most challenging aspects of the program? Transition Question: The next question relates more to food access. For any of you who have challenges accessing healthy plant foods, did the Jumpstart program address your needs? • If so, what were some essential learnings around food access and healthy eating? If not, is there anything you can recommend for future jumpstart programs? Transition Question: Among your constituents, who would be most motivated to participate in the jumpstart program? And why? • How well do you think your constituents will follow a WFPB diet? Transition Question: Among your constituents, what do you foresee being some of the barriers they may encounter around participating in this program [and how can we mitigate them?] (Barriers to participating in this program) • How much did you use the recordings, and should this be a part of the marketing of this program? Transition Question: How well do you think your constituents would follow a WFPB diet when presented with the same educational content you received through the jumpstart? • What would make the arguments for WFPB nutrition more compelling to you and your constituents? Transition Question: It has been about three weeks since the closure of the program; describe what you're eating habits have been like after its conclusion (Post-program Diet Habits and Practices) • If you were in a close-knit group, such as your fellow church members or work colleagues, would it help maintain the lifestyle? • How would you suggest facilitating this as we plan for the next Jumpstart? • For those who have adopted a more flexible approach to eating (vegetarian, flexitarian, semi-vegetarian), what would you say has prevented you from adopting the WFPB lifestyle fully?

Transition Question: Do you have any recommendations regarding recipes, facilitation of the program, and other logistical aspects?

- Content
- Communication with PPMNY staff
- Interaction with your mentors
- Marketing materials
- Registration and intake process
- Surveys
- Cooking Demos

Domain 3: Changes in Perceptions

Responses gathered before and after the program covered self-reported perceived knowledge concerning nutrition (Item 1, Table 6) in general and WFPB nutrition precisely (Item 2, Table 6), perceived self-efficacy in adopting a WFPB lifestyle (Item 3, Table 6) and preparing WFPB meals (Item 4, Table 6), perceived barriers to embracing a WFPB diet (Item 7, Table 6), as well as perceived challenges (Item 5, Table 6) and cost of consuming WFPB meals (Item 6, Table 6). Each aspect was addressed through specific questions on the pre- and post-program surveys, allowing for the evaluation of changes from pre- to post-program assessments. The statistical approaches varied. All responses to questions within the perception domain were rated on a continuous scale of 1 to 10 and evaluated using the Wilcoxon Signed-Rank Test, except for the survey question that pertained to perceived barriers to adopting a WFPB diet. This question was categorical and assessed using the McNemar-Bowker test. The study team developed these particular survey questions. Table 6 presents the results.

Table 6: Survey items related to perceptions		
Item	**Response Options**	**Statistical Approach**
[Item 1] To what extent do you feel that you are knowledgeable about nutrition in general?	Scale of 1-10, 1= Not Knowledgeable and 10 = Very Knowledgeable	Wilcoxon Signed-Rank Test
[Item 2] To what extent do you feel that you are knowledgeable about whole food, plant-based nutrition (specifically)	Scale of 1-10, 1= Not Knowledgeable and 10 = Very Knowledgeable	Wilcoxon Signed-Rank Test
[Item 3] How confident do you feel in your ability to adopt a whole food, plant-based diet?	Scale of 1-10, 1= Not confident and 10 = Very confident	Wilcoxon Signed-Rank Test
[Item 4] How confident do you feel in your ability to cook a whole food, plant-based meal by yourself?	Scale of 1-10, 1= Not confident and 10 = Very confident	Wilcoxon Signed-Rank Test
[Item 5] How challenging do you perceive that it is to eat a whole food, plant-based diet?	Scale of 1-10, 1= Not challenging and 10 = Very challenging	Wilcoxon Signed-Rank Test
[Item 6] How expensive do you perceive it is to eat a whole food, plant-based diet?	Scale of 1-10, 1= Not expensive and 10 = Very expensive	Wilcoxon Signed-Rank Test
[Item 7] To what extent to you perceive the following to be a barrier to eating a WFPB diet: • My ethnic culture's food traditions • The people with whom I live • Relationships with my family/friends • My kitchen set-up • My work life • My ability to access fresh produce	• Not Applicable • Not a barrier • Somewhat a barrier • Moderately a barrier • Very much a barrier	McNemar-Bowker's Test

In addition to evaluating perceived knowledge, we aimed to gauge actual knowledge by including fact-based questions on the pre- and post-program surveys. Table 7 displays the seven items administered to the fall 2021 (Cohort 1) and winter 2022 (Cohort 2) Jumpstart cohorts. These questions were adapted from T. Colin Campbell's whole food, plant-based nutrition quiz, which is available on his website, nutritionstudies.org [80]. The knowledge assessment questions were modified for subsequent cohorts spanning from Spring 2022 to Fall 2023 (Cohorts 3-7). Members of the PPMNY team formulated these questions to align directly with the Jumpstart's curriculum. Table 8 displays the six items featured in both the pre- and post-program surveys for these cohorts.

The change in knowledge of each participant was determined by comparing the proportion of correctly answered questions in the post-program survey to the baseline responses. A Wilcoxon Signed-Rank Test analysis was performed.

Table 7: Survey items related to assess knowledge of nutrition for Fall 2021 and Winter 2022 Jumpstart cohorts.

Item	Question	Response Options
Knowledge Assessment Questions for Cohort 1 and 2 Jumpstart Participants		
Please answer the below question related to nutrition. Please do not refer to other sources to answer these questions.[+]		
1	What is the BEST plant-based sources of calcium?	a. Spinach b. Brown rice c. Low-oxalate greens d. Potatoes
2	Which of the following is a FALSE statement about protein?	a. Protein is exclusive to animal-based foods. b. Plants proteins contain all the essential amino acids, but not in the same ratio as animal protein. c. The recommended daily allowance of protein is 0.8 gm/kg body, or a diet of 10% protein. d. Intake of "high-quality protein" (as in animal protein) does not necessarily mean better for health.
3	According to the whole food, plant-based (WFPB) diet, what is the healthiest oil to cook with?	a. Olive oil b. Coconut oil c. Avocado oil d. Canola oil e. No oil
4	How many servings of fruits and vegetables should you eat per day?	a. At least 1 serving b. At least 2 servings c. At least 3 servings d. At least 4 servings e. At least 5 servings
5	What has the most calories?	a. Protein b. Carbohydrate c. Fat
Please indicate whether the below statements are True or False.		
6	A plant-based diet can help prevent disease.	a. True b. False
7	Simply avoiding or cutting back on meat makes for a healthy diet.	a. True b. False

[+]Adapted from nutritionstudies.org whole food, plant-based nutrition quiz

Table 8: Survey items related to assess knowledge of nutrition for the Spring 2022 to Fall 2023 Jumpstart cohorts (Cohorts 3-7).		
Item	**Question**	**Response Options**
Knowledge Assessment Questions for Cohort 3-7 Jumpstart Participants		
Please answer the below questions related to nutrition. Please do not refer to other sources to answer these questions.*		
1	Which one of these statements are FALSE: Foods that come from animals…	a. Are required to build muscle and bone and to maintain health. b. Contain cholesterol and saturated fat and lack fiber and healthful carbohydrates. c. Have been linked to type 2 diabetes, cardiovascular disease, cancer and all-cause mortality (or early death).
2	Cholesterol is inside the muscle of animals and cannot be removed by cutting off the visible fat or the skin.	a. True b. False
3	Which statement about cholesterol is true?	a. Plant foods have no cholesterol. b. Our bodies make all the cholesterol we need. c. Both are true.
4	What very important dietary component shuttles excess hormones (such as estrogen and testosterone) out of the body, which would otherwise be reabsorbed into the bloodstream?	a. Vitamin C b. Beta-carotene c. Fiber
5	The Power Plate includes nourishing food groups that contain antioxidants, vitamins, minerals, fiber and so much more. Can you list what they are?	Open-ended question.
6	How does saturated fat contribute to high blood pressure?	a. Saturated fat increases blood viscosity (thickness). b. Saturated fat does not matter as long as salt intake is reduced. c. Saturated fat has a lot of calories.

*Team-generated questions based on the Jumpstart educational session curriculum.

Domain 4: Changes in Health Outcomes

Health-Related Quality-of-Life (QoL)

Health-related QoL was measured using a modified version of the 14-item CDC Health-Related QoL tool [81]. Table 9 displays the items featured in both pre- and post-program surveys.

The response options were categorical, and a McNemar-Bowker statistical test was performed. An additional analysis was performed by consolidating response options to determine if the participants experienced symptoms that impacted their daily lives.

Table 9: Survey items to assess health-related quality-of-life.

Item	Response Options	Statistical Approach
To what extent have the following symptoms affected your day-to-day life: • Pain (other than headaches) • Headaches (separate from other pain) • Mobility issues • Breathing issues • Skin issues • Upper GI issues/discomfort (e.g., acid reflux) • Lower GI issues/discomfort (e.g., irritable bowel) • Body odor • Hormonal issues (e.g. related to menstrual cycles or menopause) • Poor quality of sleep • Low energy levels • Moodiness • Lack of mental clarity • Cravings for unhealthy food	• Not at all • Slightly • Moderately • Quite a bit • Extremely	• McNemar-Bowker's Test • McNemar Test (when response options were dichotomized to 'Yes, the symptom affects my day-to-day life' and 'No, the symptom does not affect my day-to-day life')

Mental Health

To measure changes in mental health, self-reported symptoms of anxiety were assessed using the Generalized Anxiety Disorder Assessment 7 (GAD-7), and depressive symptomatology was assessed using the Patient Health Questionnaire 9 (PHQ-9) [82–84].

The GAD-7 consists of seven questions with response options ranging from "Not at all" to "Nearly every day," with each assigned a numerical value from 0 to 3. Individuals' scores were determined by summing up their responses across all questions, resulting in a total score ranging from 0 to 21. The interpretation of the total score categorizes anxiety severity as minimal (0-4),

mild (5-9), moderate (10-14), or severe (15-21). Higher scores indicate a greater degree of anxiety symptoms. The GAD-7 tool is presented in Table 10.

Table 10: GAD-7 survey tool.

Over **last 2 weeks [pre-program survey]/since the Jumpstart program [post-program survey],** last 2 weeks, how often have you been bothered by the following problems?	**Not at all sure**	**Several days**	**Over half the days**	**Nearly every day**
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it's hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3
Add the score for each column	+	+	+	
Total Score *(add your column scores)* =				

The PHQ-9 consists of nine questions and is scored by assigning a numerical value to each response option chosen by the individual. The response options ranged from "Not at all (scored as 0)" to "Nearly every day (scored as 3)" for each of the nine questions. The total score was calculated by summing the scores for each question, resulting in a total score ranging from 0 to 27. Higher scores indicated a greater degree of depressive symptoms. The PHQ-9 is presented in Table 11. Individual participant scores for both the GAD-7 and PHQ-9 were calculated by recording each participant's responses to the items on both scales at baseline and after the program. These scores were then compared to evaluate changes in the self-reported symptoms of anxiety and depression from the beginning to the end of the program.

Table 11: PHQ-9 survey tool.				
Over the last 2 weeks [pre-program survey]/since the Jumpstart program [post-program survey], how often have you been bothered by any of the following problems? *(Use "✓" to indicate your answer)*	**Not at all**	**Several days**	**More than half the days**	**Nearly every day**
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3
Add the score for each column	+	+	+	
Total Score *(add your column scores)* =				

Anthropometric Measures

The participants were invited to report their anthropometric measurements. On the surveys, participants were asked, 'To the best of your knowledge, please report the below health measures taken before (baseline questionnaire)/after (post-program questionnaire) the Jumpstart program. This can be from the lab work of your most recent physical/other doctor's visit (pre-program/post-program) or that you have taken at home or elsewhere (i.e., weight, blood pressure, hemoglobin A1c (if you have the appropriate instruments)). If you do not know, please leave the field blank. Health measurements should be taken no later than (a month pre-program or a month post-program). If available, you can also submit lab work and/or other health measures to Ayanna at ayanna.besson@downstate.edu via encrypted email when it is available.' These measures included

weight and height (which I was then able to compute their BMI values), waist circumference, systolic and diastolic blood pressure, and any available laboratory measures of low-density lipoprotein (LDL) cholesterol, total cholesterol, and hemoglobin A1c (HbA1c). Baseline anthropometric measures were obtained from self-reported data provided by participants within a month or less prior to the commencement of the Jumpstart program. Post-program anthropometric measurements were accepted within a month of the completion of the program. Participants had the option to submit their anthropometric data through two secure channels: directly on the administered surveys or via encrypted email, which allowed investigators to retrospectively input the values on the survey on the participant's behalf. All statistical analyses were performed using Stata version 16.1[85].

Human Subjects Protections

The program received exempt approval from the SUNY Downstate Health Sciences University Institutional Review Board (IRB 1800527). Those who consented to participate were enrolled in the study. Participants were informed of the potential risks associated with the program, including the potential need for medication adjustment. Possible improvements in BMI, weight, blood pressure, low-density lipoprotein (LDL) cholesterol, glucose control, and other quality-of-life measures, such as energy levels and sleep quality, were also described. PPMNY offered participants opportunities to win prizes to encourage the completion of the surveys. Program sponsors offered the prizes. Some cohorts of participants were given pantry goods or fresh produce to assist with starting their WFPB lifestyle transition. As an incentive during recruitment, focus group participants were offered a $40 Amazon gift card for their participation. A HIPAA authorization (with information) and HIPAA alteration (to waive the signature requirement) were approved by Downstate’s Institutional Review Board. Participants

received the HIPAA authorization before completing the baseline survey. The HIPAA authorization can be seen in Appendix A.

All the study data were collected using REDCap and stored on a password-protected computer. Participants were informed that they could withdraw from the study at any given time, with the number of withdrawals being the only information documented and retained about the participant(s). All survey questions were voluntary.

Results

Sample Characteristics

Between September 2021 and October 2023, 295 participants consented to participate in this study. Table 12 and Figure 4 show the characteristics of the sample. A summary of the demographic characteristics of the participants who took part in at least one session and completed both the baseline and post-program surveys (N=139) and the baseline survey only (N = 117) are shown in Table 10. The population that completed baseline and post-program surveys comprised 91.2% female, 58.3% were middle-aged and older adults (55 and older), 94.2% had health insurance, and 55.3% were widowers. This cohort was a racially diverse group of 52.2% White, 30.1% Black, 9.6% Latino, and 8.1% other races or ethnicities. The sample was also highly educated, with 77.6% having completed a bachelor's degree and 55.1% of those individuals having completed a graduate degree. Approximately 25% of this sample was not born in the United States, and 73.5% of the participants resided in New York (Table 13).

Table 12: Cohort distribution of adults, ages 18 and older who participated in Plant Powered Metro New York's (PPMNY) 21-day plant-based Jumpstart program from 2021 to 2023.

Cohort	Registered	Attended at least an educational, mentorship, prep session, orientation, or prep session	Consented to be in the study	Completed Baseline and post-program surveys
1: Fall 2021	84	74	56	38
2: Winter 2022	104	89	62	27
3: Spring 2022	86	69	37	12
4: Fall 2022	72	63	35	23
5: Winter 2023	90	68	44	19
6: Spring 2023	66	53	28	9
7: Fall 2023	79	58	32	11
TOTAL	581	475	295	139

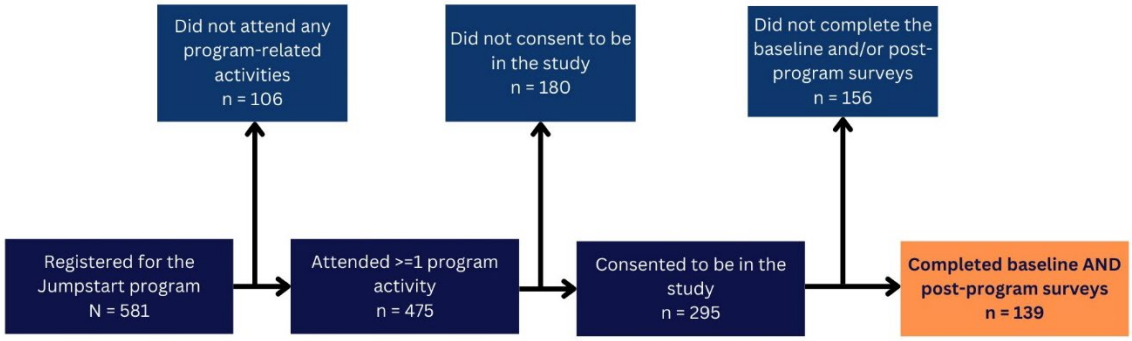

Figure 4: Flowchart of the final analytic sample of participants in the Jumpstart program.

A chi-square analysis compared the participants in the final analytic sample (those who completed both the baseline and post-program surveys) with those who completed only the baseline survey. The characteristics of both populations were similar across all demographic variables except for race and ethnicity. An association between race, ethnicity, and the number of completed surveys was found ($p < 0.001$). A total of 52.2% of Whites completed the baseline and post-program surveys compared to 30.1% of Blacks. A total of 37.1% of Black participants completed the baseline survey compared to 29.3% of White participants.

Table 13: Descriptive characteristics of adults, ages 18 and older, who participated in Plant Powered Metro New York's (PPMNY) 21-day plant-based Jumpstart program from 2021 to 2023 and completed at least the electronically administered baseline survey.

Characteristic	Participants who completed both the baseline and post-program survey, N (%)	Participants who completed the baseline survey only, N (%)	P-value

Gender*	**n = 137**	**n = 117**	0.248
Male	12 (8.8)	16 (13.7)	
Female	125 (91.2)	100 (85.5)	
Non-binary	0 (0.0)	1 (0.9)	
Age (years)*	**n = 139**	**n = 117**	0.405
18-24	2 (1.4)	1 (0.9)	
25-34	10 (7.2)	10 (8.5)	
35-44	17 (12.2)	21 (17.9)	
45-54	29 (20.9)	32 (27.4)	
55-64	45 (32.4)	32 (27.4)	
65 & above	36 (25.9)	21 (17.9)	
Race/Ethnicity	**n = 136**	**n = 116**	**<0.001**
White or Caucasian	71 (52.2)	34 (29.3)	
Black or African American	41 (30.1)	43 (37.1)	
Hispanic or Latino	13 (9.6)	18 (15.5)	
Indian (American) or Alaska Native	0 (0.0)	1 (0.9)	
Asian	1 (0.7)	3 (2.6)	
More Than One Race	6 (4.4)	16 (13.8)	
Other (Unspecified)	4 (2.9)	1 (0.9)	
Birthplace*	**n = 136**	**n = 117**	0.881
United States	100 (73.5)	87 (74.4)	
Residence*	**n = 136**	**n = 117**	0.504
New York	100 (73.5)	86 (73.5)	
Education*	**n = 129**	**n = 115**	0.156
Less Than Bachelor's	29 (22.4)	26 (22.5)	
Bachelor's	26 (20.2)	27 (23.5)	
Some Masters	3 (2.3)	8 (7.0)	
Master's	54 (41.9)	40 (34.8)	
Doctoral	17 (13.2)	14 (12.2)	
Marital Status	**n = 132**	**n = 117**	0.861
Widowed	73 (55.3)	66 (56.4)	
Health Insurance	**n = 138**	**n = 116**	0.485
Yes	130 (94.2)	111 (95.7%)	
Presence of Chronic Disease	**n = 139**	**n = 112**	0.731
Yes	102 (72.4)	80 (71.4)	
Chronic Disease 'Yes'	**n = 258**		
Diabetes	18 (12.9)	20 (16.8)	0.384
High Blood Pressure	40 (28.8)	40 (33.6)	0.402
High Cholesterol	48 (34.5)	42 (35.3)	0.898
Asthma	16 (11.5)	17 (14.3)	0.506
Heart Disease	6 (4.3)	9 (7.6)	0.267
Cancer	14 (10.1)	11 (9.2)	0.823
Kidney Failure*	2 (1.4)	1 (0.8)	1.000
Other Chronic Disease	32 (62.7)	19 (37.3)	0.156

Participation

The participation rate was calculated based on the proportion of sessions attended by each participant. On average, participants attended 73% of the educational sessions and 66% of the educational and mentorship sessions combined, based on the collected averages for each cohort (n=139) (Table 14). The average participation rate in the educational sessions decreased during the spring iterations of the Jumpstart program, as shown in Figure 5.

