Breaking Through Resistance: Improving Dietary Compliance for Better Health

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I have no known conflict of interest to disclose.

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Abstract

Hypertension (HTN), with 50% prevalence in the United States, puts people at risk of developing complications, such as heart attack, heart failure, stroke, or kidney damage if uncontrolled. The literature review showed evidence that tailored, cost-effective, and culturally competent diet education controls or improves blood pressure (BP). This quality improvement (QI) project aimed to review the outcomes of tailored Dietary Approaches to Stop Hypertension (DASH) education in underserved patients with HTN in a Federally Qualified Health Center in the Southwestern United States who were not receiving effective diet education from the primary care nurse practitioner. The intervention consisted of an in-person 1:1 DASH diet presentation, weekly phone call follow-up for one month, and printed DASH diet education. Adult participants (n=11) completed a demographic questionnaire and DASH Quality (DASH-Q) questionnaire (α=.77-.83) to measure their compliance with the diet pre- and post-intervention. Descriptive statistics and two-tailed paired samples t-test with the critical value set at $p<0.10$ were used for data analysis. The participants were primarily Hispanic women between 40 and 60, and none had tried the DASH diet. The average weekly BP readings were 138/88, 136/86, 134/83, 137/84, and 138/84. The overall average of the DASH-Q scores went from 37.5 to 45.0 ($p<0.056$). These findings suggest that tailored DASH diet education controls BP and improves adherence to the diet. This supports the need for longer appointment times, scheduling for diet education, or hiring a registered nurse or dietitian to provide effective diet education and weekly follow-ups.

Keywords: dietary approaches to stop hypertension, DASH diet, adherence, blood pressure, hypertension

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Adults with hypertension, once diagnosed, become at risk of developing complications and other diseases, disability, or even death. Modifiable risk factors, such as diet modifications, exercise, and weight loss, are some nonpharmacological interventions that must be customized to each population. Health disparities in people of different races, economic factors, and geographical locations affect how an individual can manage their blood pressure. These disparities served as the foundation for customizing evidence-based interventions so that adults with hypertension can successfully apply lifestyle modifications.

Background and Significance

The Federally Qualified Health Center (FQHC) provides primary care services to underserved communities in the urban metropolitan area. Low dietary compliance in adults with hypertension (HTN) in this FQHC needed to be addressed, as it put people at risk of uncontrolled blood pressure (BP). Improving the delivery of education regarding HTN diagnosis and how to manage it through lifestyle modifications was needed. Allotted time for education on disease, management, and lifestyle modification was required, as the usual care only provided verbal education in passing. This led to patients needing help fully understanding, processing, and retaining information. Health disparities, such as low health literacy and socioeconomic status, are the other factors contributing to the inability to grasp the importance of dietary compliance and controlling BP, as well as to be motivated to make lifestyle changes. This problem was chosen to be addressed due to the low adherence to healthy diets of the underserved patients at the FQHC. An intervention was needed to assist the Primary Care Provider (PCP) in increasing dietary compliance for HTN patients. Limited health literacy led to an inability to follow instructions, utilize preventive services, and access health information (USDHHS, n.d.). The

quarterly Quality of Measures at this FQHC revealed that the PCP is 63% in controlling BP compared to the organization's average of 59% and a national average of 60%. Even though the PCPs' average is above the organization's and national averages, addressing the lifestyle risk factor of low dietary compliance in managing blood pressure will help sustain this high percentage. Addressing diet compliance in controlling blood pressure was essential in correlation with the epidemiological data for Arizona, which states that 30.9% of its residents have been told they have high BP in 2021 (Center for the Future of Arizona, 2023). To avoid risks of cardiac events and stroke due to uncontrolled high BP, a nonpharmacologic intervention, such as dietary compliance, may help decrease these risks from occurring. HTN costs the country $131 to 198 billion annually (CDC, 2021). Improving DASH diet education is hoped to reduce this economic burden by applying cost-effective, evidence-based practice interventions.

HTN is known as the silent killer and contributes to multiple diseases related to the heart and kidneys. People from underserved populations with low health literacy are unable to follow a healthy lifestyle. This created a health barrier as the DASH diet is deemed the most effective nonpharmacological intervention in lowering or controlling BP for adults with prehypertension and established HTN (Fu et al., 2020). Sedentary behavior, including the absence of exercise, smoking, and preferring unhealthy food options like high-calorie diet, fatty foods, and high sodium intake, increases the risk of developing HTN and uncontrolled BP (Ozemek et al., 2020; Theodoridis et al., 2023). Previously mentioned are modifiable risk factors that need to be addressed one by one to lessen the risk of disability and death. It is predicted that by 2025, one-third of the world's population, 1.5 billion people, will have HTN, which will put them at risk of myocardial infarction (MI) and stroke (Kodela et al., 2023; Fu et al., 2020). The effects of HTN are significant in the U.S., which led to the American Heart Association (AHA) creating a

National Hypertension Control Initiative that aims to reduce HTN by reaching the public with awareness, counseling, and community access and resources to help alleviate the burden of HTN in the United States healthcare system (2022).

Patients at the FQHC are provided with verbal education when diagnosed with HTN and when they come for follow-up. Patients needed help to absorb and remember the education provided, leading to low dietary compliance. Kodela et al. (2023) note that long-term nutritional changes, such as low caloric intake, low salt intake, and limiting processed food, are difficult to maintain. The literature review reveals that evidence-based practices can be implemented to address modifiable risk factors such as unhealthy diet, overweight, and smoking that will positively impact HTN management headed by a PCP (Kodela et al., 2023).

Internal Evidence

The FQHC serves underserved populations and is focused on providing mental health care and primary care services with diversity, equity, and inclusion. The problem in this organization is the lack of effective DASH diet education, leading to low dietary compliance in patients with HTN. The problem was discovered as patients were asked if they had followed diet recommendations during routine visits and follow-ups, and most answered no. Some reasons they provided are that they do not remember or do not understand the importance of the verbal education provided, are too busy to prepare food, and do not have the financial capabilities to afford healthier food options. 10.9% of people in Maricopa live in poverty, and an estimated one-third to one-half of people in the US have low health literacy (US Census Bureau, 2023; Schillinger, 2020). Patients from this organization struggle to be compliant with their care due to the barriers of inadequate diet education, low health literacy, and low socioeconomic status. If

unaddressed, the HTN of the patients will become uncontrolled and will put them at risk of developing a stroke or a heart attack.

PICOT Question

A literature review led to the clinically relevant PICOT question: Among hypertensive adults in underserved communities (P), how does the utilization of culturally adapted and cost-effective DASH diet interventions (I) affect adherence to the DASH diet and blood pressure management (O) compared to usual care (C)?

Evidence Synthesis

Search Strategy

To answer the PICOT questions, the most current evidence was thoroughly reviewed. Three databases were extensively searched: the Cochrane Library, PubMed, and Medline. These databases were searched to explore research studies on DASH diet adherence and blood pressure management in adults with hypertension.

The databases were searched using combinations of key terms to address all aspects of the PICOT question. They included *hypertension*, an *affordable DASH diet*, and *blood pressure.* The critical terms for the population did not include *underserved* and *low-income,* which narrowed the search significantly. Instead, the search for the population was generalized to *adults with hypertension* or *high blood pressure*. The intervention key terms included *affordable*, *culturally sensitive*, and *cuisine-specific DASH diet* to apply to the PICOT question. The outcome was specified using *DASH diet adherence or compliance* and *blood pressure control.* Filters applied included date of publication (2019-2024), English language, and peer-reviewed articles. Mesh and Boolean terms were used to broaden the search. The titles and abstracts of articles were assessed for searches yielding under 300 results.

An initial search of the Cochrane Library using key terms *adults with hypertension* or *high blood pressure*, *culturally sensitive* or *affordable* or *inexpensive DASH diet*, *DASH diet adherence* or *compliance*, and *blood pressure control* yielded 54 results. The *inexpensive diet* term was removed to broaden the search, yielding 114 articles. Filters were applied to all searches.

The initial PubMed search included *adults with hypertension* or *high blood pressure*, an *affordable*, *tailored,* or *cuisine-specific DASH diet*, *diet compliance* or *adherence*, and *blood pressure control*. This yielded 59 articles. Critical terms tailored to the DASH diet were included in the following search to broaden the search, yielding 288 articles. Filters were applied to all searches.

The initial MedLine search, which included the key terms *adults with hypertension*, *underserved with hypertension*, *culturally sensitive* or *culture-specific DASH diet*, *diet compliance* or *adherence*, and *blood pressure control*, yielded 429 articles. The critical terms *underserved with hypertension* were removed to narrow the search, yielding 298 articles. Filters were applied to all searches.

After reviewing the titles and abstracts of the articles yielded in these databases, 23 relevant studies were collected. Full-text copies of the 23 relevant studies were attained and reviewed. Rapid critical appraisal checklists narrowed the articles to the ten most relevant and highest-quality studies. These included one systematic review, a cross-sectional analysis, and eight randomized controlled trials (RCTs).

Inclusion criteria included interventions targeting the DASH diet and blood pressure control for those with hypertension. Exclusion criteria included populations focusing on patients with diabetes and studies that did not solely have the DASH diet as the intervention. The ten

articles were selected as they were of higher levels of evidence. More randomized control trials were chosen as they had unique interventions, addressed gaps in the literature, and could be explored to be implemented on the FQHC site.

