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Implementation of a Program to Identify and Assess At-Risk Patients for Peripheral Arterial Disease

Brenna Brothers
University of the Incarnate Word, bbrother@student.uiwtx.edu

IMPLEMENTATION OF A PROGRAM TO IDENTIFY AND ASSESS AT-RISK PATIENTS FOR PERIPHERAL ARTERIAL DISEASE

by

BRENNA BROTHERS MEd, BSN, RN

DNP PROJECT ADVISOR

Karen L. Weis PhD, RNC-OB, FAAN
Ila Faye Miller School of Nursing and Health Professions

CLINICAL MENTOR

Rochele Nicolas-Wedige MSN, PA-C

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Abstract

Background. Lower extremity peripheral arterial disease is a condition that affects approximately 200 million people worldwide and 8 million women and men in the United States (McDermott, 2015). Although there are modifiable risk factors associated with peripheral arterial disease, it is believed to be under-diagnosed and under-treated in the general population (McDermott, 2015). The progression of asymptomatic peripheral arterial disease to symptomatic peripheral arterial disease can be reduced with the introduction of medications and therapeutic lifestyle modifications (Itoga et al., 2018). *Purpose.* The purpose of the project was to identify and assess at-risk clinic patients with typical and atypical symptoms for lower extremity peripheral arterial disease. *Methods.* A quality improvement project was conducted to identify high-risk patients for peripheral arterial disease with the diagnoses of hypertension, hyperlipidemia, diabetes mellitus, or tobacco smoker. These patients were screened and assessed for symptoms of peripheral arterial disease. *Results.* The most common risk factor was hypertension (73.6%) followed by hyperlipidemia (42.5%), smoker (10.3%), and diabetes mellitus (6.9%). Of the 87 patients, 27.6% had more than one of the four risk factors included in the project. All of the patients were screened for typical and atypical symptomology with two patients reporting symptoms of peripheral arterial disease. Both of these patients reported both typical and atypical symptoms. *Conclusions.* Vascular compromise occurs prior to the presence of symptoms. Early identification and treatment of modifiable risk factors are an important component in the prevention of disease progression.

Keywords: peripheral arterial disease, vascular compromise, PAD, lower extremity peripheral arterial disease

Lower extremity peripheral arterial disease (PAD) is a condition that affects approximately 200 million people worldwide and 8 million women and men in the United States (McDermott, 2015). PAD is the stenosis of the arteries perfusing the extremities caused by the presence of atherosclerotic plaque. The stenosis results in the impairment of oxygenated blood flow resulting in the degeneration of the tissue, nerves, and vasculature (Walker, Bunch, Cavros, & Dippel, 2015). There is a higher prevalence of cerebrovascular atherosclerosis and coronary artery disease in patients with a diagnosis of PAD, placing patients at higher risk for morbidity and mortality related to cardiovascular events such as myocardial infarction and CVA (McDermott, 2015). It has been shown that the presence of PAD is an independent predictor of cardiovascular mortality, holding more relevance than a clinical history of heart disease (Rac-albu, Iliuta, Guberna, Sinescu, & Davila, 2014). Although there are modifiable risk factors associated with PAD, PAD is believed to be under-diagnosed and under-treated in the general population (McDermott, 2015).

Statement of the Problem

The symptoms of peripheral arterial disease may not be apparent for many years after the disease onset, with a notable majority of PAD patients being completely asymptomatic, experiencing atypical symptoms of the disease, or attributing their symptoms to innocuous causes (Walker et al., 2015). The progression of PAD to irreversible damage can in many cases be attributed to the lack of awareness of symptoms and risk factors by patients and their healthcare providers, the delay of the patients' referral to vascular specialists, and the inconsistent availability of diagnostic testing for PAD in primary care practices (Walker et al., 2015). Greater

awareness of risk factors and increasing the knowledge of the early signs and symptoms of PAD are needed before disease related irreversible damage occurs.