Table 14: Cohort distribution and attendance rates of adults, ages 18 and older, who participated in Plant Powered Metro New York's (PPMNY) 21-day plant-based Jumpstart program from 2021-2023 (n=295).

Cohort	Sessions Offered	The average rate of educational and mentorship sessions attended	The average rate of educational sessions attended only
1: Fall 2021	8 Sessions (4 educational/4 mentorship)	75% (6/8)	82% (3/4)
2: Winter 2022	8 Sessions (4 educational/4 mentorship)	75% (6/8)	83% (3/4)
3: Spring 2022	7 Sessions (3 educational/4 mentorship)	57% (4/7)	60% (2/3)
4: Fall 2022	9 Sessions (5 educational/4 mentorship)	78% (7/9)	81% (4/5)
5: Winter 2023	9 Sessions (5 educational/4 mentorship)	56% (5/9)	75% (4/5)
6: Spring 2023	8 Sessions (4 educational/4 mentorship)	63% (5/8)	58% (2/4)
7: Fall 2023	7 Sessions (4 educational/3 mentorship)	57% (4/7)	74% (3/4)
TOTAL		66%	73%

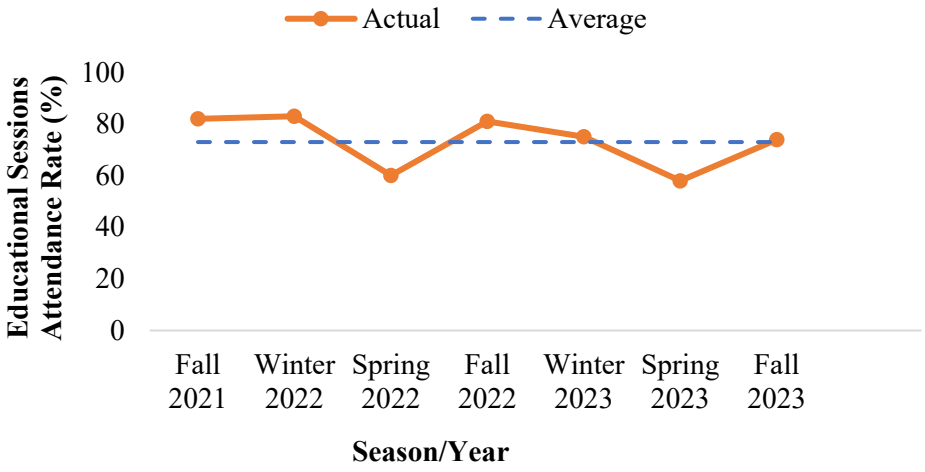

Figure 5: Attendance rate trends of adults aged 18 and older who participated in Plant Powered Metro New York's (PPMNY) 21-day plant-based Jumpstart program from 2021-2023.

Satisfaction

The Jumpstart program was well-received by participants, based on the post-program survey question "My overall experience with the Jumpstart program was…" (response options

were “disappointing,” “not so great,” “it was fine” “good,” and “excellent”). Among the 139 participants who answered the question, nearly 90% found the program to be ‘Excellent’ or ‘Good’ (64.03% and 25.90%, respectively). When asked if they would recommend the Jumpstart program to others (N=137), 97.81% responded ‘Yes.’ Fisher’s exact test revealed a statistically significant difference in the relationship between how participants responded to their overall experience with the Jumpstart program and whether they would recommend it to others. Table 15 and Figure 6 display the distribution of responses from Jumpstart participants. Overall satisfaction with and recommendation of the Jumpstart program did not differ significantly across race and ethnicity (Tables 16 and 17).

Table 15: Responses of Jumpstart participants regarding overall Jumpstart satisfaction and recommendation, ages 18 and older, who participated in Plant Powered Metro New York’s (PPMNY) 21-day plant-based Jumpstart program from 2021 to 2023 (N=137).

‘My overall experience participating in the Jumpstart:’	*‘I would recommend this program to other people:’*		
	YES N (%)	**NO** N (%)	**p-value**
Disappointing	0 (0.0)	1 (33.3)	<0.0001
Not so great	0 (0.0)	2 (66.7)	
It was fine	11 (8.2)	0 (0.0)	
Good	35 (26.1)	0 (0.0)	
Excellent	88 (65.7)	0 (0.0)	

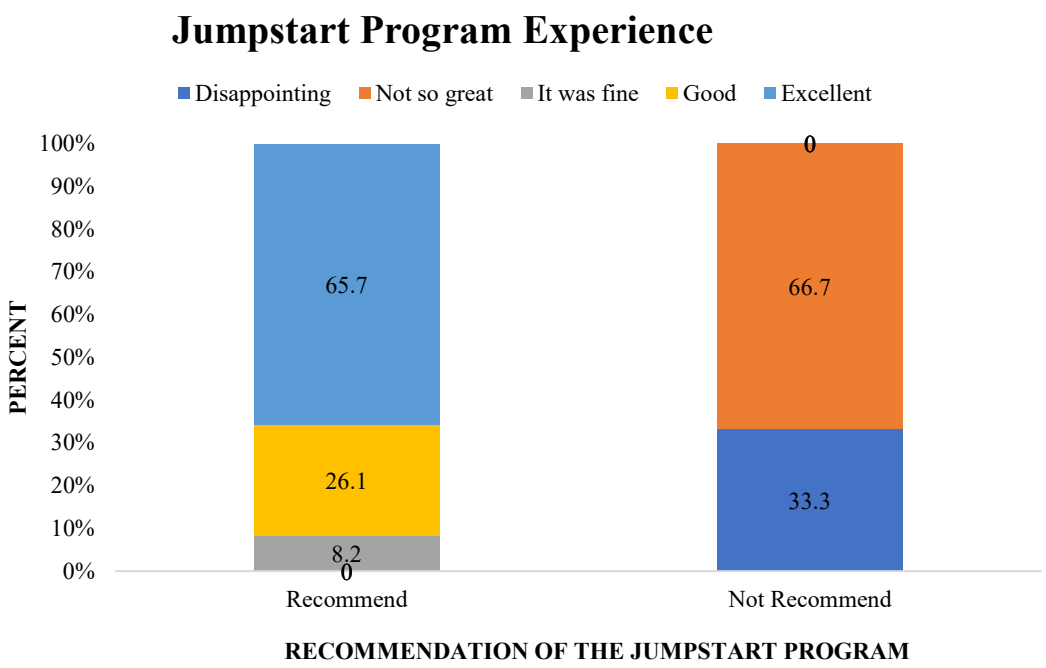

Figure 6: The rated experiences of Jumpstart participants by the recommendation of the Jumpstart program.

Table 16: Responses of Jumpstart participants regarding overall Jumpstart satisfaction by race/ethnicity.

Race/Ethnicity	Satisfactory	Unsatisfactory	p-value
Overall Satisfaction with the Jumpstart Program, *n = 125*			
White or Caucasian	66 (98.5)	1 (1.5)	0.277
Black or African American	35 (97.2)	1 (2.8)	
Hispanic or Latino	13 (100.0)	0 (0.0)	
Other	8 (88.9)	1 (11.1)	

Table 17: Responses of Jumpstart participants regarding recommending the Jumpstart program by race/ethnicity.

Race/Ethnicity	Yes	No	p-value
Recommending the Jumpstart Program to Others, *n = 134*			
White or Caucasian	68 (98.6)	1 (1.4)	0.517
Black or African American	40 (97.6)	1 (2.4)	
Hispanic or Latino	13 (100.0)	0 (0.0)	
Other	10 (90.9)	1 (9.1)	

In the post-program survey, participants were asked about their satisfaction with different aspects of the program. Among those who participated, the majority were 'Very Satisfied' or 'Satisfied' with the support they received for visioning and goal setting (89.6%), weekly educational sessions (96.3%), cooking demonstrations with culinary educators (88.1%), and weekly mentorship

meetings (88.2%). The farmers' market tours and pantry boxes were aspects of the Jumpstart program that over 60% of the participants did not engage with because they were not made available and accessible to everyone. The farmers' market tours were in-person, and not every cohort received pantry or produce boxes. Medical intakes with a healthcare professional were utilized by 50% of participants, and of those who participated, 77.9% were either 'Very Satisfied' or 'Satisfied' with the process. The participants were satisfied with the communication provided by the jumpstart team (95.6%). Regarding the Jumpstart app, 82% of participants were satisfied with this aspect of the program. Additionally, 28% of the participants who engaged with PPMNY's Facebook page were neither satisfied nor dissatisfied (Table 18).

Table 18: Satisfaction rates of core components of the Jumpstart program of adults, ages 18 from 2021-2023.

Below are some statements about feelings and thoughts related to different aspects of the program. Please check the box that best describes your satisfaction with each one.

	Very Dissatisfied N (%)	**Dissatisfied** N (%)	**Neither Satisfied nor Dissatisfied** N (%)	**Satisfied** N (%)	**Very Satisfied** N (%)
Support for my personal visioning and goal setting, *n = 135*	1 (0.7)	2 (1.5)	11 (8.1)	34 (25.2)	87 (64.4)
Weekly educational sessions, *n=135*	1 (0.7)	0 (0.0)	4 (3.0)	33 (24.4)	97 (71.9)
Cooking demonstrations with the culinary educators, *n=135*	2 (1.5)	2 (1.5)	12 (8.9)	40 (29.6)	79 (58.5)
Weekly mentorship meetings, *n=136*	0 (0.0)	3 (2.2)	13 (9.6)	32 (23.5)	88 (64.7)
In-person farmer's market tour, *n=38*	2 (5.3)	1 (2.6)	5 (13.2)	7 (18.4)	23 (60.5)
Food provided (produce and/or pantry supplies), *n=52*	2 (3.8)	1 (1.9)	4 (7.7)	16 (30.8)	29 (55.8)
Medical intake with the Jumpstart healthcare Professional, *n=68*	3 (4.4)	3 (4.4)	9 (13.2)	16 (23.5)	37 (54.4)
Communication from the Jumpstart team, *n=137*	1 (0.7)	1 (0.7)	4 (2.1)	34 (24.8)	97 (70.8)
The Jumpstart program app, *n=128*	3 (2.3)	5 (4.0)	15 (11.7)	41 (32.0)	64 (50.0)
Jumpstart Facebook group, *n=50*	1 (2.0)	1 (2.0)	14 (28.0)	9 (18.0)	25 (50.0)

The results of Fischer's exact test showed an association between satisfaction with program components: cooking demonstrations, communication with the Jumpstart team, the Jumpstart digital app, and race and ethnicity (Table 19).

Table 19: Satisfaction rates of core components of the Jumpstart program of adults, ages 18 from 2021-2023 by race/ethnicity.			
Race/Ethnicity	**Satisfied** N (%)	**Dissatisfied** N (%)	**p-value**
Support for my personal visioning and goal setting, n = 121			
White or Caucasian	63 (96.9)	2 (3.1)	0.226
Black or African American	33 (100.0)	0 (0.0)	
Hispanic or Latino	13 (100.0)	0 (0.0)	
Other	9 (90.0)	1 (10.0)	
Weekly educational sessions, n = 128			
White or Caucasian	68 (100.0)	0 (0.0)	0.078
Black or African American	38 (100.0)	0 (0.0)	
Hispanic or Latino	12 (100.0)	0 (0.0)	
Other	9 (90.0)	1 (10.0)	
Cooking demonstrations with the culinary educators, n =120			
White or Caucasian	63 (98.4)	1 (1.6)	**0.012***
Black or African American	35 (100.0)	0 (0.0)	
Hispanic or Latino	11 (91.7)	1 (8.3)	
Other	7 (77.8)	2 (22.2)	
Weekly mentorship meetings, n = 120			
White or Caucasian	60 (96.8)	2 (3.2)	0.228
Black or African American	36 (100.0)	0 (0.0)	
Hispanic or Latino	12 (100.0)	0 (0.0)	
Other	9 (90.0)	1 (10.0)	
In-person farmer's market tour, n = 33			
White or Caucasian	12 (92.3)	1 (7.7)	0.485
Black or African American	15 (93.8)	1 (6.3)	
Hispanic or Latino	1 (100.0)	0 (0.0)	
Other	2 (66.7)	1 (33.3)	
Food provided (produce and/or pantry supplies), n = 48			
White or Caucasian	16 (94.1)	1 (5.9)	1.000
Black or African American	18 (94.7)	1 (5.3)	
Hispanic or Latino	5 (100.0)	0 (0.0)	
Other	6 (85.7)	1 (14.3)	
Medical intake with the Jumpstart healthcare professional, n = 57			
White or Caucasian	25 (89.3)	3 (10.7)	0.914
Black or African American	18 (90.0)	2 (10.0)	
Hispanic or Latino	5 (100.0)	0 (0.0)	
Other	3 (75.0)	1 (25.0)	
Communication from the Jumpstart team, n = 130			
White or Caucasian	67 (100.0)	0 (0.0)	**0.007***
Black or African American	40 (100.0)	0 (0.0)	
Hispanic or Latino	12 (100.0)	0 (0.0)	
Other	9 (81.8)	2 (18.2)	
The Jumpstart program app, n = 110			
White or Caucasian	56 (96.6)	2 (3.4)	**0.010***
Black or African American	30 (90.9)	3 (9.1)	
Hispanic or Latino	11 (100.0)	0 (0.0)	
Other	5 (62.5)	3 (37.5)	
The Jumpstart Facebook group, n = 34			
White or Caucasian	18 (100.0)	0 (0.0)	0.057
Black or African American	10 (90.9)	1 (9.1)	
Hispanic or Latino	3 (100.0)	0 (0.0)	
Other	1 (50.0)	1 (50.0)	

Perceptions – Barriers to WFPB Eating

The results of the McNemar-Bowker tests on the questionnaire items related to perceived barriers to adopting a WFPB diet did not show any statistically significant differences between the pre- and post-program responses concerning cultural food traditions, people one lives with, relationships with family and friends, kitchen setup, work life and access to fresh produce as perceived barriers (Table 20).

Table 20: Summary of McNemar-Bowker test results of Jumpstart participants' baseline and post-program self-reported perceived barriers to adopting a whole food plant-based diet from 2021 to 2023.

Pre-program	**Post-program**						**p-value**
Barrier	Not Applicable N (%)	Not a Barrier N (%)	Somewhat a Barrier N (%)	Moderately a Barrier N (%)	Very much a Barrier N (%)	**TOTAL N (%)**	
My ethnic culture's food traditions, n=139							
Not Applicable	18 (12.9)	13 (9.4)	1 (0.7)	0 (0.0)	0 (0.0)	32 (23.0)	0.1495
Not a Barrier	9 (6.5)	33 (23.7)	8 (5.8)	0 (0.0)	0 (0.0)	50 (36.0)	
Somewhat a Barrier	1 (0.7)	17 (12.2)	12 (8.6)	5 (3.6)	1 (0.7)	36 (25.9)	
Moderately a Barrier	2 (1.4)	5 (3.6)	5 (3.6)	4 (2.9)	0 (0.0)	16 (11.5)	
Very much a Barrier	0 (0.0)	1 (0.7)	2 (1.4)	1 (0.7)	1 (0.7)	5 (3.6)	
TOTAL, N (%)	30 (21.6)	69 (49.6)	28 (20.1)	10 (7.2)	2 (1.4)	139 (100.0)	
The people with whom I live, n=138							
Pre-program	Not Applicable N (%)	Not a Barrier N (%)	Somewhat a Barrier N (%)	Moderately a Barrier N (%)	Very much a Barrier N (%)	**TOTAL** N (%)	0.2849
Not Applicable	32 (23.2)	11 (8.0)	1 (0.7)	0 (0.0)	0 (0.0)	44 (31.9)	
Not a Barrier	8 (5.8)	29 (21.0)	4 (2.9)	1 (0.7)	0 (0.0)	42 (30.4)	
Somewhat a Barrier	3 (2.2)	13 (9.4)	14 (10.1)	5 (3.6)	1 (0.7)	36 (26.1)	
Moderately a Barrier	0 (0.0)	2 (1.4)	5 (3.6)	3 (2.2)	0 (0.0)	10 (7.2)	
Very much a Barrier	0 (0.0)	0 (0.0)	3 (2.2)	1 (0.7)	2 (1.4)	6 (4.3)	
TOTAL, N (%)	43 (31.2)	55 (39.9)	27 (19.6)	10 (7.2)	3 (2.2)	138 (100.0)	
Relationships with my family/friends, n=138							
Pre-program	Not Applicable N (%)	Not a Barrier N (%)	Somewhat a Barrier N (%)	Moderately a Barrier N (%)	Very much a Barrier N (%)	**TOTAL** N (%)	0.5851
Not Applicable	3 (2.2)	8 (5.8)	1 (0.7)	0 (0.0)	0 (0.0)	12 (8.7)	
Not a Barrier	10 (7.2)	38 (27.5)	9 (6.5)	2 (1.4)	0 (0.0)	59 (42.8)	
Somewhat a Barrier	2 (1.4)	16 (11.6)	21 (15.2)	3 (2.2)	2 (1.4)	44 (31.9)	
Moderately a Barrier	1 (0.7)	1 (0.7)	7 (5.1)	5 (3.6)	1 (0.7)	15 (10.9)	

Very much a Barrier	1 (0.7)	1 (0.7)	4 (2.9)	2 (1.4)	0 (0.0)	8 (5.8)	
TOTAL, N (%)	17 (12.3)	64 (46.4)	42 (30.4)	12 (8.7)	3 (2.2)	138 (100.0)	
My kitchen set-up, n=138							
Pre-program	Not Applicable N (%)	Not a Barrier N (%)	Somewhat a Barrier N (%)	Moderately a Barrier N (%)	Very much a Barrier N (%)	**TOTAL N (%)**	
Not Applicable	1 (0.7)	12 (8.7)	0 (0.0)	1 (0.7)	0 (0.0)	14 (10.1)	
Not a Barrier	9 (6.5)	63 (45.7)	7 (5.1)	0 (0.0)	0 (0.0)	79 (57.2)	
Somewhat a Barrier	2 (1.4)	16 (11.6)	9 (6.5)	2 (1.4)	0 (0.0)	29 (21.0)	0.0551
Moderately a Barrier	0 (0.0)	3 (2.2)	4 (2.9)	2 (1.4)	0 (0.0)	9 (6.5)	
Very much a Barrier	0 (0.0)	3 (2.2)	2 (1.4)	1 (0.7)	1 (0.7)	7 (5.1)	
TOTAL, N (%)	12 (8.7)	97 (70.3)	22 (15.9)	6 (4.3)	1 (0.7)	138 (100.0)	
My work life, n=137							
Pre-program	Not Applicable N (%)	Not a Barrier N (%)	Somewhat a Barrier N (%)	Moderately a Barrier N (%)	Very much a Barrier N (%)	**TOTAL N (%)**	
Not Applicable	18 (13.1)	11 (8.0)	1 (0.7)	0 (0.0)	0 (0.0)	30 (21.9)	
Not a Barrier	12 (8.8)	33 (24.1)	12 (8.8)	0 (0.0)	0 (0.0)	57 (41.6)	
Somewhat a Barrier	1 (0.7)	12 (8.8)	9 (6.6)	1 (0.7)	0 (0.0)	23 (16.8)	0.1048
Moderately a Barrier	0 (0.0)	2 (1.5)	7 (5.1)	4 (2.9)	1 (0.7)	14 (10.2)	
Very much a Barrier	0 (0.0)	3 (2.2)	1 (0.7)	5 (3.6)	4 (2.9)	13 (9.5)	
TOTAL, N (%)	31 (22.6)	61 (44.5)	30 (21.9)	10 (7.3)	5 (3.6)	137 (100.0)	
My ability to access fresh produce, n=101[+]							
Pre-program	Not Applicable N (%)	Not a Barrier N (%)	Somewhat a Barrier N (%)	Moderately a Barrier N (%)	Very much a Barrier N (%)	**TOTAL N (%)**	
Not Applicable	5 (5.0)	6 (5.9)	1 (1.0)	0 (0.0)	0 (0.0)	12 (11.9)	
Not a Barrier	5 (5.0)	57 (56.4)	3 (3.0)	0 (0.0)	0 (0.0)	65 (64.4)	
Somewhat a Barrier	2 (2.0)	6 (5.9)	3 (3.0)	0 (0.0)	1 (1.0)	12 (11.9)	0.2825
Moderately a Barrier	0 (0.0)	4 (4.0)	2 (2.0)	2 (2.0)	0 (0.0)	8 (7.9)	
Very much a Barrier	1 (1.0)	1 (1.0)	2 (2.0)	0 (0.0)	0 (0.0)	4 (4.0)	
TOTAL, N (%)	13 (12.9)	74 (73.3)	11 (10.9)	2 (2.0)	1 (1.0)	101 (100.0)	

[+] Cohort 1 was excluded because this question was later added to the instrument.

