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AN EXAMINATION OF CARDIO-VASCULAR PATIENTS' EXPERIENCES IN A RURAL
FOOD PRESCRIPTION PROGRAM

By

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A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of
the requirements of the Sally McDonnell Barksdale Honors College.

Oxford

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ABSTRACT

The burden of diet-related chronic diseases in rural communities has prompted the implementation of food prescription programs in rural areas to investigate the impact of more affordable and accessible fresh produce on these vulnerable populations.

Because there is little research on the impact of food prescription programs on cardiovascular patients in rural areas, this study will focus on how food prescription programs can benefit this at-risk population. Another goal of this study is to receive feedback from participants to improve food prescription programs to better suit cardiovascular participant needs. To accomplish these goals, a series of questions were asked to qualifying participants with a cardiovascular condition to help identify cardiac specific interventions that could be implemented in an existing program. From these questions, it was found that 100% of participants interviewed said that food prescription programs have helped them improve their eating habits, but they would have to purchase significantly less produce without support from the program. Because of this, it is recommended to help participants find sustainable access to healthier options long-term.

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Background:

The general term “cardiovascular disease” includes an array of heart and blood vessel disorders. Of these disorders, the most common is coronary heart disease (“Heart Disease Facts”). In coronary heart disease, a build-up of fatty deposits in the arteries causes them to narrow, restricting blood flow. When blood cannot flow to the heart or brain, a heart attack or stroke may occur (“Cardiovascular Diseases”). There are many risk factors for heart disease, but unhealthy diet, physical inactivity, and tobacco or excessive alcohol use are the most influential behaviors, as they are more likely to result in increased blood pressure (“Cardiovascular Diseases”). If tobacco use was eliminated, the risk for cardiovascular disease would decrease by 13.7% (Virani et al.). Similarly, if food consumption was consistent with the DASH diet, the risk for cardiovascular disease would decrease by 13.2% (Virani et al.). The DASH diet recommends the consumption of at least 4.5 cups of fruits and vegetables a day, 2 servings of fish a week, and 3 servings of whole grains a day with no more than 36 ounces of sugar-sweetened beverages a week and no more than 1500 milligrams of sodium a day (Virani et al.). Additionally, if physical activity levels were sufficient, there would be an 11.9% reduction in the risk for cardiovascular disease (Virani et al.). One study found that the risk of incident heart failure was 61% lower in African Americans that had 4 or more ideal cardiovascular health components compared to those with less than 2 ideal cardiovascular health components (Virani et al.). Evidently, the fewer

cardiovascular health components that a person has at nonideal levels, the lower their risk for cardiovascular disease mortality (Virani et al.).

Cardiovascular disease is one of the leading causes of death worldwide (“Heart Disease Facts”). In 2021, about 695,000 people died from heart disease in the United States (“Heart Disease Facts”). But these deaths were not randomly or uniformly experienced. In 2021, African Americans were disproportionately impacted, making up 22.6% of those who died from cardiovascular disease, despite making up just 12.1% of the total population (“Heart Disease Facts”; “Black/African American Health”). Death by heart disease is also more common in the southeastern region of the United States and is responsible for 21% more deaths in rural areas than urban areas (Curtin and Spencer).

It has been shown that an improved diet decreases cardiovascular disease risks (“Cardiovascular Diseases”; Liyanage et al.; Sotos-Prieto et al.; Wang et al.). Ideal diet changes include reducing salt intake while increasing fruit and vegetable consumption (“Cardiovascular Diseases”). However, access to fresh produce is limited in many parts of America. Food deserts are defined as low-income areas that have low access to healthy food (Kelli et al.). Residents of food deserts tend to make dietary decisions based on what is available locally, rather than the quality of food (Testa et al.). The food available in food deserts is often characterized as being nutrient deficient, but calorically dense (Testa et al.). Living in a food desert has been associated with higher prevalences of hypertension, smoking, increased B.M.I., and other risk factors associated with cardiovascular disease (Testa et al.). Because of the higher risk for

developing cardiovascular disease in food deserts, these communities have been identified as potential targets for interventions to improve health outcomes (Kelli et al.).

