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Effect of an Educational Intervention on Coronary Artery Disease Knowledge in Men and Women at Risk for Coronary Artery Disease

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ABSTRACT

EFFECT OF AN EDUCATIONAL INTERVENTION ON CORONARY ARTERY DISEASE KNOWLEDGE IN MEN AND WOMEN AT RISK FOR CORONARY ARTERY DISEASE

by

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ABSTRACT OF GRADUATE STUDENT RESEARCH

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School of Health Professions

TITLE: EFFECT OF AN EDUCATIONAL INTERVENTION ON CORONARY ARTERY DISEASE KNOWLEDGE IN MEN AND WOMEN AT RISK FOR CORONARY ARTERY DISEASE

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Background

Coronary artery disease (CAD) is the leading cause of death in the United States. The management of CAD, a preventable disease, has significant implications for health and wellness outcomes in the United States. Decades of research have examined the role and effectiveness of an educational intervention in promoting the patient's knowledge of and ability to manage risk factors for CAD. This project examined the effectiveness of an educational tool implemented in a primary care setting in improving patients' knowledge about CAD risk factors.

Method

The research design was a non-experimental one-group pre-test and post-test design. After receiving institutional review board approval and permission from the participating family practice clinic, 150 charts were screened for CAD risk using the Pooled Cohort Risk Assessment Equation. A total of 25 participants with elevated CAD risk ultimately completed the study protocol, which involved completing a pre-test questionnaire (the CADE Q-II), watching an educational video, and completing the same survey as the post-test.

Results

Results demonstrate that the use of an educational intervention improved scores on a knowledge assessment of CAD risk factors. There was no difference in pre and post-educational knowledge between gender ($F_{1,23}$ =0.366, p=.276) and between races ($F_{1,23}$ = 1.926, p=.09). There were significant differences between CADE Q-II pre and post-education domain and total scores ($t_{(24)}$ =-5.655; p<0.001). The domains with the lowest scores were ‘Nutrition’ and ‘CAD Risk Factors.' Both domains were below the acceptable 75% score in pre and post-tests results. Participants demonstrated the highest pre and post-test scores in the 'Medical Condition' domain.

Conclusion

Educational intervention is effective in increasing the knowledge about CAD among participants with increased risk for CAD. Results demonstrated the importance of education as a core component of patient care management. Nurse practitioners in family

practice can assist their patients in adopting appropriate lifestyle modifications to manage their risk for CAD by implementing educational interventions.

Andrews University

School of Health Professions

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A Scholarly Project

Presented in Partial Fulfillment

of the Requirements for the Degree

Doctor of Nurse Practice

by

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APPROVAL BY THE COMMITTEE:

Chair: Jochebed Bea Ade-Oshifogun	Dean, College of Health & Human Services: Emmanuel Rudatsikira
Member: Eileen Willits	Date Approved

DEDICATION

This Capstone Scholarly project is dedicated to God, my Creator, for His constant presence, His outstanding wisdom, strength and love for me. It is also dedicated to my husband and my best friend, Robert Anthony Doyley M.D., Ph.D., MPH, for his deep love and relentless commitment, and for his belief in me.

I wish to thank my sister, Dr. Odette Anderson, for her tireless encouragement and incomprehensible love, my father, Allen Anderson, whose memory and silent strength propelled me, and my mother, Dr. Dercie Anderson, who is my champion.

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LIST OF ABBREVIATIONS

AACN	American Association of Critical-Care Nurses
ACC	American College of Cardiology
AHA	American Heart Association
ANOVA	One-way analysis of variance
ASCVD	Atherosclerotic cardiovascular disease
ATP	Adult Treatment Panel
BMI	Body mass index
CABG	Coronary artery bypass grafting
CAD	Coronary artery disease
CADE-Q II	Coronary Artery Disease Education Questionnaire II
CDC	Centers for Disease Control
CENTRAL	Cochrane Controlled Register of Trials
CHD	Coronary Heart Disease
CI	Confidence interval
CINAHL	Cumulative Index of Nursing and Allied Health Literature
CVD	Cardiovascular disease
DM	Diabetes mellitus
DNP	Doctor of Nursing Practice
EKG	Electrocardiogram
HDL	High-density lipoproteins
HF	Heart failure
HTN	Hypertension
ICC	Intraclass correlation coefficient
IRB	Institutional review board
LDL	Low-density lipoproteins
NCEP	National Cholesterol Education Program
SBP	Systolic blood pressure
SD	Standard deviation
SPSS	The Statistical Package for Social Science
US	United States
WHO	World Health Organization

CHAPTER 1

OVERVIEW OF EVIDENCE-BASED PROJECT

Introduction

Coronary artery disease (CAD) remains a constant challenge for healthcare providers, claiming an estimated 600,000 deaths (or one out of every five) annually in the United States. The remaining 16 million patients affected by this disease will face increasing risk and poor odds as they age (Papadakis & McPhee, 2016).

The management of CAD has significant implications for health and wellness outcomes in the United States (US). Compared to all other diseases, CAD is the most fatal (Dyakova et al., 2016). One American will die every sixty seconds from CAD (Papadakis and McPhee, 2016). In addition, 37% of patients with CAD will be diagnosed with myocardial infarction or angina. However, that 37% will pass away directly because of this disease process within one year.

According to the American Heart Association (AHA), risk factors for CAD falls into three categories: major risk factors, modifiable risk factors and contributing risk factors (American Heart Association [AHA], 2019). The differences between these will be discussed in chapter two. Overall, a patient has a higher change of developing CAD if they possess one or more risk factors. This also depends on the degree or severity of each risk factor (AHA, 2019). The World Health Organization identified important risk factors for CAD such as poor diet, smoking, drinking alcohol, and lack of exercise (World

Health Organization [WHO], 2017). In addition, high blood pressure, elevated blood lipid level, and high blood glucose, especially if untreated, are associated with developing CAD (Khan et al., 2016).

The Mayo Clinic (2017) reinforces this listing of risk factors for CAD and adds that the risk of developing CAD increases with age as arteries become smaller over time. Family history of the disease will also lead to a greater risk for subsequent generations. In addition, having diabetes, being overweight or obese, inactivity, and experiencing high stress is concerning for a greater risk of developing CAD, according to the Mayo Clinic.

Purpose /Problem Statement

An important step in managing risk for CAD is to educate the patient about what risk factors contribute to the development of the disease. This aligns with some of the main goals of both the American College of Cardiology and the American Heart Association, which are to prevent cardiovascular disease and improve the outcomes of people who have the disease through professional education and research (American College of Cardiology [ACC], 2018).

The purpose of this project is to assess the effect of an educational intervention on the knowledge of lifestyle modification to manage risk factors for CAD in men and women.

PICO Question

Do men and women at risk for CAD increase their knowledge of lifestyle modifications to manage their risk factors through participation in an educational intervention?

Background of Problem of Interest

CAD is characterized by narrowed arteries. This narrowing is caused by either the formation or rupture of plaque. Consequently the heart will experience hypoperfusion to the muscle. This further manifests itself as chest pain and an EKG will show ST-segment elevation and T-wave changes. The patient will also experience diastolic and systolic dysfunction respectively (Buttaro, Trybulski, Bailey, & Sandburg-Cook, 2013).

Although a preventable disease, CAD kills more men and women in the US and globally than any other disease. The AHA (2019) reports that lifestyle changes and patient education may prevent up to 80% of cardiovascular disease and stroke. Obesity, smoking, high blood pressure, diabetes, physical inactivity, and high blood cholesterol may play a critical role in the development of this disease.

The diagram below paints a vivid picture of the traditional and non-traditional risk factors for CAD, which will be discussed in detail in chapter two:

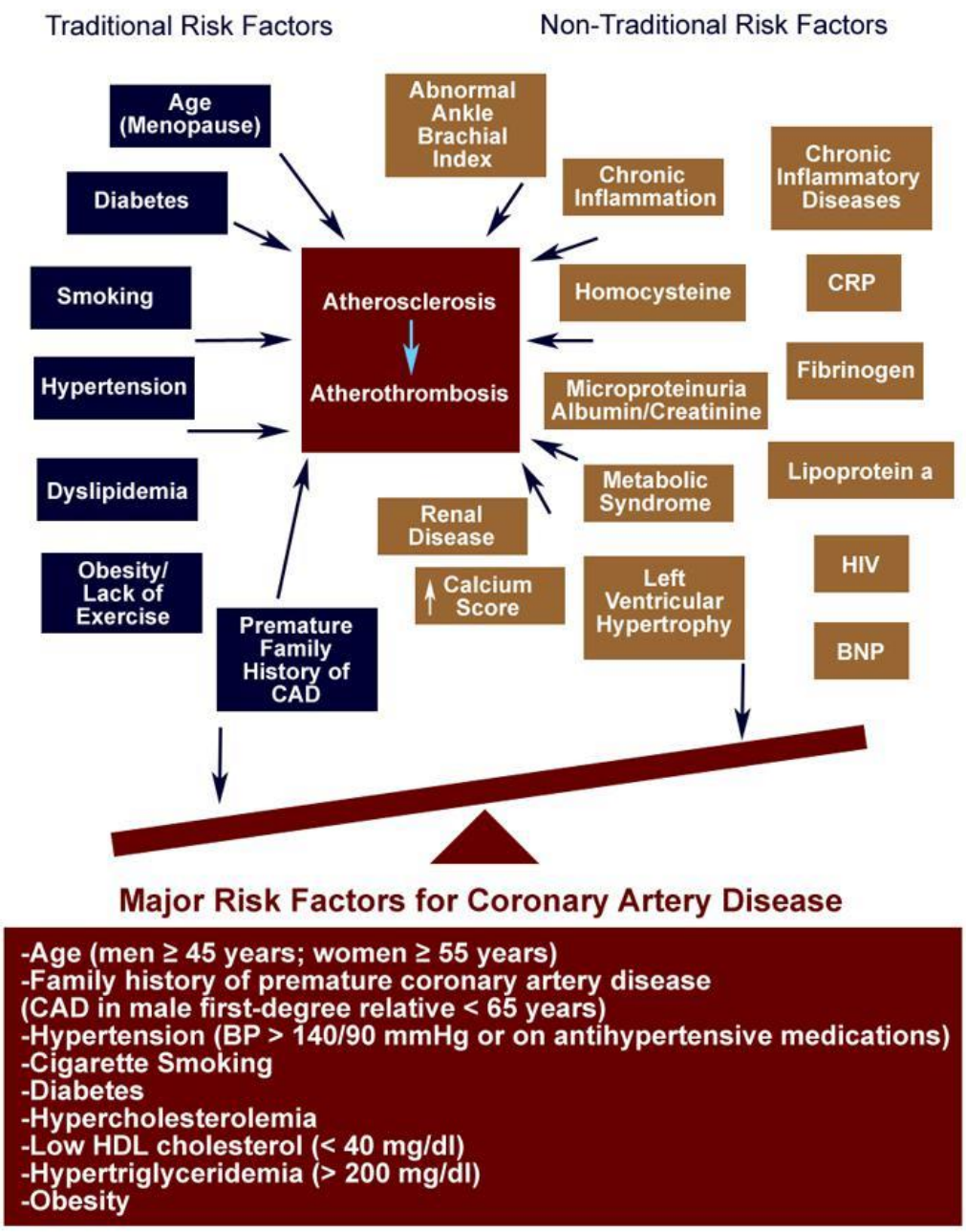


Figure 1. Risk Factors for CAD (Boudi & Ali, 2016)

Additionally, there are significant gender differences regarding risk of developing CAD and its long-term health impacts. Although men have a greater risk than women for developing CAD, women have a higher risk of stroke over the course of their lifetime, and are less likely to survive their first heart attack. Cardiovascular diseases and stroke

cause one in three female deaths each year and kill one woman approximately every 80 seconds. In particular, women in the US as well as globally remain at risk for heart disease with a high morbidity and mortality (Mehta, Wei, & Wenger, 2015). However, men have a greater risk of heart attack than women, and suffer from heart attacks at a younger age. The signs of heart attack can be less obvious in women than in men, and can be misinterpreted by patients as well as doctors.

Curriculum planning in a clinical setting for CAD education may focus on educating people at risk for CAD about how to manage modifiable risk factors. These efforts are intended to prevent negative outcomes such as myocardial infarction and consequently coronary artery bypass surgery to restore cardiac function.

Significance of Problem Related to Healthcare

The tough reality is that although the literature and the media are inundated with prevention strategies and educational interventions, people continue to die from CAD. Healthcare providers are forced to use more dramatic interventions to treat CAD, including angioplasty and coronary artery bypass surgery (CABG), with the latter considered the gold standard in care (Glineur, Gaudino, & Grau, 2016).

The benefits of health care education for patients in a primary care setting were found to be beneficial in a cross-sectional study (Galadaei, Ainaqbi, Mansoori, Darwish, & Khan, 2019). In this study, education positively affected participants' compliance with lifestyle modifications. 367 participants were given a questionnaire to assess their satisfaction rate with the educational process. 294 participants responded with an overall 86.4% satisfaction rate, which was directly linked with a resulting improvement in health status.

Similarly, a group of researchers conducted a study with a pre- and post- test design to assess patient knowledge (Habimana et al., 2019). Their results showed a 19% increase (95 % Cl, 13.9% to 24.1%, standard deviation of 16%) in patient scores for all 40 participants ($P \leq .001$). Patient satisfaction rate for the educational program was 97.5%.

The Doctor of Nursing Practice (DNP) graduate has been trained to develop treatment plans and protocols for their patients with strong support from the results of scholarly work. In this project, as the literature was reviewed, an educational intervention was developed based on the evidence presented for the patient diagnosed with CAD. The guidelines or tenets of the DNP program, "Essential lll: Clinical Scholarship and Analytical Methods for Evidenced-based Practice" (AACN, 2006, p. 11), forms the basis for this approach on the management of risk factors for CAD.

Impact of Project on Systems or Population

The literature on CAD affirms that managing risk factors is a major challenge for healthcare providers when treating patients who are at risk for CAD (Zengin et al., 2015). A three-step philosophy of treatment offers a comprehensive approach to the management of CAD. These considerations include lifestyle choices, medications, and medical procedures. The ultimate goal for healthcare providers is to work with the patient to develop and maintain healthy arteries (Mayo Clinic, 2017).

Some concrete goals for patients include cessation of smoking (if applicable), improving diet, and choosing a lifestyle that incorporates physical activity. Patients that work or live in a stressful environment should consider stress reduction strategies (Mayo Clinic, 2017).

It is likely that many healthcare providers experience a deficiency in resources for screening and identification of risk factors for CAD, as well as a for developing a consistent approach to education that is evidence-based. Further inquiry and exploration in patients at risk for CAD with a well-defined education plan may improve patient outcomes.

Advanced practice nurses must assume a global and inclusive approach in promoting health and the prevention of disease. Although the risk of developing CAD and other disease varies according to genetics, health behavior, and cultural beliefs, there is a need for men and women at risk of developing CAD to be informed about the enhancement of their cardiovascular health, as well as the prevention of the disease. Improving the health of men and women at risk for CAD requires strategic planning. This project represents an effort to determine the effect of a structured educational approach to teach men and women at risk of CAD about managing modifiable risk factors.