Perceptions – Knowledge, self-efficacy, difficulty, and expense

Results of Wilcoxon Signed-Rank tests compared participants' perceived knowledge about nutrition (generally) and whole food plant-based nutrition (specifically), confidence in adopting a WFPB diet and cooking WFPB meals, perceived challenge, and expense in eating a WFPB diet

before and after participation in the Jumpstart program. The Wilcoxon Signed-Rank test demonstrated a statistically significant increase in median nutrition knowledge ratings (0.72 increase) from pre- to post-program assessments ($p<0.0001$), suggesting an enhanced self-reported understanding of nutrition among Jumpstart participants. For perceived knowledge about WFPB nutrition specifically, the Wilcoxon Signed-Rank test yielded similar results with a 1.84 increase in the median WFPB knowledge rating from pre- to post-program ($p<0.0001$), indicating an improvement in self-reported perceived knowledge about WFPB nutrition following participation in the Jumpstart (Table 21).

Tables 22 and 23 provide evidence that self-reported knowledge was comparable to actual knowledge, with the scores of participants significantly increasing post-program compared to baseline. For cohorts 1 and 2 (n=65), a Wilcoxon Signed-Rank test revealed a statistically significant change in the median 'test scores' (11.43 percentage points increase) from pre- to post-program assessments ($p=0.0001$) (Table 22) For cohorts 3-7 (n=74), a statistically significant change in median scores represented by a 6.53 percentage points increase from post-program survey responses compared to baseline responses was shown ($p=0.0155$) (Table 23). Both findings support the previously indicated increase in self-reported knowledge ratings for nutrition and WFPB nutrition.

Table 21: Summary of Wilcoxon Signed-Rank test results for baseline and post-program self-reported perceptions related to plant-based eating of Jumpstart survey respondents from 2021 to 2023.

Item	Period	M	SD	Min	Max	Z-value/P-value
Knowledge						
To what extent do you feel that you are knowledgeable about nutrition in general? (Scale of 1-10, 1= Not Knowledgeable and 10 = Very Knowledgeable), *n=139*	Pre	6.39	1.98	1	10	$Z = 4.28$ $P = <0.0001$
	Post	7.11	1.50	2	10	
To what extent do you feel that you are knowledgeable about whole food, plant-based nutrition (specifically)	Pre	5.53	2.49	1	10	$Z = 7.78$ $P = <0.0001$
	Post	7.37	1.63	2	10	

(Scale of 1-10, 1= Not Knowledgeable and 10 = Very Knowledgeable), *n=139*						
Self-efficacy						
How confident do you feel in your ability to adopt a whole food, plant-based diet? (Scale of 1-10, 1= Not confident and 10 = Very confident), *n=139*	Pre	7.46	2.15	1	10	$Z = 2.73$ $P = 0.0064$
	Post	8.08	1.61	2	10	
How confident do you feel in your ability to cook a whole food, plant-based meal by yourself? (Scale of 1-10, 1= Not confident and 10 = Very confident), *n=139*	Pre	7.55	2.47	1	10	$Z = 3.42$ $P = 0.0006$
	Post	8.30	2.03	2	10	
Difficulty						
How challenging do you perceive that it is to eat a whole food, plant-based diet? (Scale of 1-10, 1= Not challenging and 10 = Very challenging), *n=139*	Pre	6.75	2.52	1	10	$Z = -4.41$ $P = <0.0001$
	Post	5.76	2.25	1	10	
Expense						
How expensive do you perceive it is to eat a whole food, plant-based diet? (Scale of 1-10, 1= Not expensive and 10 = Very expensive), *n=139*	Pre	3.54	4.28	0	21	$Z = -2.74$ $P = 0.0061$
	Post	1.72	2.96	0	20	

Table 22: Summary of Wilcoxon Signed-Rank test results for baseline and post-program scores on Jumpstart survey respondents' knowledge-based questions from fall 2021 to winter 2022 (Cohorts 1 & 2).

Item	Period	M	SD	Min	Max	Z-value/P-value
Knowledge Questions Raw Score (%), *n=65*	Pre	65.93	21.08	14.29	100.00	$Z = 3.91$ $P = 0.0001$
	Post	77.36	14.70	42.86	100.00	

Table 23: Summary of Wilcoxon Signed-Rank test results for baseline and post-program scores on Jumpstart survey respondents' knowledge-based questions from spring 2022 to fall 2023 (Cohorts 3-7).

Item	Period	M	SD	Min	Max	Z-value/P-value
Knowledge Questions Raw Score (%), *n=74*	Pre	80.86	19.05	33.33	100.00	$Z = 2.42$ $P = 0.0155$
	Post	87.39	14.28	50.00	100.00	

The perceived ability to adopt a WFPB diet and prepare plant-based meals notably improved post-program, as evidenced by increases in median ratings compared to baseline assessments (perceived ability to adopt: p=0.0064; perceived ability to cook: p=0.0006).

Specifically, there was a median rating increase of 0.62 for the perceived ability to adopt a WFPB diet and 0.75 for the perceived ability to cook plant-based meals.

Additionally, a Wilcoxon Signed-Rank test was conducted to assess changes in participants' perceptions regarding the challenges and costs associated with adopting a WFPB diet. The results revealed statistically significant decreases in the median ratings for perceived challenges (0.99 rating decrease, $p<0.0001$) and perceived expenses (1.82 rating decrease, $p=0.0061$) from pre- to post-program assessments. These findings suggest that participants perceived the WFPB diet as less challenging and expensive after participating in the Jumpstart program compared to their initial perceptions at the program's outset.

Anthropometric Outcomes

Participants provided self-reported anthropometric measurements at baseline and after the program. I observed a statistically significant program-related median decrease in BMI (1.16 kg/m^2) and waist circumference (1.65 inches) among Jumpstart participants at the post-program assessment compared to baseline (Table 24). There were no significant pretest-posttest differences in the other anthropometric and laboratory measurements, which is not surprising given the relatively short follow-up duration.

Table 24: Summary of Wilcoxon Signed-Rank test results for Jumpstart survey respondents' baseline and post-program self-reported anthropometric and laboratory measures from 2021 to 2023.						
Variable	**Period**	**M**	**SD**	**Min**	**Max**	**Z-value/P-value**
BMI (kg/m^2), *n = 106*	Pre	29.62	7.61	17.36	56.33	*Z* = -7.04 *P* = <0.0001
	Post	28.47	7.11	16.65	54.55	
Waist circumference (inches), *n = 53*	Pre	37.58	6.88	24.00	57.00	*Z* = -4.45 *P* = <0.0001
	Post	35.93	5.25	25.00	49.00	
Hemoglobin A1c (%), *n = 21*	Pre	6.21	2.02	4.70	14.10	*Z* = -0.04 *P* = 0.972
	Post	6.22	2.23	4.50	14.40	
LDL Cholesterol (mg/dL), *n = 18*	Pre	115.09	33.79	33.0	196.0	*Z* = -1.39 *P* = 0.172
	Post	106.80	35.25	39.0	207.0	
Systolic Blood Pressure (mm Hg), *n = 42*	Pre	120.58	15.04	90	173	*Z* = -0.11 *P* = 0.910
	Post	120.16	13.30	80	153	
Diastolic Blood Pressure (mm Hg), *n = 42*	Pre	74.75	7.32	60	90	*Z* = -0.41 *P* = 0.685
	Post	75.28	8.39	57	94	

Mental Health Outcomes

Program-related changes in depressive symptoms (PHQ-9) and anxiety symptoms (GAD-7) were also assessed. There was a median decrease of 2.85 points on the PHQ-9 and 1.82 points on the GAD-7 (both statistically significant, p=<0.0001) (Table 25). McNemar's test results also highlighted a significant decrease in the number of participants who reported having symptoms of depression or anxiety on the PHQ-9 and GAD-7, respectively (scores 10 or higher) at post-program when compared to baseline (PHQ-9: 18.1% vs. 2.4%; GAD-7: 8.8% vs. 2.4%). The results are presented in Table 26.

Table 25: Summary of Wilcoxon Signed-Rank test results for baseline and post-program self-reported Patient Health Questionnaire – 9 and Generalized Anxiety Disorder – 7 scores of Jumpstart survey respondents from 2021 to 2023.						
Variable	**Period**	**M**	**SD**	**Min**	**Max**	**Z-value/P-value**
PHQ-9 Raw Score, *n = 127*	Pre	5.18	4.94	0	23	*Z* = -8.32 *P* = <0.0001
	Post	2.33	2.96	0	21	
GAD-7 Raw Score, *n = 125*	Pre	3.54	4.28	0	21	*Z* = -6.45 *P* = <0.0001
	Post	1.72	2.96	0	20	

Table 26: Summary of McNemar results of Jumpstart participants' baseline and post-program self-reported depression and anxiety symptoms from 2021 to 2023.			
Mental Health Measure	**Participants who scored 10 or higher**		**P-value**
	Pre	Post	
PHQ-9, *n=127*	23 (18.1)	3 (2.4)	**<0.001***
GAD-7, *n=125*	11 (8.8)	3 (2.4)	**0.021***

* = p <0.05

Cronbach's alpha was calculated to measure the consistency of each scale (the PHQ-9 and GAD-7). The pre- and post-program Cronbach's alpha for the PHQ-9 showed high internal consistency (0.860 and 0.793, respectively). The GAD-7 scale at baseline and post-program also showed high internal consistency (0.916 and 0.893, respectively) [86]. The results are listed in Table 27.

Table 27: Consistency test results for PHQ-9 and GAD-7 of Jumpstart participants and baseline and post-program from 2021-2023.		
Variables	**Cronbach's Alpha**	**No. of Items**
PHQ-9 Baseline, *n=133*	0.860	9
PHQ-9 Post, *n=132*	0.793	9
GAD-7 Baseline, *n=133*	0.916	7
GAD-7 Post, *n=131*	0.893	7

Quality of Life (QoL) Outcomes

This study utilized the McNemar-Bowker test to analyze changes in responses to Quality of Life (QoL) measures between pre-test and post-test assessments. Participants were questioned about the extent to which various symptoms affected their daily lives. Statistically significant decreases in the impact of several factors on quality of life were observed: overall reported pain, headaches, mobility issues, breathing issues, skin issues, upper gastrointestinal (GI) issues (e.g., acid reflux), lower GI issues (e.g., irritable bowel), hormonal issues (menstrual issues or menopause), sleep quality, energy, mood, mental clarity, and craving issues (all p <0.05). However, no statistically significant changes in body odor were observed.

As depicted in Table 28, the reduction in symptomology refers to the increase in participants reporting 'Not at All' experiences for each Quality of Life (QoL) metric from baseline to post-program assessments. For instance, regarding pain, 53 individuals reported no baseline experience of this symptom, while 76 individuals reported not experiencing this symptom post-program. Similar trends were observed for headaches (83 vs. 99 individuals), mobility issues (72 vs. 96 individuals), breathing issues (99 vs. 122 individuals), skin issues (90 vs. 109 individuals), upper GI issues (e.g., acid reflux) (84 vs. 120 individuals), lower GI issues (e.g., irritable bowel) (83 vs. 108 individuals), body odor (116 vs. 124 individuals), hormonal issues (menstrual issues or menopause) (94 vs. 119 individuals), sleep quality (43 vs. 73 individuals), energy (39 vs. 82 individuals), mood (60 vs. 107 individuals), mental clarity (60 vs. 100 individuals), and cravings for unhealthy food (25 vs. 57 individuals). The analysis demonstrated a significant increase in participants reporting no experiences across various Quality of Life (QoL) metrics from baseline to post-program assessments.

Table 28: Summary of McNemar-Bowker test results of Jumpstart participants' baseline and post-program self-reported symptoms that affect their quality of life from 2021 to 2023.

Pre-program	**Post-program**						**p-value**
Quality-of-Life Measure	Not at all N (%)	Slightly N (%)	Moderately N (%)	Quite a bit N (%)	Extremely N (%)	**TOTAL** N (%)	
Pain (other than headaches), n=138							
Not at all	45 (32.6)	7 (5.1)	0 (0.0)	1 (0.7)	0 (0.0)	53 (38.4)	0.0007
Slightly	22 (15.9)	6 (4.3)	7 (5.1)	0 (0.0)	1 (0.7)	36 (26.1)	
Moderately	7 (5.1)	14 (10.1)	6 (4.3)	1 (0.7)	0 (0.0)	28 (20.3)	
Quite a bit	2 (1.4)	5 (3.6)	7 (5.1)	2 (1.4)	0 (0.0)	16 (11.6)	
Extremely	0 (0.0)	1 (0.7)	1 (0.7)	1 (0.7)	2 (1.4)	5 (3.6)	
TOTAL, N (%)	76 (55.1)	33 (23.9)	21 (15.2)	5 (3.6)	3 (2.2)	138 (100.0)	
Headaches, n=136							
Pre-program	Not at all N (%)	Slightly N (%)	Moderately N (%)	Quite a bit N (%)	Extremely N (%)	**TOTAL** N (%)	0.0325
Not at all	71 (52.2)	12 (8.8)	0 (0.0)	0 (0.0)	0 (0.0)	83 (61.0)	
Slightly	20 (14.7)	7 (5.1)	2 (1.5)	0 (0.0)	0 (0.0)	29 (21.3)	
Moderately	6 (4.4)	5 (3.7)	2 (1.5)	1 (0.7)	0 (0.0)	14 (10.3)	
Quite a bit	2 (1.5)	3 (2.2)	0 (0.0)	3 (2.2)	1 (0.7)	9 (6.6)	
Extremely	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.7)	0 (0.0)	1 (0.7)	
TOTAL, N (%)	99 (72.8)	27 (19.9)	4 (2.9)	5 (3.7)	1 (0.7)	136 (100.0)	

Mobility, n=136							
Pre-program	Not at all N (%)	Slightly N (%)	Moderately N (%)	Quite a bit N (%)	Extremely N (%)	**TOTAL** N (%)	0.0003
Not at all	69 (50.7)	2 (1.5)	0 (0.0)	0 (0.0)	1 (0.7)	72 (52.9)	
Slightly	20 (14.7)	14 (10.3)	3 (2.2)	0 (0.0)	0 (0.0)	37 (27.2)	
Moderately	6 (4.4)	8 (5.9)	2 (1.5)	1 (0.7)	0 (0.0)	17 (12.5)	
Quite a bit	1 (0.7)	2 (1.5)	1 (0.7)	2 (1.5)	0 (0.0)	6 (4.4)	
Extremely	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	4 (2.9)	4 (2.9)	
TOTAL, N (%)	96 (70.6)	26 (19.1)	6 (4.4)	3 (2.2)	5 (3.7)	136 (100.0)	
Breathing, n=137							
Pre-program	Not at all N (%)	Slightly N (%)	Moderately N (%)	Quite a bit N (%)	Extremely N (%)	**TOTAL** N (%)	0.0005
Not at all	96 (70.1)	3 (2.2)	0 (0.0)	0 (0.0)	0 (0.0)	99 (72.3)	
Slightly	16 (11.7)	5 (3.6)	0 (0.0)	0 (0.0)	0 (0.0)	21 (15.3)	
Moderately	9 (6.6)	1 (0.7)	1 (0.7)	0 (0.0)	0 (0.0)	11 (8.0)	
Quite a bit	1 (0.7)	0 (0.0)	3 (2.2)	0 (0.0)	0 (0.0)	4 (2.9)	
Extremely	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.7)	1 (0.7)	2 (1.5)	
TOTAL, N (%)	122 (89.1)	9 (6.6)	4 (2.9)	1 (0.7)	1 (0.7)	137 (100.0)	
							Skin, n=136
Pre-program	Not at all N (%)	Slightly N (%)	Moderately N (%)	Quite a bit N (%)	Extremely N (%)	**TOTAL** N (%)	0.023
Not at all	81 (59.6)	7 (5.1)	1 (0.7)	0 (0.0)	1 (0.7)	90 (66.2)	
Slightly	19 (14.0)	6 (4.4)	1 (0.7)	0 (0.0)	0 (0.0)	26 (19.1)	
Moderately	7 (5.1)	4 (2.9)	2 (1.5)	0 (0.0)	0 (0.0)	13 (9.6)	
Quite a bit	2 (1.5)	1 (0.7)	1 (0.7)	1 (0.7)	0 (0.0)	5 (3.7)	
Extremely	0 (0.0)	0 (0.0)	1 (0.7)	0 (0.0)	1 (0.7)	2 (1.5)	
TOTAL, N (%)	109 (80.1)	18 (13.2)	6 (4.4)	1 (0.7)	2 (1.5)	136 (100.0)	
							Upper GI, n=137
Pre-program	Not at all N (%)	Slightly N (%)	Moderately N (%)	Quite a bit N (%)	Extremely N (%)	**TOTAL** N (%)	<0.0001
Not at all	82 (59.9)	1 (0.7)	0 (0.0)	1 (0.7)	0 (0.0)	84 (61.3)	
Slightly	27 (19.7)	4 (2.9)	1 (0.7)	0 (0.0)	0 (0.0)	32 (23.4)	
Moderately	6 (4.4)	4 (2.9)	2 (1.5)	0 (0.0)	0 (0.0)	12 (8.8)	
Quite a bit	5 (3.6)	1 (0.7)	0 (0.0)	0 (0.0)	0 (0.0)	6 (4.4)	
Extremely	0 (0.0)	1 (0.7)	0 (0.0)	1 (0.7)	1 (0.7)	3 (2.2)	
TOTAL, N (%)	120 (87.6)	11 (8.0)	3 (2.2)	2 (1.5)	1 (0.7)	137 (100.0)	
Lower GI, n=137							
Pre-program	Not at all N (%)	Slightly N (%)	Moderately N (%)	Quite a bit N (%)	Extremely N (%)	**TOTAL** N (%)	0.0012
Not at all	76 (55.5)	5 (3.6)	1 (0.7)	1 (0.7)	0 (0.0)	83 (60.6)	
Slightly	21 (15.3)	7 (5.1)	0 (0.0)	0 (0.0)	0 (0.0)	28 (20.4)	
Moderately	7 (5.1)	4 (2.9)	0 (0.0)	1 (0.7)	0 (0.0)	15 (10.9)	
Quite a bit	3 (2.2)	3 (2.2)	3 (2.2)	1 (0.7)	0 (0.0)	7 (5.1)	
Extremely	1 (0.7)	2 (1.5)	0 (0.0)	1 (0.7)	0 (0.0)	4 (2.9)	
TOTAL, N (%)	108 (78.8)	21 (15.3)	4 (2.9)	4 (2.9)	0 (0.0)	137 (100.0)	
Body Odor, n=138							
Pre-program	Not at all N (%)	Slightly N (%)	Moderately N (%)	Quite a bit N (%)	Extremely N (%)	**TOTAL** N (%)	0.1879

