Spring 2024

Cardiovascular Disease Improvement Project

Deglan K. McCrystal
Gardner-Webb University, dmccrystal@gardner-webb.edu

Cardiovascular Disease Improvement Project

by

Deglan Karl McCrystal

A project submitted to the faculty of
Gardner-Webb University Hunt School of Nursing
in partial fulfillment of the requirements for the degree of
Doctor of Nursing Practice.

Boiling Springs, NC

2024

Submitted by: Approved by:

Deglan K. McCrystal   _Candice J. Rome_
Deglan K. McCrystal   Candice J. Rome, DNP, RN

_04/19/2024_   _04/19/2024_
Date   Date

Abstract

Health prevention promotes positive healthcare outcomes by identifying risk factors associated with a disease process in its early stages to halt or slow its progression. Preventions, like routine screenings, facilitate the identification of risk factors or the initiation of treatment of a disease. Identifying risk factors, which often go unrecognized, helps to manage conditions like cardiovascular disease before it progresses in severity. Early treatment options or identifying risk factors that lead to cardiac disease positively impact healthcare costs by reducing the number of hospital visits, emergency services, and the need for costly long-term care. Prevention increases the quality of disease management, decreases physical limitations, and reduces disease symptoms, like pain and shortness of breath, improving quality of life. Mobile health clinics (MHC) employ affordable, safe, evidence-based screenings that can improve life expectancy by raising patient awareness through education after identifying risk factors. This project aim was to educate the at-risk population and evaluate their knowledge, attitudes, and behaviors related to cardiovascular health by providing education and evaluate the learning with a survey after the educational intervention provided at the MHC.

Keywords: Cardiovascular disease, public health interventions, community-based health screenings, Framingham risk scale, cardiovascular costs, low-cost public health delivery models.

Table of Contents

List of Figures

Problem Recognition

Cardiovascular disease (CVD) is costly and can be deadly. Without any public health intervention currently in place, the highest cause of mortality in Pitt County, North Carolina is heart disease (Pitt County needs assessment, 2020). Prevention is a reliable strategy in reducing incidents of heart disease. Costs associated with prevention of heart disease are significantly smaller than costs to the individuals with heart disease, cost which institutions incur who treat the disease, and the cost of resources used. There are currently no public health interventions to address the heart disease issue in Pitt County. The DNP Project Leader questions, "Will education of CVD increase knowledge of preventative and treatment measures of participants screened during mobile health clinics in Pitt County, North Carolina?"

Identified Need

Cardiovascular disease is a leading cause of mortality and morbidity in Eastern North Carolina, which includes the Pitt County. Screening and prevention of CVD is the first step in reducing the impact of this problems. It is concerning that there are few options available for inexpensive and accessible screening regarding CVD. There were 311 deaths in Pitt County attributed to heart disease resulting in a death rate of 172.07 (Pitt County North Carolina, 2020). CVD can be addressed by advanced practice nurses as well as registered nurse who can implement prevention practices through evidence-based screening. A mobile health clinic is an affordable and accessible intervention to provide screening and educational opportunities.

Problem Statement

Will education of cardiovascular disease increase knowledge of preventative and treatment measures of participants screened during mobile health clinics in Pitt County, North Carolina?

Literature Review

The articles reviewed shows relevance and the need for creating an intervention in rural Eastern North Carolina beyond the fact that Pitt County has no public health interventions in place. Articles reviewed show heart disease is one of the largest causes of death on national, state, and county levels. Many barriers to health care limit the ability to start a prevention program; however, these barriers can be best addressed by identifying the at-risk population and providing low-cost health screenings and referrals to affordable primary health care providers.

Sources used included Cumulative Index for Nursing and Allied Health Literature (CINHAL), Elsevier's Science Direct, Public Health Database (ProQuest), and PubMed.

Cardiovascular Disease

Cardiovascular Disease (CVD) is a collection of diseases comprising blood vessels and the heart and often exists alongside other diseases such as coronary artery disease (CAD) which includes myocardial infarction (MI) commonly known as a heart attack (Ignatavicius & Workman, 2021). Other common CVDs are stroke, heart failure, hypertensive heart disease, cardiomyopathy, valvular heart disease, and peripheral artery disease (Ignatavicius & Workman, 2021). Atherosclerosis, the accumulation of fat plaques on the inner walls of blood vessels, is directly involved with CAD, peripheral artery disease, and stroke (Ignatavicius & Workman, 2021). Uncontrolled diabetes and hypertension increase the risk of heart disease because of the conditions' effects on blood vesicles (Ignatavicius & Workman, 2021). In diabetes, uncontrolled blood sugar causes damage to the blood vessels, while high blood pressure increases the workload on the heart, causing damage to blood vessels (Ignatavicius & Workman, 2021). Older adults are at risk due to physiological and lifestyle factors like decreased compliance and

flexibility of blood vessels, comorbidities, reduced physical activity, poor nutrition, and increased stress from living on a fixed income or losing loved ones and friends (Ignatavicius & Workman, 2021). Men are at higher risk for CVD than women for several reasons. Biologically men have less flexible blood vessels, more elevated cholesterol, and higher blood pressure when compared to women (Ignatavicius & Workman, 2021). Unhealthy lifestyle choices such as smoking, physical inactivity, and drinking alcohol are more likely to be engaged in by males than women (Ignatavicius & Workman, 2021).

Patel et al. (2018) conducted a study using the C statistics and reclassification index to look at the outcomes of coronary heart disease (CHD), stroke, peripheral artery disease, angina, and congestive heart failure. Complications of these diseases can be attributed to high blood pressure, diabetes mellitus, hypercholesterolemia, smoking, poor diet, sedentary lifestyle, excessive alcohol intake, and genetic family history (Patel et al., 2018). The incidents of heart disease, according to Patel et al. (2018), suggest the number of the incidents due to just family history was numerically small, implying that factors such as socioeconomics, lifestyles, and education play a significant role in the incidents of heart disease.

