The Prevention of Type II Diabetes in African Americans Consuming a Plant Based Diet

By

Alyssa Weakley

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Public Health in Community Health

Middle Tennessee State University

May 2023

Thesis Committee:

Dr. Kahler W. Stone, Chair

Dr. Bethany A. Wrye

DEDICATION

I dedicate my work to my mom and family for being the inspiration for my medical aspirations. I also dedicate this paper to African American communities.

ACKNOWLEDGEMENTS

My gratitude is extended to the following people:

Karen Reed

Committee Chair:

Kahler Stone

Bethany Wrye

ABSTRACT

The purpose of this study is to investigate if type II diabetes can be prevented in African Americans by consuming a plant-based diet. This study aspires to answer the following research question: Can type II diabetes be prevented in African Americans by consuming a plant-based diet? A plant-based diet is free from all animal products such as meat and dairy and is substituted with plants such as fruits and vegetables. This is a systematic review aimed at answering the previously mentioned research question. Many black people assume that because their parents and great-grandparents were diagnosed with chronic illnesses such as diabetes, hypertension, or cancer, it is set in stone that they too will have the same health disadvantages and hardships. This study aims to break that stigma by examining the relationship a plant-based diet can have on the prevention of illness.

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

LIST OF TERMS

Type II diabetes – when the body is not able to use insulin and cannot keep blood sugar levels at equilibrium

Prevention – the action of stopping something from happening

African American – a Black American of African descent

Black people – referring to the color of people

Plant-Based - diet does not necessarily eliminate all animal products, but focuses on eating foods that come directly from plants such as fruits, nuts, and vegetables

Vegan – a person who does not eat any food derived from animals and who does not use any other animal products

Vegetarian – a person who does not eat meat and sometimes other animal products, for moral, religious, or health reasons

CHAPTER ONE

INTRODUCTION

Diabetes has become a public health concern that accounts for 95% of the 25 million patients with diabetes living in the United States in 2010 (Hill, et al., 2013). According to the National Center for Minority Health and Health Disparities, the legal definition of health disparities is "is a significant disparity in the overall rate of disease incidence, prevalence, morbidity, mortality or survival rates in the population as compared to the health status of the general population" (National Library of Medicine, 2009, page 4). Type II diabetes has most commonly been diagnosed in adults, but over the years, researchers have seen an increase of type II diabetes diagnoses in young children (Centers for Disease Control and Prevention, 2023). People are more likely to develop type II diabetes if they are over 45 years of age, have a family history of diabetes, or are overweight. Concerningly, African American adults are twice as likely to be diagnosed with type II diabetes compared to white adults. According to the National Institutes of Health, this is a racial healthcare disparity that has been on the rise for the past 30 years (Hicklin, 2018).

Risk factors associated with African Americans with type II diabetes such as diet-related, environmental, and cultural factors can be reduced through utilizing tools such as effective dietary counseling, nutrition interventions, and educational programs. It is important to be aware and conscious of cultural features that affect food appearance and the comfort found in food before proceeding with these interventions as the interventionists want to be intentional with creating sustainable healthy behaviors. Frameworks can be adapted to aid in modifying traditional meals, thus incorporating more fruits, vegetables, and healthy fats into their routine

diets, as well as being intentional with hiring study staff and other interventionists who are culturally aware of this population. The goal of researchers should be to provide sustainable change and healthy behaviors in African American communities by acknowledging the cultural background and history and implementing dietary counseling on the importance of reducing foods that contribute to poor health outcomes, as well as creating interventions that focus on nutrition and curating an educational space for communities to discuss their concerns and find ways to come to a solution that improves the health of the community.

A plant-based diet omits the consumption of meat, eggs, and dairy products and indulges in foods made from plants. A plant-based diet includes legumes, whole grains, fruits, vegetables, and nuts that are proven to be excellent sources of fiber. According to McMaken & Shah (2017W) "Whole grains, including whole-grain bread, whole-grain cereals, and brown rice, have been associated with reduced risk of developing diabetes" (para. 8). A plant-based diet usually results in reduced consumption of saturated fats. A plant-based diet has proven to be effective in the prevention and management of people with type II diabetes. A plant-based diet could aid in improving the health of African American communities as they are diagnosed at higher rates compared to other races.

The socio-ecological model takes into consideration the complexity of the individual, relationships, community, and societal factors in order to help healthcare professionals to better understand the decisions they make and why they make them. Intrapersonal determinants or individual factors, influence behaviors such as knowledge, attitudes, beliefs, and personality while interpersonal determinants are interactions with other people that in return can provide social support and promote healthy barriers to personal growth resulting in healthy behaviors.

Inter and interpersonal determinants are imperative to identify to create healthier habits. By identifying barriers to living a healthier lifestyle, researchers can discover solutions to improve health in the individual and as a result, in the community. Making sustainable health changes can be difficult for many people, especially if health advocacy and literacy are absent.

Purpose

The purpose of this study is to determine if type II diabetes can be prevented in African Americans through the consumption of a plant-based diet, and to shed light on the fact that more research needs to be conducted in order to aid in improving healthcare for African American communities.

Research Question

This study aims to answer and provide insight into the question: Can type II diabetes be prevented in African Americans by consuming a plant-based diet? Diabetes is a large public health crisis but there is little research on prevention of type II diabetes in African American communities through a plant-based diet, explaining why these questions are broken up into two parts.

Hypothesis

I hypothesize that type II diabetes can be prevented in African American populations when consuming a plant-based diet. Additionally, this paper has the potential to influence public health professionals to conduct more research on the benefits of a plant-based diet in communities of color.

Significance of the Study

There has been little research on the use of plant-based diets to prevent chronic illnesses, but specifically, type II diabetes among African American communities. This paper hopes to clarify existing knowledge of the benefits a plant-based diet has, while researching and focusing on how to better aid and support communities of color.

CHAPTER TWO

LITERATURE REVIEW

Background

Diabetes, often referred to as "the sugar" in African American communities and households, is a chronic illness that affects how the body turns food into energy. The body breaks down the food into sugar, also known as glucose, and releases the sugar into the bloodstream. When the blood sugar increases, it sends signals to the pancreas to release insulin. Insulin is a hormone that regulates the amount of glucose found in the blood (American Diabetes Association, 2022). Additionally, insulin allows blood sugar to enter the body and be used as energy. A person diagnosed with diabetes is unable to produce enough insulin or cannot produce the adequate amount it should. When enough insulin is not present or when the cells stop responding to the insulin produced in the body, too much blood sugar stays in the bloodstream which can cause severe health concerns such as diabetes, heart disease, vision loss, and kidney failure over time (Centers for Disease Control and Prevention, 2022).

Diabetes

There are several types of diabetes such as type 1, type 2, gestational, and prediabetes. Type 2 diabetes is when the body is not able to use insulin and cannot keep blood sugar levels at equilibrium. Type 2 diabetes develops over the years and is mostly diagnosed during adulthood, although there has been an increase in diabetes diagnoses in young adults and children. Type 2 diabetes can be prevented or delayed with the implementation of healthy lifestyle changes. These changes can include eating a healthier, plant-based, or vegan, diet. This paper focuses on the prevention of type 2 diabetes in African Americans with a focus on a plant-based diet.

Diabetes Health Outcomes

The World Health Organization reports that more than 95% of people who have a diabetes diagnosed, have type II diabetes. Symptoms resulting from this diagnosis often go unnoticed and a person can be diagnosed years after onset which can result in complications and urgency for treatment. For many years, type II diabetes was mostly seen in adults, but has occurred more frequently in children (WHO.int). A person can live a healthy and long life with diabetes as long as they exercise, watch the amount of sugar and carbohydrates they intake, and comply with their doctor with various checkups and blood work throughout the years. Additionally, type II diabetes, unlike type I, can be reversed and even prevented with lifestyle changes. Diabetes is not a death sentence but with proper interventions, it can be a burden that is lifted from so many lives.

Diabetes Prevention

According to the Mayo Clinic (2023), there are 5 steps a person can take to prevent diabetes. Those steps include lose extra weight, partaking in physical activities, consume healthy plant foods, consuming healthy fats, and lastly, skipping diets such as paleo and keto and focus more on making healthier choices.

Weight loss can reduce the risk of type II diabetes. Physical activity can help a person lose weight, lower blood sugar, and boost insulin sensitivity. Physical activity can include walking for 30 minutes around the neighborhood, strength training, yoga, swimming, biking, running, and much more.

Additionally, a healthy plant-based diet can decrease the rate of absorption of sugars and in return can lower blood sugar levels, interferes with fat and cholesterol absorption, decreases

risk of elevated blood pressure and inflammation in the body, and lastly, allows you to become fuller due to consuming fiber-rich foods which allows energy production. The consumption of healthy fats is important because healthy fats can help to lose and maintain a healthy weight and can also help you feel fuller which decreases the food intake over time. Lastly, missing out on trending diets and focusing solely on making healthier choices can help you lose and maintain weight loss which in return will help to maintain a healthy blood sugar (Mayo Clinic, 2023).

Diabetes in African Americans

In 2015, African Americans contributed to 13% of the total population in the United States of America, ranking as the second largest minority group with Latino's ranking at the first (U.S. Department of Health and Human Services, 2017). Additionally, according to the Center for Disease Control, a National Diabetes Statistics Report was conducted in 2018. The report showed that 13.4% of black men were diagnosed with diabetes compared to 8.7% in white men. 12.7% black women were diagnosed with diabetes compared to 7.5% of white women. The total amount of diabetic diagnoses in black men and women was 13% compared to 8% diabetic diagnoses in white men and women (Center for Disease Control and Prevention, 2022). The number of black men and women who are diagnosed with diabetes is disproportionate from the number of white men and women diagnosed. This is a racial health disparity and a major public health concern which ultimately calls into action a solution.