Not at all	110 (79.7)	6 (4.3)	0 (0.0)	0 (0.0)	0 (0.0)	116 (84.1)	
Slightly	11 (8.0)	4 (2.9)	0 (0.0)	0 (0.0)	0 (0.0)	15 (10.9)	
Moderately	2 (1.4)	0 (0.0)	1 (0.7)	0 (0.0)	0 (0.0)	3 (2.2)	
Quite a bit	1 (0.7)	2 (1.4)	0 (0.0)	0 (0.0)	0 (0.0)	3 (2.2)	
Extremely	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.7)	0 (0.0)	1 (0.7)	
TOTAL, N (%)	124 (89.9)	12 (8.7)	1 (0.7)	1 (0.7)	0 (0.0)	138 (100.0)	
Hormonal Issues, n=138							
Pre-program	Not at all N (%)	Slightly N (%)	Moderately N (%)	Quite a bit N (%)	Extremely N (%)	**TOTAL** N (%)	0.0002
Not at all	92 (66.7)	2 (1.4)	0 (0.0)	0 (0.0)	0 (0.0)	94 (68.1)	
Slightly	14 (10.1)	8 (5.8)	0 (0.0)	0 (0.0)	1 (0.7)	23 (16.7)	
Moderately	9 (6.5)	4 (2.9)	1 (0.7)	0 (0.0)	0 (0.0)	14 (10.1)	
Quite a bit	2 (1.4)	0 (0.0)	1 (0.7)	0 (0.0)	0 (0.0)	3 (2.2)	
Extremely	2 (1.4)	0 (0.0)	0 (0.0)	0 (0.0)	2 (1.4)	4 (2.9)	
TOTAL, N (%)	119 (86.2)	14 (10.1)	2 (1.4)	0 (0.0)	3 (2.2)	138 (100.0)	
Quality Sleep, n=137							
Pre-program	Not at all N (%)	Slightly N (%)	Moderately N (%)	Quite a bit N (%)	Extremely N (%)	**TOTAL** N (%)	0.0001
Not at all	35 (25.5)	8 (5.8)	0 (0.0)	0 (0.0)	0 (0.0)	43 (31.4)	
Slightly	20 (14.6)	18 (13.1)	5 (3.6)	0 (0.0)	0 (0.0)	43 (31.4)	
Moderately	8 (5.8)	8 (5.8)	2 (1.5)	1 (0.7)	0 (0.0)	19 (13.9)	
Quite a bit	6 (4.4)	7 (5.1)	2 (1.5)	3 (2.2)	0 (0.0)	18 (13.1)	
Extremely	4 (2.9)	2 (1.5)	2 (1.5)	2 (1.5)	4 (2.9)	14 (10.2)	
TOTAL, N (%)	73 (53.3)	43 (31.4)	11 (8.0)	6 (4.4)	4 (2.9)	137 (100.0)	
Low Energy, n=138							
Pre-program	Not at all N (%)	Slightly N (%)	Moderately N (%)	Quite a bit N (%)	Extremely N (%)	**TOTAL** N (%)	<0.0001
Not at all	32 (23.2)	6 (4.3)	0 (0.0)	1 (0.7)	0 (0.0)	39 (28.3)	
Slightly	30 (21.7)	14 (10.1)	3 (2.2)	0 (0.0)	0 (0.0)	47 (34.1)	
Moderately	12 (8.7)	8 (5.8)	2 (1.4)	0 (0.0)	0 (0.0)	22 (15.9)	
Quite a bit	6 (4.3)	6 (4.3)	6 (4.3)	0 (0.0)	0 (0.0)	18 (13.0)	
Extremely	2 (1.4)	3 (2.2)	3 (2.2)	1 (0.7)	3 (2.2)	12 (8.7)	
TOTAL, N (%)	82 (59.4)	37 (26.8)	14 (10.1)	2 (1.4)	3 (2.2)	138 (100.0)	
Mood, n=136							
Pre-program	Not at all N (%)	Slightly N (%)	Moderately N (%)	Quite a bit N (%)	Extremely N (%)	**TOTAL** N (%)	<0.0001
Not at all	58 (42.6)	2 (1.5)	0 (0.0)	0 (0.0)	0 (0.0)	60 (44.1)	
Slightly	33 (24.3)	9 (6.6)	0 (0.0)	0 (0.0)	0 (0.0)	42 (30.9)	
Moderately	10 (7.4)	9 (6.6)	0 (0.0)	1 (0.7)	0 (0.0)	20 (14.7)	
Quite a bit	5 (3.7)	3 (2.2)	2 (1.5)	0 (0.0)	0 (0.0)	10 (7.4)	
Extremely	1 (0.7)	0 (0.0)	2 (1.5)	1 (0.7)	0 (0.0)	4 (2.9)	
TOTAL, N (%)	107 (78.7)	23 (16.9)	4 (2.9)	2 (1.5)	0 (0.0)	136 (100.0)	
Clarity, n=137							
Pre-program	Not at all N (%)	Slightly N (%)	Moderately N (%)	Quite a bit N (%)	Extremely N (%)	**TOTAL** N (%)	<0.0001
Not at all	58 (42.3)	2 (1.5)	0 (0.0)	0 (0.0)	0 (0.0)	60 (43.8)	
Slightly	29 (21.2)	15 (10.9)	2 (1.5)	1 (0.7)	0 (0.0)	47 (34.3)	
Moderately	9 (6.6)	3 (2.2)	1 (0.7)	0 (0.0)	0 (0.0)	13 (9.5)	
Quite a bit	2 (1.5)	6 (4.4)	2 (1.5)	0 (0.0)	0 (0.0)	10 (7.3)	

Extremely	2 (1.5)	3 (2.2)	1 (0.7)	0 (0.0)	1 (0.7)	7 (5.1)	
TOTAL, N (%)	100 (73.0)	29 (21.2)	6 (4.4)	1 (0.7)	1 (0.7)	137 (100.0)	
Cravings, n=138							
Pre-program	Not at all N (%)	Slightly N (%)	Moderately N (%)	Quite a bit N (%)	Extremely N (%)	**TOTAL** N (%)	<0.0001
Not at all	19 (13.8)	6 (4.3)	0 (0.0)	0 (0.0)	0 (0.0)	25 (18.1)	
Slightly	19 (13.8)	24 (17.4)	6 (4.3)	0 (0.0)	0 (0.0)	49 (35.5)	
Moderately	9 (6.5)	14 (10.1)	7 (5.1)	0 (0.0)	0 (0.0)	30 (21.7)	
Quite a bit	8 (5.8)	8 (5.8)	3 (2.2)	0 (0.0)	0 (0.0)	19 (13.8)	
Extremely	2 (1.4)	7 (5.1)	1 (0.7)	5 (3.6)	0 (0.0)	15 (10.9)	
TOTAL, N (%)	57 (41.3)	59 (42.8)	17 (12.3)	5 (3.6)	0 (0.0)	138 (100.0)	

The McNemar test yielded similar results. Statistically significant reductions in the proportion of participants who noted having issues in each QoL metric at baseline vs. post-program were reported, except for body odor (Table 29). Regarding pain (other than headaches), 61.6% of participants responded 'Yes' at baseline, compared to 44.9% who answered 'Yes' on the post-program survey (p=0.0002). With headaches, 39% of participants reported 'Yes' at baseline and 27.2% reported 'Yes' after the Jumpstart program (p=0.0114). Regarding mobility, 47.1% reported having issues with mobility at baseline, and only 29.4% of participants reported these issues post-program (p=<0.0001). Breathing: 27.7% experienced issues at baseline vs. 10.9% post-program (p=<0.0001). Skin issues: 33.8% experienced these problems at baseline vs. 19.9% post-program (p=0.0018). Upper GI: 38.7% experienced issues at baseline vs. 12.4% post-program (p=<0.0001). Lower GI: 39.4% experienced issues at baseline vs. 21.2% post-program (p=0.0001). Hormonal issues: 31.9% experienced issues at baseline vs. 13.8% post-program (p=0.0001). Quality of sleep: 68.6% experienced issues at baseline vs. 46.7% post-program (p=<0.0001). Low energy levels: 71.7% experienced issues at baseline vs. 40.6% post-program (p=<0.0001). Moodiness: 55.9% experienced issues at baseline vs. 21.3% post-program (p=<0.0001). Mental clarity: 56.2% experienced issues at baseline vs. 27% post-program (p=<0.0001). Regarding cravings for unhealthy food: 81.9% experienced issues at baseline vs. 58.7% post-program (p=<0.0001). Figure

7 displays the distribution of participant responses. The McNemar test results highlight significant improvements in various Quality of Life (QoL) metrics following the Jumpstart program, except for body odor, which signals the program's potential effectiveness in alleviating participants' reported issues across multiple domains.

Table 29: Summary of McNemar results of Jumpstart participants' baseline and post-program self-reported symptoms that affect their quality of life from 2021 to 2023.

"To what extent have the following symptoms affected your day-to-day life)"

QoL Measure	**'Yes'**		**P-value**
	Pre	Post	
Pain (other than headaches), *n=138*	85 (61.6)	62 (44.9)	0.0002
Headaches (separate from other pain), *n=136*	53 (39.0)	37 (27.2)	0.0114
Mobility issues, *n=136*	64 (47.1)	40 (29.4)	<0.0001
Breathing issues, *n=136*	38 (27.7)	15 (10.9)	<0.0001
Skin issues, *n=136*	46 (33.8)	27 (19.9)	0.0018
Upper GI issues/discomfort (e.g., acid reflux), *n=137*	53 (38.7)	17 (12.4)	<0.0001
Lower GI issues/discomfort (e.g., irritable bowel), *n=137*	54 (39.4)	29 (21.2)	0.0001
Body odor, *n=138*	22 (15.9)	14 (10.1)	0.0736
Hormonal issues (e.g., related to menstrual cycles or menopause), *n=138*	44 (31.9)	19 (13.8)	<0.0001
Poor quality of sleep, *n=137*	94 (68.6)	64 (46.7)	<0.0001
Low energy levels, *n=138*	99 (71.7)	56 (40.6)	<0.0001
Moodiness, *n=136*	76 (55.9)	29 (21.3)	<0.0001
Lack of mental clarity, *n=137*	77 (56.2)	37 (27.0)	<0.0001
Cravings for unhealthy food, *n = 138*	113 (81.9)	81 (58.7)	<0.0001

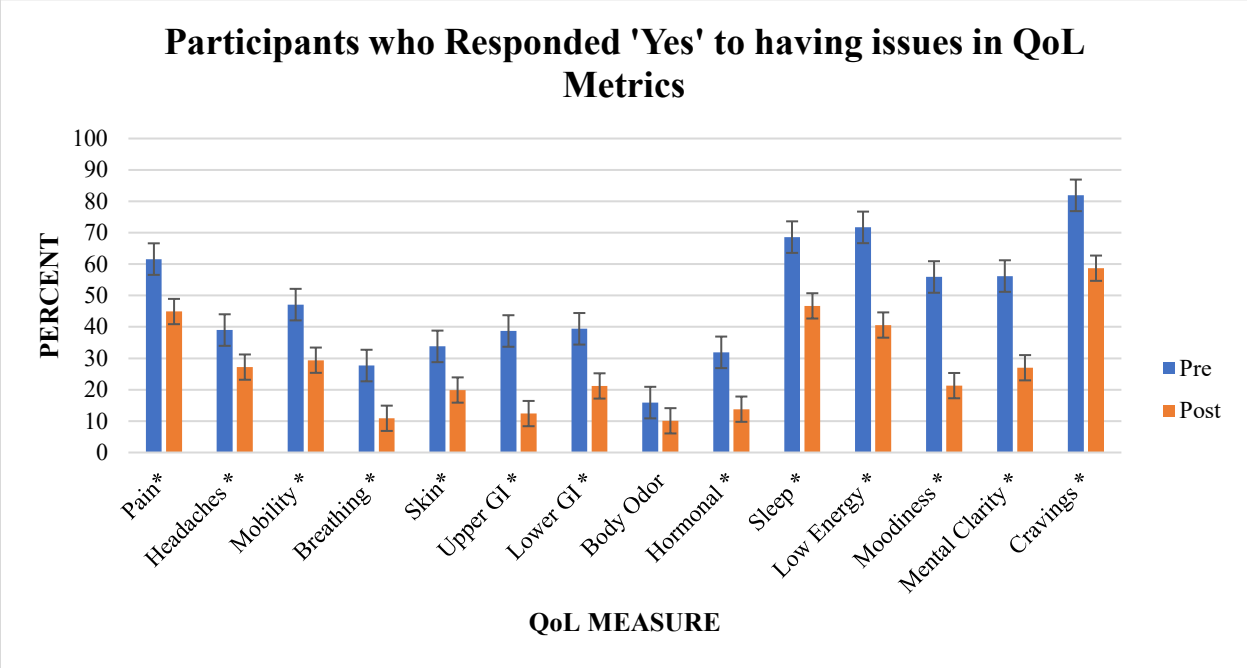

Figure 7: Proportion of participants with symptoms of ailments affecting their day-to-day life across several QoL metrics.

Focus Group Findings

This key informant focus group was used to assess program acceptability. Several subcodes were identified by inductively analyzing the qualitative data produced in the focus group, as shown in Table 30.

Table 30: Codes and subcodes of the key informant focus group.

Code	Subcodes
Program Benefits	• Education • Mentorship • Improved health • Enhanced energy and well-being • Community engagement
Challenges	• Scheduling of sessions • Recipes • Focus on plant foods • Prepping
Barriers	• Perceived cost • Cultural and social factors • Lifestyle constraints/Restrictiveness of WFPB eating • Lack of support from a healthcare provider(s) • Access to additional resources
Recommendations	• Providing culturally relevant recipes • Testimonials

Program Benefits

Participants spoke highly of the education and mentorship received in the Jumpstart program. According to the respondents, the educational component of the program was highly praised, with participants noting valuable education on WFPB nutrition and meal preparation. Specifically, one participant (FGP2) found that the program provided a good educational foundation regarding the differences between vegetarian/vegan and WFPB lifestyles. Furthermore, as the focus group respondents mentioned, what they found particularly useful and worked well in many cases was assigning a mentor to each participant. In this respect, one of the study participants mentioned that seeking additional support, she continued communicating with her mentor after completing the program, suggesting the added benefit of providing ongoing support beyond the program's duration.

Several additional benefits were mentioned as a result of the program. First, participants reported significant improvements in their health, including weight loss, reduced blood pressure, and resolution of various health issues, such as gut health problems and joint stiffness. Second, the program fostered a sense of community and support among the participants, encouraging them to share their experiences, challenges, and successes. Overall, the Plant-based Jumpstart Program yielded significant benefits for participants, from improved health outcomes to enhanced well-being and community support.

Challenges of the Jumpstart Program

The first challenge that emerged was scheduling issues. Specifically, according to the study participants, inconsistencies in the times and days of the week when educational sessions were held posed a challenge within the jumpstart program. As one of the respondents noted, “Scheduling was hard. Would have been better to meet at same time and day of the week” (FGP1).

The participants were also concerned about the recipes. While the participants enjoyed the produce box they received at the beginning of the program, they found many of its content unfamiliar. Therefore, they found that planning and shopping for additional items required for specific recipes was challenging.

In my qualitative analysis of the focus group data, the participants expressed that the program's focus on plant-based food and meal preparation was a challenge. Specifically, many participants perceived removing and supplementing animal products with vegetables to be a challenge. Food preparation, also known as “prepping,” was emphasized as instrumental in both the Jumpstart program and the adoption of a WFPB diet. Participants indicated that if they did not “prep,” they would be prone to unnecessary snacking or resorting to animal protein-based foods. For instance, one participant provided the following account of her experience:

> *"Eating greens has been my challenge. Prepping is so important. When I'm hungry, anything goes. When I have prepped and planned out, it's better. Getting in greens can be hard. I got tired of smoothies for a while – I go back and forth with those. I don't miss meat and fish, but only when I prep. Cauliflower steaks and portobello mushrooms have been great substitutes for meat" (FGP3).*

Barriers to Adopting a WFPB Diet

The group identified several barriers, one prominent issue being misconceptions about the cost of whole-food plant-based (WFPB) eating, leading to concerns about affordability. The participants stressed the importance of educating individuals about accessible options and dispelling myths surrounding the expense of WFPB eating. Additionally, cultural attitudes toward food and dietary habits presented challenges, with participants highlighting the need for education on making whole-plant foods flavorful and dispelling perceptions of WFPB eating as restrictive. Participants highlighted prevalent misconceptions, including the belief that healthy eating or giving up meat is difficult, a lack of flavorful options, and cultural preferences that cannot be accommodated in WFPB recipes. For example, one respondent noted,

> *"An obstacle is that there is great importance of food to culture, and doctors are not promoting this way of eating, so getting people to make the switch is hard. Deep importance in culture of food and what it means – hearing "we don't eat rabbit food," what we do vs. what they do" (FGP3).*

Another barrier to adopting a WFPB diet was related to lifestyle constraints and the strictness of the diet. According to the participants, organic food presupposed a somewhat restrictive lifestyle. Lifestyle constraints, such as fast-paced lifestyles and limited time for food preparation, with suggestions for providing guidance on grab-and-go options and food prep strategies tailored to busy schedules.

The third category was concerned with the lack of support from healthcare providers. As one respondent mentioned, 'Not all physicians are on board with this' (FGP6). The focus group

participants believed that communication with physicians about certain lifestyle habits, including dietary changes, physical activity, and stress management, was paramount.

Finally, the participants expressed the need for more information and resources on transitioning to a WFPB diet, including grocery shopping and meal planning guidance. Overall, the identified barriers encompassed economic, cultural, lifestyle, healthcare, and informational aspects, highlighting individuals' multifaceted and intersectional challenges in adopting WFPB nutrition and participating in similar programs.