Background and Significance

Peripheral arterial disease is strongly associated with deterioration in quality of life, higher risk for cardiovascular mortality, and higher risk for cardiovascular ischemic events (Barochiner, Aparicio, & Waisman, 2014). Hyperlipidemia, smoking, diabetes mellitus, hypertension, obesity, advanced age, and family history of atherosclerosis are all risk factors for peripheral arterial disease (Walker et al., 2015). Because PAD is linked to a diminished quality of life and the reduction of an individual's functional capacity, the early identification, diagnosis, and treatment of PAD are paramount. Although family history and advanced age are not modifiable risk factors, most of the risk factors for PAD are modifiable through therapeutic lifestyle changes and/or pharmacologic intervention. All of the risk factors are key indicators for PAD screening, with one of the primary recommendations being lifestyle modifications for at-risk patients (Walker et al., 2015). Tobacco smoking is a modifiable risk factor that is associated with arterial stenosis due to platelet dysfunction, abnormal endothelial cell function, coagulopathies, and lipoprotein metabolism (Lu & Creager, 2004). Cigarette smoking significantly increases the risk for PAD by two to six times that of a nonsmoker (Alahdab et al., 2015). In large studies, more than 80% of patients diagnosed with PAD reported being previous or current smokers (Alahdab et al., 2015).

Lower extremity PAD is most often diagnosed using the Ankle-Brachial Index (ABI), a diagnostic tool that also has a prognostic benefit. The ABI is believed to be superior to other methods of diagnosing lower extremity PAD due to the simplicity of the test, cost effectiveness, and noninvasiveness which also makes it ideal for use in the family practice setting (McDermott,

2015). The ABI is calculated by determining the ratio of the highest systolic blood pressures in two ankle arteries within one limb to the highest of the two systolic blood pressures in one of the upper limbs (Rac-albu, Iliuta, Guberna, Sinescu, & Davila, 2014). Depending on the degree of abnormality of the ABI value (Table 1), treatment of the patient's modifiable risk factors is warranted, and/or referral to a vascular specialist for further evaluation (Rac-albu et al., 2014).

Table 1

ABI Value Interpretation

ABI Value	Interpretation	Recommendation
Greater than 1.4	Vessel calcification/hardening	Referral to vascular specialist
1.0 - 1.4	Normal	None
0.9 - 1.0	Acceptable	None
0.8 - 0.9	Mild arterial disease	Treat risk factors
0.5 - 0.8	Moderate arterial disease	Vascular specialist referral
< 0.5	Severe arterial disease	Vascular specialist referral

There are two types of atypical leg pain associated with PAD: leg pain on exertion and rest and leg pain/carry on. Leg pain on exertion and rest varies from patients that exhibit the classic symptoms of intermittent claudication (McDermott, 2015).There is a higher prevalence of leg pain with exertion and rest in individuals with poor lower extremity nerve sensation, diabetes, and spinal stenosis (McDermott, 2015). Although ABI readings are typically higher in patients with leg pain on exertion and rest when compared to patients with symptoms of intermittent claudication, these patients still exhibit signs of poorer balance, decreased walking speed, and poorer walking-test performance (McDermott, 2015). Leg pain/carry-on is best

described as pain that is present on exertion, but that does not force the patient to discontinue walking (McDermott, 2015). ABI scores do not necessarily correlate with the presentation of symptoms. In other words, the severity of the patient's symptom(s) does not necessarily correlate with the numerical ABI value.

Table 2

Typical and Atypical PAD Symptoms

Symptoms	Definition
Typical Symptoms	
Leg pain and/or cramping with exertion	Intermittent claudication symptoms: exertional pain that does not begin at rest
Numbness and/or tingling in lower extremities	May be intermittent
Atypical Symptoms	
Carry-on leg pain	Exertional symptoms are present but do not prevent patient from walking
Leg pain on exertion and rest	In contrast to intermittent claudication, this pain may begin at rest
Activity avoidance	Deny symptoms - symptoms not reported as they are not present due to activity avoidance