The National Institutes of Health contributes weight and fat surrounding the abdomen to be responsible for higher rates of diabetes in African Americans compared to white Americans (National Institute of Health, 2018). Traditionally, African Americans consume more meat and less vegetables. During slavery, African Americans only had access to left-over scraps that were

unwanted by slave owners. These scraps were discarded from slaughtered animals and later consumed by the slaves. The scraps included pig intestines, referred to as “chitterlings” and the necks of cows, “neck-bones”, which bare high amounts of sodium and saturated fats that are linked to an increased likelihood of chronic illnesses (Begum, 2022). Consequently, these foods became a part of the black tradition and are still consumed today. Over time, slavery was replaced by institutionalized racism which contributed to predominantly black neighborhoods being labeled as food deserts and higher rates of poverty (U.S. Department of Health and Human Services, 2017). In fact, it was stated that one out of five African Americans consumes the recommended servings of fruit and vegetables daily. Black Americans are more likely to consume decreased amounts of produce and dietary fibers and an increase in dietary fat than white Americans (Horowitz et al., 2004).

Simultaneously, education is an additional factor that cannot go unrecognized as education and poverty help to facilitate and produce sick people as poverty contributes to the lack of poorer education. 60% of African American and Latino students attend schools that are inadequately funded and do not have access to resources that provide a quality education compared to 18% of white students (Orefield & Lee, 1995). Poorer education also results in disadvantages in the workforce and working for less pay, which, in return, inhibits the idea of financial freedom in being able to afford a healthy lifestyle by purchasing foods such as fresh fruits and vegetables. This continues to create a vicious cycle that many black Americans are inevitably caught in. Many African Americans are not taught about how their favorite cultural dishes are slowly killing them or contributing to their poor health and suffering. They are overlooked because of their background and lack of health literacy which causes African

Americans to be disproportionately diagnosed with diabetes compared to any other race (Vance, 2018).

Cultural Factors

Reflecting to slavery, African Americans have relied on each other for support and have built a close-knit culture that includes bonding with one another. A snowball effect is to be seen in African American communities as poor socioeconomic status results in poor neighborhoods where there is an increase in food deserts. The food deserts exacerbate the consumption of unhealthy foods that result to the diagnosis of chronic illness and consequently can result to poor healthcare treatment. This is an effect that haunts African American communities for generations to come and without effective interventions, will continue to haunt African American communities and maintain racial health inequalities.

Risk Factors

According to Marshall (2005) African Americans are not only at a higher risk for insulin resistance and type II diabetes, but African Americans receive lower quality healthcare compared to other minorities and have higher rates of complications than white diabetic patients (Marshall, 2005). Risk factors for this community include diet-related factors, environmental factors, and cultural factors.

Diet Related Factors

The National Library of Medicine provides a definition of diet-related disparities as being "differences in dietary intake, dietary behaviors, and dietary patterns in different segments of the population, resulting in poorer dietary quality and inferior health outcomes for certain groups and

an unequal burden in terms of disease incidence, morbidity, mortality, survival, and quality of life" (Satia, 2010, para. 4). Racial and ethnic minority groups, specifically African Americans, experience diet-related disparities and consequently suffer from poorer nutrient profiles and obtain poor dietary behaviors. These diet-related disparities include consumption of foods high in fats, particularly saturated fats, low in fruits, vegetables, and whole grains, and high consumptions of salt and sugar. These disparities are more likely to be associated with socioeconomic status and accessibility to food (Satia, 2010).

Environmental Factors

Historically black people have had higher rates of diabetes due to the inaccessibility to money and healthy fruits and vegetables. A growing interest in environmental factors has identified that health disparities contribute to poor health outcomes. Locations of food deserts or locations where fresh fruits and vegetables are not accessible, correspond in areas that have higher percentages of African American residents. African Americans are a vulnerable and overlooked population that suffer higher rates of numerous chronic illnesses (Gordon, et al.,2010). Statistics express that 12.1% of African Americans are living with diabetes compared to 11.8% of Hispanics, 9.5% of Asian Americans, and 7.4% of non-Hispanic whites (diabetes.org) and in 2015, African Americans with diabetes contributed to 13% of the United States population (U.S. Department of Health and Human Services, 2017). The number of African American men and women diagnosed is alarming and continues the health inequality and disparities in black communities.

History of African American Diets

Traditionally, African Americans have been exposed to diets high in total saturated fats, high salt, and fiber intake. The current African American diet can be traced back to slavery when African Americans were forced to eat the unhealthy leftovers of the animals such as pig intestines and feet. Food is deeply rooted in many cultures, but specifically black cultures because after a long day of harvesting crops, that was the one time where they could gather and be with their loved ones (Airhihenbuwa, et. al., 2010). Today, eating patterns are still rooted in culture as mentioned previously, but to take it even further, many African Americans are economically disadvantaged.

Economic Disadvantages and Structural Racism within Food Insecurity

The lack of resources, such as money, makes it harder for someone to afford healthier food options, not to mention the location. According to Jones et. al. (2018, para.9), "In the most recent data, African Americans are about 2.5 times as likely to be in poverty as whites". Additionally, African Americans can expect a shorter life expectancy compared to White Americans. "African Americans' life expectancy at birth has also increased substantially (up 11.5 years) between 1968 and today, outpacing the increase for whites (up 7.5 years). But an African American born today can, on average, still expect to live about 3.5 fewer years than a white person born on the same day" (Janelle Jones et al., 2018, para. 24). The United States Department of Agriculture (USDA) defines food insecurity as an economic and social condition that limits the access to adequate and healthy, fresh foods, on a household level (Coleman-Jensen, et al., 2022). According to Odoms-Young (2018), "An analysis examining trends in food insecurity from 2001 to 2016 found that food insecurity rates for both non-Hispanic black and

Hispanic households were at least twice that of non-Hispanic white households" (para 2). Many African Americans are facing food insecurity due to many factors such as poverty, incarceration, disability, and unemployment. While there are many complex factors surrounding socioeconomic factors and food insecurity among the African American population, there are many health risks that stem from these disadvantages.

Chronic Illnesses that Affect African American Communities

Chronic illnesses affect all people; however, African Americans are more likely to be diagnosed with the three most common chronic illnesses: hypertension, high cholesterol, and type II diabetes. Hypertension, formerly known as high blood pressure, is a condition when the force of the blood against the arterial wall is too high. If gone untreated, hypertension can cause heart disease, stroke, and can be fatal. High cholesterol is when a person has too much cholesterol in the blood which can also lead to a heart attack or stroke. Lastly, type II diabetes affects the way in which the body processes glucose, or blood sugar. Symptoms of type II diabetes include increase in thirst, frequent urination, lethargy, increase in hunger or appetite, and blurred vision. In some cases, there are no symptoms present. Consequently, untreated type II diabetes can manifest into skin conditions, eye damage, kidney disease, neuropathy, hearing impairment to name a few. According to the CDC, the leading causes of death of African Americans are as follows: heart disease, cancer, and COVID-19. The percentage of men, age 20 and above with hypertension, is 56.8% and for women, age 20 and above, it is 57.6%. The CDC defines hypertension as the measurement of high blood pressure or taking antihyperactive medications. Obesity percentages for men, age 20 and above are 38.7% and for women, age 20 and over, are 55.9%. According to the health status, 18.7% of adults aged 18 and older are in fair

or poor health and 2.4% for children under age 18 (CDC/National Center for Health Services, 2022). There is no denying that African Americans are disproportionately suffering from these diseases.

What is a Plant-Based Diet?

Many people use the terms "vegan" and "plant-based diets" interchangeably. To provide some context, a vegan diet is a diet that eliminates all animal products, this can include honey and purchasing clothing that comes from animals while a plant-based diet does not necessarily eliminate all animal products but focuses on eating foods that come directly from plants such as fruits, nuts, and veggies. For the sake of this paper, vegan and plant-based will be used interchangeably as they result to food, and not other purchases such as clothing. Many studies have shown that a vegan or vegetarian diet can decrease the risk of chronic illness compared to those who eat a meat-based diet. According Petti, et. al (2017, para. 1), "A better health achievement is usually the first goal of turning vegetarians, on the reports that ischemic heart, circulatory and cerebrovascular diseases, type 2 diabetes, and some cancers were significantly lower in vegetarians and vegans than in omnivores". Veganism has proven to be an effective in lowering the risk of chronic illnesses and could be a true prevention and reversal mechanism for the health of many African Americans.

Additionally, a vegan diet restricts the consumption of meat, dairy, fish, and eggs. A person can decide to become vegan for ethical issues surrounding animal care and treatment, wanting to preserve the earth and its resources, the risks associated with antibiotics and growth hormones found in the animal production industry, potential threats of animal-borne diseases, or solely because of the health advantages a plant-based diet offers. Additionally, a plant-based diet

could be ideal for people who have dairy and lactose allergies. According to Craig (2009), vegan diets tend to be higher in vitamins C and E, fiber, magnesium, and phytochemicals while being lower in calories, saturated fats, cholesterol, fatty acids and more. A low-fat vegan diet has been shown to be useful in increasing the rate of consumption of protective nutrients that are known for fighting off chronic diseases. A one-year interventional research study determined that vegetable protein consumption was negatively correlated with total cancer mortality and animal protein consumption was a strong predictor in prostate cancer mortality rates (Dewell et al., 2007). While more research needs to be conducted, the current research proves that there is a reduction in the prevalence of diabetes in people who consume a plant-based diet (Craig, 2009). Animal-based diets are loaded with fats and cholesterol. Limiting both can reduce the risk of chronic disease. Cancers and heart disease are exacerbated by high-fat diets.

