12-2014

Coronary Heart Disease Prevention with a Focus on Diet Modifications in Female College Students at a Local Community College

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CORONARY HEART DISEASE PREVENTION WITH A FOCUS ON DIET MODIFICATIONS IN FEMALE COLLEGE STUDENTS AT A LOCAL COMMUNITY COLLEGE

A project submitted in partial fulfillment of the
requirements for the degree of
Master of Science in Nursing

By

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BSN Indiana Wesleyan University, 2010

2014
Cedarville University

Abstract

In the United States, cardiovascular disease is the number one cause of death in women. The most common and deadly form of cardiovascular disease is coronary heart disease (CHD). Many coronary heart preventive education awareness programs focus on the adult women population (40 years old >). By that time, many previous lifestyle choices such as poor dietary choices have contributed to the development of risk factors for developing CHD. Young college women (18-24 years old) have the ability to implement healthy diet choices, which in turn will help to decrease their risk for CHD development. Sinclair Community College is located in the city of Dayton, Ohio. Many that live in the city of Dayton are classified at greater risk for developing CHD due to race and economic status. This project focuses on evidence-based research studies on dietary strategies to help female college students minimize their risk factors for developing CHD and to encourage self-efficacy.

A literature review was conducted with a focus on creating an evidenced-based approach to implement health promotion in those at risk for the development of coronary heart disease at Sinclair Community College. From the numerous findings in the literature, recommendations were made and categorized by level of evidence; strong, moderate, and weak recommendations. From those recommendations, four summarized recommendations were made. The information was compiled and disseminated to Sinclair faculty who assisted with this project.

Table of Contents

List of Tables

Acknowledgement

I would like to acknowledge my advisor committee chair Marsha Swinehart MSN, RN, CNE for continually offering encouragement and support while I worked on completing this research project. I would also like to acknowledge committee member Dr. Angelia Mickle DNP, RN, Interim Dean of the Cedarville University School of Nursing for her involvement in the project. I appreciate Dr. Ginger Wolgemuth Ph.D. RN, Assistant Dean and Chief Nurse Administer at University of Northwestern School of Nursing, who encouraged me to continue my undergraduate research project into my graduate studies. I appreciate the input from current and past Sinclair students and current faculty willing to assist with this research project.

Introduction Chapter 1

In the United States (US), cardiovascular disease (CVD) is the leading cause of death in women. Despite awareness, education, and marketing, many women still perceive CVD as a man's disease. In 2009, it was estimated that CVD took the lives of 1:4 US women (Kochanek Xu, Murphy, Miniño, & Kung, 2009). The lack of CVD education and marketing to the young adult population has contributed to many female college students not perceiving CVD as a threat (Smith, Dickerson, Sosa, McKyer, & Ory, 2012; Mosca, Hammond, Mochari-Greenberger, Towfighi, & Albert, 2013). Young adults have an opportune time to implement heart healthy lifestyles such as diet modification and regular exercise, which in turn may greatly decrease the risk of developing heart disease in their future (Eckel et al., 2013).

Primary prevention, with a focus on creating CVD awareness, plays a key role in preventing CVD in women (Muñoz, et al., 2010). According to the Center for Disease Control (CDC), about 200,000 deaths a year, attributed to CVD, are preventable (Center for Disease Control, 2013). Despite CVD having the capability of being a fairly preventable disease, CVD still remains the leading cause of death in more women in the US. The most common and deadly form of CVD is coronary heart disease (CHD). Early detection and prevention can lead to better outcomes for women (The National Library of Medicine, 2012). Non-modifiable risk factors are increasing age, gender, and family history. Modifiable risk factors are hypertension, tobacco use, alcohol use, physical inactivity, diet, cholesterol levels, and obesity. Taking early action can help delay or prevent development of CHD (National Institutes of Health, 2011; National Institutes of Health, 2012).

It is estimated over 10,000 women, 45 years or younger; suffer from a myocardial infarction (MI) every year (US Department of Health & Human Services, 2013). In 2010, it was estimated CVD took the lives of 290,305 women (National Institutes of Health, 2010). CVD takes most women's lives in the 65-74 year old age range (Center for Disease Control, 2013). Women who are at greatest risk for CHD can attribute that risk to their race and economic status. African American and Hispanic women are at a higher risk for CHD than Caucasian women. In women ages 18 years or older, obesity is seen at alarming rates. About half (51.6%) of Caucasian women, 80% of middle-aged African American women, and 83% of middle-aged Hispanic women are considered obese (National Institutes of Health, 2013). Women who live in low socioeconomic areas are at an increased risk for poor health (Pampel, Krueger, & Denney, 2011).

This project was developed to target women who are at higher risk for developing CHD, the leading cause of death in CVD. The city of Dayton, Ohio has a large African American (42.9%) and Hispanic (3%) population and has many living in a lower socioeconomic status (United States Census Bureau, 2013; Public Health, 2010). Sinclair Community College is located in the middle of the city of Dayton. The Sinclair population is diverse. In 2012, it was estimated 16% of the students were African American, 2% Hispanic, and 63% Caucasian. In 2012, 58.66% of the students were female (Jones, 2012). About half (54%) of Sinclair Community College students are 25 years or older with the average age of students being 32 years (Ohio Board of Regents, 2009). Many living within the city of Dayton live in a low socioeconomic bracket. In 2007-2011, 32.5% lived below the poverty level (United States Census Bureau, 2013).

A large contributing factor to developing CHD is diet (Fernades & Lofgren, 2013). Young adults may make poor diet choices. Young adults in college have an almost six times increased risk for poor diet and inactivity compared to the general population (Mihalopoulos Auinger, & Klein, 2008). Environmental and psychological factors may contribute to food choices young adults make (Lawrence et al., 2013). Poor diet can lead to comorbidities like diabetes and obesity (American Heart Association, 2014).

To educate this at risk population, the advanced practice nurse (APN) can play a vital role. APNs can encourage young women to develop heart healthy lifestyles, which in turn may help decrease financial burden of CVD in the US. According to the CDC (2013), CVD is very costly. The financial burden from CVD in the US in 2010 was estimated at about 444 billion dollars. Estimations from 2010 also show that 1:6 health care dollars went to pay for CVD. These dollars include both direct and indirect costs. Direct costs are due to cost of health care providers, hospital services, medications, and home health care. Indirect costs are related to loss of productivity due to premature mortality caused by CVD (Sidney, Rosamond, Howard, & Luepker, 2013). In the US, the *Affordable Health Care Act H.R. 3590* (2009) is now implemented and government has aimed to decrease health care costs by targeting preventable diseases and providing health care to those at risk for health disparities. There are many opportunities for the APN to implement change by targeting at risk populations.

APNs can help to decrease health disparities by implementing primary preventative strategies, which will help to prevent premature death and loss of years of productivity of women in the US (Sidney et al., 2013). Many studies have provided evidence that women continue to lack a perceived risk of CVD. A study completed by the

Mayo Clinic in Rochester, Minnesota, studied women who volunteered to receive free cardiac screenings at the *Go Red for Women* events in 2007, 2008, 2010, and 2011. Although almost 99.3% who participated in screening (n=229) believed heart disease was the number one cause of death in women, only 47% perceived themselves to be at risk. Awareness of CVD may not transfer into personal perceived risk (Kling et al., 2013).

Vulnerability for CVD is identified in the 20-30 year age range. The vulnerability is related to lifestyle changes, new psychological stressors and psychosocial stressors (Terrill, Garofalo, Soliday, & Craft, 2012). Although young women may understand their future risk of CHD, they may be hesitant to implement change. The 18-24 year old age range was identified as the least likely to identify CVD as the leading cause of death in women (Muñoz, et al., 2010). The 18-24 year old age range is the opportune time to implement heart healthy lifestyle modifications in young women. There are many barriers when implementing changes. A low perceived risk may mean young women are less likely to implement lifestyle modifications (Anderson, Silliman, & Schneider, 2013; Kling, et al., 2013; Galbraith, Mehta,Veledar, Vaccarino, & Wenger, 2011; Mosca, et al., 2006). Many college women consider CVD something that can be worried about in the future. *The Heart Truth Program's* target age range is for women ages 40-60. By that age, it may be too late for lifestyle modifications to be as effective because damage to the heart muscle has already occurred due to previous lifestyle choices (Halfon, Verhoef, & Kuo, 2012; Sundaram, M. E., Berg, R. L., Economos, C., & Coleman, 2014). The American Heart Association (AHA), however, acknowledge that *The Heart Truth Program* can also be implemented in younger women (National Heart, Lung, and Blood Institute, 2013).

The APN can help young women adopt a heart healthy lifestyle by incorporating new lifestyle changes. When young women become college graduates, many may take on a new role of adulthood. With this new role, young women take on new psychosocial stressors and psychological stressors. Some of these stressors are related to family, commitments, children, finances, jobs, self-efficacy, health, work, and friends. All of these new life stressors may decrease the young woman's willingness to implement lifestyle modifications because she does not feel she has time (Mosca, et al., 2006; Terrill, et al., 2011).

The APN is able to educate young college women on lifestyle modifications since there is a low perceived risk of CVD. Young women may be less likely to implement lifestyle modifications due to barriers such as stress management, weight control, and cultural expectations. College women have a lot of time to implement change despite their school schedule, jobs, extracurricular activities, and home life. The most effective strategy for decreasing CHD risk is by implementation of public health education on lifestyle modifications (Pearson et al., 2013). It is important to implement heart healthy education earlier in a woman's life, so that they may initiate permanent heart healthy habits into their own lifestyles.