In some patients with PAD, there is an absence of exertional leg symptoms. It is theorized that some patients with PAD do not report ischemic leg symptoms because they avoid physical activity that would produce the symptoms caused by exertion (McDermott, 2015). This is evidenced by patients that deny the presence of exertional symptoms but report leg symptoms during the standard six-minute walk test (McDermott, 2015). Another theory for the absence of

exertional leg symptoms is some patients maintain a slower speed of walking to avoid the discomfort and pain associated with exertional leg symptoms (McDermott, 2015). Because a percentage of patients with peripheral arterial disease present without symptoms, it is important to screen patients for applicable risk factors and screen for the presence of functional impairment or masked activity intolerance.

Health System Assessment

The project implementation site was a family practice clinic located in north central San Antonio, TX, at the corner of a busy intersection, making it visible from the street. The zip code in which the clinic is located had a population of 40,267 at the time of the 2010 U.S. Census (U.S. Census Bureau, 2018). The ratio of men to women was almost equal, with men accounting for 50.6% of the population (U.S. Census Bureau, 2018). The median age of individuals living in the zip code was 34.9 years old with 88.3% of the population having at least a high school diploma or GED (U.S. Census Bureau, 2018). The median household income was $43,249 per year and the poverty level was 16.0% with the majority of impoverished households being headed by females (USCB, 2018). The majority of the population was insured with 21.1% being uninsured and 24.7% of the insured having public health insurance such as Medicare or Medicaid (U.S. Census Bureau, 2018). The population was primarily Hispanic (55.4%), followed by White/Caucasian (35.1), and Black/African American (5.7%) (U.S. Census Bureau, 2018).

The practice of interest was established in 2013 and is not affiliated with another clinic in San Antonio. The clinic was owned by a family nurse practitioner who has been in practice for 10 years and who was also the sole provider at the clinic. She was supervised by a physician who had no affiliation with her practice and they met for clinical supervision on a weekly basis. The staff consisted of one medical assistant, one receptionist, and an office manager. The receptionist

was also being trained for a dual role as a medical assistant. The clinic provided primary care to patients of all ages that were privately insured or self-pay. The clinic did not accept Medicaid or Medicare, which limited the patient demographics. The FNP provided all aspects of family medicine including physical exams, employment physicals, sports physicals, well-woman exams, and well-child exams. Chronic and acute conditions were managed, and specific laboratory tests could be completed on-site. Other services included weight loss coaching, bioidentical hormone replacement therapy for men and women, and aesthetics. On-site laboratory and diagnostic testing offered at the clinic included EKG administration and interpretation, rapid strep testing, rapid flu testing, H. pylori testing, urine HCG, urinalysis, hemoglobin A1C, blood glucose, spirometry, and ABI testing. Immunizations were offered, but because of the low number of pediatric patients that are served by the clinic, immunizations were typically outsourced to a third party to minimize the clinic's expenses. The clinic also sold a variety of micronutrients to ensure quality control of the supplements and to ensure patient accessibility to recommended supplements. An Arrosti provider was also located inside the practice, but the provider leased the space and was not affiliated with the clinic. The FNP referred patients to and collaborated with the Arrosti provider, when appropriate. There was also a phlebotomist at the clinic that was affiliated with a laboratory and was not employed by the clinic. The phlebotomist was on-site Monday thru Friday from 8:00 a.m. until 1:00 p.m.

The nurse practitioner held weekly meetings with staff on Tuesday mornings to review relevant practice changes, discuss customer service strategies, and educate staff on services provided by the clinic. The provider's goal was to make the staff subject matter experts in appropriate areas. Patient care was a focus at the meetings and staff members are encouraged to discuss concerns. The staff members were engaged with the goals of the clinic and were

receptive to changes and the implementation of new standards. Walk-ins were accepted if the FNP's schedule permitted enough time to see the new patient. However, it was recommended that patients call first to check for availability. After business hours, patients could leave a voicemail for the provider, but emergencies were directed to 911 or a hospital emergency room. Medical records were maintained electronically, and all documents provided to the provider from other clinics, radiology reports, or outside labs were scanned into the EMR by the medical assistant.