CHAPTER 2

REVIEW OF SCHOLARLY EVIDENCE-BASED LITERATURE

Literature Review

According to the American Academy of Critical-Care Nurses (AACN), DNP graduates demonstrate knowledge and leadership in advanced and evidence-based nursing practice. (AACN, 2006). DNP graduates must demonstrate competence in knowledge application activities, including integrating research into practice, assessing practice outcomes, and engaging in collaboration to improve the reliability of healthcare practice and perform research.

Scholarly nursing practice has long been recognized by nurses as a means to integrate knowledge from many sources and disciplines. Research generates new methods and knowledge in order to problem-solve issues in practice towards the broader goal of improving health outcomes (AACN, 2006). The literature review is a critical part of preparing graduates to discover new knowledge and prior work to inform their own research (AACN, 2006.

Through alternative paradigms of research stemming from a broadened view of scholarship, the value of scholarship and discovery is to provide context for factual information and increase interdisciplinary connection. (AACN, 2006). Through this, compassion for life and science converge towards the mutual goal of meeting human needs.

Within the scope of this project, the goal of the literature review is to gather evidence about the role of known risk factors for CAD and the effects of educational strategies in the healthcare setting in reducing those risk factors.

Literature Search Strategy

A comprehensive literature search was conducted to find evidence-based studies on the impact of patient education on risk factors for CAD. The following databases were used: CENTRAL, MEDLINE, CINAHL, Cochrane, Briggs, and Google Scholar.

Background and Context

Decades of research have examined the role and effectiveness of educational intervention in promoting patient's knowledge of and ability to manage risk factors for CAD. Advocates of patient education in the primary care setting have embraced moving away from a simplistic approach to improving patient health status through knowledge towards a "high quality health education" (Guzek et al., p. 1, 2019). A formal and very well-organized method of delivery has become the preferred design of an educational approach, with the goal of helping the patient to take ownership of their personal health and welfare (Guzek et al., 2019). Another desirable outcome of a successful education approach is lowered cost of healthcare and improved wellness outcomes. Prior studies have examined the effects of educational intervention on the knowledge base and health outcomes of patients with coronary artery disease. The following review of evidence will examine prior investigations into education for people with coronary heart disease and for those with multiple risk factors, and then move into a review of specific evidence

defining modifiable risk factors for CAD and their implications for educational interventions.

Education for People with Coronary Heart Disease

A study by Anderson et al. (2017) sought to examine the effects of patient education in clients who were diagnosed with coronary heart disease (CHD), a term that is occasionally used interchangeably with CAD. Since the death toll from this disease is so devastating, claiming more lives than any other disease worldwide (Anderson et al., 2017), this study has important significance. A review of twenty-two randomized controlled trials involved 76,864 subjects already living with CHD developed a comparison of the benefit on education comparing the outcomes of subjects who did and did not receive an educational intervention (Anderson et al., 2017). Their findings supported the benefits of integrating a comprehensive educational intervention into cardiac rehabilitation, alongside physical and psychological therapy.

Finally, this study suggested that communicating with patients about behavioral risk factors for CAD, such as smoking, unhealthy diet, obesity, physical inactivity, and alcohol usage, is an appropriate measure to take in order to help offset most cardiovascular diseases. In fact, they have noted that interventions such as early detection strategies, use of advanced medical treatment, and lifestyle changes to reduce risk factors reduced CHD death rates by 73% for people of all ages and by 81% for those under the age of 75 (Anderson et al., 2017 p.7).

According to Ghisi et al., (2015), health education for CAD patients is paramount in improving behavioral change and patients' baseline education on CAD. In fact, patient education is considered a "core component" in the ultimate success in patient

management and compliance of this disease (p. 1). However, utilizing education to manage CAD can become complicated in patients who possess multiple risk factors, some of which are interrelated.

Multiple Risk Factor Interventions for Coronary Heart Disease

Ebrahim, Taylor, Ward, Beswick and Davey-Smith (2011) studied a population at risk for CHD who had not yet been diagnosed with the disease. The patients' risk factors of obesity, diabetes, hypertension, and elevated-cholesterol levels, to name a few, were addressed through a combination of counseling and education. In a total of 55 randomized trials with 163,471 persons over a twelve-year period, the findings showed that a combination of counseling and education regarding the benefits of behavior changes may be effective in reducing mortality in high-risk patients with hypertension and diabetes. For blood pressure reduction, the statistical benefit was interpreted from odds ratio (OR) 0.78 (95% Cl 0.68 to 89). For diabetes, the findings were OR 0.71 (95% Cl 0.61 to 0.83). These results demonstrated that a multifactorial approach to increasing patients' awareness of risk factor management in CAD specifically can have a beneficial impact on reducing negative outcomes of CAD-related risk factors.

In a randomized controlled trial, Seguin et al. (2016) noted the interrelationship between cardiovascular disease, rural communities, women, low socioeconomic status, and gender disparity. The mortality and morbidity stemming from cardiovascular disease was remarkable for rural areas, and those with low socioeconomic status, especially women. Compared to women in urban areas, women in rural areas tended to be older with less healthcare insurance coverage, less education, and living with noticeable chronic diseases. They were further burdened by limited access to basic necessities such

as affordable healthy food and participation in exercise (Seguin et al., 2016). This suggests that educational outreach in rural communities may be especially useful in increasing rural residents' awareness of strategies to identify and manage their risk factors for CAD. Additionally, this study finds that women have a 20% greater risk of developing heart disease than men. Therefore, educational outreach efforts must focus on including women as well as men.

Modifiable Risk Factors for Coronary Heart Disease

Given the important role of education in the management of CAD risk, it follows that managing modifiable risk factors, or the risk factors that are possible to exert some control over, is the lynchpin for improving health and wellness outcomes related to CAD. Unlike modifiable risk factors, people are unable to exert control over the major risk factors of age, gender, and genetics (AHA, 2019).

A third category of risk factors, described as contributing risk factors, includes stress, alcohol usage, along with diet and nutrition (AHA, 2019). Contributing risk factors are less definitively linked to CAD. A relationship to CAD has been demonstrated, however, there is not enough evidence to establish a precise cause and effect (AHA, 2019).

This section will present evidence that the following characteristics are modifiable risk factors for CAD: smoking tobacco, high blood cholesterol, high blood pressure, physical inactivity, overweightness and obesity, and diabetes.

Smoking Tobacco

Tobacco smoking is related to multiple health complications which threaten health and wellness. Its contribution to CAD morbidity and mortality in particular is overwhelming. Its association with addiction and pulmonary complications serves as an incentive for patients to make a lifestyle change. Factors contributing to the harmful effects of tobacco smoking and its relationship to CAD are multi-faceted (van den Brand et al., 2017).

Smokers of tobacco also tend to consume a high fat diet without sufficient amounts of fruits, vegetables, and other foods that have a high fiber content. They tend to drink very little water and often opt to skip eating breakfast and choose to eat dinner closer to bedtime (Dżugan, Błażej, & Tomczyk, 2019). Smokers consume more caffeine and alcohol when compared to non-smokers. In addition they are often unaware of the harmful effects of secondhand smoking (Dżugan, Błażej, & Tomczyk, 2019). This lack of knowledge complicates management of second-hand smoking as a major healthcare concern (Frazer, McHugh, Callinan & Kelleher, 2016).

Nursing-led efforts to counteract the ill effects of tobacco smoking helps some patients who are motivated through educational efforts to achieve abstinence, which in turn reduces risk for developing CAD. In 2017, 44 studies with an overwhelming 20,000 participants were part of a nursing intervention for smoke cessation (Rice, Heath, Livingstone- Banks, & Hartmann- Boyce, 2017). The likelihood of quitting was elevated as a result of the intervention (RR1.29, 95% CI 1.21 to 1.38). These results are considered moderate quality evidence that smoking cessation results from a nursing-delivered interventional program when compared to no intervention. Therefore, the

evidence supports inclusion of smoking cessation education in educational interventions for CAD risk factor management.

Elevated Blood Cholesterol

Educational efforts designed to mitigate CAD risk factors must also include education about the causes and outcomes of elevated blood cholesterol levels, which raise the risk for CAD (Thompson et al., 2003). Lipoproteins play a major role in the transportation of cholesterol, which attaches itself to the lipoprotein. “Bad” cholesterol or low-density lipoprotein (LDL) is the culprit in CAD risk. LDL cholesterol lays the foundation of plaque in the arteries, eventually causing stiffness and stenosis.

Although cholesterol is necessary for cell growth and development, an elevated blood cholesterol level restricts the flow of blood in the artery. Secondly, elevated blood cholesterol increases the risk for the development of clot formation, which can then result in a heart attack or stroke (Mayo Clinic, 2019).

Although there are genetic components that influence blood cholesterol levels, this is still considered a modifiable risk factor for CAD, and interventions are helpful for reducing high level of cholesterol (van Driel et al., 2016). Preparing meals low in sodium, eating fruits, vegetables, whole grains, reducing animal fat intake, and exercising for at least 30 minutes daily are other effective ways to reduce blood cholesterol levels. In addition, taking cholesterol-lowering medications such as statins has shown to be effective in lowering blood cholesterol levels in people who can tolerate them (Mayo Clinic, 2019).

One key factor in reducing cholesterol level in the blood through dietary efforts is

the reduction of saturated fat in food. The energy in saturated fat can be replaced with polyunsaturated fat. A review of the long-term evidence from 15 randomized controlled trials with 59,000 participants (Hooper, Martin, Abdelhamid, & Davey Smith, 2015) demonstrated that a reduction in dietary saturated fat was associated with a 17% reduction in cardiovascular events (RR 0.83; 95 % CI 0.72 to 0.96).

Hypertension

Hypertension (HTN) is a risk factor that is related to elevated blood cholesterol levels. It poses dangers that are well known within the health care community. Its effects on organ degeneration and morbidity and mortality is astounding (Buttaro et al., 2013).

Hypertension has come to the attention of the Centers for Disease Control, which acknowledges the risk that HTN poses for CAD and stroke (CDC, 2020). It reports that 75 million American adults (1 in 3) have been diagnosed with high blood pressure, and that HTN accounts for more than 1,100 deaths each day. An additional 1 in 3 adults are pre-hypertensive. The impact on the American economy is difficult to ignore at $131 billion dollars annually (CDC, 2020).

Hypertension is classified as primary (95% of cases in adults) or secondary (5% of cases in adults) (Buttaro et al., 2013). Primary, or essential hypertension, involves blood pressure readings above 130/85 without an identifiable cause. People at risk for primary hypertension include obese individuals and those of African-American descent (Onusko, 2003). Primary hypertension can also affect children. CAD risk is elevated in children with obesity and a family history of primary hypertension (Grad, Mastalerz-Migas, & Kiliś-Pstrusińska, 2015). In contrast, secondary hypertension is defined as

abnormally high blood pressure, but with a known medical cause (American Family Physicians, 2003).

A deeper study of primary HTN will discover its complexity. It is not only a hemodynamic disease, but involves abnormal fat distribution, and over-sensitivity of the sympathetic nervous system (Litwin, Feber, Niemirska, & Michałkiewicz, 2016).
In terms of treatment, lifestyle changes in physical exercise habits and diet have been suggested in addition to medication (Litwin, Feber, Niemirska, & Michałkiewicz, 2016).

The role of lifestyle changes in the treatment of hypertension cannot be overemphasized. Lifestyle changes should always accompany prescriptions for medication. As mentioned previously, dietary changes that include low salt intake are recommended. Developing a daily exercise routine, living tobacco-free life, while restricting the use of alcohol, and keeping an ideal weight are additional recommendations (Mayo Clinic, 2017).

Physical Inactivity

A fourth modifiable risk factor, physical inactivity, promises to offset a myriad of diseases including CAD when managed, with its high mortality and morbidity (Mekić et al., 2019). Exercise is being hailed as a solution for cardiac wellness and fitness by reducing blood lipid levels. Social media, traditional newsfeeds, sports journals, and women magazines are inundated with its benefits. Healthcare professionals should advise patients to participate in physical activity to ward off diseases, including CAD, as a vital part of their interventions.

Thirty minutes of physical activity per day can reduce CAD mortality by

40% to 60% (World Congress on Insulin Resistance, Diabetes, and Cardiovascular Disease, 2019). Benefits of physical activity were observed in waist circumference, triglyceride levels, blood pressure, and fasting glucose. Aerobic exercise provided the biggest reduction in CAD risk (World Congress on Insulin Resistance, Diabetes, and Cardiovascular Disease, 2019). Anaerobic or resistance exercise seemed more beneficial for patients with nonalcoholic fatty liver disease (World Congress on Insulin Resistance, Diabetes, and Cardiovascular Disease, 2019).

The literature favors physical activity for the decrease in lipid profiles for CAD patients, with increase in HDL levels and a decrease in LDL blood levels (Rajić et al., 2019). Almost always, the recommendation for physical exercise is coupled with a recommendation for a heart healthy diet. However, exercise has shown a 24 % favorable decrease in all-cause mortality (HR- 0.76, 95 % Cl, 0.65-0.88) (Mok, Khaw, Luben, Wareham, & Barge, 2019).

Physical activity is one of the biggest factors in healthy aging. Review of research suggests that adequate physical activity may prevent a host of major diseases including obesity, type 2 diabetes mellitus, cardiovascular disease, depression, dementia, osteoporosis, cancer, and chronic respiratory conditions (Lehne & Bolte, 2017). Despite this known fact, epidemiological studies show that levels of physical activity decline with increasing age (Lehne, & Bolte, 2017, p. 2).

Beyond the individual and the physical benefits, the impact of physical activity extends to psychological benefits, the community, the environment, and the workplace (Johnston & Macridis, 2019). However, it is challenging to motivate patients to get moving. Johnston & Macridis (2019) have suggested that healthcare practitioners

incorporate recommendations for physical activity into their practice with the following strategies: 1). completing a physical activity assessment and recommendation with patients regularly; 2). training healthcare providers to promote awareness of the benefits of physical activity; 3). facilitating of physical activity in the routine of our aging population, and 4). giving priority to patients with chronic illness for scheduled evaluation of their compliance with recommended physical activity

A fair question remains regarding the role of the Nurse Practitioner or other healthcare providers in prescribing exercise for patients. In a recent article, Ignaszewski, Lau, Shannon, & Isserow (2017) note that physicians may not know how to provide patients with appropriate recommendations for physical activity, although the benefits are well-known (p. 40). They suggest six principles that physicians might follow when providing patients with recommendations for exercise: frequency (how often to exercise), intensity (how hard to exercise), time (duration of each exercise session), type (kind of exercise), volume (a product of frequency, intensity and time), and progression (how to progress frequency, rate, and duration over time) (p. 41).