The APN has an opportunity to be a leader in implementing primary prevention interventions. Creating awareness is only the first step in education because awareness alone does not always mean there is going to be definitive action (Smith, et al., 2009). APNs have an opportunity to take on women's CVD education by initiating health promotion and disease prevention education to college women ages 18-24. This initiative establishes the need for multidisciplinary collaboration. Public health education involves

numerous disciplines such as nursing, physicians, psychology, education, sociology, and marketing. The APN can directly lead initiatives with collaboration. Incorporating different disciplines assists in looking at the young women with a holistic perspective, allowing the best information to be implemented.

The APN can encourage young women, to implement strategies to target those at risk, decrease health disparities, and become leaders in heart health education. In the US, there have been numerous studies identifying the lack of women's CVD knowledge and awareness. It is an opportune time to go through all of the peer-reviewed research to develop the best ways to create a CVD program focused on preventing CHD with a target age range of young women ages 18-24. There are many modifiable factors, which can put young women at an increased risk for developing CHD. These factors are increased cholesterol, high blood pressure, diabetes, obesity, smoking, physical activity, diet, and stress (National Institutes of Health, 2011). Although all these factors can be contributors to the development of CHD, this project will have a direct focus on diet and obesity causing increase risk for young women developing CHD.

Concept Analysis Chapter 2

CVD is the leading cause of death in the US (Kochanek, et al., 2009). CVD in women can tragically strip families and communities from loved ones. Recent awareness of CVD in women has helped open the door for APNs to take action. CVD awareness has allowed for growth in new research and patient education (Thanavaro, Thanavaro, & Delicath, 2010). Primary prevention plays a vital role in implementing heart healthy lifestyle strategies to help decrease heart health disparities in the future (Lloyd-Jones et al., 2010). Defining the concept of CVD in women can help to establish a standard by which the public can understand.

Key Characteristics and Attributes of the Concept

Definition of CHD

CHD is the leading cause of death in CVD. CHD develops in women through their lifestyle choices, ethnicity, genetic predisposition, and socioeconomic status. CHD causes the development of waxy plaques along the artery walls, decreasing the ability for oxygenated blood to transport through the rest of the body. Early lifestyle changes can greatly decrease the risk of CHD. Lifestyle choices such as poor diet, smoking, alcohol, stress, and decreased activity can greatly contribute to damage of artery walls. African American and Hispanic women have ethnic predisposition for developing CHD. Family history and genetics may predispose women to be at an increased risk for CHD. Women living in lower socioeconomic status and lower education levels have the greatest risk for developing CHD. Many of the risk factors for developing CHD are controllable with lifestyle modifications (National Institutes of Health, 2011; National Institutes of Health, 2012).

Women themselves have specific needs that predispose them to developing CHD. Women require a holistic approach to target their specific health needs. Intellectual, physical, emotional, social, and spiritual concepts need to be addressed when developing a plan of care. Each concept comes with both modifiable and non-modifiable factors. To treat the whole woman, APNs have an opportunity to look at all of these concepts and initiate a plan to break down barriers as well as build up heart healthy lifestyles. Implementing change early can help to prevent premature death and decrease the risk of loss of productivity in women. Heart damage can be avoided if Americans implement preventative strategies that will help decrease indirect burden of heart disease in the US (Sidney et al., 2013).

Intellectual concepts in women's CHD play a large part in how women deal with physical, emotional, social, and spiritual concepts. Women's intellectual concepts influence their risk perception, knowledge, and awareness of CHD. Risk perception is a subjective view on how one perceives prospective risks. This perception allows one to decide how they will interact with the world around them. Risk perception may allow for positive or negative reactions. How one perceives their risks may be initiated by knowledge or awareness. When defining risk perception in women's CVD, there is a decrease in the perceived risk of CVD in the US (Anderson et al., 2013; Galbraith, et al. 2011; Kling et al., 2013; Mosca, et al., 2006; Smith, et al., 2012).

Knowledge is a subjective view on how one comprehends and understands internal and external factors. When defining knowledge in the context of risk perception of women's CHD, knowledge helps increase risk perception. Ideally, increased knowledge of women's CHD will encourage women to implement change (Galbraith, et

al. 2011; Giardina et al., 2011). It is the APN's role to analyze the deficit in women's knowledge so that the best evidence can be used to better health promotion (Thanavaro, et al., 2010).

Awareness is a subjective view on how one acknowledges and is alert to internal and external factors. When defining awareness in the concept of risk perception, awareness itself works with knowledge to implement change. In women's CHD, awareness is developed through education and marketing strategies. If a woman has false perception and a lack of knowledge and awareness, it will negatively influence all of the other concepts. However, if a woman understands her risk factors, has knowledge and awareness, she can be encouraged to make lifestyle modifications (Giardina et al., 2011).

Physical concepts in women's CHD are defined as both non-modifiable and modifiable risk factors. Non-modifiable risk factors are age, gender, race, and family history. Women's estrogen levels decrease as they age, which increases their risk for CHD because estrogen has cardio protective factors. Modifiable risk factors are physical activity, weight, diet, alcohol use and tobacco use. Tobacco use with birth control pills also increases the woman's risk for CHD (National Institutes of Health, 2011; National Institutes of Health, 2012).

Emotional concepts in women's CHD are defined as ineffective or effective coping skills. Ineffective coping with life stressors may lead to more health disparities and CHD in women. Women's mental health can cause strain on the heart. Stress can narrow arteries thus increasing blood pressure. Stress may be influential in poor diet choices. Women, who are depressed, are two to three times more likely to develop CHD (National Institutes of Health, 2011).

Social concepts in women's CHD are defined by what the US media advertises and the woman's role in the US (Mosca et al., 2006). The media advertises CHD as something women do not have to worry about until they get older (National Heart, Lung, and Blood Institute, 2013). Women's roles change as they age and there are more barriers in their life to keep them from implementing heart healthy changes. However, family, commitments, jobs, and self-efficacy may interfere with college students' motivation to change (Mosca et al., 2006).

Spiritual concepts pertaining to women's CHD are defined by meaning, purpose, and quality of life. When women have something to put hope in, such as a greater power, they are able to find meaning and purpose in their life. Women who have incorporated spiritual concepts have been shown to increase their quality of life. Women who have a better grasp on spiritual care are able to deal better with emotional barriers. If women do not incorporate spiritual concepts, combined with emotional concepts, it can cause negative cardiovascular outcomes (Delaney, Barrere, & Helming, 2011; Holt-Lunstad, Steffen, Sandberg, & Jensen, B. 2011).

Definition of CVD

In terms of US women, CVD is identified as the number one cause of death in women. CVD tragically takes the lives of mothers, caretakers, friends, and family members. Although heart disease can cause devastating effects on the body, it also can be a motivator to help people implement healthy lifestyle. CVD is any dysfunction of the heart muscle or the blood vessels leading to the heart. The heart does not function properly in a variety of ways. These include damage to the coronary arteries, heart valves, myocardium, or electroconduction system (Heart Disease, 2001).

Definition of College Women

Target audience is female college students. A college student is defined as a person enrolled in a college or university. For this project, a college student is one who is enrolled in Sinclair Community College. The target population for this project is young women ages 18-24. However, this project is developed for Sinclair Community College, so it is understood that not all of the women college students fit in this specific age range.

Definition of College Women's Diet

As young women enter in their new role as college students and gain more independence, their diets may suffer. First year college students have the highest risk for weight gain due to diet (Mihalopoulos, Auinger, & Klein, 2008). College students' diets are typically higher in fat, sugar, and sodium intake. Dietary habits in college put young women at high risk for CHD and comorbidities like obesity and diabetes (Fernandes, Arts, Dimond, Hirshberg, & Lofgren, 2013; American Heart Association, 2014).

Defining Characteristics

As young women graduate college and assume their new role of working adults, their bodies have to respond to new stressors. The heart has to work harder to pump out the blood as they deal with their new stresses. Our bodies are designed to adapt to these changes. However, some women are not as resilient to keep up with the new physical demands (Howard & Hughes, 2012). Non-modifiable risk factors such as genetic history, gender, age, and race may limit the demands that the woman's body can handle (National Institutes of Health, 2011; National Institutes of Health, 2012). Before young college women adjust to their new adult role, they have many factors that impact how they perceive the world around them. How college students perceive the world around them

can cause them to develop either positive or negative coping mechanisms (Holt, Clark, Debnam, & Roth, 2014; Wichianson, Bughi, Unger, Spruijt-Metz, & Nguyen-Rodriguez, 2009). How they deal with new stressors may impact food choices. Poor food choices may lead to the development of CHD (Fernandes et al., 2013).

Antecedents

There are four antecedents addressing CHD risk factors related to diet choices in young college women. The four antecedents are knowledge, attitude, modeling, and convenience. The first antecedent is knowledge. Female college students may lack knowledge of their risk of CHD (Leach et al., 2013). Young women may also not understand what healthy food choices are. Without motivation and knowledge to change, young women may not know their risk factors. Marketers influence how information is dispersed and what education is provided to the public. Errors in how food is marketed can limit understanding of healthy food options (Stockton et al., 2013; EunSeok et al., 2014). Young women with lower health literacy are at increased risk for poor health choices that can contribute to the development of CHD (Lawrence et al., 2009).