Weaver et al. (2022) discussed the increased prevalence of CVD among ethnicities. Weaver et al. (2022) looked at populations of certain ethnicities, such as African Americans, Native Americans, and Mexican Americans, who have a higher incidence of CVD compared to whites. Weaver et al. (2022) also noted older adults and those with low socioeconomic status have an increased risk of CVD when compared to the rest of the population. Weaver et al. (2022) found genetic conditions like sickle cell

anemia, social determinants of health such as poverty and lack of access to quality healthcare, unhealthy living conditions and lifestyle habits, and healthcare disparities like access and quality can lead to adverse outcomes from underdiagnosed conditions like hypertension. According to Weaver et al. (2022), CVD accounts for 30.5% of all deaths in the United States. It is the most common cause of death in Americans and often presents clinically as coronary artery disease (CAD) or myocardial infarction (MI) (Weaver et al., 2022). The most important risk factors for CVD identified by Weaver et al. (2022) were hypertension and diabetes, which occurred concurrently in 46% and 13.5% of Americans. Weaver et al. (2022) pointed out there is also an increase in oxidative stress with diabetes and hypertension that leads to chronic inflammation and damage to the blood vessels, causing disruptions in lipid metabolism, which can lead to higher levels of cholesterol and triglycerides. Estrogen has been shown to have protective effects on the cardiovascular system protect women, while after menopause, protection is reduced, which may account for the closing gap between men and women in the last decade (Weaver et al., 2022).

Lee et al. (2015) discussed that CVD is a leading cause of death in Latino men, estimated to be above 33.4%. CVD affects several populations, while many groups are more susceptible than others. Lee et al. (2015) discussed socioeconomic status as a significant cause for health disparities in the US. There needs to be more access to healthcare, especially in rural communities where a lack of primary healthcare providers creates limited access to healthcare. Another problem associated with the lack of access to health care is transportation. Individuals need reliable transportation to avoid difficulties in getting to appointments and getting healthcare resources. The high cost of

insurance and medical care are other barriers affecting those with low income or those without insurance. Those without insurance face difficulties in getting the healthcare needed due to the high costs of medical services. Some ethnic and racial minorities, including those with limited English proficiency, face the challenges of accessing healthcare due to cultural and linguistic barriers when accessing healthcare. Lee et al. (2015) suggested that Latino males face health disparities second only to African American males because Latino males are less accultured into mainstream society and are less likely to seek medical help. Addressing these healthcare barriers and increasing access to resources can improve health-related outcomes and the quality of life for the at-risk population.

Brom et al. (2023) conducted a study using cross-sectional survey data and determined that of 5.4% of African American and 5.7% Caucasian experiencing CAD, African American were receiving less hyperlipidemia screenings than their Caucasian counterparts. The study looked at a cross-section of patients who received annual lipid screenings, 77% Caucasian compared to 70% African American, and found that African American patients were screened less often than Caucasian patients (Brom et al., 2023). This study suggested the health disparities in screenings may point to delays in healthcare interventions. Brom et al. (2023) discussed the need for increased screenings and interventions in rural communities to improve the health disparities.

Grace et al. (2016) addressed the relationship of risk factors associated with heart disease and stated it is possible for each risk factor to interact with one or more other risk factors compounding and increasing the risk of CVD.. Reduction of risk factors associated with heart disease in poorer communities can be accomplished several ways

by the nursing community. Providing health education on healthy lifestyle choices, such as proper nutrition, exercise, and stress management is one way the nursing community can assist in reduction. Regularly screening for risk factors such as high blood pressure, high cholesterol, and obesity is another way. Also, making referrals for individuals to specialized healthcare providers such as cardiologists or nutritionists can help. Helping individuals with management as well as understanding medications prescribed for CVD will increase compliance. Grace et al. (2016) points out that working with community organizations and agencies to promote heart-healthy initiatives and provide resources for the at-risk population reduces the risk factors associated with CVD. These strategies would help reduce the incidents associated with heart disease in socioeconomically challenged communities but not overcome barriers to healthcare issues many still face.

Jyotsna et al. (2023) discussed the strong association between CVD and diabetes mellitus and the use of existing evidence-based preventions to reduce the incidence of CVD. Jyotsna et al. (2023) suggested high blood sugar levels and insulin resistance have an increasing effect on incidents of hyperlipidemia and atherosclerosis, which are known to increase the risk of CVD significantly. Jyotsna et al. (2023) discussed the evidence-based link between high blood sugar levels and microvascular problems like retinopathy and nephropathy, suggesting that such links have contributed to some changes in how patient care is delivered. Jyotsna et al. (2023) pointed out that preventative measures for treating hyperglycemia not only improve outcomes for diabetes mellites but also improve the outcomes for other conditions like hypertension and confer cardiovascular benefits. Jyotsna et al. (2023) discussed the link between high blood sugar levels and

inflammation as it relates to atherosclerosis, a known risk factor for heart problems, as oxidation impacts the arteries on a microvascular level, increasing the incidence of CVD.

The study by Philip et al. (2023) indicated that CVD accounts for one-third of the deaths worldwide as well as the mitigation of CVD incidents by reducing the risk factors of CVD such as hypertension, hyperlipidemia, diabetes, alcohol consumption, tobacco smoking, and body mass index through preventative measures. Philip et al. (2023) points out that the large percentage of CVD incidents are directly linked to modifiable risk factors. Philip et al. (2023) reported the number one contributing CVD risk factor, hypertension, accounted for 22% in men and 29% in women. Philip et al. (2023) also identified hyperlipidemia, the second highest factor of CVD incidents, occurred in 17% of men and 15% of women. The study concluded that these risk factors contributed to CVD incidents by 53% in men and 57% in women globally and that using preventative measures to target CVD risk-factors could greatly reduce the incidents of CVD especially in rural areas. Philip et al. (2023) discussed implementing management of risk factors like high cholesterol can be achieved through screening and lifestyle counseling.

The systematic review by Thom et al. (2023) discussed increased positive outcomes in hypertension (HTN), CAD, and heart failure (HF) through education and prevention related to diet and lifestyle changes. Thom et al. (2023) surveyed CVD at-risk populations' dietary practices in rural areas. The study reports 20% of patients with HTN, HF, and CAD are nonadherent to healthy diet patterns and that 55% of patients eat an excess of sodium while less than 40% of patients eat the recommended amounts of vegetables, fruits, and whole grains (Thom et al., 2023). Thom et al. (2023) reported increased cardiovascular knowledge and behaviors in the at-risk population by using

mobile health clinics, screening, and providing health education at accessible public locations. Thom et al. (2023) reported health education and screenings combined are cost-effective, with a significant increase in improving CVD outcomes.