It is important to understand the relationship between fruit and vegetable consumption and mortality to better address the individual and population health outcomes in food deserts. While prescription drug treatment is often the preferred method for treating cardiovascular conditions, and in many cases necessary, nutrition plays an important role in maximizing the therapeutic effects of medications (Wang et al.; “Cardiovascular Diseases”). Physicians can also play a critical role in educating and advocating for patients in this space. However, the limiting food environment may not be enabling.

One method to address the gap between physician-recommended dietary changes and a poor food environment is through food prescription programs. Participants enrolled in food prescription programs are typically “food insecure, low-income, and/or diagnosed with a diet-related chronic health condition (e.g., diabetes, obesity, hypertension)” (Cafer et al.). In order to address these issues, food prescription programs provide participants with vouchers or ‘prescriptions’ they can use at participating vendors to support healthy eating habits. Making healthy choices more affordable and accessible increases the likelihood that people will adopt and sustain healthy habits (“Cardiovascular Diseases”). Because of food prescription programs, the acquisition of fresh fruits and vegetables is easier for at-risk populations (Cafer et al.). Yet, there is very little information on the potential impact of food prescriptions on cardiovascular disease. This study will explore the potential for food prescription

programs to improve health and wellbeing among cardiovascular patients in a rural setting.

Literature Review:

Although there has been a general decline in death rates from heart disease in the United States in the past decade, death rates in rural areas have continued to be significantly higher than death rates in urban areas (Curtin and Spencer; Melvin et al.). In 2019, the mortality rate due to heart disease in rural areas was 20% higher than in urban areas (Curtin and Spencer). It has also been found that there is up to a fifteen-year gap in life expectancy between US rural southern states compared to US rural northern states (Melvin et al.). The lower life expectancy in US rural southern states is often attributed to a combination of limited access to healthcare, economic challenges, or poor access to healthy food (Kelli et al.; Bhat et al.).

Since 2011, rural areas have experienced a significant economic decline along with declining population levels (Khan et al.). Because of this reduction in population, rural hospital closures have been accelerating (Khan et al.). Many rural hospitals cannot recoup fixed-operating costs with a reduced patient volume (“Rural Hospital Closures Threaten Access”). In fact, 136 rural hospitals have closed from 2010 to 2021 in the United States (“Rural Hospital Closures Threaten Access”). Of these closures, 19 occurred in 2020 alone, likely due to workforce shortages and limited access to supplies during the COVID-19 pandemic (“Rural Hospital Closures Threaten Access”). Of the

nineteen closures in 2020, 65% were in the South, disproportionately impacting low-income and minority populations (Stansberry et al.).

With increasing hospital closures in rural areas, rural populations are becoming increasingly vulnerable to medical and social disparities (Stansberry et al.; “Chartbook on Rural Healthcare”). Hospital closures in rural areas have put these communities at a higher likelihood of experiencing at least a thirty-minute increase in travel time to receive care (Stansberry et al.). Because of this increase in travel time, residents that are at risk for heart attacks or strokes have a higher risk for mortality (Stansberry et al.). Likewise, there is a shortage of primary care services in rural areas, resulting in worse health outcomes in these areas because of reduced access to health information, treatment, and appropriate preventative testing (“Rural Hospital Closures Threaten Access”; Stansberry et al.). Many residents of rural communities experience geographic isolation and limited access to transportation. Without reliable transportation, it becomes increasingly difficult to attend non-local healthcare appointments, further exacerbating poor health outcomes.

Compared to urban areas, rural areas also have a higher proportion of uninsured residents (Hartley et al.; Bolin and Gamm). Those who have insurance in rural areas, however, often have fewer covered benefits and are more likely to face barriers to entry, such as having a deductible, when compared to urban residents (Hartley et al.). The nature of employment in rural communities (minimum wage, part-time employment; small business) often limits access to health insurance (not eligible) or is associated with limited health insurance plans that have high premiums, poor coverage (Bolin and Gamm; Tolbert et al.). One study found that “26% of uninsured, rural patients delayed

seeking care due to costs” (“Rural Hospital Closures Threaten Access”). Without health insurance, it becomes increasingly difficult to afford healthcare costs (Tolbert et al.). Because of this, people without health insurance are less likely to attend regular healthcare appointments to receive preventative care (Bolin and Gamm; Tolbert et al.). By not receiving preventative care, uninsured people are more likely to be hospitalized for avoidable conditions (Bolin and Gamm). However, another study found that rural uninsured residents were less likely, compared to urban residents, to delay health care when they thought it was necessary (Hartley et al.). Ultimately, health insurance is a major determinant in access and utilization of health care (Bolin and Gamm).