The second antecedent is attitude. College women have numerous psychological stressors. Many young women have the desire to excel in college. Family and financial concerns can increase young college women's stress. Young college women have to learn to balance between homework and time management (Pedersen, 2012). Since young college women are under high levels of psychological stress, they may use food as a coping mechanism (Wichianson et al., 2009). Their attitude and stressors may lead them to eat foods higher in fat, sugar, and sodium content (Fernades et al., 2013; Pelletier & Laska, 2013). Attitude may also lead young women to believe that healthy food does not

taste good or attitude may limit their willingness to try new food choices (Lawrence et al., 2009).

The third antecedent is modeling. College women have numerous psychosocial stressors. College helps young women develop their relationship building skills. Young women learn to follow societal norms. Society impacts and models how college women deal with the world around them. By following what they see and hear around them, young college women may choose to eat unhealthy options (Ferrer, Cruz, Burge, Bayles, & Castilla, 2014). In addition, their childhood environment and the food choices made by their parents may influence their current food choices. Modeling good health habits in the home can greatly impact the choices young women will make in the future (Lawrence et al., 2009).

The fourth antecedent is convenience. Young college women may not implement lifestyle modifications because of perceived limited time. They think it takes longer to cook healthy food, thus, it would inhibit their time to study, work, or manage home life. It may also be more affordable to eat unhealthier option (Lawrence et al., 2009). Unhealthy options may be the only choices available. Convenience stores may not carry many healthy options (Ferrer et al, 2014).

Model Case

MW is a 21-year old African American female student at Sinclair Community College who lives in downtown Dayton. She currently does not have a major because she has not decided what she wants to pursue. She does not eat a healthy diet and chooses to eat what is cheaper and more convenient so she can provide for her children at home. She knows that is what her mom did for her growing up. MW feels she has the rest of her life

to worry about her health, and providing for her children is more important. She works at a McDonald's restaurant full time to pay for her education and to support her children. The APN student worked with current and past nursing students and faculty to implement evidence-based protocols, which focus on diet modification to prevent the risk of CHD and comorbidities. MW is able to understand her risk factors and implement heart healthy lifestyle modifications, which will impact her for the rest of her life.

Application to the Project

Defining the details, characteristics, and antecedents can help with understanding the details of the diet affecting young women putting them at risk for CHD. There is a large opportunity for primary care involvement when it comes to women's CVD. Understanding the college student's background can help to provide a clearer picture of the need. Preventing CHD is a very important topic in this nation. APNs can play an active role in initiating primary care initiatives. Evidence-based findings, combined with nursing theory driven care, can help to change practice.

Methods and Framework Chapter 3

The Iowa Model will be used to complete this project. This model uses a clear systematic guide to developing and implementing evidence-based practice. This research project focuses on steps 1-5: selection of topic, forming a team, evidence retrieval, grading the evidence, and developing an evidence-based protocol. Implementation and evaluation, steps 6-7, will not be used in this research project. This research is triggered by clear identification of a clinical problem as identified in above-mentioned findings. It is not only a clinical problem, but is also identified as a financial problem and saving health care dollars is a huge issue in this nation. This problem directly influenced the motivation for collecting the data for this research project. Another goal of this study is to assemble all of the relevant peer-reviewed literature. After assembling all of the literature, the literature will be reviewed and critiqued and evidence will be graded (Grove, Burns, & Grave, 2009; Titler et al., 2001).

From the evidence found already in the databases, there will be enough information to develop an evidence-based guideline. The aim is that the guidelines will be appropriate for female college students. An end goal is that guidelines will be instituted to change practice. It is important to identify the key players involved. When evidence-based protocols are implemented, it is important to share results, so others may benefit from the positive or negative results. This allows growth of nursing knowledge and dissemination of public health education

This project will be presented at Sinclair Community College. The key players in the project presentation will be the Sinclair students and faculty. Team members who will help with the project are Billie Sanders, chair and professor in the Exercise, Nutrition and

Sport Sciences department at Sinclair Community College, Adam Murka, the Director of Public Affairs, David Clark MS, RDN, LD, current Sinclair nursing students, and recent Sinclair Nursing Program graduates.

This project will be initiated in spring 2014. The literature review will be completed in October 2014. Data will be managed in different organized digital folders. Information backup will be continual to a backup hard drive. Key terms used in the literature findings will be tracked in a Word document organized in a table format. Institutional Review Board (IRB) approval is not a necessity. I will collect data from August-December 2014. Completion and presentation is December 2014.

Articles will be peer-reviewed and search is not limited to full text articles. Data will be collected from the most current articles. Databases searched will be Proquest, Medline, Cochrane, EBSCO, CINAHL, and Health Source. Research may not be limited to nursing/health care articles. Marketing and education play a vital part of public health education. This study has the opportunity to include interdisciplinary collaboration. Many key words/phrases will be used in the literature search of research databases. Important key words/phrases are, but not limited to CVD, CHD, CAD, obesity, college diet, metabolic syndrome, diet, cardiac disease, women, college students, awareness, primary prevention, risk reduction, heart, heart health, females, risk perception, public health, community health, and college health.

There are minimal ethical considerations. This research project has all of the young female college students' best interests in mind while implementing health promotion and prevention. A key part of this project is education and increasing

participants' knowledge. Research will be conducted through literature review and not on human subjects.

This project is a public health problem. My committee chair is Marsha Swinehart. She is my advisor and has experience in public health nursing. Dr. Angelia Mickle was chosen as a committee member because of her experience in public health nursing. Although not on my committee, originally the project idea was developed with my undergraduate research professor, Dr. Ginger Wolgemuth. She is the Assistant Dean and Chief Nurse Administer at University of Northwestern School of Nursing and has served as a resource person for my project.

Results Chapter 4

A full review of literature was developed and graded for level evidence. Due to the high number literature findings, the findings were divided into three categories: 1) dietary guideline research studies, 2) target population intervention studies, and 3) descriptive research studies. Both the dietary guideline and the target population intervention studies were critiqued and assigned to a category of strong, moderate, or weak recommendations. The descriptive research studies are all considered weak recommendations, but these articles contributed to understanding the antecedents of knowledge, attitude, modeling, and convenience.

When locating articles for this project, the search engine *Cedarville One Search* was used. This program provides access to all of the research databases (i.e. CINAHL plus with Full Text, Cochrane, Medline with Full Text, EBSCO, and Proquest) as well as interdisciplinary articles. If access to full text of articles was not provided, interlibrary loans were used to access those articles. Only scholarly peer reviewed articles were reviewed. Articles were limited to 2009 and newer. Source type was academic journals.

Key terms used to search for the dietary guideline research studies were "CHD diet," "heart healthy diet," "cardiac diet," "cardiovascular disease diet," "preventing CHD with diet," and "African American diet." Key terms for target population intervention studies and descriptive research studies were, "college student's diet," "CHD," "dietary patterns in college students," "college student's health," "health behaviors in college students," "healthy lifestyles in college students," "dietary behaviors in college students," "eating habits in college students," "African American diet," "African American college diet," and "CHD in college women." Many articles were reviewed, but only articles

pertinent to the target population were included. All articles were graded using the seven levels of evidence (Melnyk & Fineout-Overholt, 2011). Articles that were included discussed increasing healthy behaviors, decreasing the risk of CHD, behavior modifications, increasing self-efficacy in the target population, interventions to increase healthy diet, and racial disparities. Articles were excluded if they could not be applied to the target population, focused on men, lacked evidence in their findings, and inpatient care.

Dietary Guideline Research Studies Introduction

The dietary guideline research studies focused on the pertinent evidence-based research studies that had an aim to decrease CHD risk factors. The majority of the dietary guideline research study findings were systematic reviews and randomized controlled trials with a few quasi-experimental design and expert guidelines. To be included in the findings, the dietary research studies reviewed had to remain applicable to the target population.

Table 1

Dietary Guideline Research Studies

Strong, Moderate, and Weak Recommendations

Strong	Moderate	Weak
Heart Healthy Diet: fruits, vegetables, whole grains, low fat dairy products, poultry, fish, legumes, nuts, and non-tropical vegetable oils	Low carbohydrate diet may help decrease cardiovascular risk factors	No evidence of green and black tea directly decreasing the risk of CHD
Fruit and fiber protective of increased waist circumference	Females drinking sugar sweetened beverages are at increased risk for CHD	Limited evidence on whether fruits and vegetables alone will decrease the risk of CHD without the implementation of other dietary change
Limit sweets, sugar-sweetened beverages, and red meats Low saturated and trans-fat diet	Omega 3 Fatty Acids	Intake of supplementary vitamin E and ascorbic acid (vitamin C); saturated and polyunsaturated fatty acids
Decrease of salt reduction	Snacking habits increase diet but does not decrease the risk of CHD	Trans-fat and dietary cholesterol intakes put women at an increased risk for developing CHD
Reduce dietary fat	Vegetarian diet	
Mediterranean diet, high quality diet in the decrease of CHD	Vitamin D supplementation	
Increased risk for CHD was related to foods with trans-fatty acids and foods of high glycemic index		
High sugar diets are at increased risk for CHD		