Recommendations

The focus group members provided recommendations on how to debunk myths and misconceptions about healthy eating among prospective Jumpstart participants. First, they expressed the need for culturally comparable WFPB recipes to encourage people to adopt such a diet. As several of our respondents mentioned, recipes that are culturally relatable and easily modifiable may remove some of the stigma associated with the difficulty and strictness of such a dietary pattern. In this connection, one participant stated:

> *"Barriers are making people give up meat and feel like there are no options. It helps a lot to give people recipes. I made chickpea "tuna" wraps for a sorority lunch, and they all liked it. Starting people with recipes helps to give them options when they're getting started. There are restaurants with plant-based options – you have to look on the menu ahead to see what is plant-based" (FGP4).*

The second was the advertisement of testimonials: leaders who participated in the Jumpstart program acknowledged that they needed to be vocal about their experiences during the program and share the benefits of a WFPB diet to encourage others to try to change their eating habits.

PRECEDE-PROCEED Model for PPMNY's Jumpstart Program

The PRECEDE-PROCEED framework was selected to retrofit the Jumpstart program for the evaluation. Several studies have used the PRECEDE-PROCEED model in the planning, implementing, and evaluating health promotion interventions; however, few have used it retrospectively [77,87–91]. This study has led to the development of a tailored PRECEDE-PROCEED logic model that reflects these three processes of the Jumpstart program.

The PRECEDE component of this model has four phases: social assessment (first); epidemiological, environmental, and behavioral assessment (second); educational and ecological assessment (third); and administrative and policy assessment and intervention alignment (four). In 2018, PPMNY partnered with SOMOS Community Care, a network of healthcare providers predominantly serving Medicaid recipients in underserved NYC populations. Together, they launched the pilot Jumpstart program. Based on the PlantPure Communities Jumpstart model, the inaugural Jumpstart event hosted by PPMNY occurred in Harlem, New York, with a primarily bilingual audience.

The second phase is comprised of epidemiological, environmental, and behavioral assessments. In the development of this Jumpstart, PPMNY and SOMOS were intentional about their target population. With Harlem being an area of New York City with the highest prevalence rates of obesity and diabetes and a culturally rich and diverse community, it was understood that the social, cultural, and economic factors influencing dietary choices must be considered before implementing this program [92,93].

The primary objective of the Jumpstart program was to educate participants about the potential enhancements in their quality of life (QoL) and the reduction in the burden of chronic illness that could be achieved by embracing the whole-food, plant-based (WFPB) lifestyle.

Achieving this objective was to be executed by providing new knowledge while fostering a sense of confidence in their capacity to embrace fresh attitudes and behaviors towards healthy plant-based eating. These changes were intended to empower participants to create WFPB meals and successfully maintain diet adherence in the short and long term, aligning with their health improvement journey.

Successful implementation of the pilot Jumpstart led to several Jumpstart programs. Some were delivered in Spanish with SOMOS and English with the Marlene Meyerson Jewish Community Center (JCC). Shortly after the successful implementation of the pilot, the COVID-19 pandemic forced a shift in program delivery to an online platform. The virtual WFPB intervention was offered at no cost to the New York metropolitan area's healthcare workers as a gift for their services during this unprecedented time. PPMNY wanted to prioritize the underserved population next, so the following Jumpstart focused on leaders who identified as Black and were living or working in the Brooklyn area. The program selected this group of individuals as the target population because it was necessary to evaluate the Jumpstart for its feasibility among the population these leaders serve (this would be called the Brooklyn (BK) Jumpstart)

In planning the BK Jumpstart, PPMNY partnered with SUNY Downstate Health Sciences University's School of Public Health to formally evaluate the Jumpstart program and seek the institutional review board's approval(s). DrPH student Ayanna Besson, MPH, and faculty advisor Elizabeth Helzner, PhD, MS, DipACLM, were responsible for the research aspect of the Jumpstart. Part of that research was conducting a literature review for this population and assessing its health. An exploratory assessment was conducted of SUNY Downstate Medical Center's Suite B primary care clinic to provide information on the health of the East Flatbush population.

I examined the characteristics of this population by chronic disease status to describe the Suite B Family Clinic patient population. Chronic disease was defined as having a primary, secondary, or tertiary diagnosis of an ICD-10 code related to chronic diseases [94]. Data were collected during the most recent visit between January 2020 and March 2022. A Chi-square analysis showed that there were statistically significant differences in chronic disease status in subgroups defined by race (p=<0.001), age (p=<0.001), health insurance (p=<0.001), residence (p=0.003), number of visits to the clinic over two years (p=<0.001), and language spoken at home (p=<0.001), as shown in Table 22.

Table 31 confirms that the population primarily consists of individuals identifying as Black and that more females seek healthcare services than males. In addition, this population's chronic disease is evident at an earlier age, starting at 25. Watson et al. reported that 53.8% of adults ages 18-34 had at least one chronic condition, with 22.3% having multiple chronic conditions (MCC) [95].

Table 31: Demographics of patients from January 2020 to March 2022 at SUNY Downstate Medical Center's **Suite** B family clinic by chronic disease status (n=4,201)

Demographic		**No Chronic Disease** N (%)	**Chronic Disease** N (%)	**p-value**
Sex:				
	Female	1456 (70.8)	1529 (71.3)	0.704
	Male	601 (29.2)	615 (28.7)	
Race:				
	White	93 (4.6)	46 (2.2)	<0.001
	Black	1716 (85.1)	1869 (88.0)	
	Latinx	114 (5.7)	147(6.9)	
	Asian	31 (1.5)	18 (0.8)	
	Other	62 (3.1)	44 (2.1)	
Age:				
	0-17	193 (9.4)	35 (1.6)	<0.001
	18-24	272 (13.2)	94 (4.4)	
	25-44	787 (38.3)	351 (16.4)	
	45-64	466 (22.7)	724 (33.8)	

	65+	339 (16.5)	940 (43.8)	
Type of Health Insurance:				
	Private	648 (31.5)	526 (24.5)	<0.001
	Medicaid	1013 (49.3)	650 (30.3)	
	Medicare	358 (17.4)	946 (44.1)	
	Self-Pay	23 (1.1)	11 (0.5)	
	Other	14 (0.7)	11 (0.5)	
Brooklyn Residence				
	Yes	1869 (91.0)	2004 (93.5)	0.003
	No	185 (9.0)	140 (6.5)	
Visited Clinic 6+/2 years				
	Yes	562 (27.3)	1109 (51.7)	<0.001
	No	1495 (72.7)	1035 (48.3)	
Language Spoken at Home:				
	English	1609 (78.2)	1759 (82.0)	<0.001
	Spanish	65 (3.2)	123 (5.7)	
	Other	383 (18.6)	262 (12.2)	

Chronic disease rates are partially attributable to food insecurity and inequity in underrepresented communities. Food insecurity is a household-level economic and social condition characterized by limited or uncertain access to adequate food [96]. This phenomenon continues to be an issue in East Flatbush, where Downstate is located, among 25% of the population, according to The Hunter College NYC Food Policy Center's Foodscape reports (Table 32). Their report also highlighted the chronic disease burden, with 36% of the population reporting that they have hypertension, 34% obesity, and 15% type 2 diabetes. Lack of access to healthy food is reflected in the reported health behaviors of this population. At the time of this survey, 20% of the participants reported not having any fruits or vegetables the day prior, 32% stated that they had one or more sugary drinks daily, and 27% had not engaged in any physical activity in the last 30 days. Approximately 15% of this population falls below the federal poverty line [97]. This mainly involves not only the epidemiological aspect of phase 2 but also the environmental aspect.

Table 32: East Flatbush vs. NYC demographics and food insecurity variables [97–102]		
	East Flatbush	NYC
Total population (#)	162,446	~8,804,190
Demographics		
	(%)	(%)
Race		
Latino	7.8	29
Black	86.1	22
White	2.9	33
Asian/Pacific Islander	1.5	15
Other	1.6	2
Age (years)		
0-17	21	20
18-64	65	63
65+	14	17
Born Outside the US	51.7	36.8
Below FPL	15.8	19.7
Unemployment (16 & up)	4.5	4.5
Extreme Housing Burden	34.4	29.5
Chronic Diseases		
Obesity	34	24
Childhood obesity (K-8)	22	20
Diabetes	15	11
Hypertension	36	28
Access to Healthy Food		
Food Insecurity	25	15.4
Residences with no kitchen	0.5	0.8
Health Behaviors		
No Fruits and Vegetables Yesterday	20	12.9
One or More 12-ounce Sugary Drinks Per Day	32	23
No Physical Activity in the Last 30 Days	27	27.1
Physical Activity Burden		
Land Used for Public Parks, Open Space, and Recreation	5.7	24.7

[+] Based on a population of 8.3 million New Yorkers. Data obtained from the U.S. Census Bureau - American Community Survey.

The PRECEDE-PROCEED framework is heavily influenced by models such as the Health Belief Model (HBM), particularly Phases 2 and 3 [103]. The HBM suggests that individuals are more likely to take action related to their health if they perceive that there is a threat to their health

(perceived susceptibility), the perceived benefit that the action taken can improve their health, perceived barriers (conducting an internal cost-benefit analysis), and self-efficacy (confidence in carrying out the recommended action) [104]. An approach has been adopted for the Jumpstart program, where new knowledge about whole-food plant-based nutrition and the impact of unhealthy eating habits on chronic disease burden will increase perceived susceptibility in participants. This will then influence the attitudes of participants because once it is understood that adopting a WFPB lifestyle can benefit health and reduce adverse health outcomes (perceived benefit), and that eating a WFPB diet can be tasty and incorporate one's culture (reduction of perceived barrier), then it can influence behaviors. The Jumpstart program supports participants by providing mentors and creating a curriculum that encourages goal setting and visioning so that knowledge and attitudes translate into action. The proposed framework is illustrated in Figure 8.

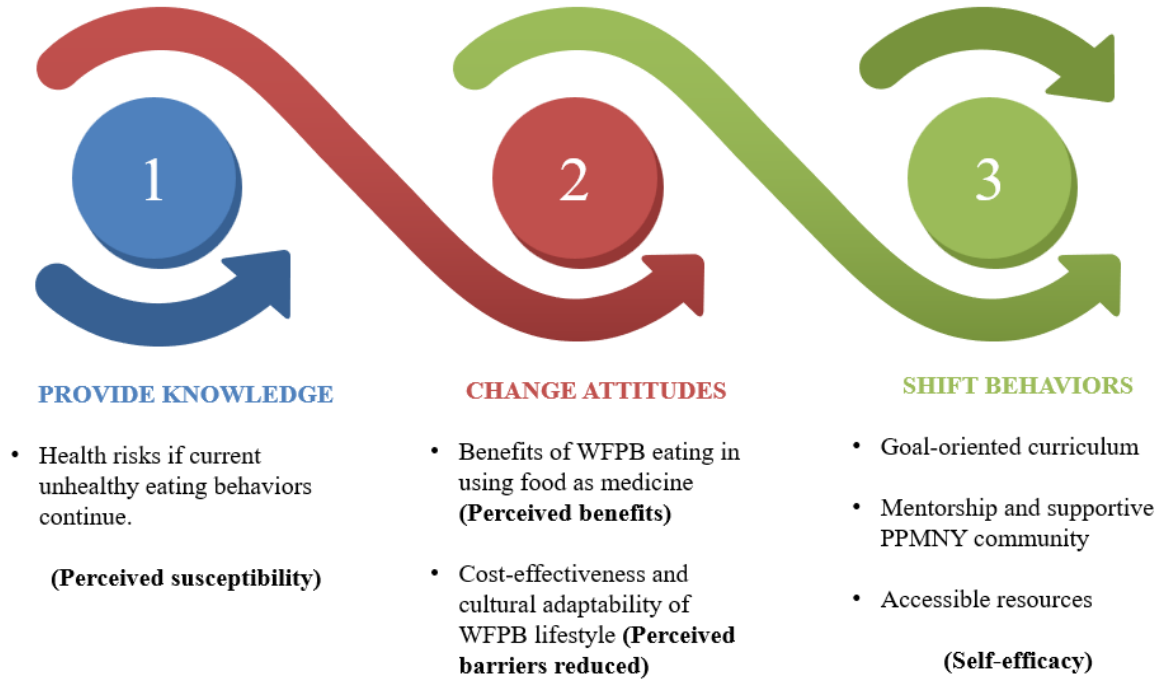

Figure 8: Proposed model for the Jumpstart Program

The results of the epidemiological, environmental, and behavioral assessments informed the next phase, ecological and educational evaluation. This phase focuses on predisposing, enabling, and reinforcing factors that influence dietary behavior [105]. The predisposing factors for the Jumpstart program include knowledge and awareness of WFPB nutrition and its benefits on the body, including the potential alleviation of chronic diseases. In addition, the cultural norms experienced by participants. For example, individuals raised on a Mediterranean diet may find it easier to transition to a WFPB lifestyle due to the similarities between the two diets. The behavioral capability of participants to change their diet can determine the feasibility of a WFPB diet. Enabling factors are environmental conditions, such as resources and services, that impact the desired outcomes in Phase 2. For instance, the enabling factors that Jumpstart offers participants are access to medical personnel before and after the program, invitations to additional PPMNY events other than the Jumpstart program, and access to PPMNY's educational resources warehouse. In addition, Jumpstart offers culturally tailored culinary demonstrations by knowledgeable WFPB chefs, teaching participants how to modify and create dishes that adhere to the model. Accessibility to these resources helps participants maintain a WFPB diet by assisting them in learning how their health characteristics may be impacted through medical intake and involvement with the PPMNY online network. Reinforcing factors will support participants in continuing the WFPB lifestyle. These factors include the PPMNY community's mentorship, the ongoing monitoring of individual progress, and incentives after education sessions (Figure 9).

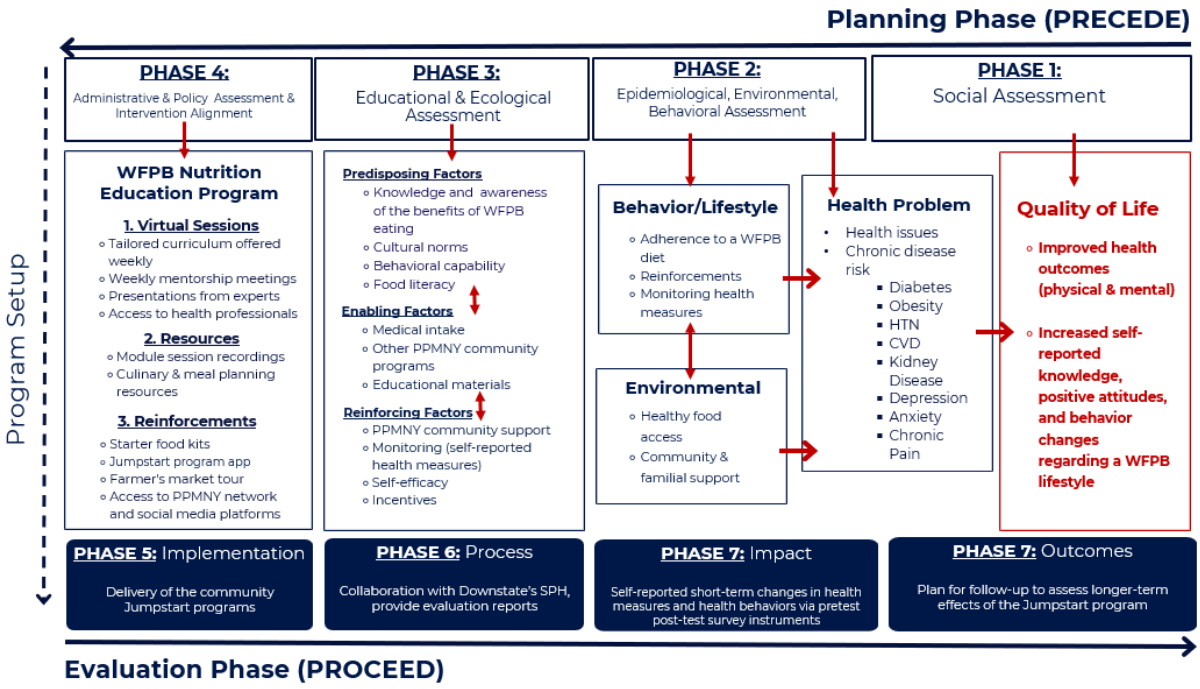

Figure 9: PRECEDE-PROCEED Logic Model for the Community Jumpstarts

The fourth phase identifies the 21-day Jumpstart program's administrative design and regulatory or policy issues that may impact its delivery [106,107]. PPMNY consists of several network organizations, a network director, an operations director, consultants, culinary educators, curriculum designers, community health educators, and more to ensure the success of the Jumpstart program [108]. Existing health disparities were already identified, and the next step was to consult community members before launching the community-based virtual Jumpstart program. A focus group was held with community ministers, pastors, educators, residents, and more to ensure that the Jumpstart curriculum design, scheduling, and marketing were culturally appropriate before we piloted the virtual program with Brooklyn's Black leaders and subsequently opened the Jumpstart to all community members, including this study.

Once the virtual pilot for Brooklyn's Black leaders was completed, the lessons learned prompted a revision of the Jumpstart curriculum that was later implemented in successive cohorts.

The subsequent iterations of the Jumpstart program included 4-5 weekly virtual educational and mentorship sessions. A specific curriculum in each session aligns with mentorship meetings and presentations from health professionals and chefs. In addition to virtual sessions, participants can continuously receive guidance through the Jumpstart digital application, where recordings are maintained and culinary and meal-planning resources are available. In addition, PPMNY offers its network as a support to all participants. To reiterate, this community provides Jumpstart participants with a space to share their WFPB journey and ask questions.

Evaluation

The subsequent four phases of the PRECEDE-PROCEED model focus on evaluation. These include implementation, process, impact, and outcome. Regarding implementation, PPMNY successfully implemented the program's protocol across various cohorts and maintained an average attendance rate of 66% in the educational and mentorship sessions and 73% in the educational sessions only for participants who consented to participate in the study. In addition, PPMNY actively collaborated with several organizations to assist with recruitment and sponsorship. Discounted rates were available to the community due to sponsorship from organizations such as Yeshiva University, Rise Up East New York, Farm to People, and Jewish Association for Services for the Aged (JASA), and more.

The process evaluation began with PPMNY's collaboration with Downstate's School of Public Health. Several public health students interned with PPMNY to work on evaluating each of the Jumpstart programs. The pre- and post-program surveys were developed and administered to participants by the research team. Reports were created after each Jumpstart program. The process evaluation included an ongoing assessment of the intervention's delivery to participants. A structured curriculum was developed by PPMNY that included session agendas and slide decks with evidence-based information and was delivered at each of the educational sessions with little

to no deviation from the agenda. Several speakers attended the sessions, from medical professionals to experienced individuals who followed the WFPB lifestyle. Weekly meetings were held to ensure that facilitators and mentors communicated consistently and complied with the program protocol.

The impact evaluation focused on short-term changes during the Jumpstart program. Statistical analyses revealed positive changes in health indications, such as significant BMI and waist circumference reductions, for individuals who reported these anthropometric measures. There were also significant reductions in self-reported PHQ-9 and GAD-7 scores and the perceived challenge and expense of adopting a WFPB lifestyle. In contrast, there were significant increases in self-reported and actual knowledge regarding nutrition after the Jumpstart program compared to baseline, and increased perception of one's ability to adopt a WFPB lifestyle and cook WFPB meals. Statistical analyses also showed significant differences in all self-reported quality of life metrics (pain (other than headaches), headaches (separated from other pain), mobility, breathing, skin, upper GI, lower GI, hormonal issues, quality of sleep, energy levels, moodiness, clarity, and cravings for unhealthy food), except body odor, of participants at baseline when compared to post-program.