Another potential contributor to the poorer health outcomes seen in rural communities is nonadherence to medications, which occurs in more than 60% of cardiovascular patients (Baroletti and Dell’Orfano). By not filling their prescriptions within 120 days of discharge after a heart attack, the patient increases their odds of death by 80% (Baroletti and Dell’Orfano). About half of the patients that initially fill their prescriptions no longer fill them after six to twelve months (Baroletti and Dell’Orfano). There are many factors that may contribute to this. Primarily, patients are unable to afford their medication (Bolin and Gamm). In rural areas, people that have health insurance are often not fully covered and cannot afford additional healthcare costs like prescription medications (Bolin and Gamm). Those without health insurance are therefore less likely to obtain their needed prescriptions due to high costs (Bolin and Gamm). In 2022, 12.3% of uninsured nonelderly adults, compared to 5.4% of insured nonelderly adults, stated that they delayed filling or did not get their needed prescription due to cost (Tolbert et al.). Additionally, some patients do not understand the importance

of their medication to their health, likely due to inadequate communication from their healthcare provider or from the lack of an immediate noticeable change in their health (Baroletti and Dell'Orfano). On top of this, 16% of independently owned rural pharmacies in the United States closed from 2003 to 2018, resulting in increased barriers to healthcare ("Chartbook on Rural Healthcare"). Without access to a local pharmacy, it becomes increasingly difficult for rural residents to attain prescribed medications ("Chartbook on Rural Healthcare"). Ultimately, nonadherence to medications results in poorer health outcomes, no matter the reason (Baroletti and Dell'Orfano).

Limited availability of nutritional food is another factor that contributes to poorer health outcomes in rural communities. Many rural communities exist in food deserts where food insecurity occurs. Food insecurity occurs when a population has a lack of access to nutritionally adequate food (Bhat et al.). Those experiencing food insecurity are more likely to consume inexpensive, nutrient poor food, further increasing their risk of developing cardiometabolic diseases (Bhat et al.). Furthermore, people that experience food insecurity are often facing financial strains as well, usually pertaining to healthcare (Bhat et al.). Similarly to food insecurity, food deserts are areas that have low income with limited access to affordable healthy food (Kelli et al.). Living in a food desert has been associated with unfavorable cardiovascular outcomes. For example, patients with cardiovascular disease in food deserts have a 44% higher risk of heart attack than patients not living in a food desert (Kelli et al.). When trying to identify what component of food deserts causes these outcomes, there was not a significant difference in the rates of unfavorable cardiovascular outcomes in areas with limited food

access and areas with adequate access (Kelli et al.). However, patients living in low-income areas had a 39% higher risk of heart attack than patients living in high income areas (Kelli et al.). Based on these findings, adverse health outcomes are more strongly associated with area income than physical access to healthy foods (Kelli et al.).

In order to help address these limitations, food prescription programs can reduce financial burdens. Participants of food prescription programs are identified based on food insecurity or low income, and the presence of a diet-related health condition (Cafer et al.). Qualifying participants then receive free or discounted fresh fruits and vegetables (Bhat et al.). Some food prescription programs provide nutritional education in addition to food vouchers (Bhat et al.). By showing participants that fresh produce is equally as important as medications, food prescription programs have led to decreases in both B.M.I. and HbA1c (Bhat et al; Cafer et al.). B.M.I., or body mass index, is an estimate of body fat that indicates your risk of developing certain diseases (“Assessing Your Weight and Health Risk”). A higher B.M.I. is correlated with a higher risk for developing heart disease, high blood pressure, and type 2 diabetes (“Assessing Your Weight and Health Risk”). HbA1c, or hemoglobin A1c, reflects a person’s average blood sugar levels over the previous 120 days (“All About Your A1C”). The decrease in HbA1c shown in participants of food prescription programs was found to be comparable to commonly prescribed glucose medications that help lower blood sugar levels (Bhat et al.). Reducing HbA1c levels is important, as higher levels are correlated with a greater risk for developing type 2 diabetes (“All About Your A1C”). Treatment and management of diabetes reduces the risk for developing cardiovascular disease and helps prevent heart attacks and strokes (“Cardiovascular Diseases”). For each additional serving per day of