Table 2

Dietary Guideline Research Studies

Author	Title	Research Design	Results	Level of Evidence
Strong Recommendations				
(Eckel et al., 2014)	AHA/ACC guideline on lifestyle management to reduce cardiovascular risk: A report of the American College of Cardiology/ American Heart Association task force on practice guidelines	Expert Committee	Heart healthy diet has a focus on vegetables, fruits, and whole grains, includes low-fat dairy products, poultry, fish, legumes, non-tropical vegetable oils, and nut Limit sweets, sugar-sweetened beverages, and red meats Low saturated and trans-fat diet	VII
(Epstein et al., 2012)	Determinants and consequences of adherence to the dietary approaches to stop hypertension diet in African-American and white adults with high blood pressure: Results from the encore trial	RCT	Those that adhere to the DASH diet result in a decrease in blood pressure and weight In this study, Caucasians were more likely to adhere to the DASH diet than African Americans	II

(Fogelholm, Anderssen, Gunnarsdottir, & Lahti-Koski, 2012)	Dietary macronutrients and food consumption as determinants of long-term weight change in adult populations: A systematic literature review	Systematic Review	An increase of fruit and fiber intake is protective against an increase in waist circumference Foods suggested for prevention of weight gain include fiber-rich foods and dairy products while decreasing refined grains, meat and sugar-rich foods and drinks in diet	V
(He, 2013)	Effect of longer-term modest salt reduction on blood pressure	Systematic Review	Decreasing salt intakes can cause significant drops in blood pressure. This was seen in those with normal and high blood pressure	I
(Hooper, 2012)	Reduced or modified dietary fat for preventing cardiovascular disease	Systematic Review	Lifestyle education for decreasing CHD should advise those at risk for CHD to reduce saturated fat and replaced by unsaturated fat	I
(Mente, De Koning, Shannon, & Anand, 2009)	A systematic review of the evidence supporting a causal link between dietary factors and coronary heart disease	Systematic Review	Evidence has shown that there is a strong causal relationship in decreasing CHD risk factors with the intake of the following foods: vegetables, nuts, Mediterranean diet Evidence has shown that there is a strong causal relationship in increasing CHD risk factors with the intake of the following foods: trans-fatty acids and foods of high glycemic index Evidence has shown that there is a moderate causal relationship in increasing CHD risk factors with the	I

			intake of the following: fish, marine fatty acids, folate, whole grains, dietary vitamins E and C, beta-carotene, alcohol, fruit, and fiber	
(Rees, 2014)	'Mediterranean' dietary pattern for the primary prevention of cardiovascular disease	Systematic Review	The Mediterranean diet helps to decrease cardio-metabolic risk factors which in turn could help decrease cardiac morbidity and mortality	I
(Thornley, Tayler, & Sikaris, 2012)	Sugar restriction: The evidence for a drug-free intervention to reduce cardiovascular disease risk	Expert Guidelines	Patients with high sugar intake are at increased risk for CHD	VII

Moderate Recommendations				
(Bazzano et al., 2014)	Effects of low-carbohydrate and low-fat diets	Randomized, parallel-group trial	Low carbohydrate diet was found to have a decrease in weight loss and a decrease in cardiovascular risk factors more so than those that implemented a low fat diet	II
(Fung, Malik, Rexrode, Manson, Willett, & Hu, 2009)	Sweetened beverage consumption and risk of coronary heart disease in women	Longitudinal Quasi-experimental Design	Even when unhealthy lifestyle and diet are considered, females with regular drinking of sugar-sweetened beverages are at an increased risk for CHD	III
(Fung et al., 2012)	Vitamin D intake is inversely related to risk of developing metabolic syndrome in African	Longitudinal Quasi-experimental Design	In young African American adults, supplementation of vitamin D helps to decrease metabolic syndrome and CHD risk factors	III

	American and white men and women over 20 y: The coronary artery risk development in young adults study			
(Nicklas, O'Neil, & Fulgoni, 2014)	Snacking patterns, diet quality, and cardiovascular risk factors in adults	Quasi-experimental Design	Snacking habits can help improve diet However, snacking patterns were found to not be associated with decreasing cardiovascular risk factors	III
(Sticher, Smith, & Davidson, 2010)	Reducing heart disease through the vegetarian diet using primary prevention	Meta-analysis	With supplementation, a vegetarian diet can be beneficial in the prevention of CHD	IV
(O'Sullivan et al., 2014)	Habitual diets rich in dark-green vegetables are associated with an increased response to ω-3 fatty acid supplementation in Americans of African ancestry	RCT	African Americans diets high in green leafy vegetables may help in the efficacy of omega 3 fatty acid supplementation	II

Weak Recommendations				
(Hartley, 2013)	Green and black tea for the primary prevention of cardiovascular disease	Systematic Review	There is no clear evidence that tea helps to minimize cardiovascular risk factors	I
(Hartley, 2013)	Increased consumption of fruit and	Systematic Review	There is limited evidence that the intake of fruits and vegetables alone will	I

	vegetables for the primary prevention of cardiovascular diseases		be beneficial without implementation of other dietary change However, fruits and vegetable intake is directly correlated with decreased blood pressure and lipid levels	
(Mente et al., 2009)	A systematic review of the evidence supporting a causal link between dietary factors and coronary heart disease	Systematic Review	Current research supports that there is insufficient evidence that intake of following will help decrease the risk for development CHD: supplementary vitamin E, ascorbic acid (vitamin C), saturated fatty acids, poly-unsaturated fatty acids, α-linolenic acid, meat, eggs and milk	I
(Tran & Barraj, 2010)	Contribution of specific dietary factors to CHD in US females	Descriptive Study	Increased trans-fat and dietary cholesterol intakes put women at an increased risk for developing CHD	VI

Dietary Guideline Research Studies Summary

Strong Recommendations

There is a causal relationship that the intake of vegetables, nuts, Mediterranean diet, and a high quality diet decrease CHD risk factors. Increased risk for CHD was related to foods with trans-fatty acids and foods of high glycemic index (Mente et al., 2009). There is moderate causal evidence for decreasing CHD with the intake of fish, marine fatty acids, folate, whole grains, dietary vitamins E and C, beta-carotene, alcohol, fruit, and fiber (Eckel et al., 2014; Mente et al. 2009; Rees, 2014). The Mediterranean diet helps to decrease cardio-metabolic risk factors, which in turn could help decrease

cardiac morbidity and mortality (Rees, 2014). An increase of fruit and fiber intake is protective against an increase in waist circumference. Foods suggested for prevention of weight gain are fiber-rich foods and dairy products. Foods to be avoided are refined grains, meat, sugar-rich foods, and sugary drinks (Fogelholm et al., 2012). A heart healthy diet has a focus on vegetables, fruits, and whole grains, and includes low-fat dairy products, poultry, fish, legumes, non-tropical vegetable oils, and nuts (Eckel et al., 2014).

Lifestyle education for decreasing CHD should be focused on those at risk for CHD. Lower risk population should be advised to reduce saturated fats and replace saturated fats with unsaturated fat and low trans-fats (Eckel et al., 2014; Hooper, 2012). Decreasing salt intake can cause significant decrease in blood pressure; this was seen in those with normal and high blood pressure. Adherence to the dietary approaches to stop hypertension (DASH) diet is associated with decreases in blood pressure and weight. In this study, Caucasians were more likely to adhere to the DASH diet than African Americans (Epstein et al., 2012; He, 2013). Patients with high sugar intake are at increased risk for CHD (Thornley et al., 2012).

Moderate Recommendations

There are varieties of moderate recommendations for diet modification as a means of decreasing CHD. Females who regularly drink sugar-sweetened beverages are at an increased risk for CHD even when unhealthy lifestyle and diet are considered (Fung et al., 2009). Snacking habits can help improve diet. However, snacking patterns were not found to be associated with decreasing CHD risk factors (Nicklas et al., 2014). With supplementation, a vegetarian diet can be beneficial in the prevention of CHD (Sticher et

al., 2010). The low carbohydrate diet was found to have a decrease in weight loss and a decrease in cardiovascular risk factors more so than those that implemented a low fat diet (Bazzano et al., 2014). In African American young adults, supplementation of vitamin D helps to decrease metabolic syndrome and CHD risk factors and diets high in green leafy vegetables may help in the efficacy of omega 3 fatty acid supplementation (Fung et al., 2012; O'Sullivan et al., 2014).

Weak Recommendations

There is no clear evidence that green and black tea help to prevent CHD (Hartley, 2013). There is limited evidence that without other dietary changes, increasing fruits and vegetables alone will help to decrease CHD. However, fruits and vegetables intake have a direct correlation with decreasing blood pressure and elevated lipid levels (Hartley, 2013). Current research supports that there is insufficient evidence that intake of following will help decrease the risk for development CHD: supplementary vitamin E, ascorbic acid (vitamin C), saturated fatty acids, poly-unsaturated fatty acids, α-linolenic acid, meat, eggs and milk (Mente et al., 2009). Trans-fat and dietary cholesterol intakes put women at an increased risk for developing CHD (Tran & Barraj, 2010).

Target Population Intervention Introduction

As summarized in the findings below, there was many research studies found to support this research project and interventions found in these studies can be applied to the target population. Majority of the studies found included in this section are quasi-experimental design, randomized control trials, and systematic reviews. All other research findings were included in the descriptive study section.