Ignaszewski, Lau, Shannon, & Isserow (2017) state that physicians have been "prescribing" exercise for centuries as far back as 600 B.C. (p. 41). Their most profound recommendation made to the healthcare provider is to consider writing a prescription for exercise using the above parameters prior to prescribing medication for blood pressure or glucose regulation.

Overweightness and Obesity

Another highly important and impactful modifiable risk factor for CAD that will be addressed in this project is overweightness obesity, defined generally as the

accumulation of excessive fat that which poses negative consequences for health (WHO, 2018). A general guideline for assessment of overweightness and obesity is body-mass index (a weight for height index). Overweight individuals are those with a BMI between 25-29, and an obese person possesses a BMI >30 (World Health Organization, 2018).

The identification and assessment of obese patients has consequences that are far-reaching. Obesity is a disease that could impact nine organs and involve 40 conditions (Kushner, 2007). Regardless of the language used or the illustrations presented, the meaningful conclusion from studies of obese patients and CAD risk demonstrate that to manage their risk of CAD, the patient will need to eat less and exercise. Obesity management requires the decision to make healthy choices at every meal, between meals, at bedtime, when watching the television, etc. (Kusher, 2007).

According to Komaroff (2016), Hippocrates characterized the human body as consisting for four humors: blood, black bile, yellow bile, and phlegm. The disbalance of humors was considered to cause disease. Obesity, in particular, was caused by an excess of humors. Thousands of years after Hippocrates, obesity is a multifactorial global health crisis. Contributing factors to excess weight are environmental, metabolic, and genetic (Srivastava, Lakham, & Mittal, 2007).

In addition, Rasmussen (2014) observed that obesity is considered “a public health crisis of epidemic proportions through its contribution to heart disease, diabetes and other chronic illness” (p. 217). He also brings attention to the suggestion that obesity springs from addiction as part of a chronic brain disorder.

A study by Sharma and colleagues (2015) of 7057 patients over an eight-year period investigated the relationship between obesity and CAD mortality risk. The authors

considered waist circumference and waist-hip ratio. The findings from Cox proportional hazard models were significant for CAD and obesity.

Similarly, Wang et al., (2014), identified a relationship between CAD and obesity through a systematic review and meta-analysis of 89 studies and 130,0794 patients. Wang and his colleagues found a J-shaped relationship between obesity and mortality. Being overweight and obese showed a lower risk of mortality initially (0.60, (0.64 to 7.750; 0.68 (0.61 to 0.75)), but that changed to a greater long-term mortality after five years of follow-up (0.78 (0.74 to 0.82); 0.79 (0.73 to 0.85)).

Obesity is confirmed to independently predict CAD (Fontes, et al., 2018), based on clinical, laboratory and angiographic profiles. A prospective, single center study evaluated blood levels with findings of abnormal values for triglycerides, glucose, creatinine, vitamin C, glomerular filtration rate and HDL-cholesterol. The angioplasty for obese patients showed coronary lesions in excess, and additional diseases.

The CDC identifies how obesity affects different populations (CDC, 2019, February 27). According to its statistics, the population with the highest age-adjusted rates of obesity are non-Hispanic blacks (47.8%), followed by Hispanics (42.5%), non-Hispanic whites (32%), and Non-Hispanic Asians (10.8%).

The CDC also states that obesity rates are higher in middle-aged adults (defined as between 40-59 years old) than among younger adults (20-39 years old). They are also higher in middle-aged adults than in than adults over 60. The obesity rates for these age groups is 39.5%, 30.3%, and 35.4%, respectively. Education level and income also play a role in predicting obesity levels, therefore may be taken into account when developing specialized education programs targeting particular populations.

As this research demonstrates, obesity is quite prevalent and concerning for patients and healthcare providers, especially as it relates to risk of CAD. Education should integrate awareness about reducing overweightness and obesity through dietary choices and exercise. However, educating a patient about unhealthy weight will require sensitivity about the difficulty about weight control and the far-reaching consequences of carrying excessive weight (Buttaro et al., 2013). Nonetheless, it will be crucial to assess and develop patients' awareness of the link between elevated BMI and CAD in any educational approach to managing risk factors for CAD.

Diabetes

Like obesity, diabetes is a modifiable risk factor for CAD. Diabetes is a disease that affects 422 million people globally (World Health Organization, 2018). The disease is chronic and metabolic in nature, with type 2 diabetes mellitus (DM) being the most common. The disease affects the body in many ways, affecting the eyes, blood vessels, heart, nerves, and kidneys.

The link between having diabetes and cardiac disease is well-documented. The Cardiovascular Outcome Trial Summit of the Diabetes and Cardiovascular Disease European Association for the Study of Diabetes Study Group is clear on the effective of DM on cardiovascular health. The conclusion that DM increases the risk of heart failure (HF) was strong (Schnell, et al., 2017). In fact, having DM and HF together decrease the chances of recovery, with a tenfold increase in mortality.

A focus on prevention and management of DM is an appropriate concern for healthcare providers, and should include education about lowering DM (and therefore CAD) risk via exercise. According to Pérez (2008), exercise is a "cornerstone" in

preventing several chronic diseases. Education about and implementation of strength training has also been suggested as a management plan in the treatment of DM and management of cardiovascular risk (Shiroma et al., 2017).

Overall, the strong link between DM and CAD must be reflected in educational intervention strategies that intend to reduce risk of CAD. Nursing-led educational efforts can be an integral part of this strategy, coupled with medical management of hyperglycemia and its consequences. Education about DM must be integrated within a program that assesses and develops awareness of all other modifiable risk factors for CAD as discussed in this chapter, in order to best increase the patient's ability to effectively understand and make changes to reduce the change that they will develop CAD.

Conceptual Framework

Orem's Grand Nursing Theory

Orem's grand nursing theory is also called Orem's Model of Nursing. Dorothea Orem, experienced as a nurse, educator, director of nursing, member of the Board of Health in Indiana, faculty member of Catholic University and acting dean, developed this theory over a period of 42 years (1959- 2001).

Orem's grand theory is composed of three theories: the Theory of Self-Care, the Theory of Self-care Deficit, and the Theory of Nursing-Systems (McEwen & Wills, 2007). Taken together, her theories provides insight into the role of the patient or client as the change agent in their care. In addition, Orem provides a crucial. view "that humans engage in continuous communication and interchange among themselves and their environments to remain alive and to function" (McEwen & Wills, 2007, p. 145).

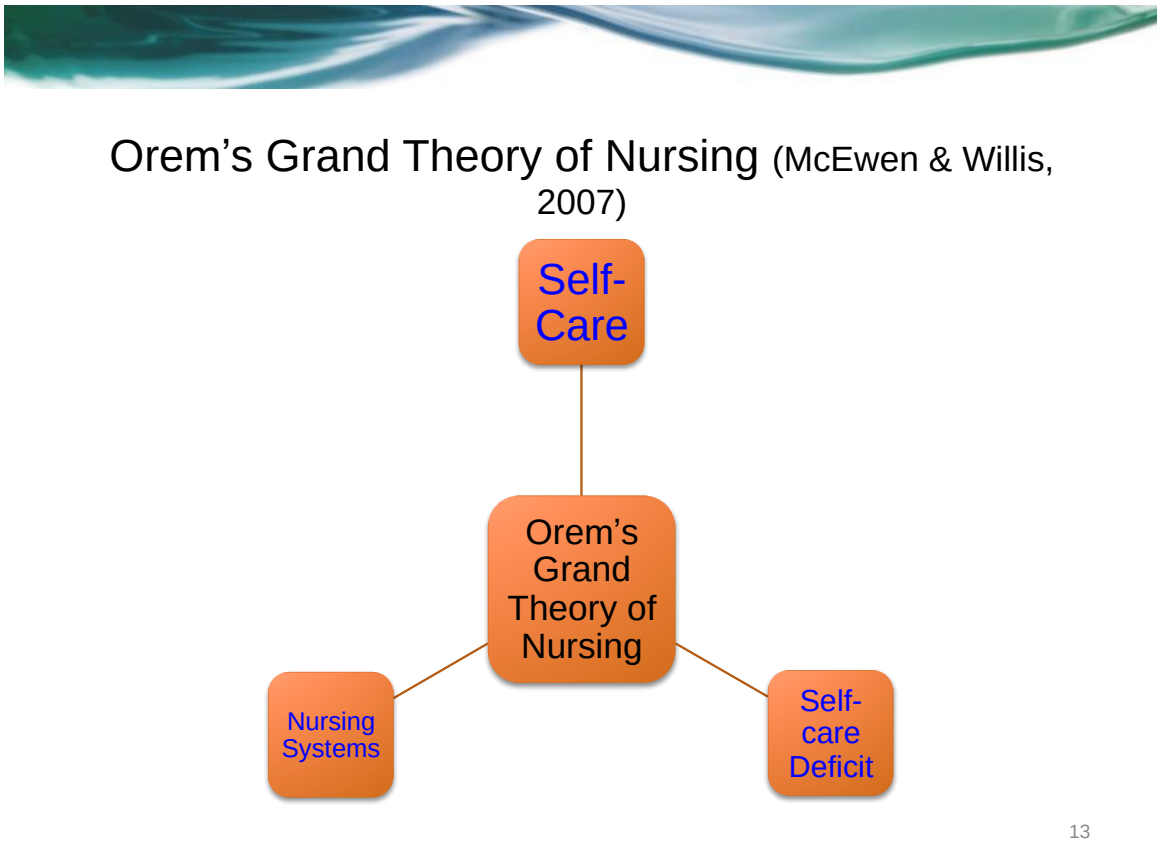


Figure 2. Orem's Grand Theory of Nursing (McEwen & Willis, 2007)

One major tenet of Orem's theory is that humans are inextricably linked via communication and interchange to their communities and environments. This connection is vital to their ability to function and survive.

premise of Orem's theory is based on the belief that humans engage in continuous communication and interchange among themselves and their environments to remain

alive and to function. Humans need agency to determine that they need and make decisions to meet those needs.

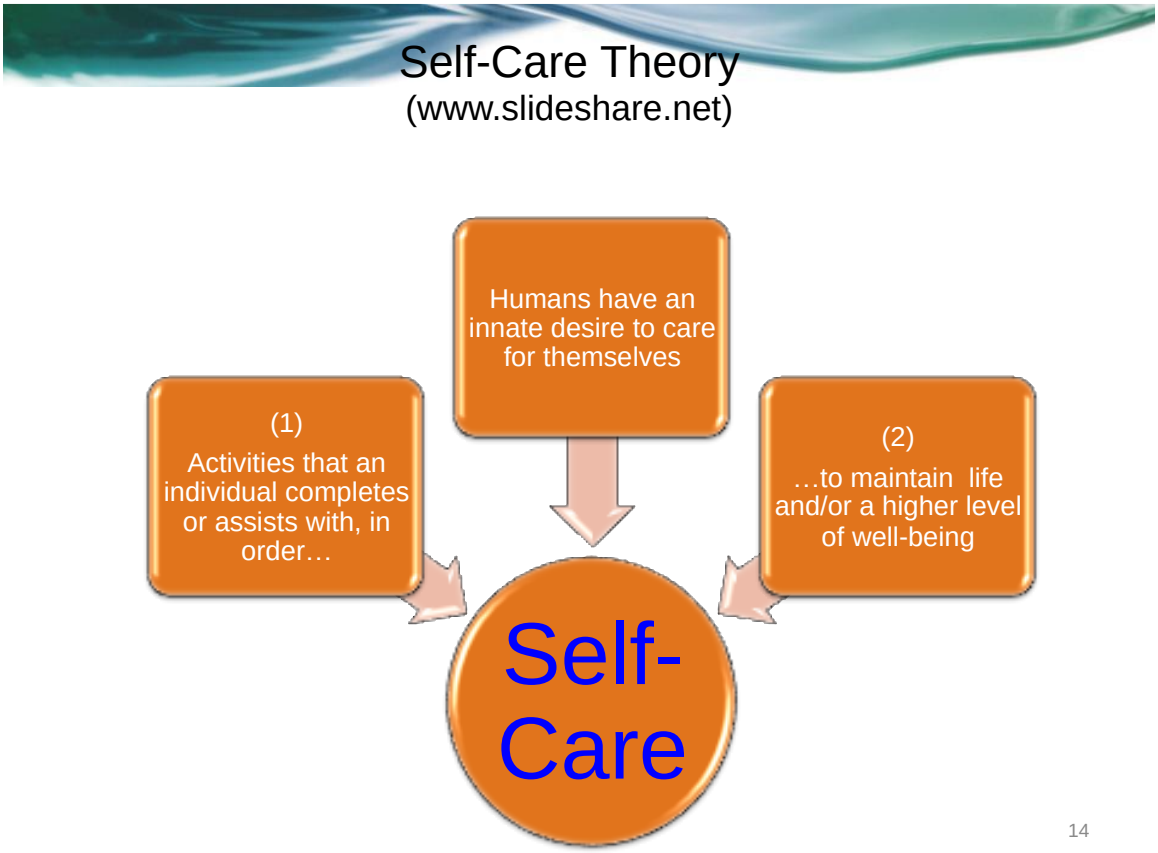


Figure 3. Orem's Self-Care Theory (Necor, 2014)

Orem's Self-Care Theory identifies the participant as the change agent for the maintenance of his or her own human integrity. Because of its focus on the patient as the change agent, Orem's self-care model has been used as an effective tool in guiding clinical nursing practice.

For the purposes of this project, Orem's Self-Care Theory is used as a model for introducing an educational intervention for men and women at risk for CAD. The theory identifies the participant as the change agent, and consequently, the most crucial component in making appropriate changes in lifestyle modifications and risk reduction measures. Self-care in men and women at risk for CAD through an educational intervention identifies them as the change agent in making appropriate lifestyle modifications and risk reduction measures.

CHAPTER 3

METHODOLOGY

Approach and Rationale

The project was completed at the Williams Family Practice clinic in the rural town of Cleveland, Texas in Liberty County, which has a population of 76,567. The Williams Family Practice manages their primary care needs. The racial and ethnic makeup of Liberty County is 78.9% Caucasian, 12.82% African American, 0.47% Native American, 0.32% Asian, 10.92 % Hispanic or Latino, and 6.06% other races ("Liberty County", n.d.). Many patients receiving services at this clinic travel from surrounding towns as far as 25-35 miles away.

Institutional Review Board (IRB) approval was received from Andrews University (Appendix A). Permission was granted by the Williams Family Practice office administration to conduct this project and all ethical considerations were accounted for to ensure participant safety and confidentiality (Appendix B).

The research design was a non-experimental one-group pre-test and post-test design. Data was collected from July 2019 through January 2020. During that time, 150 charts were screened for Coronary Artery Disease (CAD) risk using the Pooled Cohort Risk Assessment Equation.

Sampling

Participants were chosen using a convenience sampling method. The principal investigator was present at the clinic 2-3 days per weeks dictated by her personal work schedule. On the day of the patient's scheduled appointment to see their primary care physician, the participants chart was screened using The Pooled Cohort Risk Assessment Equation. The actual description of the participants, matched the following inclusion and exclusion criteria.