The outcome evaluation relates to the long-term sustained effects of the Jumpstart program. This study did not capture this; however, participants responded to a post-program survey question: "To what extent do you plan to maintain a WFPB lifestyle? [Response options: "Not at all," "A little," "I'll be eating more plant food, but I'm not going to put in all the effort to maintain it." "I'll continue it, with some modifications," and "I'll continue to follow it pretty strictly], 50.4% (n=70) responded, "I'll be eating more plant food, but I'm not going to put in all the effort to maintain it.," and 43.2% (n=62) responded, "I'll continue it, with some modifications."

Discussion

The present study aimed to evaluate the 21-day Jumpstart program developed by Plant Powered Metro New York (PPMNY) among community participants. Specifically, I explored attendance and satisfaction with the Jumpstart program. Our study revealed an average participation rate of 73% of the educational sessions, indicating that across the seven cohorts, participants on average attended approximately three-quarters of the offered educational sessions. The average attendance rate was 66% for combined educational and mentorship sessions. This highlights the engagement of participants in both the educational and mentorship components of the program.

The attendance rate, feedback from questionnaire responses, and focus group discussions also provided evidence to support the satisfaction and overall acceptability of the program. Specifically, among participants who actively participated in a PPMNY Jumpstart activity (attended at least one session), completed both the baseline and post-program surveys, and consented to be in the study, 90% rated the overall program as "Excellent" or "Good." In addition, nearly 98% of the participants were willing to recommend the Jumpstart program to others. The high satisfaction and recommendation rates suggest an overall positive reception of the Jumpstart program among engaged participants.

This intervention is similar in some ways to previously studied WFPB dietary interventions. McDougall et al reported on the effects of a 10-day residential program that included ad libitum low-fat vegan diet on biomarkers of cardiovascular disease and type 2 diabetes in a sample of 1615 adults with a median age of 58 years. This study showed statistically significant program-related decreases in cholesterol, weight, blood pressure, blood glucose, creatine, and blood urea nitrogen [109]. Similarly, in a 12-week study of 2974 adults from socioeconomically

diverse sites, Ornish et al. studied the effects of an intensive cardiac rehabilitation program that included a WFPB diet, exercise, group support meetings, and stress management techniques. That study found statistically significant 12-week improvements in BMI, cholesterol, HbA1c, triglycerides, blood pressure, depressive symptoms, and other outcomes, improvements that persisted after one year among 78% of participants who continued with the program [110].

Though there were differences between the aforementioned programs and PPMNY's Jumpstart in terms of delivery, duration, setting, and sample size, these programs share notable similarities with PPMNY's Jumpstart program, such as the WFPB diet being the core of the intervention, and the demonstration of significant program-related health benefits including reductions in weight, BMI, LDL cholesterol, and systolic BP. The results suggest that WFPB nutrition interventions can positively impact health outcomes regardless of the specific program design [111–113].

The PPMNY Jumpstart program had several unique features compared with the McDougall and Ornish programs. One is the integration of peer mentorship into their curriculum. Peer mentorship and social support has shown to be beneficial in similar interventions [114–116]. The other is its community-centered approach and inclusivity across diverse demographic backgrounds [109,110]. The study populations for the McDougall and Ornish programs were not diverse, and the study findings may not be generalizable to communities that have the most need when it comes to combatting chronic disease. For example, the McDougall study sample was 92.1% White and the Ornish study had a small sample of 35 individuals with moderate to severe CHD. In contrast, the Jumpstart program adopts a more inclusive approach, welcoming individuals from various socioeconomic, cultural, and ethnic backgrounds and medical histories, promoting greater community engagement and participation. This community-centered model enhances program

accessibility and fosters a supportive and inclusive environment conducive to sustainable behavior change and long-term health outcomes; evidence supports this approach [117].

During the focus group discussions, the participants identified ways the program could do an even better job marketing this program to the larger community. Regarding the program format, participants recommended including hybrid sessions (both online and in-person) in future cohorts. Some respondents noted that live synchronous sessions were critical to the program; hence, pre-recorded sessions should not be considered. Regarding educational sessions, the participants recommended using less scientific terminology for the target population to better understand all aspects of the program. Future cohorts' weekly check-ins with Jumpstart alums were also suggested to help participants learn to maintain a WFPB diet after program completion.

Regarding the exploratory outcomes, the results of our analysis of the changes in anthropometric (e.g., BMI and waist circumference) and laboratory measures (e.g., LDL cholesterol and systolic blood pressure) revealed that despite the small sample size, the participants experienced a statistically significant decrease in BMI (n=106) and waist circumference (n=53) within the 21-day timeframe of the program. Our findings align with those of previous research demonstrating that WFPB diets are effective for weight loss [39]. For instance, a previous observational cross-sectional study highlighted a negative association between plant protein intake and increases in BMI in contrast to the positive association observed between increases in BMI and animal protein intake [118]. Whole plant foods contain high amounts of antioxidants and fiber, and little, if any, saturated fat, and typically have lower caloric density than animal foods, making them well-suited for weight loss.

While our study was not long enough to detect changes in HbA1c, which typically takes 3 months to assess, previous studies have indicated that WFPB nutrition is effective for diabetes

prevention and treatment. WFPB diets replace saturated fats from animal products with polyunsaturated fatty acids that are known to be beneficial for diabetes and its comorbidities. In contrast, meat consumption has been reported to increase the risk of diabetes and its comorbidities [119]. Previous research demonstrated lower incidence of diabetes among those who are more adherent to WFPB diets [120,121]. Diets based on whole plant-based foods have also been reported to reduce insulin resistance and improve glycemic control through various mechanisms [42].

WFPB nutrition has also been associated with improvements in inflammatory biomarkers associated with cardiovascular risk [120], and reversal of ischemic heart disease [109,110]. We were unable to collect anthropometric and biomarker data from most participants in the current analysis. Future studies of Jumpstart participants should include the collection of anthropometric and biomarker data.

This study found statistically significant improvements in all measured QoL metrics except for body odor. For pain (other than headaches) and mobility, this finding is consistent with the results of a previous 8-week longitudinal quasi-experimental cohort study demonstrating that a diet rich in fruits, vegetables, and whole grains can effectively reduce chronic pain and disability associated with musculoskeletal conditions [55]. This is also true for patients with diabetic neuropathy who saw improvements in clinical and pain measures as a result of undergoing a 20-week plant-based dietary intervention program [122]. For headaches, our findings align with those of a cross-sectional study that examined migraine headaches and plant-based eating patterns. Investigators found that, after controlling for confounders, an increase in the overall plant-based index score (PDI) resulted in decreased headaches [123].

Improvements in breathing from baseline to post-program can be supported through the French Asthma-E3N study, which assessed 5700 elderly patients with dietary data from 1993 to 2005. Researchers observed that plant-based diets (healthful and unhealthful) were associated with a reduced incidence of asthma events over time, mediated by BMI [124].

Participants also reported program-related improvements in gastrointestinal issues. More participants responded that they had fewer symptoms of GI issues post-program than before the start of the Jumpstart program. Evidence also supports the benefits of plant-based eating to gut health. Vegans and vegetarians consume more fiber than omnivores, which enhances lactic acid bacteria and reduces problematic bacteria such as Clostridium and Enterococcus species. Polyphenols are abundant in plant foods, increase Bifidobacterium and Lactobacillus in the gut, and are known to have anti-inflammatory, anti-pathogenic, and cardiovascular-protecting properties [125]. Flores-Balderas and others suggest that the benefits of plant-based eating to the gut can also be beneficial to those suffering from inflammatory skin issues and overall skin health [126].

Similar dietary interventions to the Jumpstart program also found improvements in several quality-of-life metrics. Nyong et al. and Friedman et. examined QoL metrics in their WFPB intervention studies. These metrics included energy, mood, pain, and sleep. Nyong and others found that participants reported significant improvements in self-reported energy, sleep, and mood post-program compared to pre-program. However, no significant change was observed in pain levels [111]. Whilst Friedman and others found improvements in all four metrics post-intervention when compared to baseline [112].

We found that participation in the Jumpstart program was associated with improvements in symptoms of depression and anxiety. Our findings regarding mental health align with those of

another study on the impact of a plant-based diet on health-related QoL outcomes, which revealed improvements in physical and mental health during an 8-year follow-up [61]. While further research is needed to explain the mechanisms underlying these observations, one potential explanation is that the vitamins in fruits and vegetables, which have anti-inflammatory and antioxidant effects, lower the risk of depression. This concept can also account for inflammation as a mediating pathway for both the risk and neuroprogression of depression [61,127]. These findings can also help explain our findings. It is also possible that improvements in mental health were associated with participation in a supportive and socially engaging program, apart from the dietary change component of the intervention.

Finally, regarding dietary knowledge-related outcomes, we found that the study participants gained perceived self-reported knowledge of general nutrition and more specifically, the benefits of WFPB diets. This finding was supported by the increase in participants' scores on the knowledge-based questions developed on the questionnaires related to nutrition facts.

The present study had several limitations. First, the study participants self-reported all anthropometric and laboratory measurements and other clinical outcomes; these measures were not reported by all participants. In future iterations of the program, it will be necessary to complement the present findings with objective measurements (e.g., by collecting and analyzing blood specimens and performing anthropometric measurements by medical staff). Two further limitations of the present study include the small sample size and limited external validity due to gender bias (most study participants were female) and educational bias (most participants were highly educated), limiting the generalizability of our findings.

Recommendations

1. Further evaluation of program attrition: 117 individuals who consented to participate in the study completed the baseline survey, but not the post-program survey. Interviews are recommended to understand why these participants did not complete the survey and to determine whether survey length or content was related to the lack of post-program survey completion.
2. Many participants did not engage with the Jumpstart Facebook group(s) (63%), the farmers' market tours (71.9%), or sign up for fresh produce boxes (60.6%), potentially indicating that these program components may not be critical to participant success.
3. Facilitate more consistent communication with assigned mentors and greater diversity and inclusion in mentorship groups, especially regarding age.
4. Incorporate more live meal prep sessions with chefs, with some focusing on specific cuisines such as Jewish food.
5. Provide more examples of meals for breakfast, lunch, and dinner.
6. Expand program outreach to community organizations, especially schools (for workshops), libraries, churches, senior centers, and engaging more families.
7. Add more in-person events.
8. Consider extending the program for more than 21 days for participants who want continued support and engagement.
9. Consider implementing the Jumpstart program in different populations, such as patients with specific chronic disease profiles, employees in corporate environments, and individuals who receive Supplemental Nutrition Assistance Program (SNAP) benefits to further assess the validity of the program.

Conclusions

PPMNY's Jumpstart intervention program was well received by most of the community members recruited to participate. The participant feedback was largely positive, and participants indicated that they would recommend such a program to their constituents. Expanded access to community-based dietary change interventions, such as the WFPB diet one focused on in the present study, may effectively respond to the growing chronic disease epidemic burdening the community.

Public Health Reflection

The analysis of the Jumpstart program is promising, given the signals of good participation, satisfaction, and acceptability among community members burdened by chronic disease. Future directions for this work would include a larger sample size and a standardized method of collecting health data (BMI, waist circumference, blood pressure, HbA1c, LDL cholesterol, and total cholesterol). Data regarding changes in attitudes, behaviors, and clinical health results will inform adaptive modifications of the program to improve its effectiveness. Findings from this study can eventually be used to influence policy at the institutional level through implementation among University Hospital at Downstate (UHD) patients or patients of other health systems with similar health profiles, as well as at the city and state levels, mainly through insurance coverage of such programs. This has already been done for programs such as Diabetes Self-Management Education and Training (DSME/T) and the Chronic Disease Self-Management Program (CDSMP).

This study of the 21-day online program by Plant Powered Metro New York (PPMNY) exemplifies the importance of harnessing detailed data from various sources to evaluate program effectiveness. Through my DrPH studies, I aimed to acquire multifaceted skills to strengthen my public health research and practice expertise. In the Data and Analysis domain, I was able to build

my capacity to design well-structured research projects. In the thematic area of chronic disease prevention and management, I aimed to deepen my understanding and build lifelong skills in implementing and evaluating multi-sectoral initiatives with a focus on under-resourced groups, all of which were achieved during the completion of my dissertation work. The PPMNY study, focusing on peer support groups, mentorship, and access to medical professionals, highlights the necessity of such holistic approaches for effective chronic disease management.

These skills were also underlined by gaining a more in-depth and practical understanding of applying strategic frameworks in guiding multisectoral interventions using the PRECEED-PROCEED framework, which emphasizes the value of structured planning and evaluation, especially in public health programs that engage diverse stakeholders. Overall, my ambition to amalgamate my conceptual and methodological knowledge to contribute to rigorous and impactful research and interventions in the field of public health was successfully achieved.

References

1. Rauber, F.; da Costa Louzada, M.L.; Steele, E.M.; Millett, C.; Monteiro, C.A.; Levy, R.B. Ultra-Processed Food Consumption and Chronic Non-Communicable Diseases-Related Dietary Nutrient Profile in the UK (2008–2014). *Nutrients* **2018**, *10*, E587, doi:10.3390/nu10050587.
2. Raghupathi, W.; Raghupathi, V. An Empirical Study of Chronic Diseases in the United States: A Visual Analytics Approach to Public Health. *Int. J. Environ. Res. Public. Health* **2018**, *15*, 431, doi:10.3390/ijerph15030431.
3. World Health Organization (WHO) Non Communicable Diseases Available online: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases (accessed on 24 August 2022).
4. Chronic Diseases and Conditions Available online: https://www.health.ny.gov/diseases/chronic/ (accessed on 8 August 2022).
5. American Diabetes Association The Burden of Diabetes in New York 2021.
6. Olson, E.; Van Wye, G.; Kerker, B.; Thorpe, L.; Frieden, T. *Take Care Central Brooklyn. NYC Community Health Profiles, Second Edition*; New York City Department of Health and Mental Hygiene, 2006; pp. 1–16;.
7. University Hospital of Brooklyn | Economic & Community Benefit Available online: https://www.hanys.org/government_affairs/community_benefit/?action=view_report&type=facility&id=7001037 (accessed on 2 August 2022).
8. NYC Health + Hospitals / Kings County | Economic & Community Benefit Available online: https://www.hanys.org/government_affairs/community_benefit/?action=view_report&type=facility&id=7001016 (accessed on 2 August 2022).
9. NYU Furman Center East Flatbush Neighborhood Profile Available online: https://furmancenter.org/neighborhoods/view/east-flatbush (accessed on 2 August 2022).
10. Caribbeing/Little Caribbean NYC: New York City Neighborhood, Flatbush, Brooklyn Available online: https://www.nycgo.com/attractions/caribbeing-little-caribbean-nyc (accessed on 2 August 2022).
11. Tuso, P.; Stoll, S.R.; Li, W.W. A Plant-Based Diet, Atherogenesis, and Coronary Artery Disease Prevention. *Perm. J.* **2015**, *19*, 62–67, doi:10.7812/TPP/14-036.
12. Zhilkova, A.; Chamany, S.; Ngamwajasat, C.; De Leon, S.; Wu, W.; Tsao, T.-Y. Medication Nonuse and Hospital Utilization: Medicaid Participants With Type 2 Diabetes in New York City. *Am. J. Prev. Med.* **2022**, *63*, 543–551, doi:10.1016/j.amepre.2022.04.005.
13. Plant Powered Metro New York (PPMNY) Growing the Movement for Plant Powered Health in Metro NY. 2022.
14. Kent, G.; Kehoe, L.; Flynn, A.; Walton, J. Plant-Based Diets: A Review of the Definitions and Nutritional Role in the Adult Diet. *Proc. Nutr. Soc.* **2022**, *81*, 62–74, doi:10.1017/S0029665121003839.
15. Reynolds, R.; Dennis, S.; Hasan, I.; Slewa, J.; Chen, W.; Tian, D.; Bobba, S.; Zwar, N. A Systematic Review of Chronic Disease Management Interventions in Primary Care. *BMC Fam. Pract.* **2018**, *19*, 11, doi:10.1186/s12875-017-0692-3.
16. Gibbs, J.; Cappuccio, F.P. Plant-Based Dietary Patterns for Human and Planetary Health. *Nutrients* **2022**, *14*, 1614, doi:10.3390/nu14081614.
17. Karlsen, M.C.; Rogers, G.; Miki, A.; Lichtenstein, A.H.; Folta, S.C.; Economos, C.D.; Jacques, P.F.; Livingston, K.A.; McKeown, N.M. Theoretical Food and Nutrient

Composition of Whole-Food Plant-Based and Vegan Diets Compared to Current Dietary Recommendations. *Nutrients* **2019**, *11*, E625, doi:10.3390/nu11030625.
18. Adair, K.E.; Bowden, R.G. Ameliorating Chronic Kidney Disease Using a Whole Food Plant-Based Diet. *Nutrients* **2020**, *12*, 1007, doi:10.3390/nu12041007.
19. Brown, R.B. Low Dietary Sodium Potentially Mediates COVID-19 Prevention Associated with Whole-Food Plant-Based Diets. *Br. J. Nutr.* **2022**, 1–6, doi:10.1017/S0007114522002252.
20. Menzel, J.; Biemann, R.; Longree, A.; Isermann, B.; Mai, K.; Schulze, M.B.; Abraham, K.; Weikert, C. Associations of a Vegan Diet with Inflammatory Biomarkers. *Sci. Rep.* **2020**, *10*, 1933, doi:10.1038/s41598-020-58875-x.
21. Wang, Y.; Liu, B.; Han, H.; Hu, Y.; Zhu, L.; Rimm, E.B.; Hu, F.B.; Sun, Q. Associations between Plant-Based Dietary Patterns and Risks of Type 2 Diabetes, Cardiovascular Disease, Cancer, and Mortality – a Systematic Review and Meta-Analysis. *Nutr. J.* **2023**, *22*, 46, doi:10.1186/s12937-023-00877-2.
22. Forks Over Knives The Standard American Diet Is Even Sadder Than We Thought Available online: https://www.forksoverknives.com/wellness/standard-american-diet-sadder-than-we-thought/ (accessed on 16 January 2023).
23. U.S. Department of Health and Human Services and U.S. Department of Agriculture 2015-2020 Dietary Guidelines for Americans.
24. Oussalah, A.; Levy, J.; Berthezène, C.; Alpers, D.H.; Guéant, J.-L. Health Outcomes Associated with Vegetarian Diets: An Umbrella Review of Systematic Reviews and Meta-Analyses. *Clin. Nutr. Edinb. Scotl.* **2020**, *39*, 3283–3307, doi:10.1016/j.clnu.2020.02.037.
25. Campbell II, T.M.; Campbell, T.C. *The China Study: The Most Comprehensive Study of Nutrition Ever Conducted And the Startling Implications for Diet, Weight Loss, And Long-Term Health*; 1st ed.; BenBella Books, 2006; ISBN 978-1932100662.
26. Esselstyn, C.B.; Gendy, G.; Doyle, J.; Golubic, M.; Roizen, M.F. A Way to Reverse CAD? *J. Fam. Pract.* **2014**, *63*, 356–364b.
27. Kim, P.; Arnold, M.; Gunti, J. Five-Month Trial of Whole-Food Plant-Based Diet in a Patient With Coexisting Myasthenia Gravis and Lambert-Eaton Myasthenic Syndrome. *Am. J. Lifestyle Med.* **2021**, *15*, 230–237, doi:10.1177/1559827621993748.
28. Selinger, E.; Neuenschwander, M.; Koller, A.; Gojda, J.; Kühn, T.; Schwingshackl, L.; Barbaresko, J.; Schlesinger, S. Evidence of a Vegan Diet for Health Benefits and Risks – an Umbrella Review of Meta-Analyses of Observational and Clinical Studies. *Crit. Rev. Food Sci. Nutr.* **2022**, *0*, 1–11, doi:10.1080/10408398.2022.2075311.
29. Kovesdy, C.P. Epidemiology of Chronic Kidney Disease: An Update 2022. *Kidney Int. Suppl.* **2022**, *12*, 7–11, doi:10.1016/j.kisu.2021.11.003.
30. Plant-Based Diets and Kidney Health Available online: https://www.kidney.org/atoz/content/plant-based (accessed on 8 January 2023).
31. Campbell, T.M.; Liebman, S.E. Plant-Based Dietary Approach to Stage 3 Chronic Kidney Disease with Hyperphosphataemia. *BMJ Case Rep.* **2019**, *12*, e232080, doi:10.1136/bcr-2019-232080.
32. Alvirdizadeh, S.; Yuzbashian, E.; Mirmiran, P.; Eghtesadi, S.; Azizi, F. A Prospective Study on Total Protein, Plant Protein and Animal Protein in Relation to the Risk of Incident Chronic Kidney Disease. *BMC Nephrol.* **2020**, *21*, 489, doi:10.1186/s12882-020-02079-y.