Table 3

Target Population Intervention Studies

Strong, Moderate, and Weak Recommendations

Strong	Moderate	Weak
Peer education	Online videos	Food regulation
Increase self-efficacy	Texting health information	Lowering food prices
Developed health programs	Proper food labeling	Theory-based online health behavior intervention
Theory of Planned Behavior and the Theory of Reasoned Action based dietary interventions	Social norms directed messages	Facebook Intervention
Culturally appropriate education	Point of decision/purchase information	Home video-based telehealth
Environmental factors & visual cues	Mental contrasting	
Smart phone applications	Attentional bias	
Dietary advice	Target imagery	
Motivational interviewing	Brief motivational instrumentation	
	Behavior image model	
	Individualized dietary feedback	
	One-on-one intervention	

Table 4

Target Population Intervention Studies

Author	Title	Research Design	Results	Level of Evidence
Strong Recommendations				
(Boyle, Mattern, Lassiter, & Ritzler, 2011)	Peer 2 peers: Efficacy of a course-based peer education intervention to increase physical	Quasi-experimental Design	Peer based education helped to improve physical activity in college females	III

	activity among college students		This program encourages self-efficacy to increase physical activity	
(Dour et al., 2013)	Process evaluation of project webhealth: A nondieting web-based intervention for obesity prevention in college students	Quasi-experimental Design	Project web health program focused on healthy behaviors that help decrease weight in college students This program was shown to increase self-efficacy to make healthier lifestyle choices	III
(Duren-Winfield et al., 2011)	Champions for outreach and advocacy for campus and community health: A college-based peer health coach program	Quasi-experimental Design	Peer health program focused on healthy behaviors to minimize health disparities in African American colleges This program was shown to increase self-efficacy to make healthier lifestyle choices	III
(Hackman & Knowlden, 2014)	Theory of reasoned action and theory of planned behavior-based dietary interventions in adolescents and young adults: A systematic review	Systematic Review	Theory of planned behavior and the theory of reasoned action based dietary interventions in the priority population These theories have strong evidence that they are effective when implementing behavior interventions targeting young adults and adolescents	I
(Holland Carthron, D. L., Duren-Winfield, &	An experiential cardiovascular health education program for African	Quasi-experimental Design	Curriculum directed for African Americans with a focus on self and	III

Lawrence, 2014)	American college students		family assessment with a goal to increase awareness of their risk of cardiovascular disease This program was effective in increasing self-efficacy and implementing lifestyle modification with a goal to decrease CHD	
(LaChausse, 2012)	My student body: Effects of an internet-based prevention program to decrease obesity among college students	RCT	My student body (MSB) internet based obesity prevention program had an increase effect on college students' nutrition behavior However, MSB had no effect on weight loss or physical activity	II
(James, 2013)	Weight loss strategies used by African American women: Possible implications for tailored messages	Quasi-experimental Design	Messages should be tailored to the African American population A focus can be set on the amount of weight loss needed and effective weight loss strategies	III
(Kelly, Mazzeo, & Bean, 2013)	Systematic review of dietary interventions with college students: Directions for future research and practice	Systematic Review	When planning dietary interventions, one should focus on environmental factors and visual cues	V
(Kicklighter, Koonce, Rosenbloom, & Commander,	College freshmen perceptions of effective and ineffective aspects of	Quasi-experimental Design	A nutrition model taught by graduate students may benefit college students in implementing	III

2010)	nutrition education		healthier diet choices	
(King, Ling, Ridner, Jacks, Newton, & Topp, 2013)	Fit Into College II: Physical activity and nutrition behavior effectiveness and programming recommendations	Quasi-experimental Design	Fit into college is a 14-week program focusing on diet education and physical activity This program helped college students improve better eating perceptions However, the program was not as effective in increasing fruit and vegetable intake and healthy food planning	III
(Lemacks Wells, Ilich, & Ralston, 2013)	Interventions for improving nutrition and physical activity behaviors in adult African American populations: A systematic review	Systematic Review	African Americans using community resources such as churches and clinics were good places for teaching healthy lifestyle interventions One-on-one educational sessions, group interventions, physical activity classes, church groups, diet education, home visits, and use of nutritionist can all be effective ways of teaching healthy behaviors	I
(Normand & Osborne, 2010)	Promoting healthier food choices in college students using individualized dietary feedback	Quasi-experimental Design	Individualized dietary feedback was shown to be a beneficial method of helping college students make better diet choices	III
(Pearson, Irwin,	The change program: comparing	RCT	A 12-week program with a goal to	II

Morrow, & Hall, 2012)	an interactive versus prescriptive obesity intervention on university students' self-esteem and quality of life		decrease obesity This program was correlated with an increase in college students participating in healthy lifestyle behaviors and helped to improve self-esteem	
(Recio-Rodríguez et al., 2014)	Effectiveness of a smartphone application for improving healthy lifestyles, a randomized clinical trial (evident II): Study protocol	RCT	Smart phone applications are effective in promoting healthy lifestyle behaviors	II
(Rees, 2013)	Dietary advice for reducing cardiovascular risk	Systematic Review	Dietary advice promotes dietary change in healthy individuals Dietary interventions may help individuals decrease the risk of CHD. Even without the diagnosis of cardiovascular disease, individuals are likely to implement healthy dietary lifestyle modifications with appropriate dietary advice	I
(Schilter & Dalleck, 2010)	Fitness and fatness: Indicators of metabolic syndrome and cardiovascular disease risk factors in college students	Quasi-experimental Design	Physical Activity and obesity can be indicators of an increased risk for developing CHD	III
(Sutliffe & Carnot, 2011)	Cardiovascular risk reduction among college students	Quasi-experimental one-group	This program showed benefit in helping to decrease BMI and	III

		Design Pretest Posttest Design	CHD risk factors	
(Topp et al., 2011)	Fit Into college: A Program to improve physical activity and dietary intake lifestyles among college students	Quasi-experimental Design	This program was a beneficial peer based program, which was shown to help college freshman engage in healthier lifestyles In terms of diet, this program was beneficial in helping student decrease perceived barriers to healthy diet	III
(Villablanca et al., 2010)	Outcomes of comprehensive heart care programs in high-risk women	Quasi-experimental Design	CVD prevention built around a comprehensive heart care model program & AHA/ACC evidence-based guidelines can be used to increase cardiovascular disease knowledge and awareness	III
(White, Park, S., Israel, & Cordero, 2009)	Longitudinal evaluation of peer health education on a college campus: Impact on health behaviors	Longitudinal Quasi-experimental Design	There is evidence that with peer health education during the first year of college, by their third year, these students implemented healthier lifestyles (increase in healthier diet choices)	III
(Witt, Lindquist, Treat-Jacobson, Boucher, Konety, & Savik, 2013)	Motivational interviewing to reduce cardiovascular risk in African American and Latina women	Systematic Review	Motivational interviewing can be used as a method in preventing risk factors for CHD in the African American and Latina population	I

(Zullig, Reger-Nash, & Valois, 2012)	Health educator believability and college student self-rated health	Quasi-experimental Design	Majority of college students receive health information from health educators However, many college students view this information as neutral information	III

Moderate Recommendations				
(Brown, Wengreen, Vitale, & Anderson, 2011)	Increased self-efficacy for vegetable preparation following an online, skill-based intervention and in-class tasting experience as a part of a general education college nutrition course	Quasi-experimental Design with pre/post monitoring	Online videos may provide beneficial in helping increase self-efficacy Online is a cost effective means of teaching the target population	III
(Brown, O'Connor, & Savaiano, 2014)	Mobile myplate: A pilot study using text messaging to provide nutrition education and promote better dietary choices in college students	Quasi-experimental Design with pre/post study	Texting health information may be a cost effective method of providing nutrition knowledge and health education	III
(Chu, Frongillo, Jones, & Kaye, 2009)	Improving patrons' meal selections through the use of point-of-selection nutrition labels	Quasi-experimental, Single-group, Interrupted Time-series Design	Nutritional labeling did not decrease sales but did improve healthier food choices	III
(Crockett, 2011)	Nutritional labeling for promoting healthier food purchasing and consumption	Systematic Review	Nutritional labeling needs three parts: types of nutrient, amounts of nutrient, and visibility Better food labeling	I

			will help direct consumers to make educated healthier food choices	
(Hebden, Cook, Ploeg, King, Bauman, & Allman-Farinelli, 2014)	A mobile health intervention for weight management among young adults: A pilot randomized controlled trial	RCT	Text messages can be an effective tool for reaching the young adult population Findings showed no significant changes from the control group and low engagement in the program	II
(Hoefkens Pieniak, Van Camp, & Verbeke, 2012)	Explaining the effects of a point-of-purchase nutrition-information intervention in university canteens: A structural equation modeling analysis	Quasi-experimental Design	Individuals with increased knowledge were able to understand the point-of-purchase information When individuals like the point -of- purchase information combined with educational interventions can help college students develop knowledge	III
(Johannessen, Oettingen, & Mayer, 2012)	Mental contrasting of a dieting wish improves self-reported health behaviour	Quasi-experimental Design	Mental contrasting as a means of behavior change can help young adults make better lifestyle choices	III
(Kakoschke, Kemps, & Tiggemann, 2014)	Attentional bias modification encourages healthy eating	Quasi-experimental Design	Attentional bias as a means of behavioral change can he used as a method to increase healthy eating habits in young adults	III
(Knäupper McCollam, Rosen-Brown, Lacaille, Kelso, &	Fruitful plans: Adding targeted mental imagery to implementation intentions increases fruit consumption	Quasi-experimental Design	Target imagery methods may positively impact health behaviors	III