Inclusion Criteria:

- Women ages 40 - 79 at elevated risk for CAD
- Men ages 40 - 79 at elevated risk for CAD
- Predicted risk score of $\geq$ 7.5 % from the Pooled Cohort Risk Assessment Equation **or**
    - Predicted risk score of $\leq$ 7.5 % from the Pooled Cohort Risk Assessment Equation with:
        - History of Diabetes Mellitus (DM) or being treated for DM
        - History of Hypertension (HTN) or being treated for HM
        - History of High Cholesterol or being treated for High Cholesterol

    The Pooled Cohort Risk Assessment Equations considers these factors:

        - Gender
        - Age
        - Race
        - Total Cholesterol
        - High-density Lipoprotein (HDL)

- Systolic Blood Pressure (SBP)
- Receiving treatment for high blood pressure (if SBP > 120 mmHg)
- Diabetes
- Smoker

Exclusion Criteria:

- Men less than 40 years old and greater than 79 years old
- Women less than 40 years old and greater than 79 years old
- No history of DM, HTN, or High Cholesterol

No considerations were put in place for marital status, socioeconomic status or level of education. See data collection section below for details.

Then, each qualified participant was then approached by the researcher and given a comprehensive description of the project as outlined in the informed consent form, (Appendix C), which included the project title, project purpose, project procedure, time commitments, the benefit to them and others, the cost of participating and a review of their rights, contact inform for the IRB research integrity and compliance officer, project chair, and project manager. Those who agreed to participate and who completed the project received a $25 gift certificate, purchased from Wal-Mart as an appreciation of their time. The gift certificate was issued following the post-questionnaire completion.

Patient confidentiality was maintained. Any personal information about the participant that was gathered during the project remained confidential. A project number was used to identify each person and only the project manager knows his or her names. Neither their name nor personal information was shared. Patient information and project

related data were stored in a password-protected device, which was locked in a file cabinet in the project manager's home office.

Sample Size

To estimate the minimum sample size for this project, the G*Power software was used with the following parameters: the probability of error (p value) was set at 0.05, power was sets at 0.8 (80%), and the effect size was set to moderate at 0.5. These parameters calculated a sample size of 34. However, to control for attrition, the investigator targeted 50 participants for its sample size. With that goal in mind, 150 patients' charts were screened. From that number, 81 who met the project criteria were invited to participate. Of those, 40 accepted and completed a partial section of the study, the pre-questionnaire or the presentation (Appendix D), or both, while 25 completed the pre-questionnaire, video and post-questionnaire. Unfortunately, due to external factors beyond the control of the researcher, the 50 participants target was unmet.

External factors were a major concern. Every possible consideration was made to accommodate and facilitate the participants' completion in the project. Many patients lived far from the office. Others had deaths in their family, or family members in the hospital. Others had grandchildren to care for. Some participants had transportation challenges. Others had no money buy gas. The holidays: Thanksgiving, Christmas, New Year's Day played a factor. Others changed their minds for unstated reasons and lack of interest. These delays prolonged the length of the study and compromised the total number of participants.

A contact listed was generated to make sending reminders via phone calls and/or text messages easy for reminders for appointments to complete the project.

Intervention

The principal investigator was stationed at the clinic for appointments with all participants selected for the study. Those who agreed to participate received a comprehensive description of the project, then reviewed and signed a consent form. Each participant received an original copy of the consent form. Appointments were then scheduled for participation in the project.

On day #1 of participation, the CADE-Q II (Appendix D) pre-questionnaire was completed by the participant using Andrews University class climate software program for entry and analysis (20 -30 minutes). Additionally, the participant viewed an educational presentation, which was a voiced-over PowerPoint on Coronary Artery Disease (21 minutes). The presentation was adapted from the American Heart Association (AHA) and CADE-Q II was presented: Coronary Artery Disease – Cardiovascular prevention and Rehabilitation. It was easy viewing and was organized in 5 major sections.

The medical section was focused on the anatomy of the arteries of the heart, how the heart works, the nature and prevalence of the disease, symptoms of the disease such as Angina and medications such as Aspirin, Plavix and Statins. The second section discussed risk factors with a strong emphasis on modifiable risk factors with viable solutions such as a heart healthy diet.

Exercise or physical activity was the third section. This discussion zoned in on the important aspects of cardiovascular exercise; how long to exercise, intensity and how often. There was a section on the importance and benefit of resistance exercise. The

warning signs of a heart attack and the use on nitroglycerin were mentioned. Section four focused on nutrition.

A food pyramid was introduced along with the food groups. Omegs-3 fats, trans fats were explained. Fiber and salt, fruits and vegetables and their impact of heart health were explained. The importance of reading food labels, especially serving size was discussed. The final section introduced psychosocial risk such as stress and depression.

In addition to the viewing the video, each participant was given a written copy of the educational presentation. They were scheduled to return to the clinic in 2-3 weeks to complete the post questionnaire.

Day #2 marked the final day of their participation with the completion of the CADE-Q II post-questionnaire, which was completed using Andrews University class climate software program for entry and analysis (20 - 30 minutes). See Table 1 for a summary of the project.

Table 1

Project Steps

Pre-intervention	**Day #1**	**Day #2**
On day of scheduled MD appointment: Chart was screened using Pooled Cohort Risk Assessment Equation With inclusion criteria met, subject was approached and informed about the projected and invited to participate Consent forms were read and signed; Subject receives original copy of consent form with ID number Appointment was made to participate in Day#1 of study	CADE-Q II: Pre-questionnaire was administered Educational Video was watched Subject received a written copy of video content Appointment was scheduled for Day#2	CADE-Q II: Post-Questionnaire was administered. Project was completed. Subjects received a $25 gift certificate from Wal-Mart

Data Collection Tools

Pooled Cohort Risk Assessment Equation

The Risk Assessment Work Group, an entity of The American College of Cardiology (ACC) and the American Heart Association (AHA) developed the Pooled Cohort Risk Assessment Equation (Appendix E) to estimate a patient's risk for the development of atherosclerotic cardiovascular risk (ASCVD). The development of this peer-reviewed tool validated two groups of people, Caucasians and African-American people of both sexes.

The Pooled Cohort Risk Assessment Equation uses Pooled Cohort Equations to estimate the risk of developing ASCVD within ten years among people without pre-existing cardiovascular disease. It is validated for people between the ages of 40 and 79.

If the Pooled Cohort Equation predicted risk is ≥ 7.5%, a patient is considered to carry an "elevated risk" of developing ASCVD. The Pooled Cohort Equations have been suggested to replace the use of the Framingham Risk 10-year CVD calculation, recommended by the National Cholesterol Education Program (NCEP) Adult Treatment Panel (ATP) III guidelines for high blood cholesterol in adults.

A *lifetime* risk assessment is derived for patients between 20 to 59 years of age, although with a "low" strength of evidence). In some cases, the 10-year ASCVD risk may be higher than *lifetime* risk due to differing mathematical approaches. In this case, it is more urgent to address the 10-year risk. The Pooled Cohort Risk Assessment Equation provides predications for 10-year risk for a first ASCVD event and lifetime risk of ASCVD. It also predicts the lifetime risk for a 50-year old pooled from the factors of gender, age, race, total cholesterol in mg/dl, HDL, systolic BP, presence of treatment for HTN, diabetes, and tobacco smoking.

The Coronary Artery Disease Education Questionnaire II

The Coronary Artery Disease Education Questionnaire (CADE-Q II) is used to assess knowledge and education of coronary artery disease and related factors (Ghisi, Grace, Thomas, Evans, & Oh, 2015). It is a validated and specific questionnaire that include 31 questions covering five domains: medical condition (seven questions), risk factors (five questions), exercise (seven questions), nutrition (seven questions), and psychosocial risk (five questions).

Questions about the medical condition addressed knowledge about the following areas: the definition of coronary artery disease, the role of cholesterol-containing deposits (plaque), the meaning of angina and how it relates to a heart attack, how the heart works

and the importance of oxygen, and medications that are important in preserving the integrity of the heart in CAD such as Aspirin, Plavix, and Lipitor.

Questions that probed knowledge about risk factors addressed blood pressure, cholesterol, LDL, HDL, tobacco smoking or secondhand smoke, waist size, stress, and diabetes mellitus. A critical component is normal and abnormal values and the role of nutrition and exercise in lowering risk and the appropriate lifestyle modification.

Questions about physical exercise addressed an appropriate prescription for cardiovascular health, how to dress during the winter for physical exercise, and the role of resistance exercise in improving blood sugar levels.

Questions about nutrition highlighted the roles of omega 3 fats and trans fat, how sodium affects the heart, importance of vegetables and fruits in the diet, how whole grains, nuts and seeds decreases the risk of CAD, and the importance of reading food labels.

Finally, questions about psychosocial risk addressed the relationship between stress and coronary artery disease and stress and heart health, including the big ideas of stress management, depression, and the best options for reducing psychosocial risk factors that are associated with CAD. Eleven out of 19 questions were modified from Portuguese to better suit the cultural context in the English version:

- Cronbach's alpha was 0.809 and intraclass correlation coefficient (ICC) was 0.846
- Five well-defined and internally consistent factors were derived.
- Significant differences in means by family income ($p=0.02$) and educational level ($p<0.001$) supported criterion validity.

Each of the 31 questions has 4 alternatives, which generates a score.

- Score of 3 = Correct alternative – **Full** knowledge
- Score of 1 = Correct alternative - **Incomplete** knowledge
- Score of 0 = Incorrect alternative - **Wrong** knowledge
- Score of 0 = Don't know, statement showing **None** knowledge

Scoring Sample: Question #1:

Coronary Artery Disease is:

A. A disease of the heart's arteries that occurs only in older age and is mainly caused by deposits of calcium in the arteries
    a. *0: Incorrect alternative – Wrong knowledge*
B. A disease of the arteries of the heart which occurs in older age in people with high cholesterol or who smoke
    a. *1: Correct alternative - Incomplete knowledge*
C. A disease of the arteries of the heart that starts silently at a young age. It is influenced by poor life style habits, genetics, and involves inflammation in the arteries
    a. *Correct alternative – Full knowledge*
D. I don't know
    a. *0: Don't know, statement showing None knowledge*

Tools to measure each variable:

- (CADE-Q II)

Thirty-one questions covering 5 domains:

- Medical condition – 7 questions

- Risk Factors – 5 questions
- Exercise – 7 questions
- Nutrition – 7 questions
- Psychosocial Risk – 5 questions

The maximum possible score is 93, which represents perfect knowledge. A score of 0 represents no knowledge, with a 75% score showing significant knowledge.

Data Analysis

Demographic data from chart review were merged with intervention data collected via class climate. Then, the final dataset was cleaned and analyzed using The Statistical Package for Social Science (SPSS) for windows (version 25). Significance level was set at 0.05. Descriptive analysis for each question and domain was completed, including means for continuous variable and frequencies for categorical variables.

Pre- and post-CADE-Q II score per question, completion rate, mean score per domain and mean total score were computed. Paired *t*-test was used to compare overall participants pre and post CADE-Q II score. Independent t-test and one-way analysis of variance (ANOVA) were used to measure demographic groups differences in CADE-Q II scores. Wilcoxon rank test was used to compare pre and post scores within each domain. Different participants' knowledge by clinical characteristics (HTN, DM and tobacco smoking) were also determined.

CHAPTER 4

FINDINGS, RESULTS, IMPLICATIONS

The purpose of this project was to study the effect of an educational intervention on coronary artery disease knowledge in men and women at risk for coronary artery disease. This chapter provides the results, which include respondents' demographics, their pre/post CAD knowledge as measured by CADE-Q II scores.

Participant Demographics

From the 25 participants who completed the pre and post intervention questionnaires, 56% were female, 80% were white (Figure). The average age was 64 (*SD*=7.6), but nearly half of them were above 65 (Table 1 and Figure1).

Eighty percent had systolic blood pressure above 120, and 84% were taking medications for high blood pressure (Table 2 & Figure). Over half of the participants (56%) had diabetes, and 28% were smokers (Figure). Twenty-five percent had HDL cholesterol between 40 and 59 mg/dl (Figure), and most (83%) have their total cholesterol below 200 mg/dl (Figure).

Table 2

Demographics of Study Participants

Characteristics	*n*	(%)	*M* (*SD*)
Gender			
Male	11	(44)	
Female	14	(56)	
Race			
White	20	(80)	
Black	4	(16)	
Hispanic	1	(4)	
Received treatment for HBP	21	(84)	
Diabetes	14	(56)	
Smoking	7	(28)	
Age	25		64.20 ± 7.6
Total Cholesterol	24		174.60 ± 38.54
High density lipoprotein (HDL)	24		49.80 ± 14.62
Systolic blood pressure	25		133.40 ± 19.31

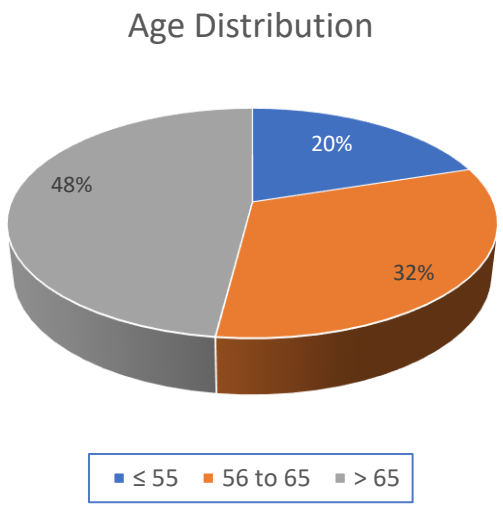


Figure 4. Age Distribution of Project Participants.