fruit and vegetables combined, there was a 4% reduction in the risk of cardiovascular disease mortality - with a maximum threshold of about 5 servings per day (Wang et al; Baroletti and Dell'Orfano). Adherence to the Mediterranean diet has shown to significantly decrease the risk of mortality from cardiovascular disease, largely due to the large consumption of fruits and vegetables in this diet (Wang et al.; Dontas et al.; Liyanage et al.).

The Mediterranean diet consists of a high consumption of fruits and vegetables, nuts and cereals, fish, poultry, beans, and olive oil paired with a low consumption of red meat and dairy products (Liyanage et al.). Strict adherence to the Mediterranean diet has been associated with a reduction in blood pressure levels (Dontas et al.). Because fruits and vegetables have large amounts of antioxidant compounds and polyphenols, increased consumption of fruits and vegetables helps prevent the oxidation of cholesterol and other lipids that accumulate in the arteries, thus reducing blood pressure levels (Wang et al.). Similarly, when adhering to the Mediterranean diet, participants experienced a 37% relative reduction in the risk of major cardiovascular events compared to those who followed the control diet (Liyanage et al.). Promisingly, the benefits of adhering to the Mediterranean diet have been more prominent in rural areas compared to urban areas (Dontas et al.).

Those who participated in food prescription programs showed a significant change in their dietary behaviors and a higher concern for financial barriers to fruit/vegetable consumption. Despite these concerns, participants in this population were willing to set goals to improve their health conditions. It is unclear if participants will continue to follow these recommended dietary changes without financial aid (Trapl

et al.). A longer study that includes a control group would allow researchers to determine if financial aid is the main factor contributing to this change in diet, or if provider advice has a strong enough influence to encourage participants to change their diets without financial assistance.

A critical gap in the current literature is how participant feedback can be best utilized in improving or adjusting food prescription programs, in real time, especially for cardiovascular patients. By obtaining feedback from participants and addressing their wants, needs, and preferences, participants will be more likely to adhere to program goals (Planner et al.). Using multiple interventions to target both individual and organizational changes has also been associated with better outcomes when compared to studies that focus on a single intervention (Wong et al.). Therefore, it is important to receive feedback on both program logistics and patient experience.

Rationale:

The benefits of improved diet on overall health have been previously discussed here and are frequently quantified in the field. However, participants' opinions and their overall feelings towards food prescription programs have not been explored by many studies. Additionally, few studies have evaluated participants' nutritional knowledge as it relates to their cardiovascular disease. By using qualitative measurements to examine participant's perceived health during food prescription programs in a rural context, current research can be applied to further understand the relationship between perceived health and actual health. Additionally, by using qualitative measurements to

obtain participant feedback, future research can examine the relationship between participant feedback and program longevity. Finally, using qualitative measurements to evaluate participants' nutritional knowledge could allow future researchers to determine if there is a relationship between nutritional knowledge and health outcomes.

Methods:

Study Site: This study takes place in Rural County, MS. In 2020, life expectancy at birth in Mississippi was 73.9 years while in Rural County the life expectancy at birth was much lower, at 69.5 years ("Rural County, MS"). Since life expectancy is lower than the state average in Rural County, it is important to analyze the demographic and social factors that influence the health of residents in Rural County. To begin with, 72% of the population in Rural County is African American, a population that is at a higher risk for heart disease ("Rural, MS"; "Heart Disease Facts"). Additionally, 30.2% of residents in Rural County live below the state-determined poverty line (*American Community Survey*). Oftentimes, those in poverty are not able to take time off of work to attend routine healthcare appointments, thus limiting their healthcare access and causing poor health outcomes ("Chartbook on Rural Healthcare"). On top of this, 63% of residents in Rural County have limited access to healthy foods and 22% of residents experience food insecurity ("Rural, MS"). Food prescription programs help make fresh produce more affordable to qualifying participants, thus reducing one of the access barriers faced by these residents.