Roseman, 2011)				
(Robinson, Harris, Thomas, Aveyard, Higgs, 2013)	Reducing high calorie snack food in young adults: A role for social norms and health based messages	RCT	Both the health and the social norm message condition compared with the control message condition help college students decrease the intake of high calorie snack food.	II
(Whitlock Cowherd, Esslinger, & Nixon, 2013)	Examination of nutritional patterns for female college students	Quasi-experimental Design (pilot)	In a small sample of female college students, one-on-one intervention and food logs were implemented Students began to make healthier food choice	III

Weak Recommendations				
(Epton et al., 2014)	A theory-based online health behaviour intervention for new university students: Results from a randomized controlled trial	RCT	Interaction with the theory-based program was low This resulted in no increase of fruits and vegetables intake, but did help students decrease cigarette smoking	II
(Donglan Giabbanelli, Arah, & Zimmerman , 2014)	Impact of different policies on unhealthy dietary behaviors in an urban adult population: An agent-based simulation model	Descriptive Study	Social norm targeted messages may be more effective to make dietary change compared to regulation of food and lowering healthy food prices	VI
(Moore, Werch, & Bian 2012).	Pilot of a computer-based brief multiple–health behavior	RCT (pilot)	Behavior image model can be used in college students a means to positively impact	II

	intervention for college students		health behaviors	
(Gerber et al., 2013)	Video telehealth for weight maintenance of African-American women	RCT	Home video-based telehealth targeted to the African American showed no improvement of weight maintenance in African American women	II
(Merchant et al., 2014)	Click "like" to change your behavior: A mixed methods study of college students' exposure to and engagement with Facebook content designed for weight loss	Quasi-experimental Design	Engagement to the Facebook page decreased over time. Facebook can be a good method to target college age population with health information	III
(Troop, 2013)	Brief report: Effect of dietary restraint on fruit and vegetable intentions intake following implementation	Quasi-experimental Design	Those studied were encouraged to make plans about eating more fruits and vegetables With dietary interventions, there was an increase of intake on unrestrained eaters	III

Target Population Intervention Research Studies Summary

Strong Recommendations

There are many strong recommendations when implementing target population interventions. The majority of college students receive health information from health educators. However, many college students view this information as neutral information (Zullig, et al., 2012). The use of peer educational programs has shown to be a strong

benefit in improving healthy behaviors in the target population. Goals of these programs help to improve physical activity in college females, encourage self-efficacy, minimize health disparities, decrease weight, healthy food planning, improve diet, better eating perceptions, decrease BMI, decrease perceived barriers, and decrease CHD risk development. "Project Web Health Program" (Dour et al., 2013), "Peer 2 Peer Program" (Boyle et al., 2011), "Champions for Outreach and Advocacy for Campus and Community Health: A College-Based Peer Health Coach Program" (Duren-Winfield, Nance, Onsomu, Valentine, McKenzie, & Roberts, 2011), "An Experiential Cardiovascular Health Education program for African American College Students" (Winham & Jones, 2011), "My Student Body" (LaChausse, 2012), "Fit into College: A Program to Improve Physical Activity and Dietary Intake Lifestyles Among College Students" (King et al., 2013), "The Change Program" (Pearson et al., 2012), "Cardiovascular Risk Reduction Among College Students" (Sutliffe & Carnot, 2011) and "Graduate Students Teaching Undergraduates" (Kicklighter et al., 2010), are some of the most recent programs that have been shown to be beneficial to the target population. There is evidence that with peer health education during the first year of college, many students implemented healthier lifestyle by their third year and had increase in healthier diet choices (White et al., 2009).

Although these programs reach the target population, there are two programs that aim at a higher risk population; "Champions for Outreach and Advocacy for Campus and Community Health: A College-Based Peer Health Coach Program," and "An Experiential Cardiovascular Health Education Program for African American College Students" (Duren-Winfield et al., 2011; Holland et al., 2014). The program, "An Experiential

Cardiovascular Health Education Program for African American College Students" is tailored to decrease the risk of CHD specifically in the African American community. This program focuses on African Americans with an emphasis on self and family assessment with a goal to increase awareness of their risk of cardiovascular disease. This program was shown to be effective in increasing self-efficacy with a goal to implement lifestyle modifications (Holland et al., 2014). When describing healthy behaviors to an African American population, a focus can be set on the amount of weight loss needed and effective weight loss strategies (James, 2013). African Americans using community resources such as churches and clinics have found these community resources to be beneficial places for teaching healthy lifestyle interventions. One-on-one educational sessions, group interventions, physical activity classes, church groups, diet education, home visits, and use of nutritionist can all be effective ways of teaching healthy behaviors (Lemacks et al., 2013).

There are strong recommendations for the use of theory in encouraging dietary interventions. Theory of planned behavior and the theory of reasoned action based dietary interventions are theories that focus on the target population. These theories are effective when implementing behavior interventions targeted at young adults and adolescents (Hackman & Knowlden, 2014). Environmental factors and visual cues can be used as an effective method to reach the target population (Kelly et al., 2013). The use of individual dietary feedback is beneficial in helping college students make healthier food choices and dietary advice may help to decrease the risk of CHD development (Normand & Osborne, 2010; Rees, 2013). Motivational interviewing can be used as a method in preventing risk factors for CHD in the African American and Latina population (Witt et al., 2013). The

use of technology such as smart phone applications can be used to promote healthy lifestyle behaviors (Recio-Rodríguez et al., 2014). In prevention of CHD, dietary changes need to be combined with physical activity and healthy weight loss strategies (Schilter & Dalleck, 2010).

Moderate Recommendations

When it comes to interventions for increasing healthy behaviors in college students, cost effectiveness is important. The majority of college students use their phones and internet daily, so these can be modes of developing educational messages. Online videos and texting can be useful ways of directing education to the target population. These modes can be used to help increase the college student's self-efficacy to choose healthier behaviors and promote better dietary choices. However, these methods need to keep college students engaged or effectiveness decreases (Brown et al., 2011; Brown et al., 2014; Hebden et al., 2014).

Food labeling plays a part in why college students make food selections. Better food labeling helps direct consumers to make educated healthier food choices. The use of point-of-selection nutrition labels helped to improve healthier food choices, but did not decrease sales. Nutritional labeling requires three parts. These are types of nutrient, amounts of nutrient, and visibility. Visibility can be defined as labels allowing the consumer to be able to see clearly what food choice they are making either positive or negative (Chu et al., 2009; Crockett, 2011).

Targeted messages help to increase a healthy diet in college students. Lower level of health literacy is a barrier to understanding some targeted health messages such as point-of-purchase information. When information education is presented in combination

with educational intervention, it can help to develop knowledge in college students (Hoefkens et al., 2012). Mental contrasting, attentional bias, mental imagery, one-on-one interventions with a food log, and social norm messages can all be beneficial ways to improve healthier diet choices in the college age population (Johannessen et al., 2012; Kakoschke et al., 2014; Knäupper, et al., 2011; Robinson et al., 2013; Whitlock et al., 2013).

Weak Recommendations

Targeting messages to increase healthy diet is more effective than regulation of food and decreasing the price of healthy food products (Donglan et al., 2014). According to Troop (2013), after applying implementation intentions, fruit and vegetable intake increases with greater intentions in unrestrained eaters. Unrestrained eaters are those that are not concerned that food intake will cause changes to weight and shape (Troop, 2013). It is important to keep college students engaged in increasing healthy diets. In one study by Epton et al. (2014), interactions with a theory-based program were low, leading to no increase in fruit and vegetable intake. In one study by Merchant et al. (2014), Facebook was used as a means to target the young adult population with health information and weight loss interventions. During the study, engagement dwindled. In a study completed by Gerber et al. (2013), home-based video telehealth was used to help target healthy behaviors in the African American population. This method showed no improvement of weight maintenance. In a small pilot study by Moore, Werch & Bian (2012), the computer-based method was used to study the behavior image model for multiple health behavior interventions in college students. Computers are a way to reach the target population if engagement is maintained.

Descriptive Research Studies Introduction

There were many descriptive studies found to support this research project. These articles are recognized as lower levels of evidence. However, these articles can be useful, directing research to the target population. As mentioned above these findings are divided into the four antecedents: knowledge, attitude, modeling, and convenience.