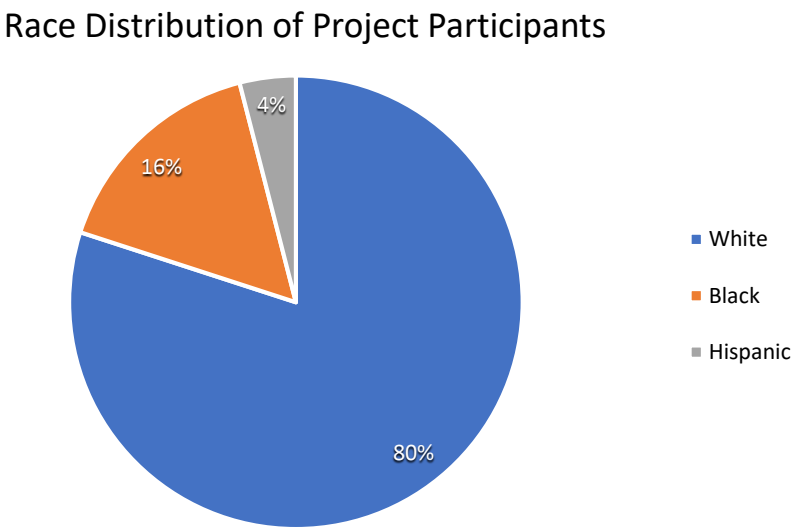


Figure 5. Race of Project Participants

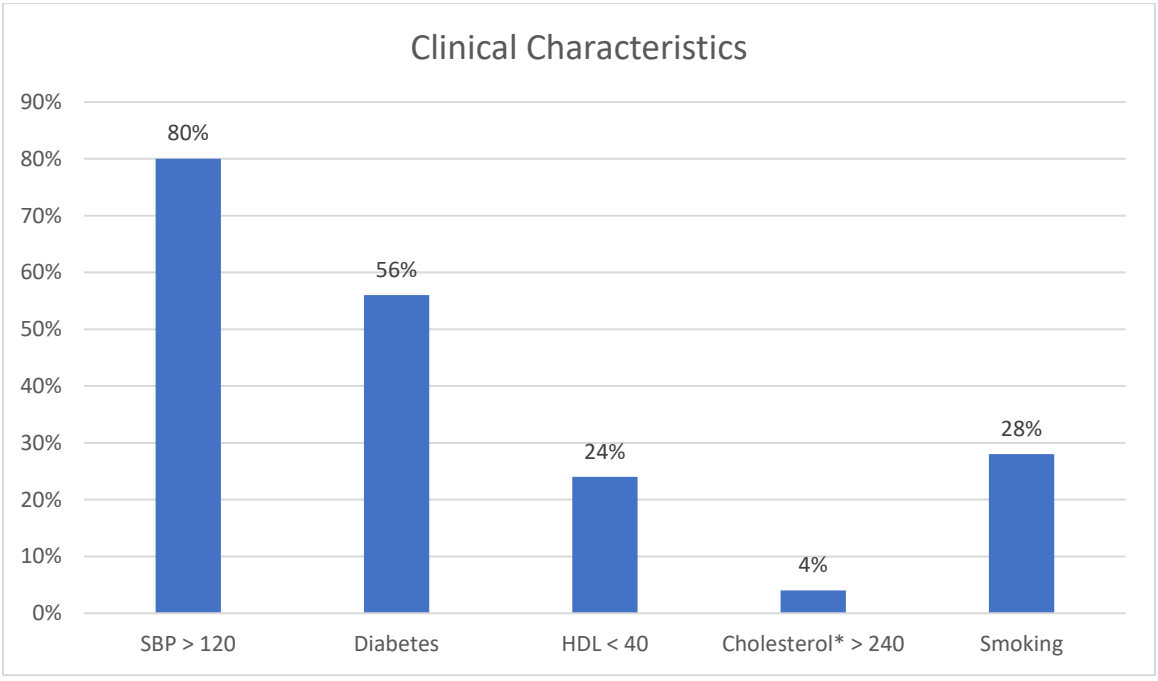


Figure 6. Clinical Characteristics of Project Participants (N=25)

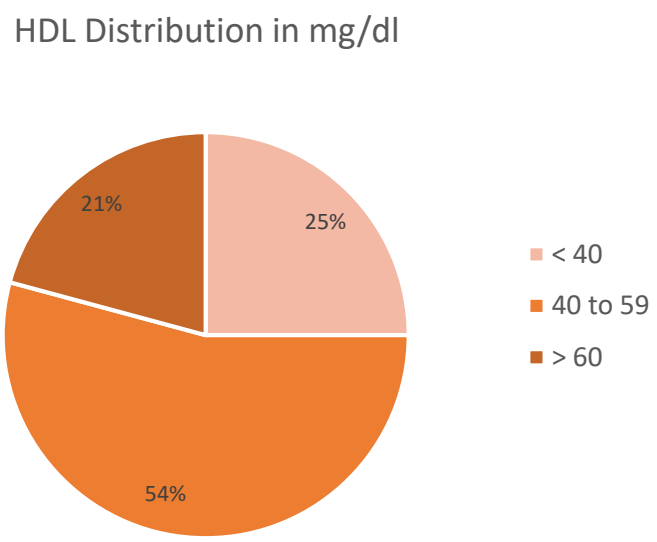


Figure 7. HDL Distribution of Project Participants.

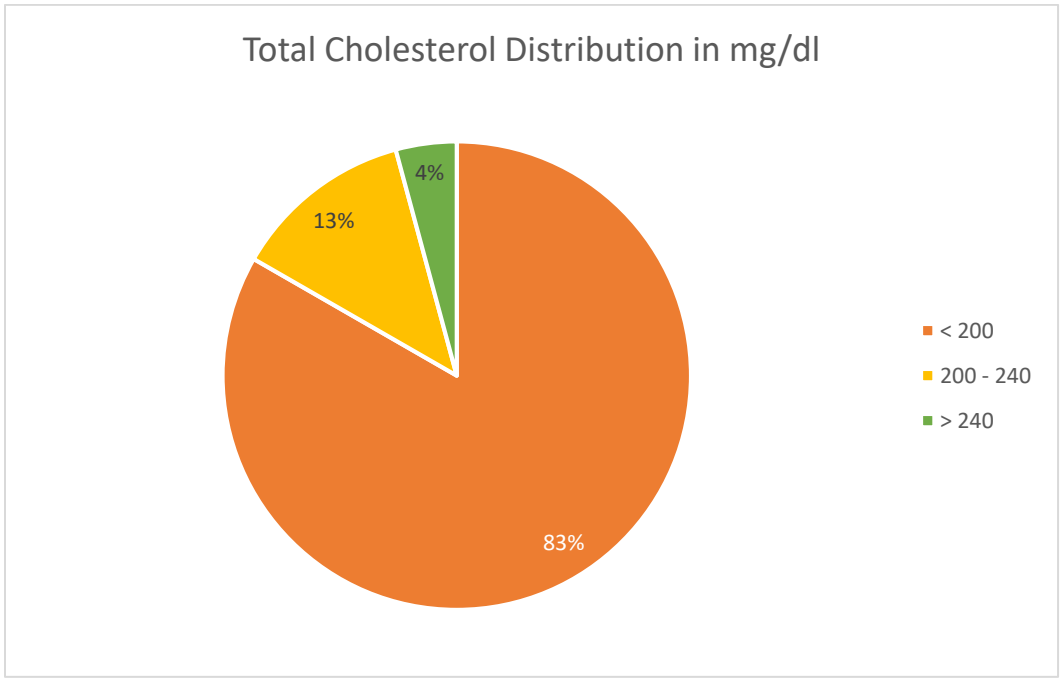


Figure 8. Total Cholesterol Distribution of Project Participants

Participant Knowledge

The research question was: Do men and women who participate in an educational intervention for Coronary Artery Disease (CAD) improve their knowledge of lifestyle modification and risk reduction measures?

Table 3 provides the distributions of pre and post overall CADE-Q II mean scores as well the median score per domain. Paired sample t-test was used to compare participants pre and post CADE-Q II scores, and the results indicated that overall post intervention mean score (M=73.86, SD=13.51) was significantly higher than the pre-intervention mean score (M=58.04, SD=15.89), $t(24) = 5.655$, one-tailed $p < .001$, d = 1.13.

The highest possible CADE-Q II score is 93. Before the intervention, 28% of the Participants scored higher than 70/93, which indicated a knowledge of 75% or higher, whereas, after the intervention, 68% of participants scored higher than 70/93, which showed a knowledge of 75% or higher. Post-scores for each of the five domains was also significantly higher than their pre-scores (Table 2).

Medical condition, Exercise and Nutrition domains each have a maximum score of 21. A score of 16 or higher indicates appropriate knowledge of that area. Risk factors and Psychosocial risk domains each have a maximum score of 15. A score of 11 or higher indicates appropriate knowledge of that area. Median scores are reported for non-parametric tests when the related variables are skewed and not normally distributed. Means score and standard deviation on the other hand are reported on parametric tests when related variable are normally distributed.

Table 3

Descriptive Statistics Related Test of Pre- and Post- scores of CADE-Q ll

Domain	Pre-CADE-Q II score *Mdn* (Range)	Post-CADE-Q II score *Mdn* (Range)	Statistics	*p**
Medical condition	15 (19)	18 (12)	*Z* =-3.137,	.001
Risk factors	9 (12)	11 (11)	*Z* =-3.022	.001
Exercise	14 (16)	17 (13)	*Z* =-3.669	<.001
Nutrition	13 (15)	15 (15)	*Z* =-2.960	.001
Psychosocial risk	11 (12)	15 (11)	*Z* =-3.049	.001
	M ± *SD*	*M* ± *SD*		
Overall	58.04 ± 15.89	73.96 ± 13.51	*t*(24)=-5.655	<0.001

*1-tailed *p*=value

Finally, ANOVA test was used to compare Mean scores between gender and between race. The results indicate no significant differences in post-intervention scores between male (*M*=72.09, *SD*=16.86) and female (*M*=75.43, *SD*=10.63), *F*(1,23)=0.366, *p*=.276, or between white (*M*=75.80, *SD*=10.53) and other race (*M*=66.60, *SD*=22.01), *F*(1,23)=1.926, *p*=.09. However, female pre-intervention score was significantly higher than male pre-intervention score. The is meaningful, from an educational focus, since men have a greater risk than women for developing CAD, and men have heart attacks earlier in life (See Table 3).

Table 4

CADE-Q II Score Comparison Between Demographic Groups

Characteristics	*n*	Pre-CADE-Q II score	Test Statistics	Post-CADE-Q II score	
Gender					
Male	11	50.36 ± 16.18	$F(1,23)=5.431$ $p=.015$*	72.09 ± 16.86	$F(1,23)=0.366$ $p=.276$
Female	14	64.07 ± 13.25		75.43 ± 10.63	
Race					
White	20	60.45 ± 15.40	$F(1,23)=2.439$ $p=.07$	75.80 ± 10.53	$F(1,23)=1.926$ $p=.09$
Other	4	48.40 ± 15.63		66.60 ± 22.01	

*1-tailed *p*=value (significant)

As shown in Table 4 above, each post-intervention mean score per item was above 2, except for risk factor item 4, nutrition items 6 and 7. Whereas pre-intervention mean scores for half of the 31 items were below 2. Five post-intervention items where knowledge was highest were: “Which of the following describes your best option for reducing your risk from depression”, “The actions that can be taken to control cholesterol levels include”, “In a person with coronary artery disease, which of the following is a usual description of angina”, “Angina (chest pain of discomfort) occurs”, “A heart attack occurs”, and “It is important to recognize “sleep apnea” because.”

With regards to the five domains, participants demonstrated the greatest post intervention knowledge related to Psychosocial risk and Nutrition. They had the least knowledge related to Risk factors (Table 5).

It is noteworthy that the domain Risk factors question #4 has a mean score of 0.48 out of a maximum possible score 3 pre-intervention and a score of only 0.96 post-intervention. Similarly under the domain Nutrition, question #6 has a score of 1.2 pre – intervention and 1.72 post-intervention out of a possible 3, and question #7 has a pre-intervention score of 0.48 and a post-intervention score of only 1.52.

Knowledge of nutrition is significant in reducing CAD risk. It impacts modifiable risk factors such as obesity, diabetes, cholesterol levels and hypertension. These are very low scores. Any score less than 2 especially in the post-intervention score are significant for additional and reinforced targeted education for participants.

Table 5

Central Tendencies of Pre- and Post- CADE-Q II Scores Per Item and Per Domain

Domains	Items	Pre-CADE-Q II score	Pre-score per domain	Post-CADE-Q II score	Post score per domain
		M ± *SD*	*Mdn* (Range)	*M* ± *SD*	*Mdn* (Range)
Medical condition	1. Coronary Artery Disease is	2.32 ± 1.14	15 (19)	2.24 ± 1.27	18 (12)
	2. Angina (chest pain of discomfort) occurs	1.92 ± 1.38		2.76 ± 0.66	
	3. In a person with coronary artery disease, which of the following is a usual description of angina	1.72 ± 1.40		2.80 ± 0.71	
	4. A heart attack occurs	2.12 ± 1.13		2.72 ± 0.79	
	5. The best resources to available to help someone understand his/her medications are	2.04 ± 1.14		2.28 ± 0.98	
	6. Medications such as aspirin (ASA) and clopidogrel (Plavix) are important because	1.56 ± 1.04		2.36 ± 0.95	
	7. The “statin” medications such as atorvastatin (Lipitor), rosuvastatin (Crestor) or simvastatin (Zocor) have a beneficial effect in the body by	1.68 ± 1.25		2.04 ± 1.14	
Risk factors	1. The risk factors for heart disease that can be changed are	2.04 ± 1.14	9 (12)	2.36 ± 0.95	11 (11)

	2. The actions that can be taken to control cholesterol levels include	1.92 ± 1.19		2.84 ± 0.55	
	3. The actions that can be taken to control blood pressure include	2.68 ± 0.90		2.6 ± 0.82	
	4. The first step towards controlling a risk factor (such as blood pressure or cholesterol) is	0.48 ± 0.71		0.96 ± 1.24	
	5. The actions to prevent developing diabetes include	1.56 ± 1.26		2.28 ± 1.10	
Exercise	1. What are the important parts of an exercise prescription?	2.28 ± 1.31	14 (16)	2.68 ± 0.90	17 (13)
	2. For a person living with heart disease, it is important to do a cardiovascular warm-up before exercising because	2.04 ± 1.14		2.64 ± 0.86	
	3. The pulse can be found	1.92 ± 1.19		2.44 ± 1.04	
	4. Three things that one can do to exercise safely outdoors in the winter are	1.6 ± 1.32		2.16 ± 1.07	
	5. The benefits of doing resistance training (lift weights or elastic bands) include	2.12 ± 1.24		2.68 ± 0.75	
	6. If a person gets chest discomfort during a walking exercise session, he or she should	1.96 ± 1.14		2.60 ± 0.82	
	7. How does a person know if he/she is exercising at the right level?	1.76 ± 1.16		2.32 ± 1.03	
Nutrition	1. What is the best source of omega 3 fats in foods?	2.36 ± 1.19	13 (15)	2.64 ± 0.86	15 (15)
	2. Trans fat are	1.16 ± 1.43		2.12 ± 1.33	
	3. What is one good way to add more fiber to your diet	2.08 ± 1.19		2.04 ± 1.02	
	4. Which of the following foods has the most salt	2 ± 1.29		2.52 ± 1.00	

	5. What combination of foods can help lower blood pressure?	2.64 ± 0.86		2.68 ± 0.75	
	6. When reading food labels, what should one look at first?	1.2 ± 0.87		1.72 ± 0.98	
	7. How many servings of fruits and vegetables should adults consume	0.48 ± 1		1.52 ± 1.48	
Psychosocial risk	1. Which of the below are effective stress management techniques	1.88 ± 1.33	11 (12)	2.44 ± 1.04	15 (11)
	2. What stresses have been related to increased risk for heart attacks	2.28 ± 1.21		2.60 ± 0.96	
	3. Which of the following describes your best option for reducing your risk from depression	2.4 ± 1.22		3.00 ± 0.00	
	4. It is important to recognize “sleep apnea” because	2.48 ± 1.08		2.72 ± 0.79	
	5. Chronic stress is defined as	1.36 ± 1.41		2.20 ± 1.22	
Total		58.04 ± 15.89		73.96 ± 13.51	

CHAPTER 5

SCHOLARLY PROJECT FOR DISSEMINATION

Coronary artery disease (CAD) remains a constant challenge for healthcare providers, claiming an estimated 600,000 deaths (or one out of every five) annually in the United States. Patients affected by this disease will face increasing risk and poor odds as they age (Papadakis & McPhee, 2016). The management of CAD has significant implications for health and wellness outcomes in the United States (Dyakova et al., 2016).