Precise demographic data for the clinic were unavailable. The population served by the clinic was primarily 18 to 64 years old, with a small percentage of patients being under the age of 18 years old. All patients were either self-pay or private insurance. The most common chronic diagnoses treated and managed by the family nurse practitioner were hypertension, dyslipidemia, hypothyroidism, diabetes mellitus, anxiety, vitamin deficiencies, and fatigue. Patients that were seen in this clinic typically request therapeutic lifestyle changes prior to the initiation of pharmacologic interventions when possible. Approximately 60% of the patients seen in the clinic were female.

Needs Assessment

A thorough needs assessment was conducted over several weeks. The provider and the staff were involved throughout the process, answering questions and providing relevant data when needed. Gaps in patient care and flawed processes were identified and discussed with the FNP and staff. Areas that were identified as potential topics of interest were the implementation of standing delegated orders, nutritional counseling for at-risk patients, and a PAD assessment/ankle-brachial index testing protocol. A lack of standing orders affected patient flow and prolonged patient appointment times. Poor patient flow patterns were created when diabetic

patients required hemoglobin A1C testing for treatment determination, yet the testing was generally not done until the provider had seen the patient. Similarly, patients with asthma who were being seen for shortness of breath, were not given spirometry testing until after their appointment, again creating a disjointed appointment.

Nutritional counseling for patients who were not able to commit to the Ideal Protein weight loss method offered by the clinic was another suggested focus area. The Ideal Protein weight loss program required weekly appointments and a strict diet regimen that many patients were not able to maintain. The program required out-of-pocket costs if the patient did not meet the BMI requirements for insurance coverage. Patients routinely requested education materials on effective nutritional approaches for decreasing their BMIs and improving their cholesterol, triglycerides, and/or blood pressure. When information was given, it was typically handwritten, with limited explanation because of appointment time constraints. The patients frequently reported being confused with the instructions.

Another gap was the lack of routine screening for peripheral arterial disease in at-risk patients. PAD assessment consisted of ankle-brachial index testing in symptomatic patients presenting with complaints of numbness or tingling in their lower extremities. Routine screening for symptoms of intermittent claudication and atypical symptoms of peripheral arterial disease such as leg pain on exertion and rest and leg pain/carry on were not conducted.

The findings from the gap analysis were provided to the owner of the practice for discussion and review. Observations by the DNP student were discussed with the FNP and brief proposals were given to explain how a project in each of the areas could be implemented. It was decided that the implementation of PAD screening and assessment coupled with an ABI protocol had the most potential to positively impact patient outcomes.

Project Identification

Purpose

The purpose of the project was to identify and assess at-risk clinic patients with typical and atypical symptoms for lower extremity peripheral arterial disease.

Objectives

The objectives of the project were to:

1. Identify 100% of at-risk patients for lower extremity peripheral vascular disease.
2. Screen and assess 100% of at-risk patients for symptoms of peripheral vascular disease.
3. Perform ankle-brachial index testing on 100% of patients that reported symptoms.
4. Provide 100% of patients with treatment and/or vascular specialist referral when clinically indicated based on ABI results.
5. Provide 100% of patients at-risk for PVD with education, independent of their ABI scores.

Anticipated Outcomes

By May 1, 2019, the anticipated outcomes of this project were to achieve:

1. Treatment and referral to a vascular specialist when appropriate for 100% of patients with abnormal ABI scores.
2. Education for 100% of at-risk patients for PVD.