Table 5

Descriptive Research Studies

Graded Review of Selected Literature

Summary of the Descriptive Literature

Knowledge	Attitude	Modeling	Convenience
Race Focused Education	Health Belief Model	Environment	Lack of time/ Money
False Perception	Social Norms	Targeted Media	Western Diet
Self-Efficacy	Body/Weight Satisfaction	Planned Behavior	Skipped Meals
Self-Motivation	Hope	Social Pressure	
Risk Perception	Dispositional Mindfulness	Relationships	
Health Literacy	Self-esteem		

Table 6

Descriptive Research Studies

Knowledge				
Author	Title	Research Design	Results	Level of Evidence
(EunSeok et al., 2014)	Health literacy, self-efficacy, food label use, and diet in young adults	Descriptive Study	Those students with greater self-efficacy and high health literacy positively impact their healthier food choices	VI
(Ferrara,	Obesity, diet, and	Descriptive	Students in health	VI

Nobrega, & Dulfan, 2013)	physical activity behaviors of student in health-related professions	Study	majors are more likely to participate in healthy behaviors compared to those in non-health majors	
(Hutchison, Warren-Findlow, Dulin, Tapp, & Kuhn 2014)	The association between health literacy and diet adherence among primary care patients with hypertension	Descriptive Study	African American are less likely to have a high level of health literacy compared to Caucasians	VI
(Kedem,Evans, & Chapman-Novakofski, 2014)	Psychometric evaluation of dietary self-efficacy and outcome expectation scales in female college freshmen	Descriptive Study	Young adults have the understanding that implementing healthy lifestyle behaviors are important, but have lower self-efficacy to initiate healthy behaviors The intervention of skill building is suggested to increasing self-efficacy in college students	VI
(Strawson, Bell, Downs, Farmer, Olstad, & Willows, 2013)	Dietary patterns of female university students with nutrition education	Descriptive Study	Dietary education alone may not be beneficial for college students to change dietary behaviors	VI
(Wald Muennig, O'Connell, & Garber, 2014)	Associations between healthy lifestyle behaviors and academic performance in U.S. undergraduates: A secondary analysis of the American	Descriptive Study	College students that have higher grades are more likely to follow public health recommendations	VI

	college health association's national college health assessment II			
(Watters & Satia, 2009)	Psychosocial correlates of dietary fat intake in African-American adults: A cross-sectional study	Descriptive Study	African Americans females with high self-efficacy and belief in the importance of a low-fat diet are the two main factors in choosing diets lower in fat Increased education of African Americans is associated with healthier food choices	VI
(Winham & Jones, 2011)	Knowledge of young African American adults about heart disease: A cross-sectional survey	Cross-sectional Descriptive Study	African American college students with higher self-efficacy are more likely to have higher education and more likely to make changes to decrease the risk of CHD	VI

Attitude				
Author	Title	Research Design	Results	Level of Evidence
(Antin & Hunt, 2013)	Embodying both stigma and satisfaction: An interview study of African American women	Qualitative Study	African American women 18-25 years old, appreciate their cultural body appearance but also may fall into societal views of	VI

			body appearance	
(Berg, Ritschel, Swan, An, & Ahluwalia, 2011)	The role of hope in engaging in healthy behaviors among college students	Cross-sectional Descriptive Study	Higher levels of hope in college students is correlated with high levels of healthy behaviors and healthy lifestyle modifications	VI
(Brown, Geiselman, & Broussard, 2010)	Cardiovascular risk in African American women attending historically Black colleges and universities: The role of dietary patterns and food preferences	Descriptive Study	Many African American female college students chose a normal body size and a healthy body shape as their ideal body size	VI
(Clifford, Keeler, Gray, Steingrube, & Morris, 2010)	Weight attitudes predict eating competence among college students	Descriptive Study	Many college women were found to be dissatisfied with their weight Those with body weight satisfaction and those with a desire to lose weight had an increase in eating competency scores	VI
(Fielder-Jenks, 2010)	Can health behaviors and motives predict college students' self-esteem?	Descriptive Study	Students with better self-esteem are more likely to choose healthier lifestyle behaviors	VI
(Fyler, Schumacher, Banning, & Gam, 2014)	Influence of body satisfaction, body mass index, and diet quality on healthy eating attitudes among college students	Descriptive Study	College students with positive satisfaction of their body are more likely to have healthier eating habits	VI
(Grossbard Lee,	Body image	Descriptive	Self-esteem and	VI

Neighbors, & Larimer, 2009)	concerns and contingent self-esteem in male and female college students	Study	weight concerns are targets for education in female college students	
(Murphy, Mermelstein, Edwards, & Gidycz, 2012)	The benefits of dispositional mindfulness in physical health: A longitudinal study of female college students	Descriptive Study	Female college students with greater dispositional mindfulness are more likely to choose healthy lifestyles	VI
(Sanderson, Lupinski, & Moch, 2013)	Is big really beautiful? Understanding body image perceptions of African American females	Descriptive Study	African American females age 18-25, although body image satisfaction is important, students may reject societal view of desiring to be thin Weight loss education can be focused on gaining health not focused on gaining beauty and weight loss	VI
(Wichianson et al., 2009)	Perceived stress, coping and night-eating in college students	Descriptive Study	Higher levels of stress in college students may increase the risk of poor eating habits at night as a means of maladaptive coping	VI

Modeling				
Author	Title	Research Design	Results	Level of Evidence
(Boggs, Rosenberg, Rodríguez-	Long-term diet quality is associated with	Descriptive Study	African American women are at risk for obesity before	VI

Bernal, & Palmer, 2013)	lower obesity risk in young African American women with normal BMI at Baseline		they reach middle age range Healthier diet choices are associated with reduced risk for obesity	
(Brown, Geiselman, & Broussard, 2010)	Cardiovascular risk in African American women attending historically Black colleges and universities: The role of dietary patterns and food preferences	Descriptive Study	African American women college students prefer higher fat foods and are at an increased risk for higher fat diets above recommended guidelines, putting them at higher risk for developing CHD	VI
(Fernandes et al., 2013)	Dietary factors are associated with coronary heart disease risk factors in college students	Descriptive Study	College students with a higher BMI were at increased risk for elevated fasting blood glucose levels and larger waist circumference Dietary factors and body mass index are good indicators of CHD risk more than physical activity in the college population	VI
(James, 2009)	Cluster analysis defines distinct dietary patterns for African-American men and women	Descriptive Study	African American diet interventions should be specific to the targeted population	VI

			There is no typical African American diet Diet is more associated with the population where they live	
(Holt et al., 2014)	Religion and health in African Americans: The role of religious coping	Descriptive Study	In the African American culture, religious involvement is associated with healthier behaviors	VI
(Kedem, Evans, & Chapman-Novakofski, 2013)	Relationship among females' weight status and beliefs about diet and health	Descriptive Study	Psychosocial factors that influence food choices in college females are self-efficacy, emotional eating, and social pressure	VI
(Kwan, Arbour-Nicitopoulos, Lowe, Taman, & Faulkner, 2010)	Student reception, sources, and believability of health-related information	Descriptive Study	In college students, the internet is the most common source of health information However, it is considered the least believable Health center medical staff and university health educators are perceived to be the most believable source of health information	VI
(LaCaille, Dauner, Krambeer, &	Psychosocial and environmental determinants of	Qualitative Study	Eating & physical activity are determined by	VI

Pedersen, 2011)	eating behaviors, physical activity, and weight change among college students: A qualitative analysis		college student to be motivations and self-regulatory skills Social structure and environment contribute to motivation and self-regulatory skills	
(Laska, Pasch, Lust, Story, & Ehlinger, 2011)	The differential prevalence of obesity and related behaviors in two- vs. four-year (of eating behaviors, physical activity, and weight change among college students: A qualitative analysis	Descriptive Study	Female students in 2-year colleges are at increased risk for overweight & obesity, decreased levels of activity, increased television viewing, increased soda intake, increased fast food and increased use of diet pills	VI
(Lawrence et al., 2009)	Why women of lower educational attainment struggle to make healthier food choices: The importance of psychological and social factors	Qualitative Study	Family dynamics and psychological factors play a key part of why women make food choices Education should address these dynamics with a focus on social support	VI
(Leach, Leach, & Bassett, 2013)	Profile of coronary heart disease risk factors in first-year university students	Quantitative cross sectional design	Physical inactivity: one of the most prevalent risk factors for developing CHD Many college students are at risk for CHD due to	VI

			lifestyle factors	
(McLean-Meyinsse, Harris, Taylor, & Gager, 2013)	Examining college students' daily consumption of fresh fruits and vegetables	Descriptive Study	Many college students in this study did not consume an adequate amount of fruits and vegetables	VI
(Melton Bigham, Bland, Bird, & Fairman, 2014)	Health-related behaviors and technology usage among college students	Cross-Sectional Descriptive Study	The use of more technology impacts healthy dietary behaviors, sleep, and body mass index	VI
(Pelletier, Graham, & Laska, 2014)	Social norms and dietary behaviors among young adults	Descriptive Study	Social norms can be associated with food choices in young adults and friends may impact food choices	VI
(Salandy & Nies, 2013)	The effect of nutrition on the stress management, interpersonal relationships, and alcohol consumption of college freshman	Longitudinal Descriptive Study	Many African American college students with poorer interpersonal relationships are more at risk for poor nutrition	VI
(Yun & Silk, 2011)	Social norms, self-identity, and attention to social comparison information in the context of exercise and healthy diet behavior	Descriptive Study	Social norms have an impact on food choices and physical activity The use of others modeling healthy behaviors around students can help students increase change towards healthy behaviors	VI

Convenience				
Author	Title	Research Design	Results	Level of Evidence
(Avram & Oravitan, 2013)	Fruit, vegetables and fast food consumption among university students	Cross-sectional descriptive study	About 2/3 of students in this study are not getting the adequate amount of fruits and vegetables Lack of time, money, and school program were the three main barriers to healthy food choices	VI
(Mead, 2009)	Gender differences in food selections of students at a historically black college and university (HBCU)	Descriptive Study	Many college students do not choose healthy foods and may lack intake of vital nutrients	VI
Odegaard, Koh, Yuan, Gross, & Pereira, 2012)	Western-style fast food intake and cardiometabolic risk in an eastern country	Descriptive Study	Western style food intake has a correlation with an increased risk for Type II diabetes and CHD in Eastern populations	VI
(Pelletier & Laska, 2013)	Campus food and beverage purchases are associated with indicators of diet quality in college students living off campus	Descriptive Study	Frequently purchasing food on college campuses is correlated with college students eating less breakfast and eating foods that are higher in fat and sugar intake	VI
(Small, Bailey-Davis, Morgan, & Maggs, 2013)	Changes in eating and physical activity behaviors across seven	Longitudinal Descriptive Study	Fruit and vegetable intake and physical activity significantly	VI

	semesters of college: Living on or off campus matters		declined from the first to the seventh semesters More health issues are seen in those students who live off campus	

Descriptive Research Studies Summary

Knowledge Summary

Lack of knowledge impacts the risk of CHD development. College women with high health literacy, higher grades, and self-efficacy will positively impact their lifestyle and lead them to make healthier food choices. However, although many college women understand the importance of implementing healthy lifestyle behaviors, they may have lower self-efficacy and low motivation to initiate healthy behaviors (EunSeok et al., 2014; Ferrara et al., 2013; Kedem et al., 2014; Strawson et al., 2013; Wald et al., 2014). African Americans are less likely to have high levels of health literacy compared to Caucasians (Hutchison et al., 2014; Watters & Satia, 2009; Winham & Jones, 2011). It is suggested that skill building in college women may be beneficial in increasing self-efficacy (Kedem, Evans & Chapman-Novakofski, 2014).