The study by Elertson and Morgan (2023) explored how heart disease and its prevention and management impacted women. Elertson and Morgan (2023) discuss CVD is the leading cause of death among men and women globally, with incidents of CVD occurring related to genetics, the environment, socioeconomics, education, and lifestyle choices. The study reports mortality rates are almost equal between men and women in the US and even though women have lower rates of CVD when compared to men, women are more likely to die from a cardiac event than men (Elertson & Morgan, 2023). Elertson and Morgan (2023) report coronary artery disease (CAD) as the highest cause of CVD and that CAD occurs more in men. However, women are misdiagnosed, improperly identified, or underdiagnosed, which leads to a delay in treatment and an increase in mortality rates (Elertson & Morgan, 2023). With women having decreased incidents of being identified with CVD appropriately, it increases the need for screening in rural communities.

Easily deployed screenings that are both cost-effective and efficacious are an effective strategy when considering interventions for the CVD at-risk population because the at-risk population is asymptomatic (Wallace et al., 2014). Wallace et al. (2014) discussed screening for risk factors like age, smoking, hypertension, and family history is key in identifying those at risk for CVD. Wallace et al. (2014) pointed out that a given relative risk reduction of 30% for a patient with a baseline risk of 10% would have an absolute risk. The guidelines for assessment using the Framingham Cardiovascular Tool

are every 4-6 years in adults 20-79 without signs of CAD (Wallace et al., 2014). Wallace

et al. (2014) provided argument that risk factors for CVD like HTN are preventative,

using screenings, for the development of CVD and death.

<div align="center">**Needs Assessment**</div>

There are several issues related to cardiovascular health in Pitt County, NC, which

indicate a need for CVD intervention. Heart disease is at an all-time high in Pitt County,

and there is no established public health measure for heart disease in Pitt County (Pitt

County needs assessment, 2020). Pitt County, regarding cardiovascular health, would

benefit from a public health strategy that focused on preventative screenings and

education. The CDIP is a much-needed intervention to bridge the gap between the current

condition of lacking preventative imitative and the ideal condition of comprehensive

health programs that improve the community's cardiovascular health outcomes.

Target Population/Community

According to the 2021-2022 Community Health Needs Assessment for Pitt

County, cardiovascular disease is the number one cause of death in Pitt County (Pitt

County, North Carolina, 2022). Heart disease has the most significant impact on the male

population of Pitt County and is more prevalent in Pitt County when compared with

North Carolina (County Health Rankings and Roadmaps, 2022). The Cardiovascular

Disease Improvement Project (CDIP) aimed to reduce the impact of heart disease on the

population of Pitt County.

To achieve this, the project identified the need to reduce heart disease death rates

in Pitt County, where cardiovascular disease is the number one cause of death. Heart

disease has the most significant impact on the male population of Pitt County and is more

prevalent when compared with other counties in North Carolina. One approach to

reducing cardiovascular death rates in the at-risk population is to overcome barriers to healthcare and provide health screenings through mobile health clinics.

The CDIP focused its efforts in Pitt County, which is located in Eastern North Carolina. Specifically, the project utilized the parking lot of a local Baptist church as the location for the mobile health clinic. The church was approached as a fiscal resource and contributed funds to support the project. By providing health screenings to the at-risk population in a centrally located area, the CDIP aimed to increase accessibility to healthcare resources and overcome existing barriers.

Available Resources

The CDIP's primary goal was to improve heart disease in the population of Pitt County residents by overcoming barriers to healthcare (Zaccagnini et al., 2021). CDIP's resources came from Baptists on Mission (BOM), the local church, local Federally Qualified Health Centers (FQHCs), and local nursing programs. BOM provided a mobile health clinic needed in the health screening process. The volunteer workforce for the CDIP came from local nursing programs and the partnering church's youth program. The Framingham Risk Score for heart disease was used as part of the screening process. Local FQHCs have agreed to provide follow-up care. The cardiovascular education pamphlet and post-education survey were utilized to reach the at-risk population and attain evidence of the CDIP's effectiveness.

The health screening was free to the population. Specifics of advertising for the CDIP utilized social networks websites, email, flyers, and local newspapers. Health screening and resources came from renting the BOM's mobile health clinics at $230 a day (Baptists on Mission, 2022). Included in the cost were the supplies needed to conduct health screening for heart disease (Baptists on Mission, 2022). BOM's mobile clinic

made referrals to local providers for clients who did not have insurance. The Framingham

risk score for heart disease was incorporated into the health screening performed on the

at-risk population. The partnering church's fiscal funds helped pay for the mobile health

clinic. The health screening location was centrally located in Pitt County for conveyance

and affordability. To ameliorate health care costs for the at-risk population without

insurance they were directed to follow up with local FQHCs. FQHCs provide services

based on a sliding pay scale, reducing the cost of healthcare (Branchly, 2022). Utilizing

pre-licensure nursing students ensured health screenings were done accurately. These

volunteers were overseen by licensed nurse practitioners (NPs) from the partnering

church's congregation and local nursing programs. CVD education was provided using

an education pamphlet. Data was collected on the retention of knowledge, attitudes, and

behaviors of CVD preventative and treatment options by a post-education survey.

Desired and Expected Outcomes

The CDIP's short-term goals were accomplished proactively by having the at-risk

population screened, identifying abnormal results, providing education about health and

the risks of heart disease, making clients aware of affordable resources, and providing a

referral for follow-up care. An essential aspect in identifying the at-risk population comes

from utilizing the Framingham risk score for heart disease, which estimates the 10-year

risk based on collected health screening data (Mahmood et al., 2014). The CDIP's long-

term goals were to ensure healthy changes in lifestyle, access to affordable health care,

and reduce heart disease risk factors. This was assessed using the post-education survey

related to knowledge, attitudes, and behaviors of CVD.

Team Selection

The use of prelicensure nursing students reduced the cost of training and ensure the accuracy with the Framingham Scale and the delivery of education. Using pre-licensure students also reduced the need for training when collecting measurable data. Using BOM's mobile clinic streamlined the team members required to operate and deploy the intervention. Incorporating church members increased trust and turnout with the at-risk population.

Committee team members and their roles were as follows: Dr. Candice Rome, chair and faculty from Gardner-Webb University; Dr. Linda O'Boyle, liaison and point of contact for Baptists on Mission; Crystal Horton, the Health Screening Ministry Coordinator and another point of contact for BOM MHC and site coordinator for the mobile clinic; and Rev. Roger Haithcork, liaison and point of contact for local church.