An important step in managing risk for CAD is to educate the patient about what risk factors contribute to the development of the disease. This aligns with some of the main goals of both the American College of Cardiology and the American Heart Association, which are to prevent cardiovascular disease and improve the outcomes of people who have the disease through professional education and research (ACC, 2018).

According to the American Heart Association, 80% of heart disease and stroke events may be prevented by lifestyle changes and education (AHA, 2019). The Doctor of Nursing Practice (DNP) graduate has been trained to develop treatment plans and protocols for their patients with strong support from the results of scholarly work. In this project, an educational intervention was developed based on the evidence presented for the patient diagnosed with CAD.

The guidelines or tenets of the DNP program, "Essential lll: *Clinical Scholarship and Analytical Methods for Evidenced-based Practice"* (AACN, 2006, p. 11), forms the basis for this approach on the management of risk factors for CAD. Decades of research have examined the role and effectiveness of educational intervention in promoting patient's knowledge of and ability to manage risk factors for CAD.

Advocates of patient education in the primary care setting have embraced moving away from a simplistic approach to improving patient health status through knowledge towards a "high quality health education" (Guzek et al., 2019, p. 1). A formal and very well-organized method of delivery has become the preferred design of an educational approach, with the goal of helping the patient to take ownership of their personal health and welfare (Guzek et al., 2019).

The research question was: Do men and women who participate in an educational intervention for Coronary Artery Disease (CAD) improve their knowledge of lifestyle modification and risk reduction measures? The significance of this Project was twofold. Firstly, it demonstrated that education is a core component of patient care management. This project provided a tool to assess patients' knowledge of CAD. Secondly, this project sought to effect change to family practice office where the scholarly project was conducted.

The theoretical framework adapted in this scholarly project, Orem's Grand Theory of Nursing, lends itself to the important role of each patient in their plan of care in learning and understanding the risks of Coronary Artery Disease and how to prevent or minimize its development. The statistics associated with the prevalence of CAD is

overwhelming, and places a tremendous burden on healthcare systems globally, which must be shared with the patient.

Orem's Grand Theory of Nursing served as the vision for this project. As discussed in Chapter 2, it is composed of three theories: The Theory of Self-Care, the Theory of Self-care Deficit, and the Theory of Nursing-systems. It is primarily used in rehabilitation and primary care settings where the patient is encouraged to be as independent as possible. The Theory of Self-Care finds its expression in meeting the basic necessities common to all persons.

The Theory of Self-Care Deficit refers to any issue that impacts the individual's level of health and well-being, which indicates when nursing actions are needed. The individual is incapable or limited in continuing effective care. Emphasis is placed on actions needed to support the client in acting as his/her own agent for health care rather than assuming nursing responsibility for all needs, including those needs the client can maintain for him or herself.

The Theory of Nursing System is a complex relationship between the patient and the nurse. This theory finds its value when the patient is unable to practice self-care independently, and relies on the expertise of the nursing profession to make the transition to performing effective self-care behaviors.

Orem's Self-Care Theory guided this study in recognizing and embracing the self-care requirements imposed on patients at risk for CAD, regardless of age, gender or race. An underlining premise of Orem's Theory is based on the belief that humans engage in continuous communication and that human being are able to adapt to their environment.

Essentially, it is an expectation, that patients are able to comprehend the idea of performing appropriately in situations that require sound thought and deliberate actions required in their care. However, the application of self-care practices may present with unexpected challenges.

Consequently, healthcare providers participating in their care are urged to help patients or individuals in clarifying urgent needs and making available the means to improve any effort towards self-care. The art of nursing embraces prevention of disease and the promotion of health and wellness. The implementation of this project's educational intervention applied the Self-Care Theory model by providing the knowledge of modifiable risk factors to men and women at an elevated risk for CAD.

In applying Orem's Self-care Theory, this study was intentional about providing patients with the educational support they needed to be independent in practicing self-care related to their elevated risk status for CAD.

The results were supportive of an improvement in their knowledge base for the risk and prevention strategies to minimize the development of the disease. The patient became the change agent as they accepted the responsibility to learn the risk factors, a vital step in acquiring the knowledge necessary to make all appropriate lifestyle modifications and task risk reduction measures.

Discussion

This project was helpful in highlighting the benefit of an educational intervention in patients at an elevated risk for CAD. Before the intervention, 28% of participants had adequate knowledge overall of CAD and risk factors. However, after the intervention, 68% of participants demonstrated adequate knowledge of CAD and risk factors.

In addition, we were able to identify areas of inadequate knowledge: Nutrition (28% before the intervention 48% after the intervention) and Risk Factors (28% before the intervention and 52% after the intervention). These findings provide the opportunity for the healthcare provider to plan personalized educational intervention for areas with low scores and less than adequate knowledge.

Knowledge of nutrition is significant in reducing CAD risk. It impacts modifiable risk factors such as obesity, diabetes, cholesterol levels, and hypertension. Low scores, especially post-intervention, are significant for additional and reinforced targeted education for participants.

It is worthwhile to revisit previous research that assessed the level of patient knowledge in CAD. Ghisi et al. (2015) demonstrated a significant increase ($p <. 01$) in overall knowledge of CAD risk factors from the pre- and post- scores of the CADE Q-II. Additionally, scores also showed an increase in knowledge in the five domains. The results in this study also indicated that patient education was effective in improving their knowledge about CAD. However, Psychosocial Risk and Risk Factors were domains identified as having inadequate knowledge.

The similarities of finding Risk Factors as an area of inadequate knowledge in two independent studies should not go unnoticed. As healthcare providers, we may find it difficult to always find success in patient education. It is also possible that the patients may need a referral to a dietician for further assessment and additional interventions.

In the present project, an ANOVA test was used to compare mean scores between genders. Female pre-intervention score was significantly higher than male pre-intervention scores. This is of interest, from a clinical and educational focus, since men

have a greater risk than women for developing CAD, and men have heart attacks earlier in life (AHA, 2019).

However, Ranjbar et al., (2018) conducted a similar study using a convenience sampling method, also administering the Coronary Artery Disease Education Questionnaire (CADE-Q II), and found quite the opposite. They administered one questionnaire without an intervention, which may be compared to the current project study's pre-interventions score. They found that for all the domains, men scored higher than women. However, the difference was significant in two areas. Men had a higher level of knowledge in Exercise ($p = 0.009$) and Psychosocial Risk subscales ($P = 0.012$).

The current's projects results had overall pre-intervention scores in Exercise (36% with adequate knowledge) and Psychosocial scores (52 % with adequate knowledge). These are low scores for both men and women. However, after the educational intervention, the current studies post-intervention scores were significantly improved in the Exercise and Psychosocial domains with 80% and 76% of participants demonstrating adequate knowledge, respectively.

To be sure, the educational intervention had significant positive result in the present study. However, the Ranjbar et al., (2018) study may have shown positive changes in the knowledge base of their participants with a high-quality educational intervention. Although men have a greater risk than women for developing CAD, and men have heart attacks earlier in life, CAD is the number one killer of women, greater than all cancers, combined.

Alwakeel et al., (2018) conducted a cross-sectional descriptive study to evaluate knowledge of CAD risk factors as well as attitude and practice in the general population

of Tabuk city in Saudi Arabia. The city's population was randomly sampled, (N=126) and methodology included the use of a single questionnaire for each participant to complete. No educational intervention was introduced.

The questionnaire included knowledge of CAD risk factors, and true practice regarding risk. Unfortunately, only 8.16 % of participants knew all five modifiable risk factors for CAD. In addition, only a small number (38.9 %) knew the symptoms of an acute heart attack. There were differences in participant recognition of modifiable risk factors: Hypertension (65.9%), obesity (77.8%), smoking (81.0%) and smoking (37.3 %), lack of exercise or sedentary lifestyle (27.8%), stress (64.3 %) and genetic disposition (44.4 %).

A significant cause for concern in this study was that the majority of participants were university graduates, and the overall knowledge of CAD risk factors was low. The recommendation of the authors was an educational intervention to increase the awareness of risk factors for CAD. Based on the current project, this recommendation remains appropriate, since after the educational intervention presentation, the overall score of adequate knowledge increased from 28% to 68 %.

Finally, Anuradha et al., (2017) conducted a study, with a similar methodology. One group of 30 participants completed a pre-test and post-test questionnaire and a planned teaching program regarding lifestyle modifications to prevent cardiovascular disease. In the pretest, from a sample size of 30 participants, inadequate knowledge was noted for 56.66 % of participants; 40 % had moderate knowledge and 3.33 % or only one participant had adequate knowledge.

The educational tool content was developed based on rigorous studies of journals, textbooks, and numerous articles. Consequently, the post-test results showed that 0% had inadequate knowledge, 13.33% had moderate knowledge, and 86.67 % had adequate knowledge regarding lifestyle modifications, which indicates that the level of knowledge was increased. This study was similar to the current project. However, a point of interest is that there was no CAD risk assessment (such as the pooled cohort risk assessment calculator) performed on participants.

The study conducted by Anuradha, et al., showed a similar resulting pattern in that pre-test scores increased after the educational intervention, which strengthens the approach of utilizing an educational intervention for CAD knowledge.

Impact of Results on Practice

The results of the current study were very well received at the clinic. The findings from this project identified an area for improvement in the assessment and delivery of patient education on CAD risk factors. The clinic staff was open to the recommendation of including ASCVD risk assessment for each patient.

Since this is a primary care office, integration of this study's results sets the stage for identifying patients with modifiable risk factors for CAD. Identifying patients at an elevated risk for CAD triggers the implementation of CADE-Q II to assess the level of knowledge regarding lifestyle modifications to prevent CAD. Nurse Practitioners at primary care clinics have the opportunity to implement this process to help patients participate in adopting appropriate lifestyle stages.

Project Limitations

A limitation of this study was the number of participants (n=25) in the study. Time constraints and patient's personal schedules played a major role in retaining participants across all stages of the study. Of the 150 patients screened, 40 patients completed the pre-questionnaire, and 25 ultimately completed the study. In addition, this study may have been benefited from including additional demographics, such as socioeconomic status to include income and education, which way have provided further statistical inferences. A large sample size is recommended for future studies.

Plan for Dissemination of Project

When this project was initiated, the Williams family practice clinic had no written instructions or formal protocol for implementing educational plan for patients at risk for CAD. This project may serve as a stepping-stone to accomplish a similar educational plan for improvement in patient care.

The practice was presented with the findings of this project. The educational focus for this office will include and emphasis on CAD nutrition and risk factors. Providers will be implementing the ASCVD calculator on their assessment information with each visit to be included with other assessment such as height and weight, and BMI to. A trifold educational pamphlet on CAD education and lifestyle modification was generated as result of the findings, and was accepted by the clinic, to be made available to patients and their families for CAD patient education. The CAD patient education video was approved to be placed on the clinic's website for easy access.

Nurse Practitioners, along with other healthcare providers, will find this process meaningful in identifying knowledge deficit for patients at an elevated risk for CAD. It

assesses risk factors and lifestyle modifications that are poorly understood by patients. This provides an optimum opportunity to focus patient educational needs.

The clinic staff was asked to complete an evaluation questionnaire (Appendix F) of the project. My presentation of the results of the project and the educational trifold are included in Appendix G.

Implications for Future Practice

According to the American Heart Association, 80% of heart disease and stroke events may be prevented by lifestyle changes and education (AHA, 2019). Healthcare providers such as Family Nurse Practitioners have a unique opportunity to ensure that patients and their families have the educational access needed for them to become a change agent in the prevention of CAD.

Advanced practice nurses must assume a global and inclusive approach in promoting health and the prevention of disease. Although the risk of developing CAD and other disease varies according to genetics, health behavior, and cultural beliefs, there is a need for men and women at risk of developing CAD to be informed about their risk for developing CAD, as well as about strategies to prevent the disease. Improving the health of men and women at risk for CAD requires strategic planning. This project represented an effort to determine the effect of a structured educational approach to educate men and women at risk of CAD about managing modifiable risk factors.

Significance

The significance of this project was twofold. Firstly, it demonstrated that education is a core component of patient care management. This project provided a tool

to assess patients' knowledge of CAD. Secondly, this project sought to effect change in this family practice office as a quality improvement for patient education.

Project Evaluation

A presentation of the project results was presented to the office staff. A questionnaire was used to evaluate the appropriateness of the educational intervention, the presentation of the results, and the trifold educational pamphlet.

Table 6

EVALUATION QUESTIONNARE				
QUESTIONS	**Person #1**	**Person #2**	**Person #3**	**Person #4**
On a scale of 1-10, rate your overall impression of this educational intervention	8	10	10	10
Do you see value in implementing this project in this Family Practice Clinic's routine?	Yes	Yes	Yes	Yes
On a scale of 1-10, rate your overall impression of the educational trifold	9	10	10	10
In your opinion, what were the most important strengths of this project	All of the above (Appendix F)	All of the above (Appendix F)	Professionalism of the Principal Investigator -Patient confidentiality	All of the above (Appendix F)

			-Involvement of office personnel in the project	
In your opinion, what were significant weaknesses of the project	The duration of the project. Ideally should be longer to address this most important topic	None	The screening process of participants	None
What suggestions do you have for improvement(s), were this project to be conducted at another Family Practice Office	Participation and adoption of these measures, particularly risk factor, diet, exercise in their daily lives	Include a larger age group. CAD is rapidly increasing in our younger generations	None	None

The purpose of this project was to study the effect of an educational intervention on coronary artery disease education knowledge in men and women at risk for coronary artery disease. Patient education is a core component for patients at risk for Coronary Artery Disease (Ghisi, et al, 2014). The comparison of pre and post intervention mean scores was sufficient to indicate the effectiveness of the educational intervention. Education assessment and strategy may benefit from this study, in planning for areas of education that would be more meaningful and helpful based on pre-intervention scores.

The family practice clinic where this study was conducted has benefited already from the screening of its patients for coronary artery disease. The participants have demonstrated a significant increase in the knowledge base for CAD. Putting the educational intervention in place, through focused education has positively affected the knowledge of CAD and its risk factors.

Since Orem's Self-Care Theory identifies the participant as the change agent for the maintenance of his or her own human integrity, focused, personalized education may

guide significant outcomes. Each participant took ownership of their responsibility, for their health in participating in this study. It was not a passive educational process.

Healthcare providers are currently forced to use more dramatic interventions to treat CAD, including angioplasty and coronary artery bypass surgery (CABG). A renewed commitment to prevention education has found solid application through this study.