Summary and Strength of the Evidence

Various professional societies have recommendations addressing the suitable use of peripheral arterial disease screening using the ABI test. The U. S. Preventative Services Task Force published a recommendation in 2013 stating that there was insufficient evidence that PAD screening is associated with clinically significant health benefits (Itoga et al., 2018). The American College of Cardiology and the American Heart Association published recommendations in 2016 stating that when screening patients at increased risk for PAD, even in the absence of physical examination findings indicative of PAD, it is appropriate to measure ABI (Itoga et al., 2018). The American College of Preventative Medicine does not recommend routine screening but encourages healthcare providers to watch for symptoms of PAD in patients that have risk factors for the disease (Itoga et al., 2018). In 2015, the American Diabetes Association published a recommendation in support of screening diabetic patients greater than 50 years old, or patients that have at least one of the following risk factors: smoking, hypertension, hyperlipidemia, or diabetes for more than 10 years (Itoga et al., 2018). The European Society of Cardiology published a statement in 2011recommending the screening of all patients with coronary artery disease (Itoga et al., 2018). Finally, the Society for Vascular Surgery recommends screening for PAD if used for preventative care or in the medical management of patients that may be asymptomatic such as adults over 70 years old, smokers, or diabetics (Itoga et al., 2018).

PAD is a disease associated with older age, with 20% of those affected being over the age of 60 years old and 50% being over the age of 85 years old (Sigvant, Lundin, & Wahlberg, 2015). Regardless of the stage of PAD, there is an association with a higher risk of cardiovascular mortality and morbidity (Sigvant et al., 2015), as evidenced by patient data

obtained in the 1980s and 1990s prior to providers stressing risk factor modification and endovascular intervention (Sigvant et al., 2015). Lower extremity circulatory compromise, even with mild PAD, is associated with a destructive clinical course (Sigvant et al., 2015). Asymptomatic PAD progresses to symptomatic PAD overtime, but the progression rate can be reduced with the introduction of medications and therapeutic lifestyle modifications (Itoga et al., 2018). After progression to symptomatic PAD, endovascular surgical intervention can return the patient to asymptomatic PAD (Itoga et al., 2018). The current recommendation for patients who have a positive ABI test is to begin statin therapy, daily intake of an ACE inhibitor, and the introduction of therapeutic lifestyle modifications to improve cardiovascular and PAD associated outcomes (Itoga et al., 2018). Symptomatic PAD, without intervention and without patient compliance, will progress to amputation, which is associated with higher perioperative mortality rates (Itoga et al., 2018).

In the landmark PARTNERS study, of 6,979 women and men in primary care practices in the United States, it was found that asymptomatic PAD and PAD presenting with atypical symptoms contributed to the under-diagnosis of PAD (Hirsch & Hiatt, 2001). The PARTNERS program goals were to determine prevalence, functional impairment, and morbidity of PAD within the primary care environment (Hirsch & Hiatt, 2001). The understanding of PAD awareness by patients, and the recognition of PAD by healthcare providers was also assessed (Hirsch & Hiatt, 2001). Approximately 48% of patients that received a new diagnosis of PAD were asymptomatic, indicating that patients that are asymptomatic are less likely to have classic symptoms of PAD, such as intermittent claudication (McDermott, 2015).

In a cross-sectional study of 873 males and females between the ages of 20 and 99 years, patients completed a questionnaire to collect patient information such as peripheral arterial

disease symptoms, cardiovascular events, and the presence of PAD risk factors (Ramalhao, Alves, & Pereira, 2014). Variables that were included in the study were age, gender, smoking status, dyslipidemia, cardiovascular events, diabetes, hypertension, intermittent claudication, and body mass index(Ramalhao et al., 2014). Of the 873 individuals, 153 patients had an ABI value of < 0.9, and a peripheral arterial disease prevalence of 17.5% (Ramalhao et al., 2014). Among the individuals in the study that were diagnosed with PAD, 78.4% had hypertension, 45.1% had dyslipidemia, and 33.3% had other cardiovascular problems (Ramalhao et al., 2014). Additionally, 22.9% of patients in this study diagnosed with PAD were symptomatic, 27.5% had non-limiting intermittent claudication, 14.4% had limiting intermittent claudication, and 28.1% experienced pain at rest (Ramalhao et al., 2014).