The Project Leader was responsible for initiating, planning, and overseeing the implementation of the project. Responsibilities included coordinating with BOM to deploy the MHC, handling and distributing educational materials, and distributing and collecting the post-educational survey. The Project Leader was also responsible for education sessions, adherence to QI/IRB protocols, maintaining participants' confidentiality, and analyzing the post-education survey. The Project Leader's other roles and responsibilities included being the primary communication between the university, BOM MHC, volunteers, and RHC liaison to ensure that the project's goals were met.

Scope of Project

The CDIP's packet of interventions included using the Framingham scale and screening blood pressure, A1C values, and cholesterol to identify abnormal health values and risk factors. The Framingham risk score for heart disease is an evidence-based

intervention established over 50 years ago and updated recently (Mahmood et al., 2014). This CDIP intervention met the "Characteristics of Good Interventions" criteria according to Zaccagnini et al. (20221) because care was provided from an established health clinic, staffed with knowledgeable volunteers overseen by a licensed person, and used established screening techniques that are based on scientific evidence in identifying heart disease risk factors.

Objectives and Timeline

The Cardiovascular Disease Improvement Project's goal was to improve the cardiovascular health of the at-risk population in Pitt County by improving the quality of education and preventive care. The project's ongoing goal will be to create a future where effective interventions and strategies decrease the occurrence of cardiovascular disease and the associated health disparities.

Outcome Objectives

The DNP Project Leader established objectives for the DNP Project. The objectives and details are outlined below.

- Identify Pitt County individuals who face health disparities because of socioeconomic status and are at risk for cardiovascular disease with mobile health clinics.

- Make economically affordable referrals to health care providers for the at-risk population.

- Provide education using an educational pamphlet.

- Interview the at-risk population to determine if there is an increase knowledge of preventative and treatment measures of participants screened during the mobile health clinics in Pitt County using a post educational survey.

Timeline

This project's timeline framework was established by Gardner-Webb University which employed the DNP Scholarly Project Process Model (Zaccagini & Pechacek, 2021). The timeline for the project included problem/needs assessment, program intervention, evaluations, data analysis, report production, and dissemination of findings. The DNP project team develop a plan for the program intervention, secured Quality Improvement approval, conducted health screenings, collected and analyzed data, and produce reports with recommendations for future improvements. The findings were disseminated to stakeholders and local organizations in a virtual presentation. The timeline and details are outlined below.

- **Problem/Needs Assessment**: January 1st, 2023 – February 1st, 2024
    - During this period research was conducted utilizing Pitt County's Health Needs Assessment. It was determined from documentation the leading cause of death was related to cardiac disease and did not have an intervention to address this issue (Pitt County North Carolina, 2020).
    - During this period the project leader reviewed pertinent literature into cardiac disease and plausible interventions.

- **Planning**: March 1st, 2023 – March 19th, 2024
    - During this period, the CDIP team developed a detailed plan for the program intervention. This plan included the screening process, data collection methods, and strategies for promoting the program. The team also identified potential barriers to success and developed plans to address those issues.
    - The project's leader obtained approval from the partnering church.

- o The project leader submitted the CDIP's Quality Improvement Application plan to the Institutional Review Board (IRB) committee at Gardner-Webb University for review and approval.

- o Approval was met on March 19th, 2024.

- **Program Intervention**: March 23rd, 2024

  - o The CDIP's intervention took place during this period. The project leader facilitated the set up of the mobile health clinic in church parking lot. The MHC conducted health screenings using the Framingham risk score and other screening techniques provided by the MHC to identify the at-risk population. The project leader provided education to participants using the CVD pamphlet. The post-education survey tool was then given after consent was obtained to assess retention of knowledge, attitudes, and behaviors related to CVD education. The project leader also facilitated the team in providing education about heart disease and referrals to low-cost healthcare providers for individuals who needed follow-up care.

- **Analyze Data**: March 23rd, 2024 - April 9th, 2024

  - o The project leader analyzed the data collected during the education intervention and completed post-education survey. The project leader used statistical analysis to identify trends and patterns in the data and evaluate the effectiveness of the intervention.

- **Evaluations**: March 23rd, 2024 – April, 9th, 2024

o During this period, the project leader conducted evaluations of the

program. The project leader collected data on the number of education

participants who also participated in the post-education survey.

- **Produce Reports**: April 10th, 2024

    o The project leader produced reports summarizing the results of the

    intervention. The project leader complied recommendations for future

    improvements based on the findings.

- **Disseminate Findings**: April, 12th, 2024

    o The project leader disseminated the findings of the program to

    stakeholders, including community members, healthcare providers, and

    local organizations.

<div align="center">

Theoretical Underpinnings

</div>

Jean Watson's theory of caring emphasizes the importance of establishing a caring

and healing relationship between the healthcare provider and the patient. The theory

focuses on holistic care, promoting healing and well-being, and recognizing the

interconnectedness of mind, body, and spirit (Dossey, 2016). In the Cardiovascular

Disease Improvement Project context, incorporating Watson's theory of caring can

enhance the overall patient experience and contribute to positive health outcomes.

The theory of caring is ideal for the project in several ways. Firstly, it can guide

the interactions between the healthcare providers, including the PMHNP student, and the

at-risk population in Pitt County. The theory emphasizes the need for authentic presence,

active listening, and empathy, which are essential for establishing patient trust and

rapport (Dossey, 2016). Healthcare providers can create a caring environment by showing

genuine concern for the well-being of the individuals, providing emotional support, and respecting their autonomy and choices.

Incorporating Watson's theory of caring into the entire project can support the project framework by enhancing the quality of care provided to the at-risk population. By focusing on caring relationships and the overall well-being of the individuals, the project can go beyond simply screening for cardiovascular disease risk factors (Dossey, 2016). It can create a safe, compassionate space where individuals feel valued and supported. This approach can increase their engagement in follow-up care with primary healthcare providers and promote long-term behavior change.

Incorporating Watson's theory of caring, the DNP Project can contribute to the overall well-being and health outcomes of the at-risk population in Pitt County. The theory provides a framework for establishing caring relationships, promoting trust, and empowering individuals to participate in their healthcare journey actively (Dossey, 2016). This approach aligns with the project's goals of reducing the impact of heart disease through education on preventative and treatment options for cardiovascular disease and improving access to affordable healthcare resources. Through the application of caring principles, the project can foster a sense of support, understanding, and healing among the individuals, ultimately leading to positive health outcomes and improved quality of life (Dossey, 2016).