Literature Review

The rapid critical appraisal tool by Melynk and Fineout-Overholt (2023) was utilized to evaluate relevant studies from the literature review to support the purpose of this paper. Ten high-quality studies were chosen to be included in the final analysis (see Appendix A, Table A1). The evaluation table examines the study design, variables, samples, measurement tools, findings, bias, and implications. All ten studies chosen used quantitative data (see Appendix A, Table A2). There were eight RCTs, one cross-sectional analysis, and one systematic review. Eight studies were done in the USA, one in Japan and Mexico, and one in China, demonstrating heterogeneity. Heterogeneity was also observed in the study settings, as some were conducted strictly at home, office, health center, and supermarket, while one was a combination of home and office. The studies' sample sizes ranged from 38 to 1049.

The length of each study varied from one week to six months. Eight out of ten studies included female and male participants, while two focused on the female population. Tailored DASH diets were applied in eight studies in combination with either behavioral change or mindfulness. Education was either in person or delivered through individual or group sessions. Six studies were conducted using mobile apps or telephones to provide education and measure dietary intake. Two studies used food deliveries throughout the study. The heterogeneous assessment tools required patients to self-report BP results and dietary intake. The validity and reliability of each tool were assessed to determine the appropriateness of the study. No biases were deduced in any of the studies, and attrition was not a significant issue. All studies focused on addressing

DASH diet adherence and blood pressure. Most studies showed significant statistical improvement in DASH diet adherence, SBP, and DBP. Half the studies also tested for lipid panel and Body Mass Index (BMI). Some results were insignificant due to the study's length or sample size limitations.

The findings from the literature review served as the foundation of this paper, as they provide statistical evidence on the improvement in diet adherence and BP readings through different ways of delivering education and assistance to comply. The various interventions from the literature review inspired how to deliver DASH diet education to an underserved population. Much of the research used weekly follow-ups through phone calls to check with participants if they had questions or needed assistance. As data from multiple research studies have shown that diet adherence and BP control are adequate, the implementation of a PowerPoint presentation and weekly phone call follow-ups was utilized for this project.

Purpose and Rationale

Half of the U.S. population is diagnosed with HTN, and 691,095 deaths are attributed to HTN as the primary or contributing cause (CDC, 2023). Addressing high rates of HTN in patients at an FQHC whose health literacy is low and resources are scarce is vital in decreasing complications and deaths. This paper aimed to provide adequate education on the DASH diet in patients to increase dietary compliance in patients with HTN.

Theoretical Framework

The Health Belief Model (HBM) was developed to strengthen health education programs by addressing individuals' health beliefs (Abraham & Sheeran, 2015). Demographic variables (socio-economic status, gender, ethnicity, and age) and psychological characteristics (personality and group pressure) are linked to the six constructs of HBM, which are perceived susceptibility,

perceived severity, health motivation, perceived benefits, perceived barriers, and cues to action (see Appendix B, Figure B1) (Abraham & Sheeran, 2015). The authors indicated no precise specifications for implementing the links between the constructs. This model explores an individual's beliefs and characteristics to provide a crucial link between socialization and behavior. Persuasive techniques are used to promote positive behavior change. These factors were portrayed in the evidence as DASH diet education provided threat perception and behavioral evaluation, improving knowledge about the benefits of healthy eating. As participants from the literature review learned about the risks of HTN and the benefits of the DASH diet, perceived susceptibility, severity, and benefits motivated patients to participate in lifestyle modifications, leading to improved DASH diet adherence, BP, BMI, and lipid panel. Demographical variables are represented in the evidence as each study was tailored to the population where the setting took place. The researchers considered perceived barriers by providing tailored DASH diet education through in-person individual or group sessions, mobile apps, telephone calls, and supermarket-based sessions. Cues to action were demonstrated through participants' buying healthier food that is DASH diet appropriate, logging dietary intake, consuming delivered food, checking their own BP at home, and seeing the study to completion. The evidence showed that HBM helped demonstrate educational interventions and understanding of population health beliefs to shape behavior patterns (Abraham & Sheeran, 2015).

When applied to adults with HTN in an underserved population, HBM suggests that adults will be unlikely to use the DASH diet unless they start to believe that an unhealthy diet correlates with the worsening of blood pressure, which can lead to stroke and heart attack. Perceived benefits and perceived barriers must be explicitly stated and addressed so that patients can develop health motivation and take action.

Implementation Framework

The Rosswurm and Larrabee Model is an evidence-based practice model that improves healthcare quality (see Appendix B, Figure B2). This model is a process that guides practitioners in updating practices from the beginning with an assessment to integrate quality improvement, evidence-based intervention (Rosswurm & Larrabee, 1999). This model was applied to the FQHC site, as providing diet education in hypertensive adults is ineffective and needs to be improved. This model guided the project facilitator in implementing evidence-based practice to enhance DASH diet adherence and BP. The Russwurm and Larrabee Model is a six-step process that starts with assessing the need for change. Internal and external data were collected and examined to investigate and define the problem, which was the second step. The third step was synthesizing the best evidence, wherein literature was appraised, and the facilitator evaluated the strengths and weaknesses of studies and identified gaps in the available literature (Rosswurm & Larrabee, 1999). The fourth step was designing a change in practice. This is where the implementation of EBP was discussed in detail. The literature shows that a tailored DASH diet showed significant results in diet adherence and BP. Detailed information on the step-by-step process for implementing this EBP was completed during this step. Step five was the implementation of the evaluation of the intervention. In this step, DASH diet adherence and BP were measured. The last step was integrating and maintaining the intervention if the study results supported the benefit of integrating the new practice into standards of care (Rosswurm & Larrabee, 1999). Obtaining, interpreting, and combining the best data was vital in utilizing this model to improve the quality of patient care (Rosswurm & Larrabee, 1999).

Methods

Ethical Considerations

To protect human participants, this project was guided by ethical principles: respect for persons, beneficence, nonmaleficence, and justice. Respect for persons, also known as human dignity, was crucial to this research. It ensured participants' autonomy and full disclosure of potential harms and benefits surrounding the project (Barrow et al., 2022). The project upheld this principle by valuing and respecting participants' rights to make decisions about their health, lives, and bodies (Melynk & Fineout-Overhold, 2023). Before obtaining participants' consent, an overview of the DASH diet education intervention and its benefits, possible risks, and goals was presented. They were given ample time to ask any questions. All were notified that they have the right to decide whether to participate or not and have the right to stop participating at any point without fear of repercussion in their care. The project also firmly adhered to beneficence and nonmaleficence. Beneficence is doing good for participants while promoting their welfare and safety, while nonmaleficence is the principle of not harming (Melynk & Fineout-Overhold, 2023). The project upheld these principles by prioritizing the well-being of the patients, their right to freedom from harm and discomfort, and protection from exploitation (Melynk & Fineout-Overhold, 2023; Barrow et al., 2022). This commitment ensured that participants would engage in a valuable intervention that would better manage their hypertension while safeguarding their privacy. Risks were analyzed to avoid physical harm, emotional distress, and physical discomfort (Barrow et al., 2022).

Justice was the final principle defined as participants' rights to fair treatment and privacy (Barrow et al., 2022). This project ensured fairness and inclusivity in selecting participants by avoiding the systematic selection of people because of their vulnerability and upholding participant confidentiality (Barrow et al., 2022). This principle was applied by approaching all patients in the target population. All participants received modified DASH diet education,

materials, and assistance to ensure fair distribution of resources and avoid potential conflicts. An expedited Institutional Review Board (IRB) approval was received from Arizona State University (see Appendix C, Figure C1). A modification was made to the IRB to allow final follow-up through phone calls in addition to in-person. A letter of support from the FQHC site's Compliance Director ensured that ethical principles were followed and that participants' human rights were protected.

Setting and Population

The FQHC site provides primary care and mental health care to underserved communities in the urban metropolitan area. Its goal is to provide holistic care and empower patients to lead healthier and happier lifestyles. The organization is guided by its core values: integrity, compassion, and empowerment, which motivate one to make a difference, one life at a time. It is part of a non-profit organization that accepts most major insurance plans, including Medicaid and Medicare. The site also offers discount programs to those without insurance based on their family income, size, and situation. There is one PCP who is a nurse practitioner (NP) who provides disease management, health screenings, sick visits, and health exams. The NP is assisted by the Medical Assistants (MA) who room the patients, obtain vital signs, and get general information on their reason for visiting. Most of the MAs are bilingual in English and Spanish and will assist in interpreting for the NP. The site also uses an interpreter service, available through audio or video calls when Spanish-speaking MAs are unavailable.

Patients diagnosed with HTN will be the target population for this QI project. Stage 1 HTN diagnosis is obtained if systolic BP (SBP) is between 130-139 mmHg and diastolic BP (DPB) between 80-89 mmHg (CDC, 2023). Stage 2 HTN diagnosis is given when SBP is greater than or equal to 140 mmHg and DBP is greater than or equal to 90 mmHg (CDC, 2023).

Potential participants must be established patients at the FQHC site to be eligible. Inclusion criteria are 18 years or older, a home BP monitor, cellphone access, and the ability to read and write. Patients are excluded if they are already following diet restrictions due to other health diseases or have a diagnosis of any terminal illness. These parameters were put in place to ensure that patients can participate in all project steps and avoid drastic changes in people's diets with other co-morbidities that may worsen their health. To recruit patients, a flyer was created and displayed in the exam rooms for patients to see. The flier included information about the project goal and the eligibility criteria for them to know if they are the target population for the intervention. They could approach the NP or MA or contact the provided number to further hear about the intervention. Participants with an HTN diagnosis in their chart were approached in the exam room after they visited with the NP to share information about the project.