The IMPACT-ABI study, a single-center retrospective cohort study, consisted of 3,131 patients that had ABI measured and were hospitalized for cardiovascular disease (Miura et al., 2017). There were a total of 270 adverse cardiovascular events that occurred within the follow-up period (Miura et al., 2017). The cardiovascular events occurred in 32.9% of patients with a low ABI, 20.2% of patients with a borderline ABI, and 11.7% of patients with a normal ABI (Miura et al., 2017). Included in the cardiovascular events were 180 cardiovascular deaths with 26.2% of the deaths occurring in patients with a low ABI, 18.7% of patients with a borderline ABI, and 8.9% of patients with a normal ABI (Miura et al., 2017). A multivariate Cox regression model showed that both low and borderline ABI scores were independent predictors of adverse cardiovascular events (Miura et al., 2017). The study concluded that hospitalized cardiac patients with borderline or low ABI scores had a significantly higher incidence of future adverse cardiovascular events and that these same patients had a markedly higher incidence of heart failure and stroke than individuals with normal ABI scores (Miura et al., 2017). It also concluded

that adverse cardiac events were significantly higher in individuals with borderline or low ABI scores compared to individuals with normal ABI values (Miura et al., 2017).

The ABI is an inexpensive and readily available method of measuring cardiovascular disease risk within the primary care setting. The ABI has a sensitivity of 70% to 95% and a specificity of 95% to 100%, making it an ideal screening test with reliable diagnostic properties. The PARTNERS study identified barriers to using the ABI within the primary care setting. Barriers included financial reimbursement by insurance, staff education and training on how to complete the ABI testing, and time constraints associated with the length of time it takes to administer the test (Hirsch & Hiatt, 2001). An alternative method of detection for asymptomatic PAD is the Rose questionnaire which is noted to have poor sensitivity (Alahdab et al., 2015). Currently, there is a markedly pronounced lack of consistency with screening recommendations for professional practice.

Methods

Project Intervention

The project setting was at a nurse practitioner owned family wellness clinic in north central San Antonio. The project population included all male and female patients with one or more of the following risk factors for peripheral arterial disease: hypertension, hyperlipidemia, diabetes, or tobacco smoker. Patients with those risk factors, even if well-controlled on medication, were included in the sample. Patients that were seen in clinic strictly for aesthetic services, weight loss counseling, or hormone replacement therapy were not included in the project population. The components of the implementation of this program included (a) identification of patients at risk for peripheral arterial disease based on diagnosis or diagnoses and patient history, (b) completion of the PAD Symptom Checklist for at-risk patients, (c) in-

office ABI testing on patients that reported one or more positive symptoms, (d) appropriate medical treatment and referral to a vascular specialist when indicated, (e) staff education and training, and (f) patient education on peripheral arterial disease.

Patient identification and PAD screening. The PAD Screening Checklist is a tool that was developed to assist with the implementation of the program and to aid the DNP student in the collection of data on each patient included in the project. The PAD Screening Checklist listed the PAD risk factors that were included in this project. If the patient had any of the risk factors identified on the checklist, the risk factors were noted and then the patient was screened for symptoms of PAD. If any symptoms were noted, those symptoms were documented on the PAD Screening Checklist. If a referral to a vascular specialist was warranted, there was also an opportunity to note the referral on the form.

In-office ABI testing. After the patient was evaluated and assessed by the provider, , the ABI testing was ordered if indicated. Because in-office ABI testing was available, it could be completed during the patient's appointment or the patient had the option to return to the clinic at a later date. The medical assistant who was trained and familiar with the administration of the test, was responsible for the completion of the ABI on the patient, with reporting results to the provider, and scanning the results into the EMR.

Patient treatment and/or referral. A treatment plan was developed by the provider based on the patient’s PAD risk factors: hypertension, hyperlipidemia, diabetes mellitus, and/or tobacco smoker. The patient's chart was reviewed to determine if the patient was currently being pharmacologically treated for the risk factors(s) identified on the PAD Screening Checklist or if the patient was newly diagnosed with one or more of the PAD risk factors. Patients with an existing risk factor diagnosis, received medication management and adjustments were made, if

necessary, to ensure they were receiving therapeutic treatment. In patients with a new diagnosis of one or more of the risk factors, medications were prescribed to treat the identified risk factor(s). ABI testing was also ordered on individuals reporting symptoms of PAD.