Work Planning

The Cardiovascular Disease Improvement Project (CDIP) was designed to increase the knowledge of the at-risk population through mobile health clinic (MHC) screenings and a post-screening educational intervention. The project included deploying

the MHC at a centrally located church within Pitt County to foster trust and allow for

easier access. The educational pamphlet was distributed prior to the post-educational

survey to assess knowledge, behavior, and attitude related to cardiovascular health. The

project occurred in phases. The first phase started with community outreach and

awareness utilizing paper advertisement, word of mouth, and social media. The next

phase was the deployment of the MHC with health screenings and educational sessions.

The final phase was collecting, analyzing, and disseminating the data. Throughout the

project, confidentiality and safety were maintained to protect the rights and welfare of all

participants. The expected outcome was improved cardiovascular health knowledge,

behavior, and attitude. The project's success was measured by participant feedback

utilizing the analysis of the post-educational survey, which was reported to stakeholders

through the dissemination of academic channels.

Project Management

The project was managed using a GANTT Chart. This tool offered a visual

timeline for the project, detailing when each task should start and finish, how long each

task will take, and where tasks overlap. The GANTT chart was updated throughout the

project as the progress changes and unforeseen challenges arise.
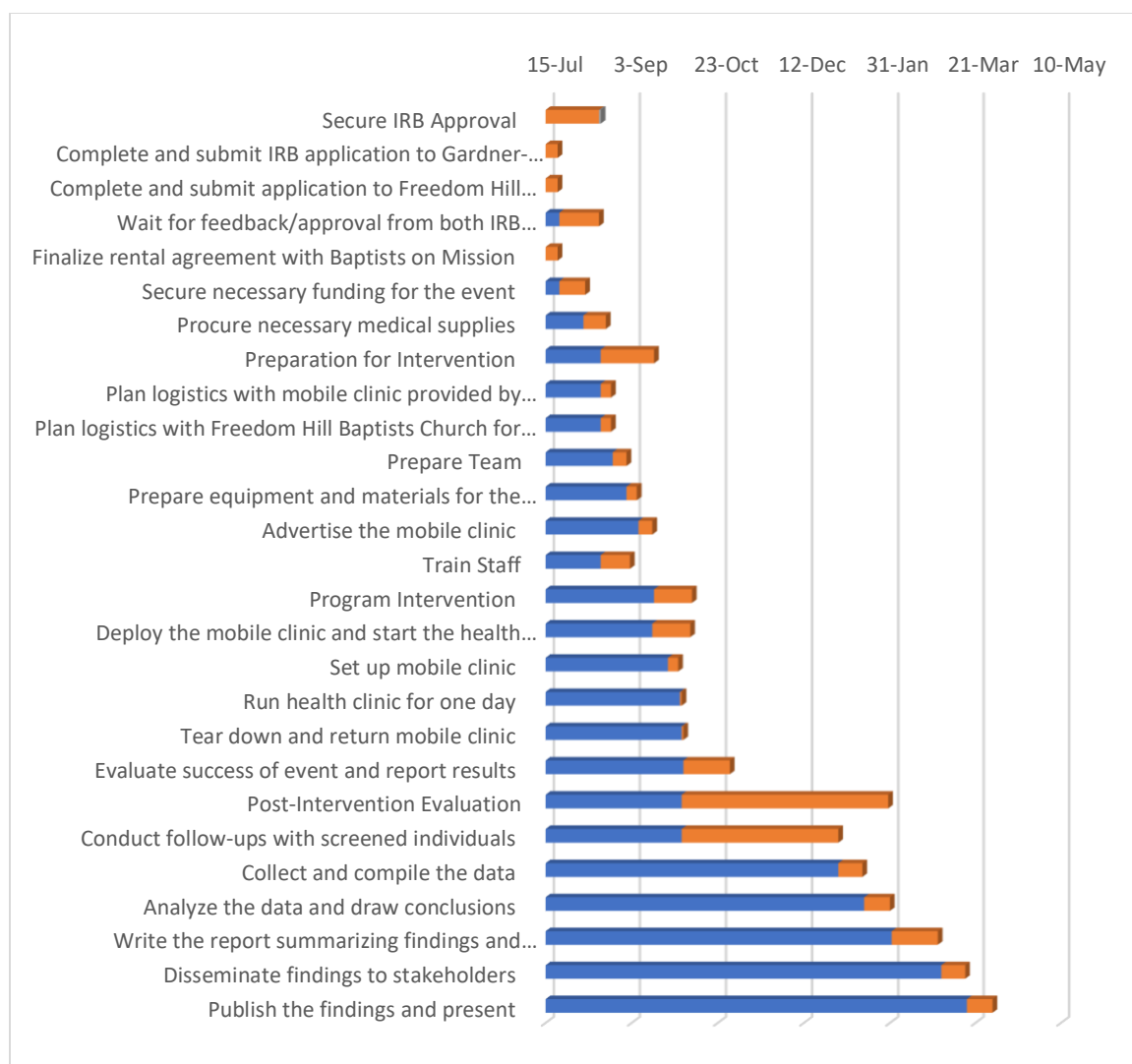
Cost/Benefit Analysis

The total budget for the project was $186, which covered the costs for the mobile health clinic rental, supplies for health screening, advertising, and miscellaneous expenses. The benefits of this project were primarily health and social benefits rather than direct economic returns. The health benefits included early detection of cardiovascular diseases among at-risk populations, with a goal of leading to timely treatment and potentially saving lives. Social benefits involved increased community awareness and knowledge about cardiovascular diseases, with a goal of leading to better health practices and lifestyle changes.

While it is difficult to quantify these benefits in direct economic terms, the potential to prevent expensive hospitalizations and long-term treatments associated with advanced cardiovascular diseases provides a compelling argument for the project's cost-effectiveness.

Renting the Mobile Health Clinic

According to Baptists on Mission, the rental cost for a mobile health clinic is $1,000 per week. For a one-day deployment, that translated to $1,000 / 7 days = $143.

Operational Costs

These are additional costs that include gas, maintenance, and insurance for the mobile clinic, estimated at $200 per week. For a one-day deployment, the operational cost was $200 / 7 days = $29.

Supplies

These include medical supplies for health screenings, estimated at $50 per week. For a one-day deployment, the supply cost were $50 / 7 days = $7.