Vegan Diets and Prevention of Chronic Illness

According to Craig (2009), "Vegan diets are usually higher in dietary fiber, magnesium, folic acid, vitamins C and E, iron, and phytochemicals, and they tend to be lower in calories, saturated fat and cholesterol, long-chain n-3 (omega-3) fatty acids, vitamin D, calcium, zinc, and vitamin B-12" (p. 1627S-1633S). Many of these nutrients are known to reduce the risk of chronic illness. Furthermore, research shows that a vegan diet is a protection factor from cancer, cardiovascular disease, and bone health.

Studies on Plant-Based Diets and Prevention of Chronic Illness

A cross-sectional study was conducted and compared the cardiovascular risks of vegetarians and non-vegetarians in black people located in the United States. 470 black women and 185 black men were selected for this study. An overnight blood sample, urine collection, and

a subcutaneous adipose tissue sample were collected. This was to measure the body fat percentage, blood pressure, get a lipid profile, and metabolic parameters were selected. The article reports that the odds ratio consisted of hypertension, diabetes, lipid levels were compared to dietary patterns and were estimated by logistical regression (Fraser et al., 2014). Means levels of each risk factor associated with dietary patterns among each of the participants who were not taking medications for the medical conditions listed or associated risk factors were taken into consideration and adjusted for using ANCOVA. Researchers adjusted for age, gender, education, physical activity, and indicator variables for the sub-study. In conclusion, the study found that there was a lower risk of cardiovascular disease among vegans and vegetarians compared to those who were not. There were even 44% lower odds of hypertension among vegans and vegetarians compared to those who were not. The study discovered that there was less than half of the risk of diabetes among vegans and vegetarians compared to those who were not. The study identified one of its weaknesses being that it was an observational study and that does not explain or determine causality (Fraser et al., 2014). In conclusion, the study found that there was a lower risk of cardiovascular disease among vegans and vegetarians compared to those who were not. There were even 44% lower odds of hypertension among vegans and vegetarians compared to those who were not. The study discovered that there was less than half of the risk of diabetes among vegans and vegetarians compared to those who were not. The study identified one of its weaknesses being that it was an observational study and that does not explain or determine causality (Fraser et al., 2014).

All in all, diabetes affects a large portion of the population, however African Americans are more likely to be diagnosed with type 2 diabetes at disproportionate rates compared to non-African Americans. 13% of African American men and women are diagnosed with diabetes

compared to 8% non-African Americans. This is detrimental, not only to the black community, as they are losing their family members to a disease that could have been prevented, but also to our economy and the overall public health of our society. Type 2 diabetes can be reversed or delayed when considering a plant-based diet (McMacken & Shah, 2017). With education and cultural competency, the black community can have autonomy over their health and live the longer and healthier lives they deserve.

Risks Associated with Plant-Based Diet

Animal-based diets provide imperative nutrients like vitamin B-12 that are not found in a plant-based lifestyle. A plant-based lifestyle also needs proper research and knowledge. Most importantly, it needs to be accessible. If the items for success, such as food, or not accessible then the lifestyle change is not sustainable. Craig (2009) discusses some potential shortfalls of veganism as stated,

> To obtain a nutritionally adequate diet, the consumer must first have appropriate knowledge of what constitutes a nutritionally adequate diet. Second, accessibility is important, i.e., the availability of certain foodstuffs and foods fortified with key nutrients that are otherwise lacking in the diet. This accessibility will vary greatly, depending on the geographic region of the world, because different countries have different fortification laws. The following section deals with nutrients of concern in the vegan diet. The problem of insufficient calcium has already been discussed in the section on bone health (p. 1627S-1633S).

Although these are some downfalls to veganism, these are also things that have positive and obtainable solutions for the environment, for animals, and most importantly, for the people.

Health Risks Associated with an Animal-Based Diet

Animal-based diets are loaded with fats and cholesterol. Limiting both can reduce the risk of chronic disease. Cancers and heart disease are exacerbated by high-fat diets. Woteki and Thomas (1992) state, "People who follow a strict vegetarian diet—no meat, poultry, fish, eggs, or dairy products—tend to have a lower blood pressure than those who eat a typical U.S. diet. Since strict vegetarians eat more monounsaturated fatty acids and polyunsaturated fatty acids, and less total fat, saturated fatty acids, and cholesterol, it is reasonable to suspect that dietary fat may have something to do with developing hypertension" (page 95).The data support vegetarian diets as being healthier and able to reduce the risk of chronic disease, so why not take it a step farther by cutting out animal products altogether? Additionally, Woteki and Thomas (1992) state, "Eating a diet high in fat can increase the risk of developing cancer, particularly cancers of the colon and breast. Studies of cancer rates and eating habits among the different people of the world show a consistent relationship between high-fat diets and high overall cancer rates" (page 96). People need to change their diets. Diet plays an imperative role in health, in all aspects.

Conclusion

There is no doubt that African Americans are at a disadvantage when it comes to their health. This paper has discussed factors such as socioeconomic status, food insecurity, and many other things. The purpose of the literature review is to explain how a plant-based diet affects health, especially among the black community. Research shows that many of these health disparities can be prevented and even reversed with knowledge. It is important to conduct research and collect up-to-date data on the effects on diet and health in the black community because they are the

ones who are suffering compared to any other ethnicity. Something can be done to help those who are in need the most.

CHAPTER THREE

METHODOLOGY

Systematic Literature Review

Systematic literature reviews are intricate literature reviews that answer a proposed research question with the objective of identifying, selecting, and analyzing the results from a selective number of studies. A systematic review consists of planned methodological approaches. A preliminary search through the Cochrane database asking the question, can type II diabetes be prevented in African Americans by consuming a plant-based diet, yielded an empty search. This proves a need for a systematic review answering the proposed research question.

Research Design

This review is based on available articles and online journals from various online databases.

Identifying Relevant Work

To answer the research question, a systematic search of the electronic databases, PubMed, SCOPUS, and Medline was conducted using the keywords “plant-based diets” AND “African Americans or black Americans or blacks” AND “type 2 diabetes”. The Boolean search strategy was used for this study. The Boolean strategy allows for researchers to combine the keywords and phrases used with operators such as “AND”, “OR”, and “NOT” to limit, widen, or even define the search without compromising the search and results (Burns, et al., 2011). The search was limited to studies published in English from the year 1990 to 2022.

Randomized controlled trials and observational studies were considered for inclusion.

Keywords: “plant-based diets” AND “African Americans or black Americans or blacks” AND “type 2 diabetes”

Cochrane Database of Systematic Reviews

The Cochrane Database of Systematic Reviews (cochranelibrary.com) is a tool utilized to conduct research in health care and in health policy. For the sake of this review, the Cochrane Review methods was utilized and is as follows:

- Defining review questions and developing inclusion and exclusion criteria
- Searching for studies
- Assessing potential risk of bias
- Analyzing the data
- Addressing reporting bias, if applicable
- Presenting the results found and summarizing the findings
- Interpreting results and drawing a conclusion

A search in the Cochrane Database yielded zero results for systematic reviews relating to the research question.

Objective

This systematic review aims to answer the questions if type II diabetes be prevented in African Americans and if type II diabetes be prevented with a plant-based diet.

Background

Type II diabetes is a prevalent chronic condition that disproportionately affects African Americans. Studies have shown that adopting a plant-based diet can improve insulin sensitivity, reduce the risk of developing type II diabetes, and improve overall health outcomes. However, the effectiveness of a plant-based diet in preventing type II diabetes among African Americans is still unclear. African Americans are at a higher risk of developing type II diabetes compared to other ethnic groups. Prevention of type II diabetes is critical to reducing the burden of the disease in African American communities. This systematic review aims to evaluate the existing evidence on the effectiveness of interventions in preventing the development of type II diabetes in African Americans.

Research Question

Can type II diabetes be prevented in African Americans by consuming a plant-based diet?

Inclusion Criteria

The primary searches include “plant-based diets” AND “African Americans or black Americans or blacks” AND “type 2 diabetes”. Age requirements of participants were not accounted for. Randomized controlled trials, observational studies will be considered for inclusion. Studies were considered if the initial search using the words above, are detected in the study. These words were carefully sought out to encompass a wide range of studies to narrow down. Type II diabetes is the illness being studied, prevention is the specific method being observed, and all interventions, including lifestyle changes, diet, and exercise were selected to gain more access to studies without excluding certain interventions. African American and black are descriptive words that may be used interchangeably throughout the literature.

Keywords and their Definitions:

Type II diabetes – when the body is not able to use insulin and cannot keep blood sugar levels at equilibrium

Prevention – the action of stopping something from happening

African American – a Black American of African descent

Black people – referring to the color of people

Plant-Based - diet does not necessarily eliminate all animal products, but focuses on eating foods that come directly from plants such as fruits, nuts, and veggies

Exclusion Criteria

Studies were excluded from the review if:

- If the literature topic was not found to be relevant to the study; or
- The literature yielded poor quality research (Jadad score below 3)

Assessing the Quality of the Studies

Two types of assessments were utilized to verify the quality of each study used for this review. **The Jadad 3-point Questionnaire** was used to assess the quality of the research studies used in this review. The Jadad questionnaire is a tool used to assess the methodological quality of clinical trials. The tool was developed by Dr. Alejandro Jadad and colleagues in 1996 and is still widely used in research and the field of evidence-based medicine to this day. The Jadad questionnaire only consists of three questions that are related to the blinding, randomization, and reporting of clinical trials. Each of the three questions is scored from 0 (indicating poor quality)

to 5 (indicating good quality) and being the highest score obtainable. The Jadad score can be found in Appendix 1.