Staff education and training. A staff training session was provided the week prior to project implementation. The session was held during the clinic's weekly staff meeting. The staff were provided with the project timeline, project goals, and their roles for project implementation. The training session included an overview of why the project was being conducted, an explanation of the screening tool and symptoms checklist, and how paperwork and data should be completed, collected, and stored. The project objectives and anticipated outcomes were discussed and questions answered.

Patient education. All patients that were identified to be at risk for peripheral arterial disease and those that reported symptoms of peripheral arterial disease were provided patient education during their clinic appointment. The patient education was focused on teaching patients about modifiable risk factors such as medical treatments, lifestyle modifications, and signs and symptoms of peripheral arterial disease.

Organizational Barriers and Facilitators

The proposed project was strongly supported by the clinic's owner, a family nurse practitioner and the sole medical provider in the office. Implementation of a PAD assessment/ankle-brachial index testing protocol was of interest to her and she was motivated and eager to implement a program with measurable outcomes aimed at improving patient care. The size of the clinic, and the staff’s positive buy-in of the project facilitated project success. The small number of staff promoted an environment conducive to communication, which fostered a

collaborative approach for project implementation, ensuring standardization of all components and data collection.

The small staff size was as much a barrier as it was a facilitator. Clinic staff were cross-trained to perform dual roles. If the medical assistant was absent, the receptionist, who had cross trained as a medical assistant, had to accomplish the medical screening of patients prior to their scheduled appointments. It was important that everybody involved in the intervention stayed up-to-date on the intervention components and the project goals in order to eliminate any issues associated with patient screening, identification, and treatment guidelines. The biggest concern was the element of time.

Ethical Considerations

Protection of patient privacy was the primary ethical consideration with implementation of the project. The patient's name was not included on the PAD Screening Checklist. A medical record number was used to track patient demographics, symptoms, and interventions. The medical record number was used as the patient identifier, and data collection and analysis was conducted on site, at the clinic. Completed screening tools and checklists were maintained in the NP’s office which remained locked when she was not in the clinic.

Evaluation Plan

The project objectives were evaluated using the PAD Screening Checklist. The first two objectives were to identify 100% of patients at risk for peripheral arterial disease and screen 100% of at-risk patients for symptoms of peripheral arterial disease during their scheduled clinic appointments. All scheduled appointments were reviewed by the DNP student to ensure patients were appropriately screened for PAD during their clinic appointment. The third objective was to perform ABI testing on 100% of patients that reported typical and atypical symptoms on the

PAD Screening Checklist. The fourth objective was to provide 100% of patients with treatment and/or referral, based on their risk factor(s) and the presence or absence of symptoms. Patients with ABI results > 1.4 or < 0.8 were to have their modifiable risk factors treated and be referred to a vascular specialist. Patients with ABI results of 0.8 to 0.9 were to have treatment of their modifiable risk factors. The final objective was to provide 100% of at-risk patients with PAD education, independent of their ABI scores. The PAD Screening Checklist included fields to document if ABI testing was completed, the patient's ABI score, treatment plan/interventions, vascular specialist referral (if needed), and completion of PAD education by the provider.

Results

The project intervention occurred between February 1, 2018 through May 10, 2018. During this period, 87 patients were evaluated for lower extremity PAD symptoms which included the classic symptoms of intermittent claudication and atypical PAD symptoms. Six patients included in this project were seen more than once during the project timeframe. However, data were only collected on these patients at the initial appointment and they were not rescreened. The final sample included 87 patients that presented with diagnoses of hypertension, diabetes mellitus, hyperlipidemia, or reported being a current tobacco smoker. None of the patients seen during the project time period who met inclusion criteria were excluded. The sample was predominantly female (58.6%), and except for one patient who was uninsured, all of the patients carried private insurance. The majority of patients were age 50 or older (59.8%) with one patient being older than 70. The most common risk factor was hypertension (73.6%) followed by hyperlipidemia (42.5%), smoker (10.3%), and diabetes mellitus (6.9%). Of the 87 patients, 27.6% had more than one of the four risk factors included in the project.