Staffing

This involves hiring trained healthcare professionals to run the clinic. Assuming an approximate wage of $25/hour for 8 hours for the one-day deployment, the staffing cost would be $200. With project leader providing education intervention and post-education survey combined with the use of volunteers reduced the cost to $0.

Miscellaneous

Advertising, printing of educational materials, and other unforeseen expenses were estimated at $50 per week. For a one-day deployment, the miscellaneous cost were $50 / 7 days = $7.

Items	Cost for One-Day Deployment ($)
Mobile Health Clinic Rental	$ 143
Operational Costs	$ 29
Supplies	$ 7
Miscellaneous	$ 7
Total Costs	$ 186

Early Detection of Cardiovascular Diseases

By offering free screenings to community members, healthcare professionals can facilitate early detection of cardiovascular diseases, leading to timely treatment and potentially saving lives.

Prevention of Expensive Hospitalizations

The early detection and treatment of cardiovascular diseases can prevent hospitalizations and expensive long-term treatments. According to Saadat et al. (2023), the average cost of a heart surgery can range from $75,000 to $200,000. Even if one surgery is prevented through our early detection, the savings far exceed the total project cost.

Increased Community Awareness

Providing education to the community about cardiovascular diseases can lead to better health practices and lifestyle changes, reducing the incidence of cardiovascular diseases in the long run. This is a long-term benefit, and although it cannot be directly quantified, it significantly contributes to the overall wellbeing of the community.

Health Equity

By providing this service, the project promoted health equity. The value of equality and the ethical standards achieved by providing healthcare to disadvantaged groups, while intangible, was a significant benefit.

In conclusion, while the total cost of the one-day deployment was $186, the potential benefits, both in terms of direct healthcare cost savings and indirect societal benefits, justify the investment. The cost-benefit analysis reveals that the one-day deployment holds significant potential to contribute positively to the community's overall health.

Evaluation

The evaluation plan served as the framework for utilization to determine the success of the project outcomes. It included a systematic collection and analysis of data, which helped measure the effectiveness of the project. The overall goal was to increase knowledge of heart health behaviors among the at-risk population in Pitt County. The project's objective was to provide education to participants using the CVD pamphlet and then assess retention of knowledge, attitudes, and behaviors related to CVD education using a post-education survey.

Objectives

The outcome of this objective was evaluated by providing education to participants using the CVD pamphlet and then assess retention of knowledge, attitudes, and behaviors related to CVD education using a post-education survey. The post-education survey included a Likert scale, which was used to analyze the mode and the median.

Quality Improvement Methods Model

The Plan-Do-Study-Act (PDSA) model was adopted for a comprehensive quality improvement model to ensure the project's continuous improvement.

Plan: Develop a detailed action plan based on the established SMART objective, resources, and expected outcome. This included the steps necessary to determine participants knowledge, attitudes, and behaviors related to CVD.

Do: Implement the action plan as designed. The "do" phase involved providing education to participants using the CVD pamphlet and then assessing retention of knowledge, attitudes, and behaviors related to CVD education using the post-education survey.

Study: Evaluate the data collected and compare it with the expected outcomes. This phase was important for understanding the impact of the intervention and the extent to which the goal was achieved. Anomalies and unexpected outcomes were investigated to determine the cause.

Act: Based on the "study" phase results, adjustments were made to the plan as necessary.

Implementation

The implementation of the project's QI approval was planned during the Fall Semester of 2023 and the Spring Semester of 2024. BOM gave the approval to use their

MHCs during the Fall semester of 2023. The project received QI approval from Gardner-Webb University on March 19th, 2024. The partnering church gave initial approval to use the location for deployment of the project on February 1st, 2024, and final approval was given on March 19th, 2024. On March 23rd, 2024, the project was successfully launched at the partnering church. The deployment included MHC's health screenings, education sessions, and post-education surveys to evaluate the project's intervention on the participant's knowledge, attitudes, and behaviors related to CVD.

Threats and Barriers

A threat to the DNP project was the timeline. The Easter holiday combined with spring break for many participants presented a barrier for advertising the MHC. All efforts were made to avoid having the MHC on Easter weekend. This presented a challenge to advertise the availability of the clinic. Information was given by leaving pamphlets describing the event in neighborhoods readily accessible to the MCH site. This resulted in an unexpected population of participants that were Hispanic. However, recognizing this possibility provided the opportunity to secure an adequate number of Spanish interpreters who were volunteers.

Monitoring of Implementation

The project was implemented on March 23, 2024. Prior to the MHC date, information was distributed in the community and on social medica. It was also announced in the partnering church. Overall, participation was adequate as there was no unforeseen inclement weather. Participants registered and were screened for CVD on the MHC. Participants were given the opportunity to participate in the DNP project. Informed consent was obtained. Each participant received individualized education and were given a copy of the educational pamphlet. After the educational session, participants

were given the post-education survey to complete. Pens were provided to each participant. Of the 20 surveys given to participants, 17 surveys were completed.

Project Closure

The project concluded with the return of the last survey and all the screening completed on all participants. A debriefing session was held with the DNP project leader and the team members present. No major barriers were identified for the process. There were an adequate number of Spanish interpreters and volunteers for screening. All team members viewed the experience as beneficial to the participants.

Interpretation of the Data

Quantitative Data

There were 20 participants overall with 17 participants who completed and submitted the survey. Data analyses was calculated on a total of 17 participants. The data relevant to each question was as follows:

Heart Health Knowledge

- I understand why it's important to keep my heart healthy, 47% (n=8) agreed and 53% (n=9) strongly agreed.

- I am aware that high blood pressure can lead to serious heart problems, 35% (n=6) agreed and 65% (n=11).

- Eating lots of fruits and vegetables helps to keep my heart healthy, 30% (n=5) agreed and 70% (n=11) strongly agreed.

- Being physically active can lower my risk of heart disease, 24% (n=4) agreed and 76% (n=13) strongly agreed.

- Smoking cigarettes has a negative effect on my heart health, 24% (n=4) agreed and 76% (n=13) strongly agreed.

- It's important to get checked out by a doctor regularly, 6% (n=1) disagreed, 30% (n=5) agreed and 64% (n=11) strongly agreed.