The three questions that are asked in the Jadad Questionnaire are as follows:

1. Was the study described as randomized?
    - 0 points: No mention of randomization.
    - 1 point: The study is described as randomized but does not provide any further details.
    - 2 points: The study describes the method of randomization (e.g., computer-generated random numbers, random number table).
2. Was the method of randomization appropriate?
    - 0 points: Inappropriate method of randomization (e.g., alternating allocation, case record number).
    - 1 point: The study mentions randomization, but the method is not described.
    - 2 points: The study describes an appropriate method of randomization (e.g., random number table, computer-generated randomization).
3. Was the study described as double-blind?
    - 0 points: No mention of blinding.
    - 1 point: The study is described as double-blind but does not provide any further details.

- 2 points: The study describes the method of double-blinding (e.g., identical placebo, double-dummy).

The Jadad presents a simple and efficient way to assess the quality of clinical trials, especially when conducting systematic reviews and meta-analyses. On the contrary, it is important to note that the questionnaire does not assess any other aspects such as, size calculation or allocation concealment, outside of study quality.

The Critical Appraisal Form is a general term that is used to describe a concept that utilizes various tools to assess the methodological quality and the risk of bias within research studies such as clinical trials and/or systematic reviews. There are different critical appraisal forms that are available dependent on the type of study being assessed and the specific research field. A widely used critical appraisal form for systematic reviews is the AMSTAR 2, A Measurement Tool to Assess Systematic Reviews 2. The AMSTAR 2 was designed by Dr. Beverley Shea and her team of researchers and was published in 2017. AMSTAR2 was designed to assess methodological quality and the risk of biases in systematic reviews of healthcare interventions. The AMSTAR 2 consists of 16 items that cover important domains such as the research question, the study selection, data extraction, risk of bias, synthesis of the findings, and the consideration of publication bias. Each item is to be answered with a "yes" (score of 1), "partial yes" (score of 0.5), or "no" (score of 0), indicating the extent to which the criteria is met (BMJ, 2017). Here are the questions that are asked in the AMSTAR 2 critical appraisal form for systematic reviews in healthcare:

1. Was an "a priori" design provided?
2. Was there a comprehensive literature search?

3. Was the study selection process described in detail?
4. Were the characteristics of the included studies provided?
5. Was the scientific quality of the included studies assessed and documented?
6. Was the risk of bias of individual studies considered in the review?
7. Was the risk of bias of the included studies appropriately used in formulating conclusions?
8. Were the methods used to combine the findings of studies appropriate?
9. Was the likelihood of publication bias assessed?
10. Was the conflict of interest included in the review?
11. Was the source of funding for the systematic review reported?
12. Was the selection of studies for inclusion in the systematic review reproducible?
13. Was the status of publication considered?
14. Was there an adequate explanation of the study heterogeneity?
15. Was the potential impact of the study's limitations on the results of the review considered?
16. Was the funding source of the systematic review reported?

Critical Appraisal Form: A Measurement Tool to Assess Systematic Reviews 2 can be found in Appendix 2.

Literature selected from the systematic review was examined to determine its quality, relevance, and validity using a critical appraisal form. All the studies were included in the appendix whether they were used or not.

Data Collection

Data collection of the studies were included in an excel sheet tracking all relevant information pertaining to the research question. The table includes characteristics of the included studies such as the name of the author, the study design, the aim, the population, the sample size, the type of intervention, the outcome, and the Jadad score, as well as the critical appraisal form.

Data Synthesis

After the completion of the data extraction, a descriptive paragraph of the included studies was included in the systematic review to provide readers with a conclusion from each study. These descriptive paragraphs include the relevant information for all the studies.

Interpreting the Findings

The findings of the selected studies are discussed and explained in greater detail in the results section of this thesis. The discussion and explanation include specific aspects of the study design and overall quality.

Reliability and Validity

The Jadad scale is a scoring procedure that assesses the methodological quality of published clinical trial work. The Jadad is widely used as a tool to assess and evaluate study quality. This tool focuses on randomization, blinding, dropout, and withdrawals to determine the quality of each clinical trial. The score scale ranges from 0 (indicating poor quality) to 5 (indicating good

quality). There are three baseline questions that the tool focuses on. Each question is to be answered with a “yes” (one point) or “no” (zero points). Additional points (one point per question) are appropriate if the method of randomization and blinding are described appropriately within the research. Points can be deducted (one point per question) if the methodology for randomization and blinding is not described appropriately.

Ethics

For this literature review, only peer reviewed and recently publish literature (from 1990 to 2022) from accredited databases was used to ensure the quality of this review.

The appropriate acknowledgement was given to all authors who contributed to the literature in this this. If applicable, all confidential information of studies was kept confidential.

Plagiarism was avoided by strategically monitoring the sources that were used to conduct this review. The information used to facilitate in this review was carefully and appropriately carried over from the same context it was written and cited.

CHAPTER FOUR

RESULTS

Identification of Studies

A complete and diverse search was conducted to identify English literature that pertained to the research question: Can type II diabetes be prevented in African Americans by consuming a plant-based diet? The goal of this paper is to shed light on pertinent need and significance of capturing African Americans or black people in research, especially when they are the largest population suffering from a chronic illness. A total of 7 studies across three different databases: PubMed, SCOPUS, and Medline. These studies were identified in respect to type II diabetes prevention in African Americans utilizing a plant-based diet.

The key search terms that were utilized include: “plant-based diets” AND “African Americans or black Americans or blacks” AND “type 2 diabetes”. The Boolean search strategy was used for this study. The Boolean strategy allows for researchers to combine the keywords and phrases used with operators such as “AND”, “OR” to limit, widen, or even define the search without compromising the search and results (Burns, et al., 2011).

Screening of Studies

A total of 7 articles was recorded across 3 unique databases. Each article was assessed based on the information provided in the title and the abstract. A decision was based on the inclusion and exclusion criteria that was previously mentioned in this paper. A total of 6 studies out of 7 search results were in respect to type II diabetes prevention in African Americans by consuming a plant-based diet.

At this point, duplicate studies were not found or were removed from the included searches. A comprehensive list of all studies identified based on their relevance to type II diabetes prevention in African Americans by consuming a plant-based diet, is attached as Appendix 3.

PubMed yielded 3 studies in total, the most of the three databases. The complete list of studies identified in relation to the research question are attached as Appendix 4.

Scopus provided 1 study in total, the least of the three databases. The study identified in relation to the research question is attached as Appendix 5.

Medline contributed 2 studies in total. The complete list of studies identified in relation to the research question are attached as Appendix 6.

It is important to note that other systematic reviews were found when conducting the search among the three databases, however, after reviewing the study title and abstract, these studies were excluded because they were a systematic review and did not meet eligibility criteria.

Eligibility of Studies

Any study that was not done on humans was excluded from this review. The database that produced the most human studies was PubMed, with a total of 3 out of the 6 human studies; this was after duplicates were removed and studies published in 2023 were eliminated.

Duplicate studies and studies published in 2023 were removed which yielded 3 unique human studies. The 3 remaining studies were then sourced and assessed for eligibility for inclusion in the review. Table 1 consists of the three studies referred to above.

The Jadad scale was used to assess the methodological quality of each of the 3 studies. According to the previously stated Jadad criteria, any study that received a score of 3 or more

was to be included in the systematic review. A score below 3, according to the Jadad criteria, was considered to be that of poor quality and would not be included in the systematic review.

Table 1: Three Out of the Six Studies That Met the Eligibility Criteria

Study (Author, Year)	Country, year, design	Population	Study Groups	Primary Outcomes	Aim of trials and authors conclusions
Cooke-Jackson, (2011)	Socio-ecological model	Black mothers and their daughters	45 to 75 and non-diabetic adult daughters in the age range of 20 to 56 years old	The results of the study indicated that black people are more likely to obtain information and knowledge about various health topics when it is presented in a dialogue that they are comfortable and familiar with.	This can help shape medical interventions and aid in better care for African American patients.
Barnard ND et. al., (2009)	Randomized control trial	Outpatient research center with a total of 93 adults with type 2 diabetes	Two groups: a low-fat vegan diet or a diet following the 2003 American Diabetes Association	Dopamine has a significant role in the regulation of insulin action which can significantly reduce A1c levels in individuals with type 2 diabetes	Determine the presence of certain D2 dopamine receptors Taq 1A genotypes were associated with the reduced efficacy of an interventional diet in people with type 2 diabetes
Davis BC et. al., (2019)	Republic of the Marshall Islands, Randomized control trial	People with type 2 diabetes	Intensive plant rich diet and lifestyle intervention along with exercise versus the standard of care type 2 diabetes patients	The results of the study have not yet been reported	Researchers are hopeful that the results will aid in the guidance of future medical care and shed light on how to effectively design and achieve an intensive lifestyle intervention for the treatment and management of diabetes

In accordance with the Cochran Review handbook, referred to earlier, scales for assessing the risk and or quality of bias is discouraged when conducting a Cochrane review. While these scales tend to offer a simple approach to biases quality control, it tends to lack empirical evidence. These types of scales have also been known to be an unreliable assessment of validity. However, Cochrane does advice using a simpler approach when assessing the validity of the research (Higgins & Green, 2011). The Jadad scale was developed to assess randomized trials. Cochrane also discourages the use of the Jadad scale for randomized clinical trials. The importance of potential bias in randomized trials is not addressed using the Jadad scale. For the previously stated reasoning, a full qualitative analysis in addition to assessment is ruled against the Jadad scale was conducted for other qualifying studies (Higgins & Green, 2011).