A literature review was conducted from December 2022 to February 2024 using Google Scholar to identify research articles focused on cardiovascular disease and food

prescription programs in the United States. There was not a publication date restriction for article inclusion. This literature review was used to identify current findings on the relationship between cardiovascular health, food prescription programs, and food accessibility and to identify gaps in the literature.

Research Methods:

Based on the literature, a series of questions were formulated that would help identify cardiac-specific interventions that could be implemented in a current food prescription program. These questions were used to better understand what influenced participants to join the program, how the program has affected their health, and to receive feedback about the program.

After establishing the questions that would be asked to participants in a food prescription program, we identified participants who had a cardiovascular condition at the time of their enrollment to the Gus Schumacher Nutrition Incentive Program (GusNIP). After identifying qualifying participants, they were contacted to schedule a time to be interviewed. A total of six focus groups were held, with a total of 19 participants. We aimed to have five participants per focus group, but due to conflicting schedules some participants were individually interviewed. Each interview or focus group session was recorded and transcribed by Trint, an online transcription service (TRINT™ 2022). These transcriptions were analyzed using open and axial coding . Open codes were created based on what the participant(s) directly stated. Then, the most relevant and reoccurring open codes were grouped based on similarities to form axial codes. Axial codes allow for connections to be drawn between the open codes.

The number of participants that agreed with or mentioned each idea was recorded. Then, the axial codes were organized into three overarching themes: enrollment, effects of the program, and improvements. After establishing the themes, the interview question(s) that led to each axial code was identified (see table 1). Each theme and the supporting question(s) were then operationalized to standardize what the requirements for inclusion were.

Table 1

Interview Questions and Their Corresponding Themes

Theme	Associated Interview Question
Enrollment	<ul style="list-style-type: none"> • What role, if any, did your cardiovascular condition play in your decision to enroll in this program? • Have you seen a physician? If yes, have they discussed nutrition as part of managing your condition? If not, has anyone talked to you about the role of nutrition in managing cardiovascular conditions?
Effects of the program	<ul style="list-style-type: none"> • What has your overall experience been since joining this program? <ul style="list-style-type: none"> ○ How do you feel this program has helped (if at all) you in managing your cardiovascular condition?

Table 1 (continued)

Theme	Associated Interview Question
Effects of the program	<ul style="list-style-type: none">• Have you noticed any changes regarding your cardiovascular health?<ul style="list-style-type: none">○ Do you feel as if you have more or less energy since beginning this program?○ How have your eating habits changed?○ What are your long-term goals related to your eating habits?• Could you continue buying fresh produce without support from this program? Why or why not?• How, if at all, does your cardiovascular condition influence your decisions around purchasing food? What are other things that influence your decisions around purchasing food?
Improvements	<ul style="list-style-type: none">• Do you have any suggestions on how to make improvements to the program?<ul style="list-style-type: none">○ Specifically, are there practices, education, etc. related to your condition that you had hoped you would receive as part of your participation?○ If yes, what are those? What are your suggestions for delivering/providing those?

Table 2

Demographic Characteristics of Interviewed Participants

Demographic Characteristics	Frequency (n=19)	Percentage
Gender		
Male	3	15.8%
Female	16	84.2%
Age		
30-39	4	21.1%
40-49	3	15.8%
50-59	3	15.8%
60-69	5	26.3%
70-79	2	10.5%
80-89	1	5.3%
90-99	1	5.3%
Race/Ethnicity		
Black or African American	18	94.7%
White or Caucasian	1	5.3%
Time enrolled in program		
7 months	10	52.6%
10 months	9	47.4%
Cardiovascular condition		
High Blood Pressure or Hypertension	16	84.2%
High/Bad Cholesterol	12	63.2%
Heart Attack	1	5.3%
Coronary Heart Disease	2	10.5%
Stroke	3	15.8%

Results and Discussion:

Enrollment

Associated Interview Questions: “What role, if any, did your cardiovascular condition play in your decision to enroll in this program?” “Have you seen a physician? If yes, have they discussed nutrition as part of managing your condition? If not, has anyone talked to you about the role of nutrition in managing cardiovascular conditions?”