Attitude Summary

Attitude impacts the risk of CHD development. Self-esteem and weight concerns are targets for education for many female college students. Healthy behavior targeted at decreasing weight gain needs a cultural approach. Many African American women 18-25 years of age appreciate their cultural body appearance (Antin & Hunt, 2013). Although body image satisfaction is important, students may reject the societal view of desiring to

be thin. However, when surveyed, many African American college women choose a normal body size and a healthy body shape as their ideal body size (Brown et al., 2010). Many college women were found to be dissatisfied with their weight (Clifford et al., 2010). Those with body weight satisfaction and those with a desire to lose weight had an increase in healthy eating habits (Fyler et al., 2014). However, weight loss and diet education in the African American culture should be focused on gaining health, not focused on gaining beauty and weight loss (Sanderson et al., 2013).

A woman's self-esteem plays a key part in implementing a healthy lifestyle. Higher levels of hope in college women are associated with healthier lifestyle choices (Berg et al., 2011; Fielder-Jenks, 2010; Grossbard et al., 2009). Higher levels of stress in college students may increase the risk of poor eating habits at night as a means of maladaptive coping (Wichianson et al., 2009). Female college students with greater dispositional mindfulness are more likely to choose healthy lifestyles (Murphy et al., 2012).

Modeling Summary

Environment and modeling impact the risk of CHD development. Eating and physical activity are determined by college women's motivation and self-regulatory skills. This can be affected by the young woman's environment (LaCaille et al., 2011). Even before African American women hit the middle age range, they are at a high risk for developing obesity (Boggs et al., 2013). African American female college students prefer higher fat foods and are at an increased risk for desiring higher fat diets above recommended guidelines, putting them at higher risk for developing CHD (Brown et al., 2010). CHD development is associated with elevated fasting blood sugar and larger

waist circumference causing increases in body mass index (BMI). Dietary factors and BMI are good indicators of CHD risk in this population (Fernandes et al., 2013). Physical inactivity is one of the most prevalent risk factors for developing CHD (Leach, et al., 2013).

Lifestyle factors are impacted by a young woman's environment. Many college students are at risk for CHD due to lifestyle factors. When it comes to targeting the African American population, diet interventions should be specific to the targeted population. However, there is no typical African American diet and African American diet choices are associated with their family upbringing (James, 2009). Family dynamics and psychological factors play a key part of why women make food choices (Lawrence et al., 2009).

Social norms can be associated with food choices in college females. Friends may impact food choices and physical activity. When targeting education to college students, education should be focused on social dynamics with a focus on social support (Pelletier et al., 2014; Yun & Silk, 2011). Peers can help college students lean towards healthy behaviors. College students with poorer interpersonal relationships are more at risk of having poor nutrition (Salandy & Nies, 2013). A positive environment in the African American culture is the church. African Americans with religious involvement are more likely to implement healthy behaviors (James, 2009).

Media influences the information given to college women. The internet is the most common source of health information. However, the internet is considered the least believable. Health center medical staff and university health educators are perceived to be the most believable source of health information (Kwan et al., 2010). The increased use

of technology may cause lifestyle changes such as impacting healthy dietary behaviors, sleep, and body mass index (Melton et al., 2014). Female students in 2-year colleges are at increased risk for overweight and obesity, decreased levels of activity, increased television viewing, increased soda intake, increased fast food intake and increased use of diet pills (Laska et al., 2011).

Psychosocial factors that influence food choices in college females are self-efficacy, emotional eating, and social pressure (Kedem et al., 2013). Many college students in this study did not consume an adequate amount of fruits and vegetables (McLean-Meyinsse et al., 2013). Targeted advertisements can be used to direct education and communication to the college population (Villiard & Moreno, 2012).

Convenience Summary

Convenience of food impacts the risk of CHD development. Many college students are not getting adequate amount of fruits and vegetables and foods chosen may lack vital nutrients (Mead, 2009). College students who live off campus are more at risk for poor food choices (Small et al., 2013). Lack of time, money, and school programs are three main barriers to healthy food choices (Avram & Oravitan, 2013). Western style diet is correlated with an increased risk for association with Type II diabetes and CHD (Odegaard et al., 2012). Frequently purchasing food on college campuses is associated with less frequent breakfast consumption and consuming foods that are higher in fat and sugar (Pelletier & Laska, 2013). Targeted education should focus on helping students make healthier food choice.

Chapter 5: Discussion

As summarized above, there were numerous articles pertinent to this research project. There were four evidence-based concepts that stand out from the research findings. These four concepts focus on reaching those at risk for developing CHD. The four concepts are based on college women's needs: support and encouragement from others to make dietary changes, dietary education classes to improve self-efficacy, marketing targeted to reach their population, and dietary education focused on CHD prevention. College women need dietary education to improve self-efficacy.

As described above, there are a variety of educational programs designed to increase self-efficacy in female college students. Healthcare professionals, dieticians, educators, and graduate students can offer educational programs. Effective educational programs use modalities such as classroom time, interactive websites, hands-on-sessions, healthy food planning, and culturally appropriate education. Educational programs help college women limit the perceived barriers for making healthy food choices. These programs target the college women's barriers to food choices such as knowledge, attitude, modeling and convenience. Educational programs can be provided at colleges, community centers, and local churches (Boyle et al., 2011; LaChausse, 2012; Kicklighter et al., 2010; King, et al., 2013; Lemacks et al.., 2013; Pearson et al., 2012; Sutliffe & Carnot, 2011; Topp et al., 2011; Villablanca et al., 2010; White, et al., 2009; Zullig, et al., 2012).

College women need the support of others to make dietary changes. As mentioned in education, college women benefit from the use of the collaboration of nurses, dieticians, wellness educators and peers to make dietary change. College women benefit

from individualized dietary feedback, motivational interviewing, and dietary advice (Berg et al., 2011; Hackman & Knowlden, 2014; Kakoschke et al., 2014; Kemps, & Tiggemann, 2014; Normand & Osborne; Rees, 2013; Witt et al., 2013). When healthy behaviors become a positive choice, attitude about healthy food choices can be modified. College women need encouragement to make healthy diet choices. When healthy choices are made, this helps to increase body/weight satisfaction, hope, and self-esteem. College women with high body/weight satisfaction, hope, and self-esteem are more likely to make healthy food choices (Antin & Hunt, 2013; Fielder-Jenks, 2010; Fyler et al., 2014; Pearson et al., 2012).

College women need marketing targeted to reach their population. Internet and smart phones are cost effective ways that this population can be reached. There are barriers to reaching busy college students, so online videos, smart phone applications, and texting of health information have been shown to be beneficial ways to reach this target population (Brown et al., 2011; Brown et al., 2014; Hebden, et al., 2014; Merchant et al., 2014; Recio-Rodríguez et al., 2014). According to the Pews Survey in (2013), 72% of internet users say they looked online for health information within the past year. Of those who searched for online health information, women were more likely to look up information than men were. Not only can the internet be used to reach the target population, but college women can be reached by proper food labeling, point of purchase information, theory of planned behavior and the theory of reasoned action based dietary interventions, environmental cues, and visual cues (Chu et al., 2009, Crockett, 2011, EunSeok et al., 2014; Hackman & Knowlden, 2014; Kelly et al., 2013).

College women need dietary education focused on CHD prevention. Primary prevention of CHD diet helps young women implement healthy lifestyles habits. These habits will benefit women for their whole life by helping them decrease CHD risk factors. Young college women have the capability to make dietary changes (Bazzano et al., 2014; Eckel et al., 2014; Epstein et al., 2012; Fogelholm et al.,2012; Hooper, 2012; Mente et al., 2009; Rees, 2014; Thornley et al., 2012).

By Sinclair Community College implementing the above strategies, the school has an opportunity to reach college women at risk for complications related to CHD and help them decrease that risk. Collaboration of education, dietary, and marketing is beneficial to reach the college population. Primary preventive dietary changes early, will be beneficial to the students' futures.

There was a wide variety of research found on implementing healthy dietary behaviors in college students. However, there were limited research articles specific to limiting CHD risk factors in college students. There were many systematic reviews on the evidence that healthy dietary behaviors minimize the risk for developing CHD.

Future implications for research include longitudinal studies. There are two suggestions for longitudinal studies. The first study is to follow the college student's long-term cardiac benefits of dietary changes that they made while in college. The second is to study how college women are able to adhere to dietary habits that they learned in college. More advances should be made at developing education using evidence-based practice and nursing theory to help college women decrease their risk factors for CHD.

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