Unlike other studies on education or educational tools, this study made its distinction on focusing the effect of an educational intervention. For this clinical site, and the patients that participated, it became evident that this organization needed to tailor patient education in Risk factors and Nutrition. In conclusion, CAD education, from a comprehensive prospective, with consideration for medical condition, risk factors, exercise, nutrition, and psychosocial risk, may be considered for positively effecting knowledge for men and women at risk for Coronary Artery Disease.

DNP Essentials Mastery through Scholarly Project

Essentials I: Scientific Underpinnings for Practice

The application of applied scientific knowledge found its expression in understanding the pathophysiology of CAD, its risk factors and the toll it takes on human life. Combining all the modifiable risk factors in the same presentation was appropriate in gaining a full understanding of the severity of the disease and its management through patient education.

Essentials II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

Healthcare providers remain challenged with too many adults presenting with physical inactivity, hypertension, diabetes, and other modifiable risk factors for CAD.

Consistent with Essentials II goals, this project's efforts were geared in providing an educational intervention for a positive effect and improvement in the quality of education and its delivery.

Essentials III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

Discovery of new phenomenon and application are its key components. Literature review is the backbone of an independent effort of inquiry and discovery through rigorous methods. Addressing modifiable risk factors through education are applicable practice methods that may reverse the trends towards the improvement of patient knowledge in CAD.

Essentials IV: Information Systems/Technology and Patient Care Technology for the improvement and Transformation of Health Care

The use of information systems and technology was critical for the processing and results. Data collection relied on class climate utilization for patient confidentiality and questionnaire entry and storage of demographics. Data analysis relied on the Statistical Package for Social Science (SPSS) window version 25.

Essentials V: Health Care Policy for Advocacy in Health Care

The Williams' Family Practice was invited to understand the impact of CAD education through evidence-based practice. The proposal to have the educational presentation from this project placed on their website for mandatory patient education on admission and as needed through the course of their care was an important policy change.

Essentials VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

Team leadership and collaboration are basic tenets of this Essential. Patient education is challenging, yet can be accomplished as evidenced by this project. Collaboration with the Medical Director, office manager, and staff are key components in effecting change.

Essentials VII: Clinical Prevention and Population Health for Improving the Nation's Health

Knowledge of CAD risk factors is a viable first step in clinical prevention and health promotion. Communicating with patients about behavioral risk factors for CAD, such as smoking, unhealthy diet, obesity, physical inactivity, and alcohol usage, is an appropriate measure to take in order to help offset most cardiovascular diseases (Anderson et al., 2017). Interventions such as early detection strategies, use of advanced medical treatment, and lifestyle changes to reduce risk factors reduced CHD death rates by 73% for people of all ages and by 81% for those under the age of 75 (Anderson et al., 2017).

Essentials VIII: Advanced Nursing Practice

The profession of Nursing provides the opportunity of exposure to many experiences within Healthcare. The interest in coronary artery disease education was shaped by literature, education, work experience, family modes and the growing public interest in health. Coronary artery Ddsease remains the leading cause of death and a major cause of morbidity, globally.

Decades of research have examined the role and effectiveness of educational intervention in promoting patient's knowledge of and ability to manage risk factors for CAD. Advocates of patient education in the primary care setting have embraced moving away from a simplistic approach to improving patient health status through knowledge towards a "high quality health education" (Guzek et al., p. 1, 2019). A formal and very well-organized method of delivery has become the preferred design of an educational approach, with the goal of helping the patient to take ownership of their personal health and welfare (Guzek et al., 2019).

Spiritual Emphasis

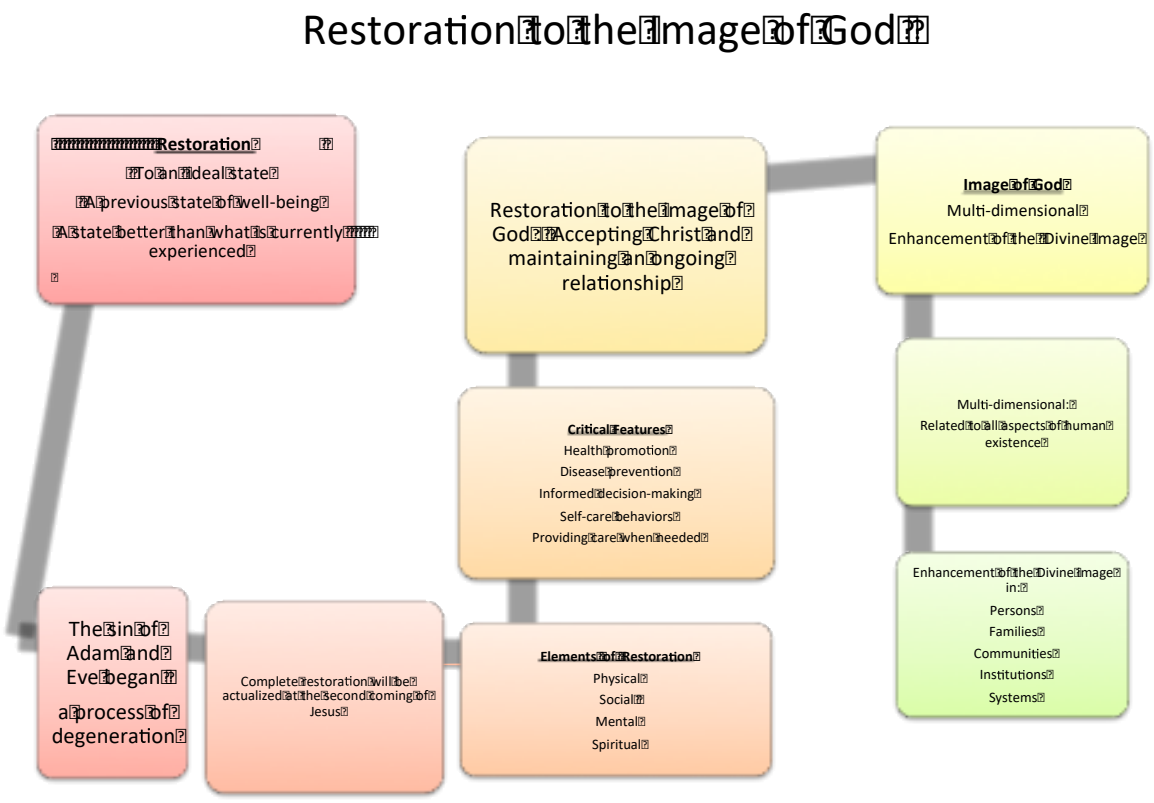


Figure 9. Conceptual Framework: Adapted from Andrews University Department of Nursing Handbook (pp. 3-5)

An important spiritual element is “Restoration to the Image of God.” It emphasizes returning to an ideal state, returning to a previous state of well-being, or achieving a state better than what is currently experienced. The image of God is seen as the “gold standard”, enhancing the divine image in persons, families, communities, institutions, and systems in ways that promote health and prevent disease (Handbook, 2016).

Doctor of Nursing Practice Providers may promote awareness of cardiovascular risk factors for the purpose of preventing CAD and promoting health. This project manager anticipates participation with an organization that creates an environment that explores and identifies perceived barriers to health promotion behaviors, and assist patients and their families in gaining insight into health promotion. Nursing practice may be impacted by encouraging patients to practice a heart-healthy lifestyle by developing a successful personalized risk reduction plan.

“Study every day to show God that you’re a workman who does not need to be ashamed” (2 Timothy 2:15, The Clear Word Bible).

APPENDIX A

INSTITUTION IRB LETTER OF APPROVAL

Andrews University
Office of Research & Creative Scholarship

July 12, 2019

Rochelle Anderson-Doyley
Tel: 832-368-5643
Email: rochella@andrews.edu

RE: APPLICATION FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS
IRB Protocol #: 19-042 **Application Type:** Modification **Dept.:** Nursing (DNP)
Review Category: Expedited **Action Taken:** Approved **Advisor:** Jochebed Ade-Oshifogun
Title: Effect of an Educational Intervention on Coronary Artery Disease Knowledge in Men and Women at Risk for Coronary Artery Disease.

This letter is to advise you that the Institutional Review Board (IRB) has reviewed and approved your IRB **modification** application for research involving human subjects entitled: "*Effect of an Educational Intervention on Coronary Artery Disease Knowledge in Men and Women at Risk for Coronary Artery Disease*" IRB protocol number 19-042 under Expedited category. This approval is valid until July 12, 2020. If your research is not completed by the end of this period you must apply for an extension at least four weeks prior to the expiration date. We ask that you inform IRB whenever you complete your research. Please reference the protocol number in future correspondence regarding this study.

Any future changes made to the study design and/or consent form require prior approval from the IRB before such changes can be implemented. Please use the attached report form to request for modifications, extension and completion of your study.

While there appears to be no more than minimum risk with your study, should an incidence occur that results in a research-related adverse reaction and/or physical injury, this must be reported immediately in writing to the IRB. Any project-related physical injury must also be reported immediately to the University physician, Dr. Katherine, by calling (269) 473-2222. Please feel free to contact our office if you have questions.

Best wishes in your research.

Sincerely,

Mordekai Ongo, Ph.D.
Research Integrity & Compliance Officer

Institutional Review Board -8488 E Campus Circle Dr Room BUL 234 - Berrien Springs, MI 49104-0355
Tel: (269) 471-6361 E-mail: irb@andrews.edu

APPENDIX B

INSTITUTIONAL LETTER OF AGREEMENT

June 4, 2019

Williams Family Practice
Balmore W. Williams
202 North Washington Avenue
Cleveland TX 77327

To the Andrews University Institutional Review Board:

The purpose of this letter is to inform you that Rochelle Anderson-Doyley has been approved to conduct her **Scholarly DNP Project** at the Williams Family Practice Clinic:

"Effect of an Educational Intervention for Low Socioeconomic Women at Risk for Coronary Artery Disease"

Rochelle Anderson-Doyley has been granted the opportunity to conduct her DNP Scholarly Project at the Williams Family Practice Clinic. She has been granted full privilege for data collection, which includes screening for her inclusion criteria using the Pooled Cohort Risk Assessment Equation.

Female subjects will be recruited from the Williams Family Practice Office. Using a convenience sampling approach, charts will be screened using the Pooled Cohort Risk Assessment Equation for CAD risk, before their scheduled appointment at the office:

- Subjects with a Pooled Cohort Risk Assessment Equation score of $\geq$7.5 % will be approached to participate in the project on the day of their scheduled appointment while waiting to see the Physician by the project manager

To accomplish this Rochelle will have full access to the patient's chart to retrieve, prior to their visit for the following and all relevant information:

- Gender
- Age
- Race
- Lab values
    - Total cholesterol
    - High-density Lipoprotein (HDL) cholesterol
- Systolic Blood Pressure (SBP)
- Is the patient receiving treatment for high blood pressure (If SBP is greater than 120 mmHG)
- Is the patient a Diabetic
- Is the patient a Smoker

If there are any questions, please feel free to contact me.

Sincerely,

Dr. Balmore Williams
CEO, Williams Family Practice/Board Certified Family Physician

APPENDIX C

INFORMED CONSENT

Subject ID Number: _____

Project Director: Rochelle Anderson-Doyley – 832-368-5643 – rochella@andrews.edu

Project Title: "Effect of an Educational Intervention on Coronary Artery Disease Knowledge in Men and Women at Risk for Coronary Artery Disease"

Project Purpose: The purpose of this project is to assess the effect of an educational intervention on the knowledge of lifestyle modification in men and women at risk for Coronary Artery Disease.

Why me:

- You are at risk of having Coronary Artery Disease and I want to ensure that you have the tools to help you to avoid getting this disease

Project Procedure:
You will receive a questionnaire: Coronary Artery Disease Education-Questionnaire II and an educational presentation about coronary artery disease, its risk factors and how a heart healthy diet and physical activity and can reduce your risk.
You will be in contact with the person in charge of the project on 2 occasions:
-On the first day of participation at the Williams Family Practice Clinic you will complete a questionnaire and receive an educational presentation about Coronary Artery Disease and how to reduce your risk for development of the disease. Your time commitment will be approximately 1.5 hours.
-In 2-3 weeks from the first day, the project director will meet you at the Williams Family Practice Clinic to complete a second questionnaire. The project director will schedule this appointment with you at the end of your first day.
Your time commitment will be approximately 20 minutes.

TIME Commitment
First encounter
-Questionnaire- 20 minutes
-Educational Presentation – 45 minutes
Second encounter (2-3 weeks after first encounter)
-Questionnaire – 20 minutes

Your participation in this project is voluntary. Your withdrawal will not affect your relationship with this Family Practice Clinic.

What risks will I face by taking part in the project and how will the project director protect me from these risks?
Risk for this project is minimal. There is no risk for participating. Any personal information about you that is gathered during this project will remain confidential. A project number will be used to identify you in the project and only the project director will know your name. Neither your name nor personal information will be shared with others.

How could others and I benefit if I take part in this project?
As a participant in this project, you may increase your knowledge of Heart Disease and your health status and help educate your family about important lifestyle changes.

Are there any cost or payments?
You will not incur any costs. At the end of your participation, you will receive a $25 gift certificate to Wal-Mart as an appreciation of your time.

What are my rights in this project?
Taking part in this project is your choice. No matter what decision you make, even if your decision changes, there will be no penalty to you.
If you have any complaints about this project you may contact Andrews University:
Mordekai Ongo, Research Integrity & Compliance Officer
Phone: 269-471-6361 - Email: irb@andrews.edu

If you have any complaints about me you may contact my Project Chair:
Jochebed Bea Ade-Oshifogun, PhD, Chair, Department of Nursing
Phone: 269-471-3363 - Email: jochebed@andrews.edu

Where can I get more information?
If you have any question regarding your participation in this project please ask. You can contact the project director: **Rochelle Doyley**, BSN, MSN, DNP (c)
Phone: 832-368-5643 - Email: rochella@andrews.edu

Project Participant:
I have read this consent form or had it read to me. I was given the opportunity to discuss the project with the project director and my questions have been answered. I will be given a signed copy of this form, and I agree to participate in this project.

Signature of Project Participant:
_____ Date: _____ Time:_____
Name (Print Legal Name): _____
Email address: _____ Phone #: _____

Person Obtaining Consent:

I have given this participant (or her legally authorized representative) information about this project that I believe is accurate and complete. The participant has indicated that she understands the nature of the project and the risks and benefits of participating.

Name: Rochelle Anderson-Doyley **Title:** Graduate Student

Signature: _____ Date of Signature: _____

APPENDIX D

CADE-Q II QUESTIONNAIRE

You are being invited to fill out this questionnaire because you are at risk for coronary artery disease. Knowledge about your condition, treatments and risk factors is an important component about management.

About the questionnaire:

The purpose of this questionnaire is:

- To assess patients' overall knowledge about heart disease and related factors; and,
- To assess specific areas/domains of knowledge (medical condition, risk factors, exercise, nutrition, and psychosocial risk,).