- I understand why it is important to check my blood pressure and cholesterol levels, 6% (n=1) neither agreed or disagreed, 24% (n=4) agreed and 70% (n=12) strongly agreed

Heart Health Attitude

- I believe that making small changes in my diet can greatly improve my heart's health, 6% (n=1) disagreed, 30% (n=5) agreed and 64% (n=11) strongly agreed.

- I am ready to start exercising regularly, 30% (n=5) agreed and 70% (n=12) strongly agreed.

- I feel confident that I can avoid things that are bad for my heart, like smoking, 6% (n=1) neither agreed or disagreed, 35% (n=6) agreed and 65% (n=11) strongly agreed.

- I believe talking with my family about my health will help me take better care of my heart, 12% (n=2) strongly disagreed, 6% (n=1) disagreed, neither agreed or disagreed 6% (n=q), 30% (n=5) agreed, and 46% (n=8) strongly agreed.

- I am more likely to talk to a doctor or nurse if I have questions about my heart health, 6% (n=1) strongly disagreed, 6% (n=1) disagreed, 30% (n=5) agreed, and 58% (n=10) strongly agreed.

- I am motivated to follow through with the heart health action plan I learned today, 6% (n=1) disagreed, 41% (n=7) agreed, and 53% (n=9) strongly agreed.

Heart Health Behavior

- I will choose water or milk instead of sugary drinks to help my heart, 6% (n=1) disagreed,30% (n=5) agreed, and 53% (n=11) strongly agreed.

- I plan to be active for at least 30 minutes most days to keep my heart pumping well, 6% (n=1) disagreed, 35% (n=6) agreed, and 58% (n=10) strongly agreed.

- I am going to eat more fruits and vegetables every day to improve my health, 6% (n=1) strongly disagreed, 6% (n=1) disagreed, 30% (n=5) agreed, and 58% (n=10) strongly agreed.

- I will try to avoid foods that are high in salt, sugar, and fat, 6% (n=1) strongly disagreed, 6% (n=1) disagreed, 24% (n=4) agreed, and 64% (n=11) strongly agreed.

- If I smoke, I am going to take steps to quit smoking, 6% (n=1) disagreed, 30% (n=5) agreed, and 65% (n=11) strongly agreed.

- I feel more ready to make heart-healthy choices when I am under stress instead of turning to unhealthy habits, 12% (n=2) disagreed, 24% (n=4) agreed, and 64% (n=11) strongly agreed.

Most participants retained the knowledge regarding for preventative and treatment options related to CVD. Although most participants had positive attitudes towards heart health, four participants did not believe talking with their family would be beneficial. In addition, two participants did not feel talking to a doctor or nurse would be beneficial. This could have cultural implications regarding a reluctance to verbalize feelings and concerns.

Most of the participants indicated they were likely to incorporate healthy behaviors for cardiovascular disease. Two participants were not likely to eat more fruits

and vegetable or avoid foods high in salt, sugar, or fat. Although this could be personal preference it could also be related to low socioeconomic status of the participants and lack of income to purchase health foods.

Process Improvement Data

The project's outcomes were to improve the at-risk population's knowledge, attitudes, and behaviors related to cardiovascular health through educational intervention, which was evaluated with a post-educational survey. The project successfully educated many participants and collected survey data, which showed an improvement in the participant's understanding of cardiovascular health maintenance, risk factors, and preventive measures. The project instituted a change in the approach to cardiovascular health awareness within Pitt County. The project directly engaged participants after the MHC screenings and provided specific educational sessions, which allowed the project to shift from a passive dissemination of information to an interactive educational framework. The impact of the project was measured by the post-education survey, which assessed the participant's knowledge, attitudes, and behaviors regarding cardiovascular health. The survey data showed a positive shift in the participant's comprehension as well as a willingness to adopt heart-healthy behaviors. This was shown by a significant number of participants who strongly agreed with the importance of physical activity and changes in their diet to maintain a healthy heart. The project's sustainability will be achieved by continuing to collaborate with BOM's MHCs and local churches and engaging with the community to maintain heart health awareness. Future MHC events will reinforce cardiovascular educational efforts. Future measurements will gauge long-term impact by using follow-up surveys to assess the at-risk population's knowledge, attitudes, and behavior as it relates to cardiovascular health. The unexpected demographic

turnout from the Hispanic community suggests a bigger need for cultural sensitivity and inclusive material related to written education.

Personal Reflection

This process has shown a greater need for continued screening and education. Although screening in the community is important, providing education for identified problems is beneficial to the participants. It is also noted that follow-up care is important. Changes in reimbursement that will be evident with Medicaid expansion could possibly provide mores access for healthcare for the population that was served in this study. The importance of continued support for advanced practices nurse to be able to practice to the fullest extent could also increase access to care for this population. The participants were grateful for the education as well as the services provided by the MHC. It would be beneficial to have all material printed in Spanish and other languages needed.

References

Baptists On Mission. (2022, October 1). *Mission projects: Medical and dental*.

> https://baptistsonmission.org/Mission-Projects/By-Mission-Type/Medical-and-
>
> Dental

Brom, H., Poghosyan, L., Nikpour, J., Todd, B., Sliwinski, K., Franz, T., Chittams, J., Aiken, L.,

> & Carthon, M. B. (2023). Racial disparities in lipid screening among patients with
>
> coronary artery disease narrowed in primary care settings supportive of nurse
>
> practitioners. *Journal of Nursing Regulation, 14*(3) 20-30. https://doi.org/10.1016/S2155-
>
> 8256(23)00110-2

Branchly, L. (2022). Federally qualified health centers: A key source of affordable

> healthcare. *Journal of Public Health Policy*, 43(1), 22-34.

County Health Ranking and Roadmaps. (2022, June 8th). *North Carolina: Pitt County.*

> *https://www.countyhealthrankings.org/explore-health-rankings/north-*
>
> *carolina/pitt?year=2023*

Dossey, B. M. (2016). *Holistic nursing* (7th Ed). Jones & Bartlett Learning.