Project Description and Timeline

This project provided a DASH diet education intervention to those with HTN. It aimed to increase dietary compliance to avoid worsening BP, complications, and further medical costs. The project's design and finalization took place from June to August 2024. During June, information was requested regarding the demographics of the patients at the FQHC site and the percentage of those diagnosed with HTN. This helped identify the most common ethnicities and create culturally specific DASH diet education. Since the FQHC site served the underserved population, it aimed to provide cost-effective food options while ensuring DASH diet requirements were met. PowerPoint presentation, brochure, food diary, BP log, and flier were created in August.

The education materials were presented to the mentor and site champion in August to ensure appropriateness and completeness and to see if edits were needed. The implementation

started in October and lasted until December after receiving IRB approval and a project site letter of support. Fliers were displayed in exam rooms to invite patients to participate. Each participant was part of the project for one month. In-person recruitment was done 3-4 times a week by seeing patients diagnosed with HTN in exam rooms after they visited with the NP. Potential participants were given a quick presentation on the study's goal, their commitment responsibilities, and a chance to receive a $10 incentive if they completed the project. They were all given the opportunity to ask questions regarding the project to see if they were interested in participating. Once the consent form was signed, participants completed a demographic and pre-intervention DASH questionnaire and obtained BP. A presentation regarding HTN and modified DASH diet education was completed. Patients were given the chance to ask questions. An appointment for a one-month follow-up was set, whether in person or online. Each participant will return home with a brochure, food diary, and BP log. A BP machine was provided if the participants didn’t have one at home. They received calls weekly for three weeks to report an overview of their food options and obtain one BP reading. The facilitator addressed the barriers in participants who needed to meet the food requirements and provided reinforcement of education. Predicted obstacles were financial and time constraints, and the need to be more motivated to change diet. Since patients in the FQHC have a high rate of no-shows due to noncompliance, transportation difficulties, or forgetfulness, this design was set so that the final meeting could be held in person, online, or through a phone call. During the one-month follow-up, post-intervention BP readings and DASH questionnaire were obtained. All participants who completed the project received a $10.00 Walmart gift card.

Data Collection, Instrument, and Outcomes Measurement

To protect participants' identities, data collected, such as consent forms and questionnaires, were locked in the NP's cabinet inside her office for the project's duration. All data were kept private and contained no identifying factors, such as participant names and age. Each participant was assigned a random identifier, a combination of three numbers from 101 and the last four digits of their phone number. Only professionals working on the project had access to the de-identified data. All data will be destroyed by shredding after the dissemination of results and findings. The demographic data that will be collected are age, gender, ethnicity, primary language, highest level of education, employment status, health insurance, use of BP medications, heard of the DASH diet, tried the DASH diet before, and who prepares their food.

To measure the effect of the DASH diet education intervention, the DASH Quality (DASH-Q) questionnaire was utilized to assess participants' adherence to the DASH diet among adults (Warren-Findlow et al., 2017). This 11-item questionnaire indicates food consumption that aligns with the DASH diet's dietary requirements and the frequency of the consumption over the past week (see Appendix C, Figure C1) (Warren-Findlow et al., 2017). One example item is asking how many days of the past week the participant has eaten beans, peas, or lentils. The response options for each item range from 0 to 7 days, so higher scores indicate higher adherence. This tool is easy to score and was created to be quickly used by practitioners to address the increasing prevalence of chronic disease (Warren-Findlow et al., 2017).

A cross-sectional study in the United States with two separate samples, national and university samples, was conducted to measure the tool's reliability and ensure the instrument was replicable. The national sample was α=.77, and the university sample was α=.83 (Warren-Findlow et al., 2017). This means that the national sample had acceptable reliability, and the university sample had good reliability. The validity of DASH-Q was also assessed to ensure that

the tool is accurate and consistent. Pearson correlations were used to assess for convergent validity. The results were compared from the DASH-Q, physical and emotional health questionnaire, a healthy eating plan, self-reported diet quality, and a Dietary Survey Tool. The findings show that self-rated emotional and physical health correlations ranged from 0.23 to 0.33; diet assessment had a correlation of 0.49, and DST had 0.67 (Warren-Findlow et al., 2017). Predictive validity was assessed via one-way ANOVA using DASH-Q and gender and nutrition-related behaviors, such as restricted diet, grocery shopping, food label reading, and cooking. It was found that those who reported not reading food labels had significantly lower mean scores on the DASH-Q (mean 22.4, SD=14.26) compared to those who did (mean 36.8, SD=14.08) (Warren-Findlow et al., 2017). The authors also state that women had higher DASH-Q scores (mean 37.6) than men (mean 34.8). Their findings also showed that grocery shopping was significant in the national sample (P <.04), doing one's grocery shopping resulted in higher DASH-Q scores, and DASH-Q scores on those with restricted diets did not show any significant difference. The validity of the DASH-Q was supported by these results (Warren-Findlow et al., 2017).

Along with gathering pre- and post-intervention DASH-Q scores, BP values were analyzed to see if numbers were stable, increased, or decreased after intervention. Five BP readings were gathered for each participant that were taken during the first meeting, three weekly phone call follow-ups, and one-month follow-ups (in-person or phone call).

The measurement of the DASH-Q scores and BP outcomes relates to the Health Belief Model. This project attempted to influence each participant's beliefs about the importance of HTN management and the DASH diet. Both tools measured how effective the intervention was in motivating participants to adhere to healthy eating, which may cue them to act by adjusting

their food options following the DASH diet requirements. The result of the DASH-Q and the trend of BP demonstrated how the participants accepted and practiced the intervention. It also showed how participants acted on their perceived benefits and barriers through stable, improved, or worsened DASH-Q score and BP results.

Budget

The doctoral student funded the project entirely (four blood pressure machines and a $10.00 gift card from Walmart for each participant who completed the one-month follow-up). The estimated direct cost of the project was $500.00 (see Appendix D, Table 1).

Results

Intellectus Statistics Software was used to store, manage, and analyze the data (Intellectus Statistics, 2023). Descriptive Statistics was used for the demographics. Adult patients with hypertension (n = 11) completed the project. The average age of the subjects was 48 (*SD* = 7.44), and the ages ranged from 40 to 60. The descriptive statistics can be found in Table 1. Most of the sample was female, 8 (73%), and the remaining were males, 3 (27%). The majority were Hispanic/Latino, 7 (64%), and the remaining were White and African American, 4 (36%). The majority spoke Spanish 5 (46%), while the remaining were English-speaking or bilingual in English and Spanish, 6 (54%). Most of the participants received an education less than high school 6 (55%), and the remaining either had a high school diploma/equivalent or had a bachelor's degree, 5 (45%). The majority were unemployed, 6 (55%), and the remaining worked part-time or full-time, 5 (45%). Most have insurance coverage (AHCCCS, Medicare, and private pay, 7, 64%), and the remaining had no insurance, 4 (36%). The majority of them take blood pressure medication 8 (73%), and the remaining do not take any blood pressure medication 3 (27%). The majority have not heard of the DASH diet 8 (73%), while the remaining have not

heard of the DASH diet 3 (27%). None of the participants have tried the DASH diet 11 (100%). The majority always or sometimes prepare their own food, 9 (82%), and the remaining do not, 2 (18%). Frequencies and percentages are presented in Table 2.

Table 1

Descriptive Statistics for Age

Variable	*M*	*SD*	*n*	Min	Max
Age	48.45	7.80	11	40.00	60.00

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

Table 2

Frequency for Demographic Variable

Variable	*n*	*%*
Gender		
Female	8	72.73
Male	3	27.27
Ethnicity		
White	2	18.18
Hispanic/Latino	7	63.64
African-American	2	18.18
Language		
English	4	36.36
Spanish	5	45.45
English/Spanish	2	18.18
Education		
Less than HS	6	54.55
Bachelor's	2	18.18
HS diploma/equivalent	3	27.27
Employment Status		
Full-time	3	27.27
Part-time	2	18.18
Not employed	6	54.55
Health Insurance		
Private pay	1	9.09
AHCCCS	4	36.36
Medicare	2	18.18

No insurance	4	36.36
Blood pressure medication		
Yes	8	72.73
No	3	27.27
Heard DASH Diet		
Yes	3	27.27
No	8	72.73
Tried DASH diet		
No	11	100.00
Prepare own food		
Yes	8	72.73
Sometimes	1	9.09
No	2	18.18

Note. Due to rounding errors, percentages may not equal 100%.

Blood Pressure Measurements

Descriptive Statistics were calculated for SBP Pre-intervention, DBP pre-intervention, SBP One week after, DBP One week after, SBP Two weeks after, DBP Two weeks after, SBP Three weeks after, DBP Three weeks after, SBP Four weeks after, and DBP Four weeks after.

The average BP reading before the intervention was 138/88mmHg, and the BP readings range from 117/65 -169/108. One week after the intervention, the average BP reading was 136/86mmHg, and the BP readings ranged from 109/61 to 166/99. Two weeks after the intervention, the average BP reading was 135/84mmHg, and the BP readings ranged from 106/65 to 158/98. Three weeks after the intervention, the average BP reading was 137/84mmHg, and the BP readings ranged from 120/66 to 155/99. Four weeks after the intervention, the average BP was 138/84mmHg, and the BP readings ranged from 112/60 to 165/102. The summary statistics can be found in Table 3.