Operationalization: This theme explores what influenced participants to enroll in the program – including the role of their cardiovascular condition in program enrollment, whether they have seen a physician, and if they know the role of nutrition in managing their condition. Answers were recorded as a categorical variable. By understanding why participants joined the program, it will be easier to tailor their experience to address their needs.

Discussion: When asked their main motivation for joining the program, the majority of interviewed participants stated that they joined for financial reasons (n=15) and/or because of their cardiovascular condition (n=14). These findings confirm what other studies have found, as financial concerns often precede other concerns (Trapl et al.). When asked if they have seen a physician regarding their cardiovascular condition, 21% of participants interviewed (n=4) stated that they had not. This is likely due to the shortage of primary care physicians along with a high uninsured rate in rural areas (“Rural Hospital Closures Threaten Access”). Those without insurance are less likely to attend regular healthcare appointments if they do not think it is necessary (Bolin and Gamm).

Effects of the program

Associated Interview Questions: “What has your overall experience been since joining this program?” “How do you feel this program has helped (if at all) you in managing your cardiovascular condition?” “Have you noticed any changes regarding your cardiovascular health?” “Do you feel as if you have more or less energy since beginning this program?” “How have your eating habits changed?” “What are your long-term goals related to your eating habits?” “Could you continue buying fresh produce without support from this program? Why or why not?” “How, if at all, does your cardiovascular condition influence your decisions around purchasing food?”

Operationalization: All answers were recorded as a categorial variable. This theme will describe any changes that participants have made since joining the program, including changes to their diet, food preparation and eating habits. This will also describe any physical changes participants have noticed since joining the program, including any changes to their cardiovascular health and whether they have more or less energy. This theme will also describe what their long-term goals are related to their eating habits. Additionally, this theme will include the influence that their cardiovascular condition plays on purchasing food, along with any financial constraints participants may have. Many participants rely on support from the program to purchase fresh fruits and vegetables. This is an important theme to evaluate, as participants in this program experience food insecurity.

Discussion: 95% of participants interviewed (n=18) stated that they have chosen healthier options, especially when it comes to snacking, since joining the program. Because healthier options are much more affordable with food prescription programs,

participants are able to consume them at much higher rates (Bhat et al.). 84% of participants interviewed (n=16) stated that they have felt more energetic since joining the program. Similarly, 42% of participants interviewed (n=8) stated that they have lost weight since joining the program. These findings support what the literature stated, as food prescription programs have been shown to decrease BMI and HbA1c levels (Bhat et al; Cafer et al.). 100% of participants interviewed (n=19) stated that the food prescription program has helped them improve their eating habits. This is supported by the literature, as participants are more likely to sustain healthy eating habits when these options are more affordable (“Cardiovascular Diseases”). Similarly, 100% of participants interviewed (n=19) stated that they would have to purchase significantly less produce without support from the program. This is supported by the literature, as adverse health outcomes are more correlated with low income than access to healthy food (Kelli et al.). Without the financial backing from this program, many participants would not be able to afford to purchase as high of a quantity of fruits and vegetables.

Improvements

Associated Interview Question: “Do you have any suggestions on how to make improvements to the program?”

Operationalization: This theme explores the improvements to the programs that participants stated and any practices/education that they hoped that they would receive as a part of the program.

Discussion: 73% of participants interviewed (n=14) agreed that more stores should be included in the program that have better quality fresh produce. The price of

fresh produce at the current affiliated store is higher than other stores, making it harder to get enough fresh produce with the vouchers provided. 63% of participants interviewed (n=12) thought that including frozen fruits and vegetables in the program would be beneficial. This would allow for easier storage of products and the ability to buy preferred produce that may not currently be in season. By making these two highly requested changes, participants will be more likely to adhere to program goals and consume more fruits and vegetables (Planner et al.).