Study Characteristics

Article 1

Cooke-Jackson (2011) conducted a study to determine how conversations transpire between type II diabetic mothers and their adult daughter. These conversations have the potential to bring understanding to their illnesses and how their daughters may deal with them in the future if they were to be diagnosed. This work is especially insightful as a cultural snapshot for practitioners who provide self-care and prevention information to the African American and black population.

Cooke-Jackson (2011) does specify that the study was designed using a socio-ecological model to explain multi-layered communicative health behaviors.

The participants included met the eligibility criteria of being self-identified type II diabetic African American mothers in the age range of 45 to 75 and non-diabetic adult daughters in the age range of 20 to 56 years old. 20 individuals were recruited from Kentucky, Cincinnati,

Dayton, and Yellow Springs. Education and income levels varied. 3 interviews over a seven-day period for a total of 50 in-depth interviews was conducted. Interviews lasted between 45-90 minutes.

The results of the study indicated that black people are more likely to obtain information and knowledge about various health topics when it is presented in a dialogue that they are comfortable and familiar with. This can help shape medical interventions and aid in better care for African American patients.

Article 2

Barnard ND et al., (2008) conducted a study to determine the presence of certain D2 dopamine receptors Taq 1A genotypes were associated with the reduced efficacy of an interventional diet in people with type 2 diabetes. Specific of these D2 dopamine receptors have been associated with conditions such as obesity and substance abuse.

Barnard ND et al., (2008) states that the study was a randomized clinical trial that was facilitated in an outpatient research center with a total of 93 adults with type 2 diabetes. These patients were assigned to two groups: a low-fat vegan diet or a diet following the 2003 American Diabetes Association for 74 weeks.

		A1-	A1+	P-value
Black Participants				
N		20	24	
Mean age, range (years)		51.1	51.4	0.92
Sex				0.51
	Male	6	8	
	Female	14	16	
Marital status				0.37
	Not married	12	12	
	Married	8	12	
Education				0.13
	High school, partial or graduate	0	4	
	College, partial or graduate	13	12	
	Graduate degree	7	8	
Occupation				0.28
	Service occupation	4	2	
	Technical, sales, administrative	5	10	
	Professional or managerial	9	7	
	Retired	2	5	
White Participants				
N		26	23	
Mean age, range (years)		59.8	57.9	0.52
Sex				0.66
	Male	12	11	
	Female	14	12	
Marital status				0.63
	Not married	11	9	
	Married	15	14	
Education				0.29
	High school, partial or graduate	3	2	
	College, partial or graduate	15	9	
	Graduate degree	8	12	
Occupation				0.38
	Service occupation	3	1	
	Technical, sales, administrative	11	6	
	Professional or managerial	7	9	
	Retired	5	7	

Figure 1. Barnard ND et al., (2008)

For the duration of the 74 weeks nutrient intake, body weight, and hemoglobin A1c was measured.

The results of the study indicated that the role that dopamine plays in the brain's reward and pleasure system is also seen in addictive behaviors and this includes dietary behaviors. The results concluded that a vegan diet would be more effective compared to an ADA diet.

	Vegan Group			ADA Group			
	Week 0	**Final**	**Change**	**Week 0**	**Final**	**Change**	**P-value** [†]
Black, A1- (A2A2; 9 vegan, 11 ADA)							
Weight (kg)	93.5 (3.1)	85.3 (2.7)	-8.2 (1.4)[‡]	103.8 (3.0)	104.3 (3.0)	+0.6 (0.7)	0.02
A1c	8.49 (0.17)	7.77 (0.17)	-0.72 (0.18)	7.87 (0.16)	8.37 (0.18)	+0.5 (0.18)	0.04
White, A1- (A2A2; 9 vegan, 17 ADA)							
Weight	103.9 (4.4)	98.6 (4.9)	-5.3 (1.06)	90.0 (2.3)	84.4 (2.6)	-5.5 (1.0)[§]	0.94
A1c	8.11 (0.14)	7.22 (0.10)	-0.89 (0.11)[‡]	7.99 (0.15)	7.86 (0.16)	-0.13 (0.10)	0.02
Black, A1+ (A1A1 or A1A2; 13 vegan, 11 ADA)							
Weight	108.0 (2.3)	107.1 (2.3)	-0.9 (0.5)	113.3 (2.0)	110.6 (2.2)	-2.7 (0.6)	0.30
A1c	8.15 (0.15)	7.75 (0.17)	-0.40	7.52 (0.09)	7.51 (0.15)	-0.01 (0.12)	0.30
White, A1+ (A1A1 or A1A2; 16 vegan, 7 ADA)							
Weight	86.0 (3.0)	81.5 (3.2)	-4.5 (0.6) [¶]	106.4 (3.5)	103.4 (3.7)	-3.0 (0.6)	0.40
A1c	7.80 (0.16)	7.78 (0.16)	-0.02 (0.11)	8.53 (0.18)	8.06 (0.18)	-0.47 (0.11)	0.20

[*]Mean values. Standard error of the mean is indicated in parenthesis. Final weight measurements are last available values. Final A1c values are last available values before any change in diabetes medications.

[†]P-Values for between-group (vegan vs ADA) comparisons of changes from baseline to final values

[‡]$P < 0.05$,

[§]$P < 0.01$,

[‖]$P < 0.001$,

[¶]$P < 0.0001$ for within-group changes

Figure 2: Comparison of Weight and A1C Changes Between Diet Groups, Barnard ND et al., (2008)

It is important to note that this was only seen in A1 individuals where the two different diet interventions diverged significantly with their effects on glycemic control. The research indicated that the high prevenance of A1+ genotypes in this population was supported by the

possibility that certain variables in dopaminergic activity have the possibility of being influenced by the likelihood that diabetes is genetically predisposed to individuals, but this finding does not remedy the question whether this relationship is mediated by dietary differences. Other factors other than diet may be contributors in the relationship between dopaminergic activity and diabetes. Additionally, dopamine has a significant role in the regulation of insulin action which can significantly reduce A1c levels in individuals with type 2 diabetes.

Article 3

Davis BC et al., (2019) conducted a study to determine if a community based, intensive, and plant-rich lifestyle intervention with the addition of exercise would be more effective in the management and treatment of type 2 diabetes in the Republic of the Marshall Islands in comparison to the standard of diabetes care.

Davis BC et al., (2019) study was a randomized controlled trial that happened to be the first randomized clinical trial that has ever been conducted in the Republic of the Marshall Islands.

The duration of study lasted 24 weeks where patients were in randomized groups to test the efficacy of an intensive plant rich diet and lifestyle intervention along with exercise versus the standard of care type 2 diabetes patients.

The results of the study have not yet been reported but researchers are hopeful that the results will aid in the guidance of future medical care and shed light on how to effectively design and achieve an intensive lifestyle intervention for the treatment and management of diabetes.

Jadad Questionnaire

Out of the three studies that were screened for eligibility using the Jadad scale, Davis BC et al., (2019) received a final score of 3 indicating quality throughout the study. Barnard ND et al., (2008) received a 4 as the final score, indicating good quality of the study. Lastly, Cooke-Jackson (2011) received a score of 0 indicating poor quality of research. The scorings of all the articles in this review can be found attached as Appendix 7, 8, and 9.

Table 2: Jadad Score Breakdown

Title of Study	Jadad Score	Jadad Notes
A World of Difference: Unraveling the Conversations African American Mothers Have with Their Adult Daughters to Negotiate Diabetes	0	The study received 0 points for not mentioning randomization, 0 points for not mentioning the method of randomization, and 0 points for not mentioning if the study was blinded.
D2 dopamine receptor Taq1A polymorphism, body weight, and dietary intake in type 2 diabetes	4	The study received 2 points for describing the method of randomization, 2 points for describing the method of randomization, and 0 points for not mentioning if the study was blinded.
An Intensive Lifestyle Intervention to Treat Type 2 Diabetes in the Republic of the Marshall Islands: Protocol for a Randomized Controlled Trial	3	The study received 2 points for describing the method of randomization, 1 point for mentioning randomization but not including a description of the method, and 0 points for not mentioning if the study was blinded.

Critical Appraisal

For a research paper to be considered high quality, it is imperative that the paper presents a good scientific method and good scientific objectify. Each and every research paper needs to have a clear research question that can be testable and answerable.

Randomized controlled clinical trials, when accurately conducted, designed, and reported, have been known to be the 'gold standard" in evaluating healthcare interventions. A randomized and controlled trial can present with low quality, biased results if the study was not properly initiated and lacks specific methodology, repeatability, verifiability, reduction of biases, and reliability.

AMSTAR2 was designed to assess methodological quality and the risk of biases in systematic reviews of healthcare interventions. The AMSTAR 2 consists of 16 items that cover important domains such as the research question, the study selection, data extraction, risk of bias, synthesis of the findings, and the consideration of publication bias.

Literature was specifically and only selected for this systematic review if it met a score of 3 or higher on the Jadad scale. If the paper received a scale score of 3 or better, it was subjected to be used in the critical appraisal process. The overall purpose of the critical appraisal form is to meticulously examine research articles with the intention to judge whether the article is trustworthiness, if it has value and if it has relevance in the specified research topic. The critical appraisal form is attached as Appendix 2.