Table 3

Descriptive Statistics of Pre- and Post-Intervention Blood Pressure Readings

Variable	*M*	*SD*	*n*	Min	Max
SBP* Pre-intervention	138.36	16.58	11	117.00	169.00
DBP** Pre-intervention	88.00	11.26	11	65.00	108.00
SBP One week after	136.27	18.60	11	109.00	166.00
DBP One week after	86.18	12.79	11	61.00	99.00
SBP Two weeks after	134.55	14.43	11	106.00	158.00
DBP Two weeks after	83.55	9.89	11	65.00	98.00
SBP Three weeks after	137.36	9.35	11	120.00	155.00
DBP Three weeks after	84.27	10.96	11	66.00	99.00
SBP Four weeks after	138.36	14.95	11	112.00	165.00
DBP Four weeks after	84.18	15.34	11	60.00	102.00

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size
*Systolic blood pressure
** Diastolic blood pressure

DASH Diet Compliance

Descriptive Statistics were calculated for Pre-DASH Intervention Compliance and Post-DASH Intervention Compliance. The average score for pre-DASH intervention compliance was 37.55 points (*SD* = 11.15), ranging from 21 to 51 points. The average post-intervention DASH compliance was 45.18 points (*SD* = 12.92), ranging from 23 to 57 points. The descriptive statistics can be found in Table 4.

Table 4

Descriptive Statistics for DASH Diet Compliance

Variable	*M*	*SD*	*n*	Min	Max
Pre-DASH Intervention Compliance	37.55	11.15	11	21.00	51.00
Post-DASH Intervention Compliance	45.18	12.92	11	23.00	57.00

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

Two-Tailed Paired Samples *t*-Test

A two-tailed paired samples *t*-test was conducted to examine whether the average compliance scores increased significantly after the intervention. The critical value was set as $p <$

.10. For the purposes of this study, due to the importance of detecting small to moderate differences with a small size (p values >0.05 but <0.10 are referred to as trend); therefore, significance was tested at the p <0.10 (Fugate Woods Lentz et al., 1997).

The two-tailed paired samples *t*-test result was significant. $t(10) = -2.16$, $p = .056$, indicating that the average compliance scores increased from 37.55 to 45.18 points. The intervention on the outcome variable compliance had a medium effect as measured by Cohen's d = 0.65. The results are presented in Table 5. A bar plot of the means is presented in Figure 1.

Table 5

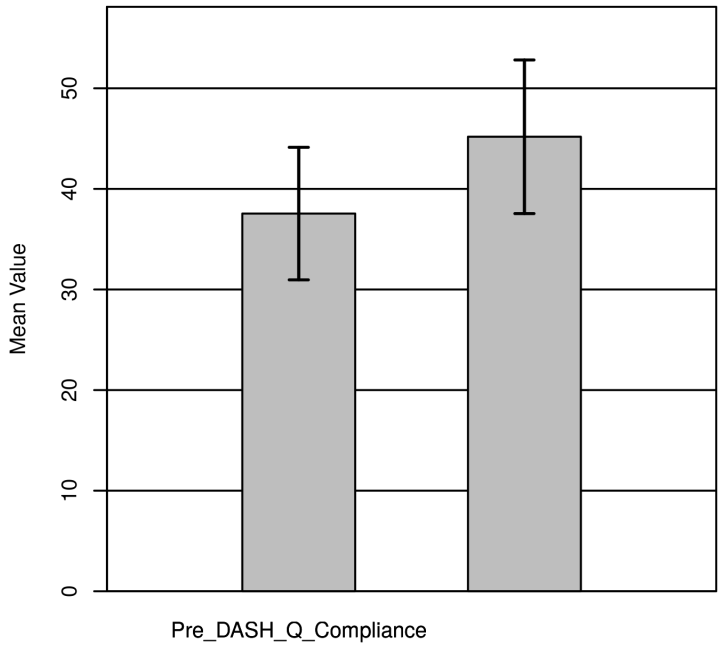
Two-Tailed Paired Samples t-Test for the Difference Between Pre-DASH Intervention Compliance and Post-DASH Intervention Compliance

PreDASH Intervention Compliance		PostDASH Intervention Compliance				
M	*SD*	*M*	*SD*	*t*	*p*	*d*
37.55	11.15	45.18	12.92	-2.16	.056	0.65

Note. N = 11. Degrees of Freedom for the *t*-statistic = 10. *d* represents Cohen's *d.*

Figure 1

The means of Pre-DASH Intervention Compliance and Post-DASH Intervention Compliance with 95.00% CI Error Bars



Impact of Project

Through this project, participants learned what food groups and serving sizes are required to follow the DASH diet. They learned how to modify one lifestyle factor that could impact their health and health outcomes. They feel empowered to make informed decisions regarding their food consumption. Through the weekly follow-up, participants could develop the habit of logging in their BP for the day, which can be presented to the healthcare provider and help make decisions on care plans. The intervention could avoid the need to start BP medications or the addition of medications as BP is controlled. This project showed providers the effectiveness of modified interventions created for specific communities. Sufficient time allows for education to be more effective due to having time to absorb information and opportunities for participants to ask questions during education and weekly follow-ups. The modified DASH diet intervention shows the system the need to prioritize providing diet education to those with HTN. It will be more effective if education is culturally competent. It also shows that there is a need to provide

resources to those with food insecurity as it hinders healthy eating behaviors and could worsen BP. This intervention could support policy change by having mandatory diet education in care plans for those with HTN, as it helps increase compliance with healthy eating and controls blood pressure, decreasing the chance of starting or adding BP medications.

Sustainability

To sustain this intervention in a simpler way, the FQHC site can provide the DASH diet brochure. However, the information provided is limited as it only includes the 8 food groups, serving size, and example food. The sustainability of intervention is difficult due to provider time constraints. To achieve effectiveness similar to the project, the project site will need to prolong PCP appointment time, allow appointments solely for diet education, or hire a dietitian or RN to provide diet education and weekly follow-ups.

Discussion

The average age of the participants (n = 11) was 48. The demographic information of gender, ethnicity, language, education, employment status, health insurance, BP medication use, hearing of the DASH diet, trying the diet, and preparing their own food was collected before to the intervention. The majority of the participants were females of Hispanic ethnicity. Most of them spoke Spanish or were bilingual in English and Spanish. Most of them were unemployed and either had AHCCCS or no insurance. Most are already using BP medication. Most have not heard of the DASH diet, and all of them have not tried it. Most of them prepare their own food. Descriptive Statistics were used to monitor the trend of BP weekly, which showed controlled or stable findings from pre-intervention to four weeks after. The two-tailed paired samples t-test showed significant results, indicating that average DASH-Q scores increased after the intervention. These findings demonstrate increased compliance after the intervention. The

desired outcome of helping participants increase adherence to healthy eating and controlling BP was met.

A limitation of this project is the small sample size (n = 11). One challenge was the need to stay for at least 30 minutes to participate in signing the consent, a 1:1 presentation, and 11-question demographics and DASH-Q questionnaires that potential participants did not have the time for. It would be longer if Spanish interpreting services were used. Another challenge with using interpreting services was that the connection would sometimes be cut off, delaying the completion of intervention or phone call follow-ups. This intervention would be a challenge to sustain due to provider time constraints. Unforeseen barriers were participants taking their BP after working in their garden, running errands, and drinking coffee, leading to higher BP readings than normal.

As previously mentioned, Umemoto et al. (2022), Rodriguez et al. (2019), and Ponce-Martinez (2022) articulate how a modified and culturally competent DASH diet education positively impacts compliance and HTN management. Steinberg et al. (2020) reveal how noncompliance with healthy eating can be addressed by providing a digital health intervention, which in this intervention was through phone calls. These findings demonstrate that an intervention specifically for a diverse community can improve HTN management, prevent complications, and avoid starting or adding new BP medications.

Due to the DASH diet being created 25 years ago, there is already a lot of research on its effectiveness in HTN control. However, more research needs to be done on which methods are most effective in maintaining diet behavioral change. The duration of this project can be extended to recruit more participants to better represent the community. Longer duration can also address other lifestyle modifications, such as increasing physical exercise to provide more ways

for patients to control their blood pressure better. This project can also be expanded to include those with pre-hypertension to prevent them from reaching HTN status.

Conclusion

The increased incidence and prevalence of HTN worldwide puts people at risk of complications such as heart attack, heart failure, stroke, and kidney failure. It is important that healthcare professionals provide sufficient and effective education on lifestyle modifications, such as healthy eating, to allow patients to control HTN, avoid complications, and avoid increased medical costs. The desired outcome of helping patients with a history of HTN to increase healthy eating compliance and control BP readings was achieved with this project. However, this project has some limitations, and more research needs to be done to have a better representation of the community and monitor the long-term effectiveness of the intervention.