Table 3

Participant Responses to Interview Questions

Themes	Axial codes	Open codes	Count
Enrollment	Financial aid influenced their decision to enroll in the program	“I can use more of my income for bills”; “Produce at the store is expensive”; “I was eager to have low cost fresh produce.”	15
	Cardiovascular condition played a role in their decision to enroll in the program	“My cardiovascular condition played a big role in joining the program.”	14
	Have seen a physician about their cardiovascular condition		11

Table 3 (continued)

Themes	Axial codes	Open codes	Count
Enrollment	Educated about the role of nutrition in managing their cardiovascular condition	“I have received education through this program”; “I have received education from a physician”; “I believe that eating healthy helps the whole body.”	10
	Have NOT seen a physician about their cardiovascular condition		4
Effects of the program	Without support from the program, would have to purchase less fruits and vegetables	“I wouldn’t be able to buy as much produce without support from the program”; “Fresh produce is expensive”; “This program increases my accessibility to purchase fresh produce.”	19
	Program helped improve eating habits	“I now choose fruit over junk for snacks when available.”	19
	Choosing healthier options	“I eat healthier snacks.”	18

Table 3 (continued)

Themes	Axial codes	Open codes	Count
Effects of the program	Increased fruit/vegetable consumption through support from the program	“This program has been a great asset to my family.”	17
	Increased fruit/vegetable consumption	“I am becoming more healthy”; “I can incorporate more fruits and vegetables in my every day diet.”	16
	More energetic	“I feel more energetic since joining the program.”	16
	Long term goal is to continue current eating habits	“I want to maintain eating healthy to live a longer, safer life”; “I want to make these changes long term rather than temporary.”	14
	Cardiovascular condition influences what food they purchase	“My cardiovascular condition whole heartedly influences what food I purchase.”	11
	Weight loss	“I have lost weight since joining this program”; “I feel better and lighter.”	8
	Preparing food healthier	“I bake or broil food rather than frying it”; “I cook with less grease.”	6

Table 3 (continued)

Themes	Axial codes	Open codes	Count
Effects of the program	Eating in moderation or small portions	“I now eat in moderation”; “I satisfy my hunger, but I don’t overeat”; “I drink more water to satisfy my hunger”; “I eat smaller portions for snacks.”	4
Improvements	More stores available for purchasing fruits and vegetables	“I have limited access to stores, but I am willing to travel to the neighboring town for better prices”; “Fresh produce is more expensive at the local store [than at a chain grocery store].”	14
	Better options in store	“The produce at the local store is not always fresh”; “The local store needs better quality produce.”	14
	Include frozen fruits and vegetables	“Frozen produce is easier to store”; “If we could buy frozen produce, we could buy items that we enjoy out of season.”	12

Table 3 (continued)

Themes	Axial codes	Open codes	Count
Improvements	Food preparation education	“Food preparation education would make people more cognitive of what they are eating”; “I could learn to cook food that still tastes good without all of the bad stuff.”	10
	Expand program	“Expanding the program would increase accessibility across county.”	3
	Newsletter with testimonies	“Newsletters with testimonies would encourage healthy eating to the community.”	2

Recommendations:

1. **Regular and On-going Feedback Loops:** Based on the findings, it is important for future food prescription program administrators to implement regular feedback in their programs. Although these findings were on a small scale, seeing the impact of feedback-based changes on a long-term scale would help better understand the relationship between feedback and participant adherence.
2. **Sustainable Access to Healthier Options Long-Term:** This study found that financial barriers had a larger influence on joining the program than health conditions alone. Because of this, it is important to help participants find long-term solutions to eating healthier. Since many food prescription programs are not permanent, finding other ways to make fruits and vegetables more affordable is imperative for rural populations to make permanent diet changes.

Limitations:

There are three key limitations of this research. The first is that there were a limited number of food prescription participants that wanted to participate in the focus group interview. Because of this, only a small sample of the larger program was interviewed. The second limitation is that the sample taken is not generalizable. Because only nineteen participants were interviewed, the results may not be representative of the entire population. The third limitation is that the participants live in a rural, historically marginalized community which directly reflects program outcomes.

Conclusions:

All of the participants interviewed agreed that the program helped them improve their eating habits, but without support from the program they would have to purchase less fruits and vegetables. Because of this, we recommend finding sustainable ways to access healthier options in the long-term. Additionally, the majority of the participants felt as if more stores should be included in the program, along with better quality options in the stores. On top of this, the majority of the participants felt as if it would be beneficial to include frozen fruits and vegetables as a qualifying item to use their vouchers on. Because three ideas were frequently mentioned, we recommend implementing regular and on-going feedback loops. Making the changes that participants suggest, if possible, may increase participant outcomes.

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