Critical Appraisal Results

Article 1

The study conducted by Davis BC et al., (2019) did provide a research question and reports that this study was designed to determine if an intensive lifestyle intervention could treat type 2 diabetes. The intervention aspect consisted of a community-based, intensive, plant-rich lifestyle with exercise compared to type 2 diabetes patients who received standard of care treatment. The literature review was comprehensive of type 2 diabetes and its prevalence. The study lasted a total of 24 weeks and was described as a randomized clinical trial. The study did define the scientific quality of the research, methods used were appropriate, a conflict of interest was discussed, and the status of publication was considered. However, the study did lack transparency on the funding source, publication bias, and the risk of bias overall. The results of this study be found as Appendix 10.

Article 2

The study conducted by Barnard et al., (2008) did provide a research question and reports that this study was designed to determine the effects of dopamine and its reaction to dietary interventions in individuals with type 2 diabetes. This randomized clinical trial took place in an outpatient research facility with a total of 93 participants with type 2 diabetes. The two groups were assigned to a low-fat vegan diet or. A diet recommended by the 2003 American Diabetes Association. Over a course of 74 weeks, nutrient intake, body weight, and hemoglobin A1c were measured. A study expressed the importance and relevance of type 2 diabetes, dopamine, and glycemic regulation. On the contrary, the study did lack information discussing the risk of biases, potential limitations, publication bias, and funding sources. While this study was deficient in

qualitative rigor, it was still included in the systematic review for its relevance to the proposed research question: can type 2 diabetes be prevented in African Americans by consuming a plant-based diet. The results of this study be found as Appendix 11.

Table 3: Critical Appraisal Form Results

Study Title	Include or Exclude	Notes
An Intensive Lifestyle Intervention to Treat Type 2 Diabetes in the Republic of the Marshall Islands: Protocol for a Randomized Controlled Trial, Davis et al., (2008)	Include	The study did define the scientific quality of the research, methods used were appropriate, a conflict of interest was discussed, and the status of publication was considered. However, the study did lack transparency on the funding source, publication bias, and the risk of bias overall.
D2 dopamine receptor Taq1A polymorphism, body weight, and dietary intake in type 2 diabetes, Barnard et al., (2008)	Include	The study did lack information discussing the risk of biases, potential limitations, publication bias, and funding sources. While this study was deficient in qualitative rigor, it was still included in the systematic review for its relevance to the proposed research question publication bias, and the risk of bias overall.

CHAPTER FIVE

DISCUSSION

Type II diabetes has become a more common chronic illness that affects the way the body breaks down sugar and turns sugar into energy. When the amount of sugar in the blood increases, a chemical signal is sent to the pancreas and tells it to release insulin. Insulin is a hormone that aids in the glucose regulation (American Diabetes Association, 2022). If enough insulin is not present in the body or if cells stop responding to insulin it can lead to diabetes, heart disease, vision loss, and kidney failure (Centers for Disease Control and Prevention, 2022).

The Mayo Clinic (2023) reported that there were 5 steps to prevent diabetes. These steps include weight loss, physical activity, healthy plant foods, healthy fat consumption, and avoiding diets. This paper focuses on the prevention of type II diabetes when consuming a plant-based diet and research has indicated that a healthy plant-based diet can decrease the rate of absorption of sugars and lower blood sugar levels.

According to the National Institute for Health (2018) weight and fat surrounding the abdomen is responsible for the higher rates of diabetes seen in African Americans compared to white Americans. Traditionally, African American households consume foods high in sodium and saturated fats which has been linked to chronic illnesses (Begum, 2022).

Poor education and lower socioeconomic status has contributed to disproportionate healthcare outcomes. Poorer education also results in disadvantages in the workforce and working for less pay, which, in return, inhibits the idea of financial freedom in being able to afford a healthy lifestyle by purchasing foods such as fresh fruits and vegetables.

Traditional Use and Prevalence

Plant-based diets have been around for years in various countries but are relatively new to Western culture and medicine. Plant-based diets have many benefits such as the reversal and prevention of many chronic illnesses. More and more scientists are observing the benefits and healing properties food has on people and it is believed that food is another form of medicine. This groundbreaking revolution can account for the decline in diagnoses of chronic illnesses such as type 2 diabetes for hundreds of thousands of individuals all over the country, but especially for black and brown communities who are more likely to be diagnosed with this illness and who are also more likely to have poorer health outcomes compared to white Americans.

This systematic review identified very few studies that pertained to the research question. While this was disappointing, it was not shocking information. Only three of the studies pertaining to plant-based diet intervention and/or type 2 diabetes were identified. There were no studies identified that pertained specifically to the research keyword searches of "plant-based diet" AND "African American" AND "type 2 diabetes". Of the three studies identified, only 2 received a Jadad score of 3 or higher. All things considered, only two out of the three studies were subjected to critical appraisal.

"D2 dopamine receptor Taq1A polymorphism, body weight, and dietary intake in type 2 diabetes" by Barnard et al., (2008) indicated that the high prevenance of A1+ genotypes in this population was supported by the possibility that certain variables in dopaminergic activity have the possibility of being influenced by the likelihood that diabetes is genetically predisposed to individuals, but this finding does not remedy the question whether this relationship is mediated

by dietary differences. Other factors other than diet may be contributors in the relationship between dopaminergic activity and diabetes. Additionally, dopamine has a significant role in the regulation of insulin action which can significantly reduce A1c levels in individuals with type 2 diabetes.

"An Intensive Lifestyle Intervention to Treat Type 2 Diabetes in the Republic of the Marshall Islands: Protocol for a Randomized Controlled Trial" by Davis BC et al., (2019) stated that the research results have not yet been reported but researchers are hopeful that the results will aid in the guidance of future medical care and shed light on how to effectively design and achieve an intensive lifestyle intervention for the treatment and management of diabetes.

Seemingly, well designed and conducted investigations of the clinical effect plant-based diets have on type 2 diabetes utilizing the intervention of a plant-based diet is needed.

Summary

It appears that plant-based diets can be considered a new intervention for the prevention of type 2 diabetes in any population, including black people. According to my search, the best available clinical research pertaining to the prevention of type 2 diabetes in African Americans by consuming a plant-based diet does not exist. Historically, black and brown communities have not been the target population of plant-based diets and it is well known that these communities are more likely to be diagnosed with chronic and debilitating illnesses such as type 2 diabetes and have poorer health outcomes. Since there is a lack of research on this topic and intervention, this is a call to action for researchers and healthcare professionals to conduct more work on interventions, but specifically plant-based diet interventions, in black and brown communities to limit the increasing numbers of patients who are being diagnosed. Type 2 diabetes has become

an epidemic in the United States and as healthcare professionals, there is a duty to better serve these populations and to right the wrongs that so many of these individuals have historically faced.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

Conclusion

The prevalence of type 2 diabetes, the complications, and burdens it places on individuals, their families, and the healthcare system as a whole has been an issue for decades. Chronic illnesses such as diabetes has been more prevalent in black communities compared to white. This occurrence has raised concern for many public health and healthcare professionals. There has been a new urgency to finding cost-effective and culturally appropriate interventions that can effectively manage the disease. Plant-based diets are widely and often practiced in regions and cultures outside of the United States. Increasingly, researchers and health care officials are realizing that food is medicine and are implementing innovative interventions to heal patients with chronic and uncontrollable illnesses. After researching and reporting the findings of plant-based diet interventions and the prevention of type 2 diabetes in African Americans, it is clear that the research does not exist. As a result, this paper hopes to shine light on the shortcomings of said research and hopes to increase the awareness and importance of better serving African American communities in the same ways that white communities might be.

Recommendations and Limitations

The following limitations of the study are hereby acknowledged: the search for relevant literature was exclusively focused on English literature; and the search for relevant literature was exclusively focused on English literature. The results for one of the studies have not yet been reported. Lastly, only studies written in English from 1990 up until 2022 were utilized.

For future similar studies a list of the following recommendations may be considered: the use of different assessment tools other than the AMSTAR 2 and the Jadad questionnaire, the search for relevant literature including the publications of other languages and research populations. Lastly, the use of different key search terms such as “vegan” or “vegetarian”.

It is further recommended that more clinical trials and interviews (i.e., surveys, face to face interactions, questionnaires, etc.) be conducted to further observe and answer the research question and concerns discussed in this paper.

REFERENCES

About Cochrane Reviews: Cochrane Library. About Cochrane Reviews | Cochrane Library. (n.d.) Retrieved April 4, 2023, from https://www.cochranelibrary.com/about/about-cochrane-reviews

About veganism. Vegan Action. (2019, November 19). Retrieved February 23, 2022, from

https://vegan.org/about-veganism/

Author links open overlay panelCraig Winston J 1, 1, & AbstractRecently. (2023, March 5).

Health effects of vegan diets. The American Journal of Clinical Nutrition. Retrieved April 13, 2023, from https://www.sciencedirect.com/science/article/pii/S0002916523238356?via%3Dihub

Barnard ND, Noble EP, Ritchie T, Cohen J, Jenkins DJ, Turner-McGrievy G, Gloede L, Green AA, Ferdowsian H. D2 dopamine receptor Taq1A polymorphism, body weight, and dietary intake in type 2 diabetes. Nutrition. 2009 Jan;25(1):58-65. doi: 10.1016/j.nut.2008.07.012. Epub 2008 Oct 2. PMID: 18834717; PMCID: PMC2615385.

Burns, P.B., Rohrich, R.J., Chung, K.C. (2011). The Levels of Evidence and Their Role in Evidence-Based Medicine. *Plastic and Reconstructive Surgery*. 128 (1), pp 305 - 310.