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Appendix A

Evaluation and Synthesis Tables

Table A1

Evaluation Table for Quantitative Studies

Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Umemoto et al., (2022). Effects of a Japanese Cuisine-Based Antihypertensive Diet and Fish Oil on Blood Pressure and Its Variability in Participants with Untreated Normal High Blood Pressure or Stage I Hypertension: A Feasibility	Not stated, inferred to be Social Cognitive Theory	**Design:** Single-center, pragmatic, open-label, triple-arm parallel-group randomized single-masking controlled-feeding trial **Purpose:**	**N=** 48 **Demographics:** 44% F, 56% M, MA 50 **Setting:** Clinic; 1 Hr lifestyle modification lecture at intervention & follow-up phase. Home; UC no interventions, IG1 1x meal J-DASH diet, IG2 J-DASH diet 2x meal with	**IV1:** J-DASH diet **IV2:** J-DASH diet W fish oil **DV1:** Clinic SBP **DV2:** Clinic DBP **DV3:** Home SBP **DV4:** Home DBP **DV5:** BMI **DV6:** Serum & Urinary biomarkers	**Tools:** BP monitoring BMI Bloodwork	**Statistical Tests Used:** One-way ANOVA, Kruskal-Wallis test, Fisher's exact test, Dunnett,	**DV1:** p=0.303 **DV2:** p=0.105 **DV3:** $p<0.01$ **DV4:** $p<0.01$ **DV5:** p=0.040 **DV6:** serum SC p <0.0001; urinary SC p=0.0013; urinary AC p=0.0357; serum UC p=0.795; urinary SC p=0.795; urinary AC p=0.357	**Level of Evidence**: II **Strengths**: Appropriate statistical tests and measurements used, use of tables, graphs, and diagrams cuisine-specific diets, comparison of clinic and home BP, **Weakness**: small sample, non-blinded Tx allocation, no diet/lifestyle records for follow up phase, high cost & long prep time,

Key: **AF** African American **ACS** Acute Coronary Syndrome **AC** Albumin Concentration **ANOVA** Analysis of Variance **A** Asian **ASA24** Automated Self-Administered 24hr recall tool **BD** Bipolar Disorder **BMI** Body Mass Index **BP** Blood Pressure **C** Caucasian **Ca** Calcium **CVD** Cardiovascular Disease **CKD** Chronic Kidney Disease **CFC** Consideration of Future Consequences **CG** Control Group **DASH** Dietary Approaches to Stop Hypertension **DASH-AI** Dietary Approaches to Stop Hypertension Adequacy Index **DV** Dependent Variable **DM** Diabetes Mellitus **ED** Eating Disorder **EMI** Ecological Momentary Intervention **EFT** Episodic Future Thinking **F** Female **FFMQ** Five Facet Mindfulness Questionnaire **FU** Follow-Up **FFQ** Food Frequency Questionnaire **GFR** Glomerular Filtration Rate **Ht** Height **HS** High School **Hr** Hour **H** Hispanic **Hx** History **HTN** Hypertension **IV** Independent Variable **IG** Intervention Group **ICC** Intra-cluster Correlation **IPAQ** International Physical Activity Questionnaire **J-DASH** Japanese cuisine based Dietary Approaches to Stop Hypertension **IG** Intervention Group **K** Potassium **MAIA** Multidimensional Assessment of Interoceptive Awareness **M** Male **MA** Mean Age **Mg** Magnesium **MB-BP** Mindfulness-Based Blood Pressure Reduction **MCI** Mild Cognitive Impairment **MIM** Mindfulness in Motion **MOS** Months NTI Non-Tailored Intervention **MAMRT** Mobile Audio Manager and Response Tracker **NA** Native American **POC** People of Color **PMHR** Post-Menopausal Hormone Replacement **PD** Psychotic Disorder **QALY** Quality Adjusted Life Years **SAGE** Self-Administered Gerocognitive Examination **SC** Serum Concentration **SOC** Stages of Change **SET** Standardized Episodic Thinking **SI** Suicidal Ideation **TBI** Tailored Behavioral Intervention **TC** Total Cholesterol **TTM** Transtheoretical Model **Tx** Treatment **Tg** Triglyceride **UC** Usual Care **Wt** Weight **W** With **WK** Week

Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Randomized Controlled Study **Country**: Japan **Funding**: Grant from the Japan Society for the Promotion of Science **Bias**: None recognized		To compare the effects of a normal usual-diet, the J-DASH diet alone, or the J-DASH diet W fish oil on the participants' BP & variability of their BP	fish hamburger patty **Exclusion:** Secondary HTN, CKD Hx GFR > 30, CVD Hx, PMHR therapy > 3MOS, dementia, DM, liver disease, food allergies, pregnancy, away from home > 1WK **Attrition:** not specified, but 11 did not complete study	**Definitions:** J-DASH diet modified DASH diet, rich in fruits, vegetables, low-fat dairy foods, 0.8 g salt daily, double amount of K, Ca, Mg, fiber compared to Japanese diet				healthy low risk participants **Feasibility:** Applicable to the project site as this supports need for tailored DASH diet depending on participant's cultural background. **Application**: Can only be applied to immigrant Japanese patients in the US. Cuisine-specific to allow Japanese patients to follow healthy diet. Relevant to PICO question, need to be tailored to create version for lower income, moderate evidence in improving home BP.
Rodriguez et al., (2019). A Tailored Behavioral	Transtheoretical Model	**Design:** Randomized control Trial	**N=** 533 **Demographics:** TBI (MA 66.4, C	**IV1:** telephone delivered TBI **IV2:** telephone delivered NTI	**Tools:** Dietary SOC 2-step algorithm	**Statistical Tests Used:** Kruskal-Wallis test,	**DV1:** TBI p=0.01,NTI p=0.32, UC p>0.05	**Level of Evidence:** II **Strengths:** Appropriate statistical tests used in

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Intervention to Promote Adherence to the DASH Diet **Country**: USA **Funding**: Grant from the US Department of Veterans Affairs Office of Research and Development **Bias**: None recognized		**Purpose:** Aimed to determine if a TTM-based tailored telephone counseling intervention is effective in advancing individual's dietary stage of change and improving adherence to the DASH diet	46%, AF 36.9%. H 46%) NTI (MA 66.5, C 33.9%, AF 43.3%, H 16.1%) UC (MA 65.3, C 39.6%, AF 39%, H 15.8%) **Setting:** Veterans clinic; Baseline screening at the start and returned to clinic 6MOS after **Exclusion:** No access to phone, plans to move, terminal illness **Attrition:** not specified	**DV1:** DASH diet adherence **DV2:** dietary SOC **Definitions:** TTM: composed of 3 constructs (decisional balance, self-efficacy, and stage of change) Decisional balance: relative pros & cons of eating healthier. Self-efficacy: individual's confidence in making behavioral changes. SOC: readiness to eat healthier	6-item assessment for diet self-efficacy (α=0.81) O'Connell and Velicer's weight decisional balance (α=0.74) Willett FFQ	Fisher's exact test, Rao-Scott chi-square test, McNemar test	**DV2**: TBI p=0.01, NTI, p=0.64	each DV, use of tables and graphs, racially diverse study population, no significant difference in each group, tailored TBI in accordance to dietary SOC, 6 month FU to test effectiveness, **Weakness**: FFQ is a long questionnaire, unable to measure daily dietary intake, demanding changes in short period of time **Feasibility:** Applicable to project site as the Hispanic population is high. Will need to create DASH diet plans for ethnicities with highest population in the project site. **Application:** Result generalizable to the

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
								public, applicable to PICO, strong evidence in improving DASH diet adherence with TBI
Ponce-Martínez et al. (2022). Adherence to the DASH dietary pattern is associated with blood pressure and anthropometric indicators in Mexican adults. **Country:** Mexico **Funding:** National Council of Science and Technology (CONACYT) and AstraZaneca Mexico	Not stated, inferred as Behavioral Learning Theory	**Design:** Cross sectional analysis **Purpose:** Assess adherence of DASH dietary pattern by using an adapted DASH-AI and to evaluate association with CVD risk markers among Mexican adults living Mexico city	**N=** 1049 **Demographics:** 34% M, 66% F, MA 37.9, <HS 16.6%, HS 36.3%, >HS 47.2% **Setting:** National Institute of Cardiology Ignacio Chavez **Exclusion:** HTN, DM, dysthyroidism ischemic cardiomyopathy, ACS, cognitive disability, pregnant, anti HTN meds	**IV1:** DASH diet adherence **DV1:** BMI **DV2:** WC **DV3:** SBP **DV4:** DBP **DV5**: urine sodium excretion **DV5**: lipid panel **Definitions:** DASH: promotes high consumption of vegetables, fruits, whole grains, skim dairy products, fish, poultry, and seeds, and	**Tools:** Mechanical column scale Measuring tape Bloodwork BP monitoring FFQ IPAQ DASH-AI	**Statistical Tests Used:** t-test Multivariable linear regression analyses Multivariable logistic analyses	**DV1:** p=0.097 **DV2:** p<0.001 **DV3:** p<0.001 **DV4:** p<0.001 **DV5:** glucose p<0.001, TC p=0.018, HDL p<0.001, LDL p<0.001, Tg p<0.001	**Level of Evidence:** II **Strengths:** First study to evaluate DASH diet adherence in Mexicans, large sample size, use of adapted DASH-AI, use of bar and graphs, data consistent from prior data about low adherence to potassium intake, all aspects of PICO addressed **Weakness:** Cross sectional analyses did not allow causality between DASH diet adherence and CVD risk markers, FFQ did not include certain food which could be relevant to assess DASH diet adherence

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Bias: None recognized			**Attrition:** Not specified	limits intake of red meat, sugar, sweetened beverages, total and saturated fat, cholesterol, and sodium				**Feasibility:** Ideal to be applied at project site to assess if DASH diet is sustainable for the underserved population **Application:** Results generalizable to the Mexican population; foundation to study effectiveness of DASH diet to with Mexican cuisine.
Henderson et al. (2024). The cost-efficacy of a healthy food box for managing hypertension within a native American population: The Chickasaw healthy eating	Not specified, inferred to be Transtheoretical Model or Social Cognitive Theory	**Design:** randomized control trial **Purpose:** Evaluate the cost-efficacy of delivering boxes of healthy, culturally	**N=** 160 **Demographics:** 34% M, 66% F, <HS & HS 36%, >HS 64%, MA CG 49.6, MA IG 49.1	**IV1:** monthly home delivery of DASH diet food and voucher for produce **DV1:** BP **DV3:** QALY **Definitions:** None	**Tools:** BP monitoring EQ-5D-5L	**Statistical Tests Used:** ICC Multinominal logistic regression	**DV1:** BP dropped 13/8 and 20/13 **DV2:** 50.70 years; 40.64 years	**Level of Evidence:** II **Strengths:** Address scarcity of literature about non=pharmacological intervention to address HTN among Native Americans, answers PICO question, use of tables, tailored intervention to Native