33. Yuzbashian, E.; Asghari, G.; Mirmiran, P.; Hosseini, F.-S.; Azizi, F. Associations of Dietary Macronutrients with Glomerular Filtration Rate and Kidney Dysfunction: Tehran Lipid and Glucose Study. *J. Nephrol.* **2015**, *28*, 173–180, doi:10.1007/s40620-014-0095-7.
34. Joshi, S.; McMacken, M.; Kalantar-Zadeh, K. Plant-Based Diets for Kidney Disease: Guide for Clinicians. *Am. J. Kidney Dis. Off. J. Natl. Kidney Found.* **2021**, *77*, 287–296, doi:10.1053/j.ajkd.2020.10.003.
35. Kim, H.; Caulfield, L.E.; Garcia-Larsen, V.; Steffen, L.M.; Grams, M.E.; Coresh, J.; Rebholz, C.M. Plant-Based Diets and Incident CKD and Kidney Function. *Clin. J. Am. Soc. Nephrol. CJASN* **2019**, *14*, 682–691, doi:10.2215/CJN.12391018.
36. Mozaffarian, D.; Angell, S.Y.; Lang, T.; Rivera, J.A. Role of Government Policy in Nutrition—Barriers to and Opportunities for Healthier Eating. *The BMJ* **2018**, *361*, k2426, doi:10.1136/bmj.k2426.
37. Restrepo, B.J. Obesity Prevalence Among U.S. Adults During the COVID-19 Pandemic. *Am. J. Prev. Med.* **2022**, *63*, 102–106, doi:10.1016/j.amepre.2022.01.012.
38. Centers for Disease Control and Prevention Obesity Is a Common, Serious, and Costly Disease Available online: https://www.cdc.gov/obesity/data/adult.html (accessed on 29 August 2022).
39. Wright, N.; Wilson, L.; Smith, M.; Duncan, B.; McHugh, P. The BROAD Study: A Randomised Controlled Trial Using a Whole Food Plant-Based Diet in the Community for Obesity, Ischaemic Heart Disease or Diabetes. *Nutr. Diabetes* **2017**, *7*, e256, doi:10.1038/nutd.2017.3.
40. Campbell, E.K.; Fidahusain, M.; Campbell II, T.M. Evaluation of an Eight-Week Whole-Food Plant-Based Lifestyle Modification Program. *Nutrients* **2019**, *11*, 2068, doi:10.3390/nu11092068.
41. Brown, L.; Rose, K.; Campbell, A. Healthy Plant-Based Diets and Their Short-Term Effects on Weight Loss, Nutrient Intake and Serum Cholesterol Levels. *Nutr. Bull.* **2022**, *47*, 199–207, doi:10.1111/nbu.12554.
42. McMacken, M.; Shah, S. A Plant-Based Diet for the Prevention and Treatment of Type 2 Diabetes. *J. Geriatr. Cardiol. JGC* **2017**, *14*, 342–354, doi:10.11909/j.issn.1671-5411.2017.05.009.
43. Pettersen, B.J.; Anousheh, R.; Fan, J.; Jaceldo-Siegl, K.; Fraser, G.E. Vegetarian Diets and Blood Pressure among White Subjects: Results from the Adventist Health Study-2 (AHS-2). *Public Health Nutr.* **2012**, *15*, 1909–1916, doi:10.1017/S1368980011003454.
44. Matsumoto, S.; Beeson, W.L.; Shavlik, D.J.; Siapco, G.; Jaceldo-Siegl, K.; Fraser, G.; Knutsen, S.F. Association between Vegetarian Diets and Cardiovascular Risk Factors in Non-Hispanic White Participants of the Adventist Health Study-2. *J. Nutr. Sci.* **2019**, *8*, e6, doi:10.1017/jns.2019.1.
45. Fraser, G.; Katuli, S.; Anousheh, R.; Knutsen, S.; Herring, P.; Fan, J. Vegetarian Diets and Cardiovascular Risk Factors in Black Members of the Adventist Health Study-2. *Public Health Nutr.* **2015**, *18*, 537–545, doi:10.1017/S1368980014000263.
46. Jakše, B.; Jakše, B.; Pinter, S.; Jug, B.; Godnov, U.; Pajek, J.; Fidler Mis, N. Dietary Intakes and Cardiovascular Health of Healthy Adults in Short-, Medium-, and Long-Term Whole-Food Plant-Based Lifestyle Program. *Nutrients* **2019**, *12*, E55, doi:10.3390/nu12010055.
47. Satija, A.; Bhupathiraju, S.N.; Spiegelman, D.; Chiuve, S.E.; Manson, J.E.; Willett, W.; Rexrode, K.M.; Rimm, E.B.; Hu, F.B. Healthful and Unhealthful Plant-Based Diets and the

Risk of Coronary Heart Disease in US Adults. *J. Am. Coll. Cardiol.* **2017**, *70*, 411–422, doi:10.1016/j.jacc.2017.05.047.
48. Thompson, A.S.; Tresserra-Rimbau, A.; Karavasiloglou, N.; Jennings, A.; Cantwell, M.; Hill, C.; Perez-Cornago, A.; Bondonno, N.P.; Murphy, N.; Rohrmann, S.; et al. Association of Healthful Plant-Based Diet Adherence With Risk of Mortality and Major Chronic Diseases Among Adults in the UK. *JAMA Netw. Open* **2023**, *6*, e234714, doi:10.1001/jamanetworkopen.2023.4714.
49. American Diabetes Association Statistics About Diabetes | ADA Available online: https://diabetes.org/about-us/statistics/about-diabetes (accessed on 29 August 2022).
50. Centers for Disease Control and Prevention Prediabetes - Your Chance to Prevent Type 2 Diabetes Available online: http://bit.ly/2hMpYrt (accessed on 29 August 2022).
51. Yao, B.; Fang, H.; Xu, W.; Yan, Y.; Xu, H.; Liu, Y.; Mo, M.; Zhang, H.; Zhao, Y. Dietary Fiber Intake and Risk of Type 2 Diabetes: A Dose-Response Analysis of Prospective Studies. *Eur. J. Epidemiol.* **2014**, *29*, 79–88, doi:10.1007/s10654-013-9876-x.
52. Dhingra, D.; Michael, M.; Rajput, H.; Patil, R.T. Dietary Fibre in Foods: A Review. *J. Food Sci. Technol.* **2012**, *49*, 255–266, doi:10.1007/s13197-011-0365-5.
53. Williams, B.A.; Mikkelsen, D.; Flanagan, B.M.; Gidley, M.J. "Dietary Fibre": Moving beyond the "Soluble/Insoluble" Classification for Monogastric Nutrition, with an Emphasis on Humans and Pigs. *J. Anim. Sci. Biotechnol.* **2019**, *10*, 45, doi:10.1186/s40104-019-0350-9.
54. Rosenfeld, R.M.; Kelly, J.H.; Agarwal, M.; Aspry, K.; Barnett, T.; Davis, B.C.; Fields, D.; Gaillard, T.; Gulati, M.; Guthrie, G.E.; et al. Dietary Interventions to Treat Type 2 Diabetes in Adults with a Goal of Remission: An Expert Consensus Statement from the American College of Lifestyle Medicine. *Am. J. Lifestyle Med.* **2022**, *16*, 342–362, doi:10.1177/15598276221087624.
55. Towery, P.; Guffey, J.S.; Doerflein, C.; Stroup, K.; Saucedo, S.; Taylor, J. Chronic Musculoskeletal Pain and Function Improve with a Plant-Based Diet. *Complement. Ther. Med.* **2018**, *40*, 64–69, doi:10.1016/j.ctim.2018.08.001.
56. Kim, H.; Rebholz, C.M.; Hegde, S.; LaFiura, C.; Raghavan, M.; Lloyd, J.F.; Cheng, S.; Seidelmann, S.B. Plant-Based Diets, Pescatarian Diets and COVID-19 Severity: A Population-Based Case–Control Study in Six Countries | BMJ Nutrition, Prevention & Health. *BMJ Nutr. Prev. Health* **2021**, doi:http://dx.doi.org/10.1136/bmjnph-2021-000272.
57. Iguacel, I.; Huybrechts, I.; Moreno, L.A.; Michels, N. Vegetarianism and Veganism Compared with Mental Health and Cognitive Outcomes: A Systematic Review and Meta-Analysis. *Nutr. Rev.* **2021**, *79*, 361–381, doi:10.1093/nutrit/nuaa030.
58. Haghighatdoost, F.; Mahdavi, A.; Mohammadifard, N.; Hassannejad, R.; Najafi, F.; Farshidi, H.; Lotfizadeh, M.; Kazemi, T.; Karimi, S.; Roohafza, H.; et al. The Relationship between a Plant-Based Diet and Mental Health: Evidence from a Cross-Sectional Multicentric Community Trial (LIPOKAP Study). *PloS One* **2023**, *18*, e0284446, doi:10.1371/journal.pone.0284446.
59. Askari, M.; Daneshzad, E.; Darooghegi Mofrad, M.; Bellissimo, N.; Suitor, K.; Azadbakht, L. Vegetarian Diet and the Risk of Depression, Anxiety, and Stress Symptoms: A Systematic Review and Meta-Analysis of Observational Studies. *Crit. Rev. Food Sci. Nutr.* **2022**, *62*, 261–271, doi:10.1080/10408398.2020.1814991.

60. Medawar, E.; Huhn, S.; Villringer, A.; Veronica Witte, A. The Effects of Plant-Based Diets on the Body and the Brain: A Systematic Review. *Transl. Psychiatry* **2019**, *9*, 1–17, doi:10.1038/s41398-019-0552-0.
61. Baden, M.Y.; Kino, S.; Liu, X.; Li, Y.; Kim, Y.; Kubzansky, L.D.; Pan, A.; Okereke, O.I.; Willett, W.C.; Hu, F.B.; et al. Changes in Plant-Based Diet Quality and Health-Related Quality of Life in Women. *Br. J. Nutr.* **2020**, *124*, 960–970, doi:10.1017/S0007114520002032.
62. Barnard, N.D.; Kahleova, H.; Holtz, D.N.; del Aguila, F.; Neola, M.; Crosby, L.M.; Holubkov, R. The Women's Study for the Alleviation of Vasomotor Symptoms (WAVS): A Randomized, Controlled Trial of a Plant-Based Diet and Whole Soybeans for Postmenopausal Women. *Menopause N. Y. N* **2021**, *28*, 1150–1156, doi:10.1097/GME.0000000000001812.
63. American College of Lifestyle Medicine What Is Lifestyle Medicine? Available online: https://lifestylemedicine.org/ (accessed on 22 April 2023).
64. Albert, S.L.; Massar, R.; Kwok, L.; Correa, L.; Polito-Moller, K.; Joshi, S.; Shah, S.; McMacken, M. Pilot Plant-Based Lifestyle Medicine Program in an Urban Public Healthcare System: Evaluating Demand and Implementation 2022, 2022.02.09.22270738.
65. Gottfried, M. Bellevue Hospital Announces Plant-Based Diet Program Available online: https://www.forksoverknives.com/wellness/bellevue-hospital-announces-plant-based-diet-program-to-help-treat-nyc-patients/ (accessed on 2 August 2022).
66. American College of Lifestyle Medicine Redesigning Healthcare, Better.
67. Aggarwal, M.; Grady, A.; Desai, D.; Hartog, K.; Correa, L.; Ostfeld, R.J.; Freeman, A.M.; McMacken, M.; Gianos, E.; Reddy, K.; et al. Successful Implementation of Healthful Nutrition Initiatives into Hospitals. *Am. J. Med.* **2020**, *133*, 19–25, doi:10.1016/j.amjmed.2019.08.019.
68. Mayor Adams, NYC Health + Hospitals Expand Access to Lifestyle Medicine Services City-Wide Available online: http://www1.nyc.gov/office-of-the-mayor/news/063-22/mayor-adams-nyc-health-hospitals-expand-access-lifestyle-medicine-services-city-wide (accessed on 2 August 2022).
69. Rahman, V.J.; Horberg, M.A.; Hu, H.; Vupputuri, S. Implementation of a Plant-Based, Nutrition Program in a Large Integrated Health Care System: Results of a Pilot Program. *J. Prim. Care Community Health* **2021**, doi:10.1177/21501327211053198.
70. Chwyl, C.; Wright, N.; M Turner-McGrievy, G.; L Butryn, M.; M Forman, E. Remotely Delivered Behavioral Weight Loss Intervention Using an Ad Libitum Plant-Based Diet: Pilot Acceptability, Feasibility, and Preliminary Results. *JMIR Form. Res.* **2022**, *6*, e37414, doi:10.2196/37414.
71. Porter, C.M. Revisiting Precede–Proceed: A Leading Model for Ecological and Ethical Health Promotion. *Health Educ. J.* **2016**, *75*, 753–764, doi:10.1177/0017896915619645.
72. Taplin, S.H.; Barlow, W.E.; Ludman, E.; MacLehos, R.; Meyer, D.M.; Seger, D.; Herta, D.; Chin, C.; Curry, S. Testing Reminder and Motivational Telephone Calls to Increase Screening Mammography: A Randomized Study. *J. Natl. Cancer Inst.* **2000**, *92*, 233–242, doi:10.1093/jnci/92.3.233.
73. Monteiro, S.M.; Jancey, J.; Howat, P.; Burns, S.; Jones, C.; Dhaliwal, S.S.; McManus, A.; P Hills, A.; Anderson, A.S. The Protocol of a Randomized Controlled Trial for Playgroup Mothers: Reminder on Food, Relaxation, Exercise, and Support for Health (REFRESH) Program. *BMC Public Health* **2011**, *11*, 648, doi:10.1186/1471-2458-11-648.

74. Riegel, B.; Carlson, B. Facilitators and Barriers to Heart Failure Self-Care. *Patient Educ. Couns.* **2002**, *46*, 287–295, doi:10.1016/s0738-3991(01)00165-3.
75. Center for Community Health and Development at the University of Kansas PRECEDE/PROCEED Available online: https://ctb.ku.edu/en/table-contents/overview/other-models-promoting-community-health-and-development/preceder-proceder/main (accessed on 20 September 2022).
76. Li, Y.; Cao, J.; Lin, H.; Li, D.; Wang, Y.; He, J. Community Health Needs Assessment with Precede-Proceed Model: A Mixed Methods Study. *BMC Health Serv. Res.* **2009**, *9*, 181, doi:10.1186/1472-6963-9-181.
77. Calano, B.J.D.; Cacal, M.J.B.; Cal, C.B.; Calletor, K.P.; Guce, F.I.C.C.; Bongar, M.V.V.; Macindo, J.R.B. Effectiveness of a Community-Based Health Programme on the Blood Pressure Control, Adherence and Knowledge of Adults with Hypertension: A PRECEDE-PROCEED Model Approach. *J. Clin. Nurs.* **2019**, *28*, 1879–1888, doi:10.1111/jocn.14787.
78. Bammann, K.; Recke, C.; Albrecht, B.M.; Stalling, I.; Doerwald, F. Promoting Physical Activity Among Older Adults Using Community-Based Participatory Research With an Adapted PRECEDE-PROCEED Model Approach: The AEQUIPA/OUTDOOR ACTIVE Project. *Am. J. Health Promot.* **2021**, *35*, 409–420, doi:10.1177/0890117120974876.
79. Azar, F.E.; Solhi, M.; Darabi, F.; Rohban, A.; Abolfathi, M.; Nejhaddadgar, N. Effect of Educational Intervention Based on PRECEDE-PROCEED Model Combined with Self-Management Theory on Self-Care Behaviors in Type 2 Diabetic Patients. *Diabetes Metab. Syndr. Clin. Res. Rev.* **2018**, *12*, 1075–1078, doi:10.1016/j.dsx.2018.06.028.
80. Capó, E. Whole Food, Plant-Based Quiz. *Cent. Nutr. Stud.* 2020.
81. Centers for Disease Control and Prevention Measuring Healthy Days. **2000**, 1–44.
82. Spitzer, R.L.; Kroenke, K.; Williams, J.B.W.; Löwe, B. A Brief Measure for Assessing Generalized Anxiety Disorder: The GAD-7. *Arch. Intern. Med.* **2006**, *166*, 1092–1097, doi:10.1001/archinte.166.10.1092.
83. Kroenke, K.; Spitzer, R.L.; Williams, J.B.W. The PHQ-9. *J. Gen. Intern. Med.* **2001**, *16*, 606–613, doi:10.1046/j.1525-1497.2001.016009606.x.
84. Kroenke, K.; Spitzer, R.L.; Williams, J.B.W.; Löwe, B. The Patient Health Questionnaire Somatic, Anxiety, and Depressive Symptom Scales: A Systematic Review. *Gen. Hosp. Psychiatry* **2010**, *32*, 345–359, doi:10.1016/j.genhosppsych.2010.03.006.
85. StataCorp Stata Statistical Software: Realease 16 2023.
86. Koo, T.K.; Li, M.Y. A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research. *J. Chiropr. Med.* **2016**, *15*, 155–163, doi:10.1016/j.jcm.2016.02.012.
87. Whatnall, M.; Patterson, A.; Hutchesson, M. A Brief Web-Based Nutrition Intervention for Young Adult University Students: Development and Evaluation Protocol Using the PRECEDE-PROCEED Model. *JMIR Res. Protoc.* **2019**, *8*, e11992, doi:10.2196/11992.
88. Lin, H.; Wang, X.; Luo, X.; Qin, Z. A Management Program for Preventing Occupational Blood-Borne Infectious Exposure among Operating Room Nurses: An Application of the PRECEDE-PROCEED Model. *J. Int. Med. Res.* **2020**, *48*, 0300060519895670, doi:10.1177/0300060519895670.
89. Guevarra, J.P.; Peden, A.E.; Franklin, R.C. Application of the PRECEDE–PROCEED Model in the Development of Evidence-Informed Interventions for Drowning Prevention: A Mixed-Methods Study Protocol. *BMJ Open* **2021**, *11*, e050688, doi:10.1136/bmjopen-2021-050688.