Cancer facts & figures for African American/black people. American Cancer Society. (n.d.).

Retrieved February 23, 2022, from https://www.cancer.org/research/cancer-facts-statistics/cancer-facts-figures-for-african-americans.html

Centers for Disease Control and Prevention. (2022, April 5). *Diabetes risk factors*. Centers for

Disease Control and Prevention. Retrieved September 12, 2022, from https://www.cdc.gov/diabetes/basics/riskfactors.html

Centers for Disease Control and Prevention. (2022, February 16). *FastStats - health of Black or African American population*. Centers for Disease Control and Prevention. Retrieved February 23, 2022, from https://www.cdc.gov/nchs/fastats/black-health.htm

Centers for Disease Control and Prevention. (2022, January 18). *National Diabetes Statistics Report*. Centers for Disease Control and Prevention. Retrieved September 28, 2022, from https://www.cdc.gov/diabetes/data/statistics-report/index.html

Centers for Disease Control and Prevention. (2022, July 7). *What is diabetes?* Centers for Disease Control and Prevention. Retrieved September 28, 2022, from https://www.cdc.gov/diabetes/basics/diabetes.html

Craig, W. J. (n.d.). *Health effects of a vegan diet*. Academic.oup.com. Retrieved September 28, 2022, from https://academic.oup.com/ajcn/article/89/5/1627S/4596952

Cultural aspects of African American eating patterns. Taylor & Francis. (n.d.). Retrieved February 23, 2022, from https://www.tandfonline.com/doi/abs/10.1080/13557858.1996.9961793

Culture, food, and racism: The effects on african american health. (n.d.). Retrieved September 29, 2022, from https://scholar.utc.edu/cgi/viewcontent.cgi?article=1175&context=honors-theses

Davis BC, Jamshed H, Peterson CM, Sabaté J, Harris RD, Koratkar R, Spence JW, Kelly JH Jr. An Intensive Lifestyle Intervention to Treat Type 2 Diabetes in the Republic of the Marshall Islands: Protocol for a Randomized Controlled Trial. Front Nutr. 2019 Jun 5;6:79. doi: 10.3389/fnut.2019.00079. PMID: 31231656; PMCID: PMC6560078.

Definitions of Food Security. USDA ERS - Definitions of Food Security. (n.d.). Retrieved February 23, 2022, from https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/definitions-of-food-security/#:~:text=Food%20insecurity%E2%80%94the%20condition%20assessed,may%20result%20from%20food%20insecurity.

Dewell, A., Weidner, G., Sumner, M. D., Chi, C. S., & Ornish, D. (2008, January 29). *A very low-fat vegan diet increases intake of protective dietary factors and decreases intake of pathogenic dietary factors*. Journal of the American Dietetic Association. Retrieved September 28, 2022

Fraser, G., Katuli, S., Anousheh, R., Knutsen, S., Herring, P., & Fan, J. (2014, March 17). *Vegetarian diets and cardiovascular risk factors in Black Members of the adventist health study-2: Public Health Nutrition*. Cambridge Core. Retrieved February 23, 2022

Higgins, J., Green, S. (2011). *Part 2: General Methods For Cochrane Reviews*. Available from: http://handbook.cochrane.org/. (Last accessed 14 March 2017).

Hill, J., Nielsen, M., & Fox, M. H. (2013). *Understanding the social factors that contribute to diabetes: A means to informing health care and social policies for the chronically ill*. The Permanente journal. Retrieved October 21, 2022, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3662286/

Horowitz, C. R., Colson, K. A., Herbert, P. L., & Lancaster, K. (2004) Barriers to buying healthy foods for people with diabetes: Evidence of environmental disparities. American Journal of Public Health. 94(9), 1549-1554.

Institute of Medicine (US) Committee on Diet and Health. (1992, January 1). *Fats, cholesterol, and chronic diseases*. Eat for Life: The Food and Nutrition Board's Guide to Reducing Your Risk of Chronic Disease. Retrieved February 23, 2022, from https://www.ncbi.nlm.nih.gov/books/NBK235018/#:~:text=Diets%20high%20in%20fat%2C%20particularly,animal%20fat%20and%20prostate%20cancer.

Insulin basics. Insulin Basics | ADA. (n.d.). Retrieved September 28, 2022, from

https://diabetes.org/healthy-living/medication-treatments/insulin-other-injectables/insulin-basics

Jadad AR, Moore RA, Carroll D, et al. Assessing the quality of reports of randomized clinical trials: is blinding necessary? Control Clin Trials. 1996;17(1):1-12. doi:10.1016/0197-2456(95)00134-4

Jones, R. • B. J. (n.d.). *50 years after the Kerner Commission: African Americans are better off in many ways but are still disadvantaged by racial inequality*. Economic Policy Institute. Retrieved May 2, 2022, from https://www.epi.org/publication/50-years-after-the-kerner-commission/

Le, L. T., & Sabaté, J. (2014, May 27). *Beyond meatless, the health effects of vegan diets:*

Findings from the Adventist cohorts. Nutrients. Retrieved September 28, 2022, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4073139/

Marshall, M. C. (2005, December 1). *Diabetes in African Americans*. Postgraduate Medical

Journal. Retrieved October 21, 2022, from https://pmj.bmj.com/content/81/962/734

Mayo Foundation for Medical Education and Research. (2023, March 24). *Diabetes prevention:*

5 tips for taking control. Mayo Clinic. Retrieved April 4, 2023, from https://www.mayoclinic.org/diseases-conditions/type-2-diabetes/in-depth/diabetes-prevention/art-20047639

McMacken, M., & Shah, S. (2017, May). *A plant-based diet for the prevention and treatment of type 2 diabetes*. Journal of geriatric cardiology : JGC. Retrieved October 21, 2022, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5466941/

Njike VY, Kela GCM, Treu JA, Ayettey RG, Kussaga FM, Khan N, Comerford B, Agboola O. Egg Consumption in the Context of Plant-Based Diets and Diet Quality in Adults at Risk for Type 2 Diabetes: A Randomized Single Blind Cross-over Controlled Trial. J Am Nutr Assoc. 2023 Feb;42(2):130-139. doi: 10.1080/07315724.2021.2006824. Epub 2022 Jan 27. PMID: 35512755.

Odoms-Young, A., & Bruce, M. A. (2018). *Examining the impact of structural racism on food insecurity: Implications for addressing racial/ethnic disparities*. Family & community health. Retrieved February 23, 2022, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5823283/

Orfield, G. & Lee, C. (2005). Why segregation matters: Poverty and educational inequality. Cambridge, MA: Civil Rights Project, Harvard University.

Racial and ethnic income gaps persist amid uneven growth in household incomes. Economic Policy Institute. (n.d.). Retrieved February 23, 2022, from https://www.epi.org/blog/racial-and-ethnic-income-gaps-persist-amid-uneven-growth-in-household-incomes/

Satia, J. A. (2009, April). *DIET-related disparities: Understanding the problem and accelerating solutions*. Journal of the American Dietetic Association. Retrieved October 21, 2022, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2729116/.

Shea BJ, Reeves BC, Wells G, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ. 2017;358:j4008. doi:10.1136/bmj.j4008

Statistics about diabetes. Statistics About Diabetes | ADA. (n.d.). Retrieved October 21, 2022, from https://diabetes.org/about-us/statistics/about-diabetes#:~:text=Diabetes%20by%20race%2Fethnicity&text=12.1%25%20of%20non%2DHispanic%20blacks,7.4%25%20of%20non%2DHispanic%20whites

U.S. Department of Health and Human Services. (2018, January 23). *Factors contributing to higher incidence of diabetes for Black Americans*. National Institutes of Health. Retrieved September 28, 2022, from https://www.nih.gov/news-events/nih-research-matters/factors-contributing-higher-incidence-diabetes-black-americans

U.S. Department of Health and Human Services: Office of Minority Health. (2017). Obesity and African Americans. Retrieved from https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=25

U.S. Department of Health and Human Services: Office of Minority Health. (2017). Profile: Black American [Data file]. Retrieved from https://www.minorityhealth.hhs.gov/omh/browse.aspx?lvl=3&lvlid=61

Vegetarianism and veganism: Not only benefits but also gaps. A Review. (n.d.). Retrieved May 3,2022, from https://www.researchgate.net/profile/Maria-Vadala/publication/320372169_Vegetarianism_and_veganism_not_only_benefits_but_also_gaps_A_review/links/59e0670a45851537160df94f/Vegetarianism-and-veganism-not-only-benefits-but-also-gaps-A-review.pdf

World Health Organization. (n.d.). *Diabetes*. World Health Organization. Retrieved April 4, 2023, from https://www.who.int/news-room/fact-

APPENDICES

APPENDIX 1

Jadad Questionnaire

1.	Was the study described as randomized?	
	0 points: No mention of randomization.	
	1 point: The study is described as randomized but does not provide any further details.	
	2 points: The study describes the method of randomization (e.g., computer-generated random numbers, random number table).	
2.	Was the method of randomization appropriate?	
	0 points: Inappropriate method of randomization (e.g., alternating allocation, case record number).	
	1 point: The study mentions randomization, but the method is not described.	
	2 points: The study describes an appropriate method of randomization (e.g., random number table, computer-generated randomization).	
3.	Was the study described as double-blind?	
	0 points: No mention of blinding.	
	1 point: The study is described as double-blind but does not provide any further details.	
	2 points: The study describes the method of double-blinding (e.g., identical placebo, double-dummy).	