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environment research study. **Country:** USA **Funding:** National Institute on Minority Health and Health Disparities of the National Institutes of Health **Bias:** None recognized		tailored foods and checks to be spent on produce in a Native American population in managing HTN	**Setting:** local Chickasaw Nation facility **Exclusion:** no Hx of HTN **Attrition:** Not specified					Americans, proper use of statistical tests **Weakness:** applied to very specific population, participants not placed to CG or IG randomly, small sample size, costs to implement is expensive, no guidance to use of gym membership, Fitbit, access to AYA app that could have affected BP and QALY and duration and frequency of use was not measured. **Feasibility:** Cannot be applied to this site as it can be costly to provide monthly boxes for multiple participants. This study is appropriate for literature review as it supports tailored intervention

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								Application: Generalizable to Native American population, practical way to endorse healthy lifestyle,
Loucks et al. (2023). Adapted mindfulness training for interoception and adherence to the DASH diet: A phase 2 randomized clinical trial. **Country:** USA **Funding:** NIH Science of Behavior Change Common Fund Program	Not specified, inferred to be Transformative Learning Theory	**Design:** randomized control trial **Purpose:** Evaluate effects of the MB-BP program on interoceptive awareness and DASH adherence	**N=** 201 **Demographics:** F 58.7%, M 41.3%, MA 60, A 2.5% AF 4.5%, H 4%, NA 1.5%, C 81.1% **Setting:** Brown University or local health center in a low-income urban neighborhood **Exclusion:** >1 per week mediation practice, serious medical illness, current substance	**IV1:** MB-BP program **DV1:** Interoceptive awareness **DV2:** DASH diet adherence **Definitions:** Self-awareness: awareness of one's thoughts, emotions, physical sensations Interoceptive awareness: conscious level of interoceptions W its multiple	**Tools:** MAIA Harvard 163 item 2007 Grid FFQ FFMQ	**Statistical Tests Used:** t-test Noncentrality parameter Predictive mean matching	**DV1:** 95% CI, 0.35-0.74 points; P < .001; Cohen d = 0.45 **DV2:** 95% CI, 0.13-1.11 points; P = .01; Cohen d = 0.71	**Level of Evidence:** II **Strengths:** Participants randomly assigned to IG or CG, address literature gap in investigating mindfulness training on dietary patterns, first RCT to evaluate MB-BP impact on diet, analyses adjusted by having separate measurement for participants with already high DASH diet adherence, 1st study to evaluate mediation analyses in dietary patterns. Answers PICO question

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Bias: None recognized			use, SI, EO, Hx BD or PD **Attrition:** IG 12.8%, CG 11%	dimensions that are accessible to self-report Interoception: process of sensing, interpreting, & integrating signals originating from inside body				**Weakness:** High proportion of well educated C participants, high rate of C participants, SBP is not reported, unable to determine which MB-BP components were most important in improving interoceptive awareness and DASH diet adherence, **Feasibility:** Ideal to be replicate. MB-BP with personalized feedback allows to educate participants with low health literacy. Checking effects on BP and adding on DASH questionnaire to assess effectiveness of intervention in sustaining the diet. **Application:** Result not generalizable d/t well-

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								educated participants and disproportionate race representation, foundation to implement mindfulness training in educating healthy eating.
Steinberg et al. (2020). Feasibility of a Digital Health Intervention to Improve Diet Quality Among Women With High Blood Pressure: Randomized Controlled Feasibility Trial **Country**: USA **Funding**: National	Did not specify behavioral change theory, inferred to be Social Cognitive Theory	**Design:** Randomized control trial **Purpose:** 3mos study that aimed to improve adherence to the DASH diet among women with HTN and preHTN using a digital health tool to leverage smartphone diet tracking	**N=** 59 **Demographics:** MA 49.9, mean BMI 33.9, C 69%, >HS 83%, insured 97% **Setting:** Study office **Exclusion:** CVD event in the last 6mos, cancer diagnosis, institutionalized d/t psych disorder, pregnant, lactating, enrolled	**IV1:** App-based diet tracking with daily/weekly text messages w/ tailored feedback, motivational msgs, boost adherence, and tips; videos r/t DASH; DASH booklet **DV1:** DASH diet adherence **DV2:** SBP **DV3:** DBP **Definitions:** None specified	**Tools:** Baseline online survey Nutritionix app BP, Ht, Wt DASH diet adherence score ASA24 PHQ-9 Intervention satisfaction survey	**Statistical Tests Used:** 2-tailed t-test Unstructured covariance Linear regression ANOVA Sensitivity analysis model	**DV1:** IG 0.8, 95% CI 0.2-1.5; P=.02; CG 0.8, 95% CI 0.4-1.2; P<.001) **DV2:** IG p=0.03; CG p=0.37 **DV3:** IG p=.26; CG p=.16	**Level of Evidence:** II **Strengths:** Address literature gap in creating HTN intervention for women, sample were randomized, purposefull use of commercial apps leading to increased potential of dissemination in future studies,, strong recruitment and retention rate. **Weakness:** small sample size, potential recall & response biases, over or underestimate dietary intake, possible nondifferential

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Institute of Health **Bias**: None specified		app to in women.	in another diet study **Attrition:** Not specified					misclassification of participants, sample consists of C and educated women, did no include coach or human support, 28% felt texts were not personalized **Feasibility:** This study will be difficult to apply in the project site as patients may struggle tracking their dietary intake leading to inaccurate results. **Application:** Not generalizable beyond study population. Intervention can be tailored to underserved population of all population w/ more personable interactions.

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Hollis-Hansen et al. (2020). Mothers' DASH diet adherence and food purchases after week-long episodic future thinking intervention. **Country**: USA **Funding**: Eunice Kennedy Shriver National Institute of Child Health and Human Development and grant from Mark Diamond Research Fund **Bias**: None specified	NIH Stage Model of Behavior Change	**Design:** 2x2 factorial design **Purpose:** Examine whether EFT improves mothers' dietary behavior and food purchasing over a longer 7-10 day period.	**N=** 62 **Demographics:** POC 25.7%, MA (EFT+DASH 37.8, EFT+Safety 40.2, SET+DASH 38.9, SET+Safety 39.87) **Setting:** Not specified **Exclusion:** Participation in an EFT study, ED or dietary restriction, pregnant, untreated PD, bariatric sx **Attrition:** 2 were dropped d/t missing f/u data	**IV1:** EFT + DASH **IV2:** EFT + Food Safety **IV3:** SET + DASH **IV4:** SET + Food Safety **DV1:** DASH diet adherence **DV2:** Sodium in mg purchased **DV3:** Delay discounting **Definitions:** # of cue recalls: # of times participants logged into MAMRT Attention to cue: report of how much they were paying attention to their cue	**Tools:** EMI Audacity MAMRT ASA24 Ht, Wt, BMI 6-item food insecurity form Online adjusting delay discounting task CFC scale Shopping Habits survey Behavioral Risk Factor Surveillance System (BRFFS)	**Statistical Tests Used:** Priori power analysis ANOVA Chi-square test Linear mixed model Linear regression	**DV1:** p = .04 **DV2:** p = .05 **DV3:** p = .22	**Level of Evidence**: II **Strengths**: participants randomized to each group, use of graph and tables, appropriate use of statistical tests, low attrition rate, 1st study to ask participants to track their food purchases. **Weakness**: Short study period, failure to test effects of EFT on delayed discounting, small sample size, focused on mothers that are overweight and obese, no information if food purchased was actually consumed by mom and family **Feasibility:** This study can be replicated in the project site by getting weekly budget of participant and helping create a grocery list that is DASH diet appropriate

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				Vividness of cue: report of how much vividly participants could picture the episodes during their cue recall	NutritionistPro			**Application**: May not be generalizable to general population who are uninterested in changing behavior. May be used for future study to participants that are motivated to change to assess DASH diet adherence effectiveness
Steen et al. (2022). Efficacy of supermarket and web-based interventions for improving dietary quality: a randomized, controlled trial. **Country**: USA **Funding**: The Kroger Company, Collaborative Research	Not stated, inferred to be Health Belief Model	**Design:** Randomized control trial **Purpose:** Supermarket web-based intervention targeting nutrition **(**SuperWIN) was designed to test dietitian-led education	**N=** 247 **Demographics:** MA 58, F 69%, AF 21%, **Setting:** 13 Kroger Supermarkets in Ohio and Kentucky **Exclusion:** Current Tx w/ another dietary or weight loss	**IV1:** Individualized, in-person, dietitian-led, purchasing data-guided interventions **IV2:** IV1 + online tool for shopping, home delivery, selectin of healthier purchases, meal planning and healthy recipes	**Tools:** BP monitoring Ht, Wt, BMI Lipid panel Adapted DASH score Research Electronic Data Capture (REDCap) Interviews	**Statistical Tests Used:** Intention-to-treat analysis Residual plots Two-sided alpha Analysis of variance	**DV1:** at 3mos CG p=0.0006, IG1 p<0.0001, IG2 p<0.0001; at 6mos CG p=0.02, IG1 p<0.000, IG2 p<0.0001 **DV2:** at 3mos IG1 -6.6mmHg, IG2 -5.7mmHg; at 6mos IG1 -5.4mmHg, IG2 -4.2mmHg	**Level of Evidence**: II **Strengths**: Offer opportunities to mitigate challenges r/t poor health literacy, busy schedules, inadequate person or public transportation, disability, and industry marketing; use of graphs and table, appropriate use of statistical tests; answers the PICOT question **Weakness**: predominantly middle-aged, female, married, reasonable annual household income; did not