90. Johnson, O. Application of the PRECEDE-PROCEED Model in the Evaluation of a Community-Based Youth Fitness and Nutrition Summer Camp Program. *Grad. Coll. Diss. Theses* **2016**.
91. Ashwell, H.E.S.; Barclay, L. A Retrospective Analysis of a Community-Based Health Program in Papua New Guinea. *Health Promot. Int.* **2009**, *24*, 140–148, doi:10.1093/heapro/dap009.
92. Why Harlem Is New York's Most Culturally Rich Neighbourhood Available online: https://www.nationalgeographic.com/travel/article/harlem-new-york-most-culturally-rich-neighbourhood (accessed on 4 February 2024).
93. Bansilal, S.; Vedanthan, R.; Kovacic, J.C.; Soto, A.V.; Latina, J.; Björkegren, J.L.M.; Jaslow, R.; Santana, M.; Sartori, S.; Giannarelli, C.; et al. Rationale and Design of Family-Based Approach in a Minority Community Integrating Systems–Biology for Promotion of Health (FAMILIA). *Am. Heart J.* **2017**, *187*, 170–181, doi:10.1016/j.ahj.2017.02.020.
94. OHCA Office of Data Governance and Analytics Unit Chronic Condition ICD-10 Diagnosis Codes 2019.
95. Watson, K.B. Chronic Conditions Among Adults Aged 18─34 Years — United States, 2019. *MMWR Morb. Mortal. Wkly. Rep.* **2022**, *71*, doi:10.15585/mmwr.mm7130a3.
96. USDA Economic Research Service Definitions of Food Security Available online: https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/definitions-of-food-security/ (accessed on 28 September 2022).
97. NYC Food Policy Editor Foodscape: East Flatbush Available online: https://www.nycfoodpolicy.org/foodscape-east-flatbush/ (accessed on 12 August 2022).
98. U.S. Census Bureau QuickFacts: New York City, New York Available online: https://www.census.gov/quickfacts/newyorkcitynewyork (accessed on 12 August 2022).
99. 2020 Census -DCP Available online: https://www1.nyc.gov/site/planning/planning-level/nyc-population/2020-census.page (accessed on 12 August 2022).
100. Find Your Community Garden : NYC Parks GreenThumb Available online: https://greenthumb.nycgovparks.org/gardensearch.php (accessed on 12 August 2022).
101. Measure of America, Social Science Research Council DATA2GO.NYC Available online: https://data2go.nyc/cd/?id=317*36047015900*ahdi_puma!undefined!ns*!buttonHolder~other_pop_cd_506~ahdi_puma_1~life_expectancy_puma_562~sch_enrol_cd_112~high_cost_h_cd_216~unemployment_cd_408~age_pyramid_male_85_plus_cd_20~ex_high_cost_h_cd_historical_402~poverty_ceo_cd_417~bodega_supermarket_cd_148~median_household_income_puma_397~fruits_veggies_cd_164~median_personal_earnings_puma_400!*air_qual_cd~ahdi_puma*family_homeless_cd_245# (accessed on 12 August 2022).
102. NYCdata | (NYC) Age and Sex Distribution Available online: https://www.baruch.cuny.edu/nycdata/population-geography/age_distribution.htm (accessed on 26 April 2024).
103. Vera -; Rahardjo, S.S.; Murti, B. Health Belief Model and PRECEDE PROCEED on the Risk Factors of Multidrug Resistant Tuberculosis in Surakarta, Central Java. *J. Epidemiol. Public Health* **2017**, *2*, 241–254.
104. Historical Origins of the Health Belief Model - Irwin M. Rosenstock, 1974 Available online: https://journals.sagepub.com/doi/10.1177/109019817400200403 (accessed on 4 February 2024).

105. Gorina, M.; Limonero, J.T.; Álvarez, M. Educational Diagnosis of Self-Management Behaviours in Patients with Diabetes Mellitus, Hypertension and Hypercholesterolaemia Based on the PRECEDE Model: Qualitative Study. *J. Clin. Nurs.* **2019**, *28*, 1745–1759, doi:10.1111/jocn.14794.
106. Crosby, R.; Noar, S.M. What Is a Planning Model? An Introduction to PRECEDE-PROCEED. *J. Public Health Dent.* **2011**, *71*, S7–S15, doi:10.1111/j.1752-7325.2011.00235.x.
107. Glanz, K.; Rimer, B.K.; Viswaranth, K. *Health Behavior and Health Education : Theory, Research, and Practice*; 4th ed.; Jossey Bass;
108. OUR TEAM Available online: https://www.plantpoweredmetrony.org/our-team.html (accessed on 4 February 2024).
109. McDougall, J.; Thomas, L.E.; McDougall, C.; Moloney, G.; Saul, B.; Finnell, J.S.; Richardson, K.; Petersen, K.M. Effects of 7 Days on an Ad Libitum Low-Fat Vegan Diet: The McDougall Program Cohort. *Nutr. J.* **2014**, *13*, 99, doi:10.1186/1475-2891-13-99.
110. Ornish, D.; Scherwitz, L.W.; Billings, J.H.; Brown, S.E.; Gould, K.L.; Merritt, T.A.; Sparler, S.; Armstrong, W.T.; Ports, T.A.; Kirkeeide, R.L.; et al. Intensive Lifestyle Changes for Reversal of Coronary Heart Disease. *JAMA* **1998**, *280*, 2001–2007, doi:10.1001/jama.280.23.2001.
111. Nyong, F.A.; Barnett, T.D.; Garver, B.; Dewhirst, M.; Pollock, B.; Friedman, S.M. A Whole-Food, Plant-Based Program in an African American Faith-Based Population. *Front. Nutr.* **2023**, *10*, 1196512, doi:10.3389/fnut.2023.1196512.
112. Friedman, S.M.; Barnett, C.H.; Franki, R.; Pollock, B.; Garver, B.; Barnett, T.D. Jumpstarting Health With a 15-Day Whole-Food Plant-Based Program. *Am. J. Lifestyle Med.* **2021**, *16*, 374–381, doi:10.1177/15598276211006349.
113. Bansal, S.; Connolly, M.; Harder, T. Impact of a Whole-Foods, Plant-Based Nutrition Intervention on Patients Living with Chronic Disease in an Underserved Community. *Am. J. Lifestyle Med.* **2021**, *16*, 382–389, doi:10.1177/15598276211018159.
114. Toobert, D.J.; Strycker, L.A.; Glasgow, R.E.; Barrera, M.; Angell, K. Effects of the Mediterranean Lifestyle Program on Multiple Risk Behaviors and Psychosocial Outcomes among Women at Risk for Heart Disease. *Ann. Behav. Med. Publ. Soc. Behav. Med.* **2005**, *29*, 128–137, doi:10.1207/s15324796abm2902_7.
115. Lorig, K.; Ritter, P.L.; Villa, F.J.; Armas, J. Community-Based Peer-Led Diabetes Self-Management: A Randomized Trial. *Diabetes Educ.* **2009**, *35*, 641–651, doi:10.1177/0145721709335006.
116. Patil, S.J.; Ruppar, T.; Koopman, R.J.; Lindbloom, E.J.; Elliott, S.G.; Mehr, D.R.; Conn, V.S. Effect of Peer Support Interventions on Cardiovascular Disease Risk Factors in Adults with Diabetes: A Systematic Review and Meta-Analysis. *BMC Public Health* **2018**, *18*, 398, doi:10.1186/s12889-018-5326-8.
117. Campbell, J.A.; Yan, A.; Egede, L.E. Community-Based Participatory Research Interventions to Improve Diabetes Outcomes: A Systematic Review. *Diabetes Educ.* **2020**, *46*, 527–539, doi:10.1177/0145721720962969.
118. Lin, Y.; Bolca, S.; Vandevijvere, S.; Vriese, S.D.; Mouratidou, T.; Neve, M.D.; Polet, A.; Oyen, H.V.; Camp, J.V.; Backer, G.D.; et al. Plant and Animal Protein Intake and Its Association with Overweight and Obesity among the Belgian Population. *Br. J. Nutr.* **2011**, *105*, 1106–1116, doi:10.1017/S0007114510004642.

119. Olfert, M.D.; Wattick, R.A. Vegetarian Diets and the Risk of Diabetes. *Curr. Diab. Rep.* **2018**, *18*, 101, doi:10.1007/s11892-018-1070-9.
120. McMacken, M.; Shah, S. A Plant-Based Diet for the Prevention and Treatment of Type 2 Diabetes. *J. Geriatr. Cardiol. JGC* **2017**, *14*, 342–354, doi:10.11909/j.issn.1671-5411.2017.05.009.
121. Schlesinger, S. Diet and Diabetes Prevention: Is a Plant-Based Diet the Solution? *Diabetes Care* **2022**, *46*, 6–8, doi:10.2337/dci22-0041.
122. Bunner, A.E.; Wells, C.L.; Gonzales, J.; Agarwal, U.; Bayat, E.; Barnard, N.D. A Dietary Intervention for Chronic Diabetic Neuropathy Pain: A Randomized Controlled Pilot Study. *Nutr. Diabetes* **2015**, *5*, e158, doi:10.1038/nutd.2015.8.
123. Karimi, E.; Tirani, S.A.; Azimi, E.S.; Askari, G.; As'habi, A.; Arab, A. Is There an Association between a Plant-Based Eating Pattern and Clinical Findings of a Migraine Headache? *Front. Nutr.* **2023**, *10*, 1117740, doi:10.3389/fnut.2023.1117740.
124. Ait-Hadad, W.; Bédard, A.; Delvert, R.; Orsi, L.; Chanoine, S.; Dumas, O.; Laouali, N.; Le Moual, N.; Leynaert, B.; Siroux, V.; et al. Plant-Based Diets and the Incidence of Asthma Symptoms among Elderly Women, and the Mediating Role of Body Mass Index. *Nutrients* **2022**, *15*, 52, doi:10.3390/nu15010052.
125. Tomova, A.; Bukovsky, I.; Rembert, E.; Yonas, W.; Alwarith, J.; Barnard, N.D.; Kahleova, H. The Effects of Vegetarian and Vegan Diets on Gut Microbiota. *Front. Nutr.* **2019**, *6*, 47, doi:10.3389/fnut.2019.00047.
126. Flores-Balderas, X.; Peña-Peña, M.; Rada, K.M.; Alvarez-Alvarez, Y.Q.; Guzmán-Martín, C.A.; Sánchez-Gloria, J.L.; Huang, F.; Ruiz-Ojeda, D.; Morán-Ramos, S.; Springall, R.; et al. Beneficial Effects of Plant-Based Diets on Skin Health and Inflammatory Skin Diseases. *Nutrients* **2023**, *15*, 2842, doi:10.3390/nu15132842.
127. Berk, M.; Williams, L.J.; Jacka, F.N.; O'Neil, A.; Pasco, J.A.; Moylan, S.; Allen, N.B.; Stuart, A.L.; Hayley, A.C.; Byrne, M.L.; et al. So Depression Is an Inflammatory Disease, but Where Does the Inflammation Come From? *BMC Med.* **2013**, *11*, 200, doi:10.1186/1741-7015-11-200.

Appendices

Appendix A

SUNY DOWNSTATE HEALTH SCIENCES UNIVERSITY
BROOKLYN, NY 11203

INFORMATION SHEET WITH HIPAA AUTHORIZATION

Title: **21-Day Plant Powered Community Jumpstart Program**
Researcher(s): **Ayanna Besson, MPH, Jennifer De Los Santos, BS, Aliye Mosaad, MPH, Aimee Afable, PhD, MPH and Elizabeth Helzner, PhD, MS**
Researcher Contact Information: **Ayanna Besson at Ayanna.Besson@downstate.edu or Principal investigator, Elizabeth Helzner at Elizabeth.Helzner@downstate.edu**
Sponsor: **[insert sponsor names]**

KEY INFORMATION FOR YOU TO CONSIDER:

Researchers are asking if you would like to be in a research study. The boxes below provide key information about this research to help you to consider whether to participate. Please consider all of the details on the pages that follow.

What is the purpose of this research?	The purpose of this study is to evaluate a whole food, plant-based (WFPB) nutrition intervention program offered by the nonprofit organization, Plant Powered Metro New York (PPMNY). The program will support a diverse group of participants as they transition to a WFPB diet for 21 days.
What will happen to you during the study?	You will be asked to adhere to a whole food plant-based (WFPB) diet for 21 days, attend one orientation session, [#] virtual educational sessions, and [#] mentorship sessions and complete corresponding surveys if you would like to participate in the research study/program evaluation that will run parallel to this intervention program.
How long will you be in the research?	The intervention period is from [start date] to [end date] The research can last from [start date] to [end date].
Could being in this research harm you?	Some of the foreseeable risks and discomforts of your participation include loss of privacy and/or breach of confidentiality. There will be measures/procedures in place to prevent breaches of privacy, as described below.
Will being in this study help you in any way?	While there is no guarantee that you will experience health benefits from taking part in this research study, many people adopting WFPB nutrition as instructed see noteworthy benefits, including improvements to energy and mood and a potential reduction in medication. You may also see changes in health measures such as weight, BMI, LDL cholesterol, total cholesterol, A1c, waist circumference, and blood pressure.
Are there any costs to participate?	There is no cost to participate in the study.

How do researchers protect your information?	Researchers will keep information about you in a secure location. Only those approved to have access will see your information.

ADDITIONAL DETAILED INFORMATION:

Please review the rest of this document for additional details before making a decision about whether to participate in this research.

Who can you talk to about the research?

If you have questions, concerns, complaints, or think the research hurt you, please contact the researcher(s) listed on the top of the first page.

This research is reviewed and approved by an Institutional Review Board (IRB). An IRB is a committee that provides ethical and regulatory oversight of human research. You may talk to the SUNY Downstate Health Sciences University IRB & Privacy Board by calling (718) 613-8480, if

- You have questions about your rights as a research participant
- Your questions, concerns, or complaints are not being answered by the research team,
- You cannot reach the research team,
- You want to talk to someone besides the research team, or
- You want to get information or provide input about this research.

What happens to the information collected for this research?

Researchers will securely store your information in a HIPAA-compliant database whereby your information can be linked back to you. However, the database will be password protected, whereby only the researchers approved by the IRB may have access to your information using their individualized passwords.

The researchers will not use or distribute your identifiable private information collected for this research for future research studies, even after removal of identifiers.

How do researchers protect your information?

The researchers will keep information about you in a secure electronic location with limited access. The researchers will not reveal your identity in any publication or public presentation of the results of the study.
The researchers will destroy your information after the retention period of 10 years [insert year] The researchers will keep information about you as long as required by regulations and institutional policy.

Federal law protects your right to privacy concerning Protected Health Information (PHI). There are certain things you need to know. PHI is any information from your medical record or obtained from the study linked to you and that refers to your mental or health conditions in the past, the present or the future.

The researchers will not use unsecure e-mail for any research communications involving PHI unless you specifically authorize us to do so.

PHI that will be collected (voluntarily) include:

- **Name** – to identify you and ensure data collection consistency and prevent errors
- **Geographic data** – to pinpoint where participants reside, and which geographic areas are participating most in the Jumpstart
- **Dates of submission of surveys and lab work** – There will be cutoff dates to which we will accept the completion of the surveys as well as include the values of the self-reported anthropometric measures in our analysis. We need to collect the date of submission to verify what information in within our set cutoffs.
- **Email address –** For future communication
- **Lab work/Anthropometric measures –** To compare changes in values from before and after the intervention

For the purposes described above, the research team will create, use and/or report PHI from your labs directly if you choose to send them via encrypted email and/or from self-report on the surveys for an indefinite time period. This may include results from laboratory tests associated with LDL cholesterol, total cholesterol, A1c, and blood pressure values. Additionally, weight, height, body mass index (BMI) and waist circumference.

The authorization will expire until the completion of the research and data will be stored and maintained electronically until [insert year that is 10 years after the study's date]. Only the investigators approved by the IRB on this study will have access to your information.

Research and administrative staff from SUNY Downstate Health Sciences University will use your protected PHI related to this research study.

Research and administrative staff from SUNY Downstate Health Sciences University, will share your PHI with the following persons or agencies for purposes related to the conduct of the research:

- The Institutional Review Board(s) that have oversight of this research.
- The research staff approved by the Institutional Review Board.
- Collaborating research sites, outside laboratories, cooperative study groups, or contracted research organizations that are approved by the Institutional Review Board
- The SUNY Downstate Health Sciences Universityand other administrative staff who supervise the way research is done, such as auditors or monitors.
- The Federal agencies that supervise the way research is conducted, such as the Department of Health and Human Services Office for Human Research Protections, the Food and Drug Administration*,* the National Institute of Health or other government agencies.

You can withdraw this authorization for the use or reporting of your PHI. You have to write to us to withdraw. To withdraw, please write to *Elizabeth Helzner at* 450 Clarkson Avenue, MSC 43 Brooklyn, NY 11203 or Elizabeth.Helzner@downstate.edu. If you withdraw, the researchers will stop collecting and accessing your PHI, but will collect and report any adverse event (bad effect) that you had in the study. Your PHI collected before you withdraw your authorization will still be used and reported. If you withdraw your authorization, you can no longer be in the study.

You have a right to refuse to sign this form. If you do not sign this form, your health care treatment, your enrollment for benefits, your payment for the health care outside of the study, and your health care benefits are not affected. However, you will not be able to participate in the research described in this consent form if you do not sign this form.

You need to know that some of the individuals or groups mentioned above who may receive your health information may not be required by federal privacy laws to protect your PHI. They may share your information with others without your permission if permitted by the laws governing them. For example, the sponsor does not have the same obligations as your research team and may no longer protect your PHI.

As required by law, the research team may share your PHI with the relevant agency to:

- Report suspected child abuse or neglect,
- Report certain communicable diseases,
- Report a possible threat or harm to yourself or others,
- Comply with a court ordered subpoena, or,
- Comply with other laws.

Recipients of HIV-related information may not re-disclose your HIV-related information without your authorization unless permitted to do so under federal or state law. You have a right to request a list of people who may receive or use your HIV-related information without authorization, as well as a list of any disclosures made pursuant to this research authorization. For more information about HIV confidentiality, call the New York State Department of Health HIV Confidentiality Hotline at 1-800-962-5065; for more information regarding federal privacy protection, call the Office for Civil Rights at 1-800-368-1019. You may also contact the NYS Division of Human Rights at 1-888-392-3644.

What additional information should I know?

The researchers will inform you of any significant new information that may affect you in a timely manner. Such information may help you decide if you want to stay in the study. The researchers will share any new information with you if it affects your ability to stay in the study. Also, please note that you may participate in the Jumpstart program but may choose to not participate in the research study.

SIGNATURES:

You have read this document and were told of the risks and benefits and a member of the research team answered questions to your satisfaction. A member of the research team will answer any future questions. You voluntarily agree to join the study and know that you can withdraw from the study at any time without penalty. You do not waive any legal rights by responding 'Yes' with your initials to this form. Responding 'Yes' with your initials will serve as your consent to participate in the study. You will be able to download a copy of your consent and survey responses at the end of the REDCap survey.

After reading the above, do you consent to participate in this study?

Yes _____(initial here)

No