Final Score:

APPENDIX 2

Critical Appraisal Form: A Measurement Tool to Assess Systematic Reviews 2

		Yes	No	Unclear
1.	Was an "a priori" design provided?			
2.	Was there a comprehensive literature search?			
3.	Was the study selection process described in detail?			
4.	Were the characteristics of the included studies provided?			
5.	Was the scientific quality of the included studies assessed and documented?			
6.	Was the risk of bias of individual studies considered in the review?			
7.	Was the risk of bias of the included studies appropriately used in formulating conclusions?			
8.	Were the methods used to combine the findings of studies appropriate?			
9.	Was the likelihood of publication bias assessed?			
10.	Was the conflict of interest included in the review?			
11.	Was the source of funding for the systematic review reported?			
12.	Was the selection of studies for inclusion in the systematic review reproducible?			
13.	Was the status of publication considered?			
14.	Was there an adequate explanation of the study heterogeneity?			
15.	Was the potential impact of the study's limitations on the results of the review considered?			
16.	Was the funding source of the systematic review reported?			

Overall Appraisal:

Include: ☐ **Exclude:** ☐ **Seek Further Info:** ☐

APPENDIX 3

List of all Studies Identified Based on Their Relevance to Type II Diabetes Prevention in African Americans by Consuming a Plant-Based Diet

Database	Keyword	Number of Results	Results
PubMed	plant-based diets AND African American AND type ii diabetes	3	1. Egg Consumption in the Context of Plant-Based Diets and Diet Quality in Adults at Risk for Type 2 Diabetes: A Randomized Single Blind Cross-over Controlled Trial (2023) 2. A 12-Week Randomized Intervention Comparing the Healthy US, Mediterranean, and Vegetarian Dietary Patterns of the US Dietary Guidelines for Changes in Body Weight, Hemoglobin A1c, Blood Pressure, and Dietary Quality among African American Adults (2023) 3. D2 dopamine receptor Taq1A polymorphism, body weight, and dietary intake in type 2 diabetes (2008)
SCOPUS	plant-based diets AND African American AND type ii diabetes	1	1. A World of Difference: Unraveling the Conversations African American Mothers Have with Their Adult Daughters to Negotiate Diabetes (2011)
Medline	plant-based diets AND African American AND type ii diabetes	2	1. Effect of a Plant-Based vs Omnivorous Soul Food Diet on Weight and Lipid Levels Among African American Adults: A Randomized Clinical Trial (2023) 2. An Intensive Lifestyle Intervention to Treat Type 2 Diabetes in the Republic of the Marshall Islands: Protocol for a Randomized Controlled Trial (2019)

APPENDIX 4

List of studies identified in PubMed

PubMed	plant-based diets AND African American AND type ii diabetes	3	1. Egg Consumption in the Context of Plant-Based Diets and Diet Quality in Adults at Risk for Type 2 Diabetes: A Randomized Single Blind Cross-over Controlled Trial (2023) 2. A 12-Week Randomized Intervention Comparing the Healthy US, Mediterranean, and Vegetarian Dietary Patterns of the US Dietary Guidelines for Changes in Body Weight, Hemoglobin A1c, Blood Pressure, and Dietary Quality among African American Adults (2023) 3. D2 dopamine receptor Taq1A polymorphism, body weight, and dietary intake in type 2 diabetes (2008)

APPENDIX 5

List of studies identified in Scopus

Scopus	plant-based diets AND African American AND type ii diabetes	1	1. A World of Difference: Unraveling the Conversations African American Mothers Have with Their Adult Daughters to Negotiate Diabetes (2011)

APPENDIX 6

List of studies identified in Medline

Medline	plant-based diets AND African American AND type ii diabetes	2	1. Effect of a Plant-Based vs Omnivorous Soul Food Diet on Weight and Lipid Levels Among African American Adults: A Randomized Clinical Trial (2023) 2. An Intensive Lifestyle Intervention to Treat Type 2 Diabetes in the Republic of the Marshall Islands: Protocol for a Randomized Controlled Trial (2019)

APPENDIX 7

Jadad Questionnaire – Article 1: Cooke-Jackson, 2021

A World of Difference: Unraveling the Conversations African American Mothers Have with Their Adult Daughters to Negotiate Diabetes (Scopus)

1.	Was the study described as randomized?	
	0 points: No mention of randomization.	0
	1 point: The study is described as randomized but does not provide any further details.	
	2 points: The study describes the method of randomization (e.g., computer-generated random numbers, random number table).	
2.	Was the method of randomization appropriate?	
	0 points: Inappropriate method of randomization (e.g., alternating allocation, case record number).	0
	1 point: The study mentions randomization, but the method is not described.	
	2 points: The study describes an appropriate method of randomization (e.g., random number table, computer-generated randomization).	
3.	Was the study described as double-blind?	
	0 points: No mention of blinding.	0
	1 point: The study is described as double-blind but does not provide any further details.	
	2 points: The study describes the method of double-blinding (e.g., identical placebo, double-dummy).	

Final Score: 0

APPENDIX 8

Jadad Questionnaire – Article 2: Barnard ND et al., 2009

Jadad Questionnaire

D2 dopamine receptor Taq1A polymorphism, body weight, and dietary intake in type 2 diabetes (PubMed)

1.	Was the study described as randomized?	
	0 points: No mention of randomization.	
	1 point: The study is described as randomized but does not provide any further details.	
	2 points: The study describes the method of randomization (e.g., computer-generated random numbers, random number table).	2
2.	Was the method of randomization appropriate?	
	0 points: Inappropriate method of randomization (e.g., alternating allocation, case record number).	
	1 point: The study mentions randomization, but the method is not described.	
	2 points: The study describes an appropriate method of randomization (e.g., random number table, computer-generated randomization).	2
3.	Was the study described as double-blind?	
	0 points: No mention of blinding.	0
	1 point: The study is described as double-blind but does not provide any further details.	
	2 points: The study describes the method of double-blinding (e.g., identical placebo, double-dummy).	

Final Score: 4

APPENDIX 9

Jadad Questionnaire – Article 3: Davis BC et al., 2019

An Intensive Lifestyle Intervention to Treat Type 2 Diabetes in the Republic of the Marshall Islands: Protocol for a Randomized Controlled Trial (Medline)

1.	Was the study described as randomized?	
	0 points: No mention of randomization.	
	1 point: The study is described as randomized but does not provide any further details.	
	2 points: The study describes the method of randomization (e.g., computer-generated random numbers, random number table).	2
2.	Was the method of randomization appropriate?	
	0 points: Inappropriate method of randomization (e.g., alternating allocation, case record number).	
	1 point: The study mentions randomization, but the method is not described.	1
	2 points: The study describes an appropriate method of randomization (e.g., random number table, computer-generated randomization).	
3.	Was the study described as double-blind?	
	0 points: No mention of blinding.	0
	1 point: The study is described as double-blind but does not provide any further details.	
	2 points: The study describes the method of double-blinding (e.g., identical placebo, double-dummy).	

Final Score: 3

:

APPENDIX 10

Critical Appraisal Form – Article 1: Davis BC et al., (2019)

Article 1: *"An Intensive Lifestyle Intervention to Treat Type 2 Diabetes in the Republic of the Marshall Islands: Protocol for a Randomized Controlled Trial"* by Davis BC et al., (2019)

		Yes	Partial Yes	No
1.	Was an "a priori" design provided?			x
2.	Was there a comprehensive literature search?	x		
3.	Was the study selection process described in detail?	x		
4.	Were the characteristics of the included studies provided?			x
5.	Was the scientific quality of the included studies assessed and documented?	x		
6.	Was the risk of bias of individual studies considered in the review?	x		
7.	Was the risk of bias of the included studies appropriately used in formulating conclusions?			x
8.	Were the methods used to combine the findings of studies appropriate?	x		
9.	Was the likelihood of publication bias assessed?			x
10.	Was the conflict of interest included in the review?	x		
11.	Was the source of funding for the systematic review reported?	x		
12.	Was the selection of studies for inclusion in the systematic review reproducible?			x
13.	Was the status of publication considered?	x		
14.	Was there an adequate explanation of the study heterogeneity?		x	

15.	Was the potential impact of the study's limitations on the results of the review considered?		x	
16.	Was the funding source of the systematic review reported?			x

Overall Appraisal:

Include: [x] **Exclude:** [ ] **Seek Further Info:** [ ]

APPENDIX 11

Critical Appraisal Form – Article 2: Barnard et al., (2008)

Article 2: *"D2 dopamine receptor Taq1A polymorphism, body weight, and dietary intake in type 2 diabetes"* by Barnard et al., (2008)

		Yes	Partial Yes	No
1.	Was an "a priori" design provided?	x		
2.	Was there a comprehensive literature search?	x		
3.	Was the study selection process described in detail?	x		
4.	Were the characteristics of the included studies provided?	x		
5.	Was the scientific quality of the included studies assessed and documented?	x		
6.	Was the risk of bias of individual studies considered in the review?			x
7.	Was the risk of bias of the included studies appropriately used in formulating conclusions?			x
8.	Were the methods used to combine the findings of studies appropriate?	x		
9.	Was the likelihood of publication bias assessed?			x
10.	Was the conflict of interest included in the review?			x
11.	Was the source of funding for the systematic review reported?			x
12.	Was the selection of studies for inclusion in the systematic review reproducible?			x
13.	Was the status of publication considered?	x		
14.	Was there an adequate explanation of the study heterogeneity?	x		

15.	Was the potential impact of the study's limitations on the results of the review considered?	x		
16.	Was the funding source of the systematic review reported?			x

Overall Appraisal:

Include: [x] **Exclude:** [ ] **Seek Further Info:** [ ]