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Advancement Grant, Rehn Family Research Award, College of Medicine Research/Pilot Grant and Collaborative Grant, Junior Faculty Pilot Project, UC Health **Bias**: None specified		interventions focused of the DASH dietary pattern to improve the quality of grocery purchases and dietary intake	intervention, use of Kroger's online shop w/in 12 mos, previous use of Kroger's dietary counseling services, baseline SBP >190, SBP >110mmHg or non HDL-C >190 mg dl **Attrition:** 20 pulled out d/t COVID19 emergency	**DV1:** DASH diet adherence **DV2:** SBP **DV3:** DBP **DV4:** BMI **DV5:** nonHDL, Tg, TC **Definitions:** None specified	24hr dietary phone recall		**DV3:** at 3mos IG1 - 2.4mmHg, IG2 -2.0MmHg at 6mos IG1 -3.7mmHg, IG2 -4.4mmHg **DV4:** IG1. - 0.6kg, IG2 - 0.7kg **DV5:** nonHDL p=0.51, Tg p=0.70, TC p=0.38	collect data on medications; little # of BP measurements; participants on C and AF **Feasibility:** The tailored approach of supermarket based intervention may be replicated to the project site by focusing on supermarkets or groceries stores with affordable products **Application**: Not generalizable to public. Can be tailored to serve supermarkets located in underserved population w/ hopefully affordable groceries.
Wright et al. (2021). Mindfulness in motion and dietary approaches to stop hypertension	Not stated, inferred to be Interpersonal Mindfulness	**Design:** randomized control trial **Purpose:** Examine the feasibility &	**N=** 38 **Demographics:** AF 100%, MA (IG1 74, IG2 71.0, CG 70.8), F (IG1	**IV1:** MIM + DASH **IV2:** 8 2 hr sessions that covered non HTN topics	**Tools:** BP monitoring Ht, Wt SAGE MyPlate	**Statistical Tests Used:** 0.84 Spearman rank correlation	**DV1:** IG1 (baseline 70.0, at 3mos 68.4) IG2 (baseline 58.1, at 3mos 75.5) CG (baseline 69.1, at 3 mos 63.1)	**Level of Evidence**: II **Strengths**: Focused population to address greater risk of HTN, addressed literature gap, answers PICOT question, Use of

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
(DASH) in hypertensive African Americans. **Country**: USA **Funding**: The Ohio State University Center for Clinical and Translational Science grant **Bias**: None		acceptability of MIM and DASH to improve diet, mindfulness, stress, and SBP in older AF adults with MCI and HTN	32%, IG2 23%, CG 26.6%), **Setting:** Community room of an intergenerational care center **Exclusion:** None stated **Attrition:** None stated	**IV3:** DASH pamphlet after study **DV1:** DASH diet adherence **DV2:** Mindfulness **DV3:** Perceived stress **DV4:** SBP **Definitions:** None	DASH Questionnaire (α=0.83) Cognitive Affective Mindfulness Scale (α=0.77) Perceived Stress Scale (α=0.83)	Mixed effect linear modeling ANOVA	**DV2:** IG1(baseline32.1, at 3 mos 29.0) IG2 (baseline 33.7, at 3 mos 31.6) CG (baseline 31.2, at 3mos 35.1) **DV3:** IG1(baseline 10.5, at 3 most 11.7), IG2 (baseline 9.7, at 3mos 10.5) CG (baseline16.1, at 3 mos 10.2) **DV4:** IG1 -10.4mmHg, IG2 -3.2mmHg, CG -13.8mmHg	graphs and tables, appropriate statistical tests. **Weakness**: Small sample size, participants highly educated, short study duration to test sustainability of intervention, lack of contact led to reduced completion in CG **Feasibility:** The frequency of in-person group session may be difficult to get high attendance rate in the project site. MIM+DASH intervention can be replicated by tailoring sessions to the capabilities of the participants in regards to transportation and compliance **Application**: Not generalizable to general population, but can be tailored to more diverse

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
								sample size. MIM+DASH applicable in decreasing SBP.
Guo et al. (2021). Effects of the modified DASH diet on adults with elevated blood pressure or hypertension: A systematic review and meta-analysis. **Country**: China **Funding**: National Key research and Development Program of China; Science & Technology Department of Sichuan province;	PRISMA	**Design:** Systematic review and meta-analysis **Purpose:** Assess effects of modified DASH diet on BP in pts with HTN and preHTN	**N=** 10 studies with a total of 2,416 participants **Study Characteristics:** RCTs that tested DASH diet interventions to either UC, another Tx , or no Tx 10/10 of the studies checked for BP effects. 8/10 checked BMI, 5/10 checked for sodium intake	**IV1:** UC or no Tx **DV1:** SBP **DV2:** DBP **DV3:** Weight **DV4** Waist **DV5:** TC **DV6:** Tg **DV7:** LDL **DV8:** HDL **Definitions:**	**Tools:** Cochrane tool for risk of bias GRADE for quality evidence	**Statistical Tests Used:** Cochran's Q test I2 test	**DV1:** p=0.006 **DV2:** p=0.01 **DV3:** p=0.05 **DV4:** p=0.03 **DV5:** p=0.19 **DV6:** p=0.00001 **DV7:** p=0.21 **DV8:** p=0.33	**Level of Evidence**: I **Strengths**: Offered strong evidence on the effects of DASH diet on BP and CVD risk factors **Weakness**: Short study duration for each study, no sufficient information about study design, high heterogeneity of study, did not describe blinding process **Feasibility**: This study is beyond the scope of this project, but is appropriate to be apart of the literature review **Application**: May help in reducing BP in people with HTN and preHTN as well as decrease CVD risk factors

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
National Clinical Research Center for Geriatrics, West China Hospital, Sichuan University **Bias**: None								

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Table A2

Synthesis Table

Study (Author, year)	Umemoto et al.	Rodriguez et al.,	Ponce-Martinez et al.	Henderson et al.,	Loucks et al.	Steinberg et al.	Hollis-Hansen et al.	Steen et al.	Wright et al.	Guo et al.
Year	2022	2019	2022	2024	2023	2020	2020	2022	2021	2021
Design/LOE	RCT/II	RCT/II	Cross-sectional analysis/II	RCT/II	RCT/II	RCT/II	RCT/II	RCT/II	RCT/II	SR + meta-analysis/I
Sample										
n subjects	48	533	1049	160	201	59	62	247	38	10
M-Age	50	66	37.9	IG 49.1 CG 49.6	60	49.9	±35	58	±71	n/a
Country	Japan	USA	Mexico	USA	USA	USA	USA	USA	USA	China
Setting										
Home	X	X		X	X					
Office	X		X			X	X			
Health Center					X				X	
Supermarket								X		
Interventions										
Food	Delivered 5-day J-DASH menu w/ fish hamburger patty			Monthly box of DASH diet food						
DASH education	X	X			X	X	X	X	X	X

Key: **BMI** Body Mass Index **CG** Control Group **DBP** Diastolic Blood Pressure Japanese cuisine-based Dietary Approaches to Stop Hypertension **HDL** High-Density Lipoprotein **DASH IG** Intervention Group **LOE** Level of Evidence **LDL** Low-Density Lipoprotein **M-Age** Mean Age **PA** Physical Activity **QALY** Quality Adjusted Life Years **SOC** Stages of Change **SR** Systematic Review **SBP** Systolic Blood Pressure **TC** Total Cholesterol **Tg** Triglyceride ↑ Increase ↓ Decrease **–** No Change

Study (Author, year)	Umemoto et al.	Rodriguez et al.,	Ponce-Martinez et al.	Henderson et al.,	Loucks et al.	Steinberg et al.	Hollis-Hansen et al.	Steen et al.	Wright et al.	Guo et al.
Behavioral change			X	X	X	X		X	X	
Mindfulness					X		X			
Tailored Education		X				X		X	X	X
Mobile app /Telephone use		X		X		X	X	X		
Length per session	3 session, 1 hr	n/a	n/a	n/a	8 session, 2.5hr/1 session, 7.5hr	n/a	2 10min video	n/a	2hr	n/a
Session frequency	At baseline	Monthly	n/a	n/a	Weekly	n/a	At baseline	Bimonthly	weekly	n/a
Length of intervention	2mos	6mos	n/a	6mos	6mos	3mos	7-10days	3mos	2mos	n/a
Outcomes/ Themes										
DASH diet adherence		↑			↑	–	↑	↑	–	
SBP	↓		↓	↓		↓	↓	↓		↓
DBP	↓		↓	↓		↓	–	↓	↓	↓
BMI			–					↓		
Dietary SOC		↑								
Weight										↓
Waist			↓							↓
Glucose			↓							
TC			–					–		–
Tg			↓					–		↓

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Study (Author, year)	Umemoto et al.	Rodriguez et al.,	Ponce-Martinez et al.	Henderson et al.,	Loucks et al.	Steinberg et al.	Hollis-Hansen et al.	Steen et al.	Wright et al.	Guo et al.
LDL			↓							↓
HDL			↓					–		–
Intoreceptive awareness					↑					
Urinary sodium			↓							
Mindfulness									–	
Perceived stress									–	
QALY				–						