Elertson, K. M., & Morgan, L. L. (2023). Considerations of gender in cardiovascular

> disease prevention and management. *Nursing Clinics of North America, 58*(4),
>
> 595-605. https://doi.org/10.1016/j.cnur.2023.06.003

Jyotsna, F., Ahmed, A., Kumar, K., Kaur, P., Chaudhary, H. M., Kumar, S., Khan, E.,

> Khanam, B., Shah, S. U., Varrassi, G., Khatri, M., Kumar, S., & Kakadiya, K. A.
>
> (2023). Exploring the complex connection between diabetes and cardiovascular

disease: Analyzing approaches to mitigate cardiovascular risk in patients with diabetes. *Cureus, 15*(8), e43882. https://doi.org/10.7759/cureus.43882

Grace, S. L., Turk-Adawi, T., Contractor, A., Atrey, A., Campbell, N., Derman, W., Chisi, G., Sarkar, B., Yeo, T. J., Lopez-Jimenez, F., Buckley, J., Hu, D., & Sarrafzadegan, N. (2016). Cardiac rehabilitation delivery model for low-resource settings: An international council of cardiovascular prevention and rehabilitation consensus statement. *Progress in Cardiovascular Diseases,* 59(3), 303-322. https://doi.org/10.1016/j.pcad.2016.08.004

Ignatavicius, D. D., & Workman, M. L. (2021). *Medical-surgical nursing concepts for interprofessional collaborative care* (10th ed.). Elsevier.

Jyotsna, F., Ahmed, A., Kumar, K., Kaur, P., Chaudhary, H. M., Kumar, S., Khan, E., Khanam, B., Shah, S. U., Varrassi, G., Khatri, M., Kumar, S., & Kakadiya, K. A. (2023). Exploring the complex connection between diabetes and cardiovascular disease: Analyzing approaches to mitigate cardiovascular risk in patients with diabetes. *Cureus, 15*(8), e43882. https://doi.org/10.7759/cureus.43882

Lee, M. J., Sobralske, M. C., & Fackenthall, C. (2015). Potential motivators and barriers for encouraging health screening for cardiovascular disease among Latino men in rural communities in the northwestern United States. *Journal of Immigrant Minority Health,* 18: 411-419. doi: 10.1007/s10903-015-0199-8

Mahmood, S., Levy, D., Vasan, R., & Wang, T. (2014). The Framingham Heart Study and the epidemiology of cardiovascular diseases: A historical perspective. *Lancet*, *383*(9921), 999–1008. https://doi.org/10.1016/S0140-6736(13)61752-3

North Carolina Division of Public Health (2022, October 1). *Chronic disease and injury section.* North Carolina Department of Health and Human Services. https://publichealth.nc.gov/chronicdiseaseandinjury/

Patel, J. P., Mahmoud, A. R., Scheuner, M. T., Shea, S., Blumenthal, R. S., Nasir, K., Blaha, M. J., & McEvoy, J. W. (2018). Basic versus more complex definitions of family history in the prediction of coronary heart disease: The multi-ethnic study of atherosclerosis. *Mayo Clinic Proceedings, 93(9),* 1213-1223. https://doi.org/10.1016/j.mayocp.2018.01.014

Philip, J., & Yusuf, S. (2023). Coordinating efforts to reduce the global incidence of cardiovascular disease. *The New England Journal of Medicine. 289*(14), 1329-1331. https://doi.org/10.1056/NEJMe2309401

Pitt County North Carolina (2020). *Pitt County, NC 2020 state of the county health report.* Pitt County North Carolina Health Statistics. https://www.pittcountync.gov/368/Health-Statistics

Powell, K. L., Stephens, S. R., & Stephens, A. S. (2020). Cardiovascular risk factor mediation of the effect of education and genetic risk score on cardiovascular disease: A prospective observational cohort study of the Framingham Heart Study. *BMJ Open*, 11, e045210. https://doi.org/10.1136/bmjopen-2020-045210

Saadat, S., Habib, R., Engoren, M., Mentz, G., Gaudino, M., Engelman, D. T., & Schwan, T. A. (2023). Multiarterial coronary artery bypass grafting practice patterns in the United States: Analysis of the society of thoracic surgeon's adult cardiac surgery database. *The Annals of Thoracic Surgery. 115*(6), 1411-1419. https://doi.org/10.1016/j.athoracsur.2022.12.014

Song, P., Fang, Z., Wang, H., Cai, Y., Rahimi, K., Zhu, Y., Fowkes, F. G. R., Fowkes, F. J. I., & Rudan, I. (2020). Global and regional prevalence, burden, and risk factors for carotid atherosclerosis: A systematic review, meta-analysis, and modelling study. *The Lancet Global Health*, *8*(5), e721-e729. https://doi.org/10.1016/S2214-109X(20)30117-0

Thom, S. J. M., Sivakumar, B., Ayodele, A., Tan, M. C., Brown, J. M., & Arcand J. (2023). Impact of mhealth interventions on supporting dietary adherence in cardiovascular disease: A systematic review. *Journal of Nutrition Education and Behavior. 55*(6), 419-436. https://doi.org/10.1016/j.jneb.2023.03.004

Wallace, M. L., Ricco, J. A., Barrett, B. (2014). Screening strategies for cardiovascular disease in asymptomatic adults. *Primary Care: Clinics in Office Practice, 41*(2), 371-397. https://doi.org/10.1016/j.pop.2014.02.010

Wang, H. K., Kenkel, D., Graham, M. L., Paul, L. C., Folta, S. C., Nelson M. E., Strogatz, D., & Seguin, R. S. (2019). Cost-effectiveness of a community-based cardiovascular disease prevention intervention in medically underserved rural areas. *BMC Health Services Research, 19*(1), 315. https://doi.org/10.1186/s12913-019-4117-y

Weaver, A., McGuninn, L., Neas, L., Devlin, R., & Dingra, R., Ward, C., Cascio, W., Kraus, W. E., Hause, R. E., & Diaz-Sanchez, D. (2022). Associations between neighborhood socioeconomic cluster and hypertension, diabetes, myocardial infarction, and coronary artery disease within a cohort of cardiac catheterization patients. *The American Heart Journal,* 243, 201-209. https://doi.org/10.1016/j.ahj.2021.09.013

Yeganeh, H. S. T., Prokop, L. J., Kiliaki, S. A., Karthik, G., Mohammed, Y., Vella, A.,

    Montori, V. M., & Dugani, S. B. (2023). Guidelines, position statements, and

    advisories for the primary prevention of type 2 diabetes, hypertension, and

    cardiovascular disease in rural populations: A systematic review protocol. *PLoS*

    ONE, 18(6), e0288116. https://doi.org/10.1371/journal.pone.0288116M

Zaccagnini, M, & Pechacek, J.M., (2021). The doctor of nursing practice essentials: A

    new model for advanced practice nursing (4th ed.). Jones and Bartlett Publishing.