Questions are structured as followed:

- Multiple choice
- Each question has 4 possible answers/alternatives
- Each answer corresponds to a knowledge level:
    - - A correct statement showing "complete knowledge"
    - - A correct statement showing "incomplete knowledge"
    - - An incorrect statement showing "wrong knowledge"
    - - A don't know statement showing "lack of knowledge"
- Each alternative has a score and the sum of final scores lead to a classification on knowledge.

Instructions for completing this survey:

- Questions are grouped in domains (areas of knowledge)
- Please answer as many questions as you can
- Check the alternative you think that is the most correct one
- If you don't know the answer, mark the "don't know" statement (do not leave the question blank)

This questionnaire is **confidential** and completely **voluntary.** It should take around 20 minutes to complete.

Domain: **Medical Condition**

1. **Coronary Artery Disease is:**
    a. A disease of the heart's arteries that occurs only in older age and is mainly caused by deposits of calcium in the arteries
    b. A disease of the arteries of the heart which occurs in older age in people with high cholesterol or who smoke
    c. A disease of the arteries of the heart that starts silently at a young age. It is influenced by poor life style habits, genetics, and involves inflammation in the arteries.
    d. I don't know

2. **Angina (chest pain of discomfort) occurs:**
    a. When the heart muscle is working too hard.
    b. When the heart muscle is not getting enough blood and oxygen to work properly
    c. When the brain is not getting enough oxygen
    d. I don't know

3. **In a person with coronary artery disease, which of the following is a usual description of angina:**
    a. Headache after meal
    b. Chest pain or discomfort, at rest or during physical activity, which can also be felt in the art and/or back and/or neck
    c. Chest pain or discomfort during physical activity
    d. I don't know

4. **A heart attack occurs:**
    a. If an artery in the heart becomes blocked.
    b. If the heart suddenly races in response to stress
    c. If the flow of oxygen-rich blood to an area of heart muscle suddenly becomes blocked. If blood flow is not restored quickly, the area of heart muscle begins to die
    d. I don't know

5. **The best resources to available to help someone understand his/her medications are:**
    a. The doctor, the cardiac rehab team, the pharmacist and recommended resources on the internet
    b. What someone reads on the internet
    c. The doctor and the cardiac rehab team
    d. I don't know

6. **Medications such as aspirin (ASA) and clopidogrel (Plavix) are important because:**
    a. They lower blood pressure
    b. They "thin" the blood
    c. They reduce the "stickiness" of platelets in the blood so that blood flows more easily through coronary arteries and past coronary stents
    d. I don't know

7. **The "statin" medications such as atorvastatin (Lipitor), rosuvastatin (Crestor) or simvastatin (Zocor) have a beneficial effect in the body by:**
    a. Lowering LDL cholesterol in the blood stream
    b. Blocking the production of LDL cholesterol in the liver, lowering LDL cholesterol in the blood stream, and encouraging cholesterol to move out of plaques from the arteries
    c. Reducing the absorption of cholesterol from food
    d. I don't know

Domain: **Risk Factors**

8. **The risk factors for heart disease that can be changed are:**
    a. Blood pressure, cholesterol, and smoking
    b. Age, family history of heart disease, ethnicity and sex
    c. Blood pressure (systolic and diastolic), LDL + HDL cholesterol, smoking and second hand smoking, waist size and reaction to stress
    d. I don't know

9. **The actions that can be taken to control cholesterol levels include:**
    a. Knowing the total cholesterol level, becoming a vegetarian and avoiding eggs
    b. Knowing the LDL and HDL levels, taking cholesterol medication as prescribed, increasing soluble fiber intake and reducing saturated fat in the diet and participating in aerobic exercise 5 times per week
    c. Knowing the cholesterol levels and taking cholesterol medication as prescribed
    d. I don't know

10. **The actions that can be taken to control blood pressure include:**
    a. Increasing calcium in the diet
    b. Reducing the amount of salt in the diet, and taking blood pressure medication
    c. Reducing the amount of sodium in the diet to <2000 mg per day, exercising, taking blood pressure medication regularly and learning relaxation techniques
    d. I don't know

11. The first step towards controlling a risk factor (such as blood pressure or cholesterol) is:

a. Knowing if someone has the risk factor
b. Knowing the level of the risk factor
c. Setting a goal or action plan to control the risk factor
d. I don't know

12. The actions to prevent developing diabetes include:

a. Follow a heart health diet, do 150 minutes of aerobic exercise weekly and twice weekly resistance exercise with weights and therabands
b. Reduce the amount of fats and carbs in the diet
c. With a family history of diabetes, a person is bound to develop diabetes because diabetes in not a preventable disease
d. I don't know

Domain: **Exercise**

13. What are the important parts of an exercise prescription?

a. Replacing calories and salt during a light workout
b. How hard to exercise, how long to exercise, how often to exercise and what type of exercise to do
c. How hard to exercise and how long to exercise
d. I don't know

14. For a person living with heart disease, it is important to do a cardiovascular warm-up before exercising because:

a. It gradually increases the heart rate, it may reduce muscle soreness and can reduce the risk of developing angina
b. It adds more time to the total amount of minutes of exercise
c. It prepares the body for exercise
d. I don't know

15. The pulse can be found:

a. In the wrist below the base of the thumb
b. In the wrist below the base of the pinky finger or on the neck of the Adam's apple
c. At the radial artery (wrist) or at the carotid artery (neck)
d. I don't know

16. Three things that one can do to exercise safely outdoors in the winter are:

a. Check the temperature and wind-chill, and wear layers of clothing
b. Check the temperature and wind-chill and make sure it is not below -10 degrees C, wear 3-4 layers of clothing and adjust the pace of walking so that the level of exertion and heart rate are on target
c. Check the temperature and wind-chill and make sure it is not below -15 degrees C, wear a winter coat and jog if one gets too cold
d. I don't know

17. The benefits of doing resistance training (lift weights or elastic bands) include:

a. Builds up strength and muscles
b. Lowers resting heart rate
c. Increases strength, improves the ability to carry out day to day activities, improves blood sugar levels and increases muscle
d. I don't know

18. If a person gets chest discomfort during a walking exercise session, he oar she should:

a. Speed up to see if the discomfort goes away
b. Slow down and stop exercising
c. Slow the walk pace and if it does not go away within 1 minute, stop exercising. If it still does not go away within the next minute, take nitroglycerine as prescribed. If the pain continues, get help
d. I don't know

19. How does a person know if he/she is exercising at the right level?

a. The heart rate is in the target zone, the exertions level is no higher that "some-what hard", and the person can exercise and talk
b. The heart rate is in the target zone
c. Working up a sweat, breathing heavy and the heart rate is going fast
d. I don't know

Domain: **Nutrition**

20. What is the best source of omega 3 fats in foods?

a. Ground flaxseed
b. Pasta
c. Fatty fish (e.g. trout, salmon)
d. I don't know

21. Trans fat are:

a. Found in nuts and seeds
b. Partially hydrogenated vegetable oils (e.g. vegetable shortening)
c. Margarine
d. I don't know

22. What is one good way to add more fiber to your diet:

a. Add nuts and seeds to a salad
b. Drink juice
c. Eat plant proteins (e.g. legumes/beans, lentils)
d. I don't know

23. Which of the following foods has the most salt:

a. Bread
b. Frozen dinners
c. Fruits and vegetables
d. I don't know

24. What combination of foods can help lower blood pressure?

a. Red meat, poultry, fish
b. Vegetables and fruits
c. Vegetables and fruits, whole grains, low fat dairy, nuts and seeds
d. I don't know

25. When reading food labels, which should one look at first?

a. Fat content
b. Brand name
c. Serving size
d. I don't know

26. How many servings of fruits and vegetables should adults consume?

a. 7 to 10 servings a day
b. 5 servings a day
c. As many as possible
d. I don't know

Domain: **Psychosocial Risk**

27. Which of the below are effective stress management techniques?

a. Deep breathing
b. Avoid communication
c. Medication, progressive muscle relaxation, making social connections, stretching/exercise, deep breathing
d. I don't know

28. What stresses have been related to increased risk for heart attacks?

a. Chronic stresses, major life events, disrupted sleep, and feelings of distress
b. Chronic stress at home or at work and feeling depressed
c. Stresses that you do not feel in control of
d. I don't know

29. Which of the following describes your best option for reducing your risk from depression:

a. Take an antidepressant, and do your exercise prescription
b. Do your exercises, take better care of yourself, and if required, take medications
c. The risk of heart attack due to depression cannot be reduced
d. I don't know

30. It is important to recognize "sleep apnea" because:

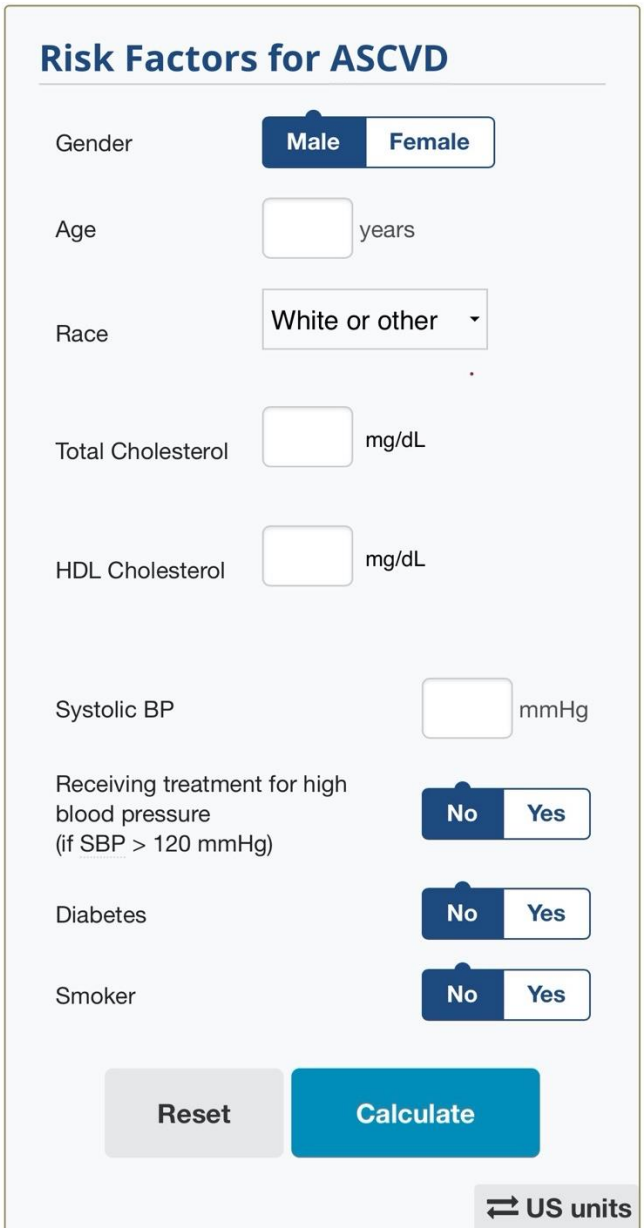
a. It leads to long term lung disease
b. It is associated with high blood pressure, abnormal heart rhythms, and higher risk of future heart attack
c. It lead to further heart problems
d. I don't know

31. Chronic stress is defined as:

a. Ongoing persistent events in one are of your life
b. Events at work or at home that make you feel irritable, anxious, or sleepless
c. The stresses that are out of a person's control
d. I don't know

APPENDIX E

POOLED COHORT RISK ASSESSMENT EQUATION



APPENDIX F

EVALUATION QUESTIONNAIRE

EVALUATION QUESTIONNAIRE

Effect of an Educational Intervention on Coronary Artery Disease Knowledge in Men and Women at Risk for Coronary Artery Disease

Rochelle Anderson Doyley, DNP Student

Andrews University

1. On a scale of 1-10, rate your overall impression of this educational intervention project:

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Very Inadequate									**Excellent**

2. Do you see value in implementing this project in this Family Practice Clinic's routine? (**Please circle one response**):

YES MAYBE NO

3. On a scale of 1 – 10, rate your overall impression of the educational trifold: **Coronary Artery Disease Education - Lifestyle Modifications**

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Very Inadequate									**Excellent**

4. In your opinion, what were the most important strengths of this project? (**Select all that apply**):

- o Professionalism of the Principal Investigator
- o The screening process of participants
- o The inclusion and exclusion criteria
- o Patient confidentiality
- o Tools:

- Pooled cohort Risk Assessment Tool for calculating Risk Score
- Coronary Artery Disease Education Questionnaire II (CADE-Q II) – Pre and Post Test

- Involvement of Office Personnel in the project
- Other (Please Specify):

_____
_____
_____
_____
_____

5. In your opinion, what were significant weaknesses of the project? (**Select all that apply**):

- Professionalism of the Principal Investigator
- The screening process of participants
- The inclusion and exclusion criteria
- Patient confidentiality
- Tools:
  - Pooled cohort Risk Assessment Tool for calculating Risk Score
  - Coronary Artery Disease Education Questionnaire II (CADE-Q II) – Pre and Post Test
- Involvement of Clinic Personnel in the project
- Other (Please Specify):

_____

_____

_____

_____

6. What suggestions do you have for improvement(s), were this project to be conducted at another Family Practice Office?

_____

_____

_____

APPENDIX G

EDUCATIONAL TRIFOLD

American Heart Association (AHA)
&
The American Collage of Cardiology (ACC)

The goals of the American College of Cardiology and the American Heart Association are to:

Prevent Cardiovascular disease

Improve the management of people who have these disease through

Professional education and Research

Coronary Artery Disease Patient Education:
(Video available on Williams Family Practice website)

Coronary Artery Disease Education:

Medical Condition

- How your heart works
- Nature and Prevalence of CAD

Risk Factors

- Emphasis on Modifiable Risk Factors

Exercise/Physical Inactivity

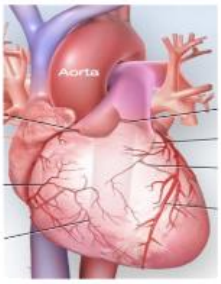
- Frequency and Intensity
- Resistance exercise

Nutrition

- Fruits and Vegetables
- Understanding Food Labels

Psychosocial Risk

- Stress and Depression



Coronary Artery Disease (CAD)

CAD is a common term for the buildup of plaque in the heart's arteries

Plaque first grows within the the walls of the coronary arteries until the blood flow to the heart's muscle is limited

CAD begins in childhood

CAD is preventable

Typical warning signs are:

- Chest pain
- Shortness of breath
- Palpitations and Fatigue

Risk Factors

* Is your risk score less than 7.5% ?

Major Risk Factors

Increasing AGE

Male Gender

Heredity (Including race)

Modifiable Risk Factors

Tobacco smoke

High blood Cholesterol

High Blood Pressure

Physical Inactivity

Obesity and being Overweight

Diabetes

Contributing Risk Factors

Stress

Alcohol

Diet and Nutrition

Coronary Artery Disease Education

~Lifestyle Modifications

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