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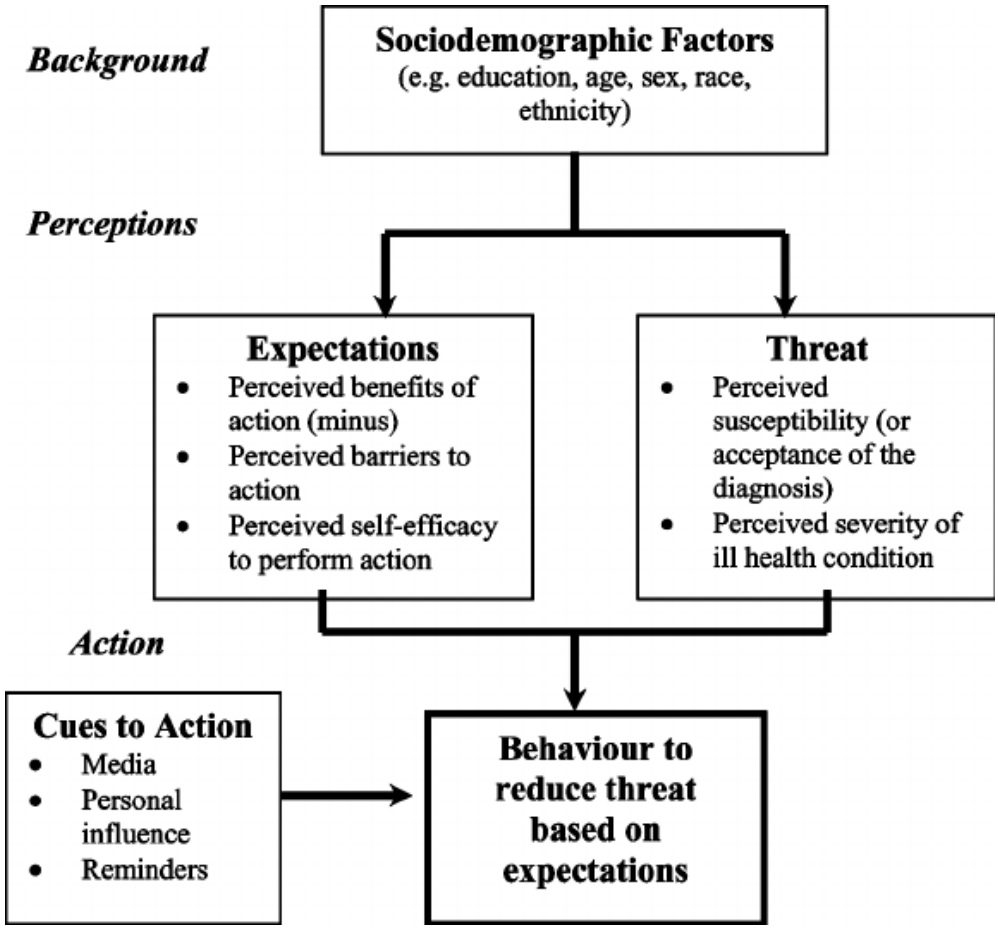
Appendix B

Models and Frameworks

Figure B1

The Health Belief Model

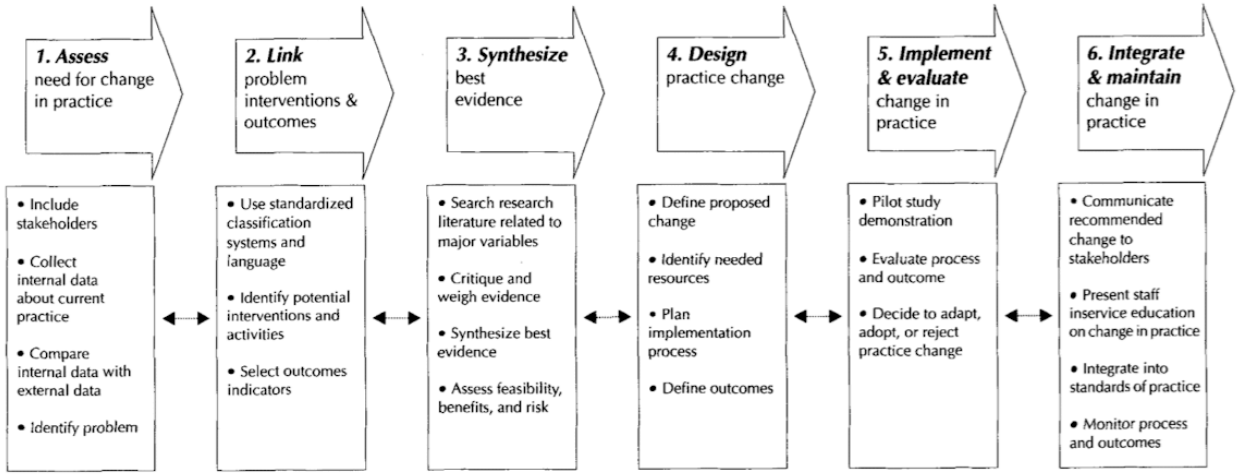


A theoretical model

(Abraham & Sheeran, 2015)

Figure B2

Rosswurm and Larrabee's Model for evidence-based practice



An evidence-based practice model

(Rosswurm & Larrabee, 1999)

Appendix C

IRB Approval

Figure C1

Expedited Review from IRB

APPROVAL: EXPEDITED REVIEW

Judith Ochieng
EDSON: DNP
602/496-0730
Judith.Ochieng@asu.edu

Dear Judith Ochieng:

On 9/10/2024 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Breaking Through Resistance: Improving Dietary Compliance for Better Health
Investigator:	Judith Ochieng
IRB ID:	STUDY00020707
Category of review:	4, 7
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• IRB Protocol, Category: IRB Protocol;

The IRB approved the protocol effective 9/10/2024. Continuing Review is not required for this study.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

It is the research team's responsibility to notify the IRB of 'reportable new information.' (an RNI) During a research study, any adverse events, unanticipated problems involving risk, and non-compliance **must** be reported to the IRB as an RNI. Please see the following link for details: https://researchintegrity.asu.edu/human-subjects/reportable-events. This does not include risks previously identified and listed in the IRB protocol and consent. Any serious events **must** be reported within **24 hours**. Non-serious adverse events **must** be reported within 5 business days.

Appendix D

Budget Plan

Table D1

DASH Diet Intervention Budget Plan

	Activities	Cost	Subtotal	Total
Preparation	Design and print fliers	$60		
	Design and print brochure, food diary, and BP log	$200		
	Create PowerPoint presentation $25 x 15 slides	$375		
	Hire Spanish translator Estimated 10 hrs @ $15/hr for Flier, PowerPoint presentation, brochure, food diary, and consent form	$150		
	Print DASH-Q Questionnaire and consent forms (30 copies each x2)	$30		
	Gas to and from clinic	$60	$965	
Delivery	Electricity on exam rooms ($13¢ x 130 hrs)	$1690		
	Translation Spanish to English Interpretation Service or Medical Assistants	$1000		
	Blood Pressure Equipment x15	$150		
	Cellphone Phone Plan ($5 per participant)	$150	$2860	
	$10.00 gift card x15	$150		
Evaluation	Review and analysis of results ($25 x 10 hrs)	$250	$250	$4075

Budget Justification: The following is the justification for the items budgeted for this quality improvement project

1. Preparation
    a. Fliers (Direct Cost): To spread awareness about the quality improvement project by posting it at the reception desk and each exam room.
    b. Brochure, food diary, BP log (Direct Cost): The brochure will help participants recall what was taught during the in-person meeting. The food diary will help with recording food consumption each day. The BP log will allow participants to see a daily trend in their BP values.
    c. PowerPoint Presentation (Direct Cost): To deliver education regarding hypertension management and the importance and benefits of the DASH diet.

   d. Translation of material to Spanish (Direct Cost): The clinic has many Spanish speakers, and translating everything to Spanish will help the QI project reach more people.
   e. Questionnaire and consent (Direct Cost): The questionnaire will be completed twice, pre- and post-intervention, to evaluate the effectiveness of the intervention. Each potential participant will be given consent to notify them of what will happen during the project.
   f. Gas (Direct Cost): The expense of driving to and from the clinic during recruitment, delivery of the intervention, and follow-ups.
2. Delivery
   a. Electricity (Indirect Cost): To use the computers and exam rooms with light and air conditioners to make participants comfortable.
   b. Spanish to English Interpretation (Indirect Cost): Need assistance from medical assistants or interpreter services to help deliver information regarding project overview, consent, education, and follow-up calls to translate.
   c. Blood Pressure machine (Indirect Cost): To obtain blood pressure in the clinic pre- and post-intervention.
   d. Cellphone plan (Indirect Cost): Participants must have cellphone access for texting or calls for follow-ups.
   e. Gift cards (Direct cost): To demonstrate appreciation to participants who finish the one-month DASH diet project.
3. Evaluation
   a. Results review and analysis (Indirect Cost): Estimated to spend 10 hours inputting, reviewing, and analyzing project results using Intellectus software.

Potential Savings/Cost Savings

1. Increased knowledge about hypertension and management with the DASH diet
2. Increased comfort level in asking about hypertension management
3. Increased compliance = improvement in managing blood pressure
4. Decreased number of patients with high blood pressure medications = Decreased medical cost
5. Decrease no-shows on hypertension follow-ups = Increased revenue
   a. Average of 5 no-shows daily ($100 lost for each no-show)
   b. If the average of no-shows decreased to 2 daily, the clinic would earn $300 more daily
   c. 16 days of work per month x $300 = $4800
   d. $4800 - $4075 = $725 added inflow each month