All 87 patients were screened for typical and atypical symptomology with two patients reporting symptoms of PAD. Both of these patients reported both typical and atypical symptoms. One of the patients was already being treated by a vascular specialist for circulation deficits to the lower extremities and had already completed perfusion testing ordered by the physician. The other patient that screened positive had ABI testing ordered, but declined the testing. This individual also declined vascular specialist referral due to his self-pay status. Both of these patients were over 50 years old and both of them had three of the four risk factors that were the focus of this project, making them at higher risk for PAD.

Table 3

Peripheral Arterial Disease Risk Factors

Number of risk factors	*n*	%
One risk factor	59	67.8
Two risk factors	25	28.7
Three risk factors	2	2.3
Four risk factors	1	1.1

Note. $N = 87$.

Discussion

The purpose of this quality improvement project was to identify and assess at-risk clinic patients for the presence of typical and atypical symptoms of lower extremity peripheral arterial disease. Based on the criteria established during the project timeframe, 100% of patients determined to be at-risk for PAD were screened and assessed for the presence of PAD symptoms. All at-risk patients received risk reduction education, with an emphasis on cardiac and vascular risk reduction. The project intervention encouraged focused patient assessment and increased knowledge and awareness of PAD symptoms by the provider. Prior to the project

implementation, atypical PAD symptoms and the symptoms of intermittent claudication were not a part of a routine assessment for any patients, especially those that were deemed to be high-risk based on their diagnosis.

Although none of the patients included in this project had ABI testing completed, and none received a referral to a vascular specialist during the project implementation, the project highlighted the importance of having a process in place that ensured assessment, identification, and treatment of PAD when appropriate. Asymptomatic PAD will progress to symptomatic PAD over time, with estimates showing this occurs in 7% of patients over a 5 year period (Itoga et al., 2018). The progression rate of the disease can be reduced by 25% in 5 years through pharmacologic intervention and therapeutic lifestyle modifications (Itoga et al., 2018). The project was not designed to diagnose asymptomatic PAD. Although the project was not designed to diagnose asymptomatic PAD, the project goals were in alignment with reducing the risk of patients developing symptomatic PAD through the implementation of a screening and assessment process for at-risk patients.

Limitations

The project was limited by the small sample size, short timeframe to collect data, and the limited number of patients age 50 years or older. The clinic population could be considered a limitation of the project. Because the project was conducted at a wellness clinic, the culture and patient care model of the clinic attracts patients who are actively involved with or seeking lifestyle improvements. Weight, dietary habits, nutrition, and activity level are discussed at all appointments for chronic condition management and yearly physical exams, regardless of the patients' comorbidities. The low number of smokers and diabetic patients might have also affected the results of the intervention. Patients with diabetes mellitus and who are smokers have

the highest risk for developing PAD (McDermott, 2015). This project only included 15 patients with those risk factors.

Recommendations

Screening of at-risk patients should include the identification and assessment of typical and atypical symptoms of peripheral arterial disease. Patients should be reassessed for symptomology at all disease management appointments and during yearly wellness exams. The Society for Vascular Surgery has recommended routine screening to improve patients' risk stratification as part of preventative care, especially in patients that are at high-risk for PAD (Itoga et al., 2018). Providing all patients with education on modifiable risk factors should be ongoing. Patients would benefit from written materials being developed and provided to them as tools for modifying risk factors and improving outcomes.

Focused screening and assessment for PAD in the older population is another recommendation (McDermott, 2016). PAD is a disease associated with older age, with 20% of those affected being over the age of 60 years and 50% being over the age of 85 years (Sigvant et al., 2015). Advanced age, regardless of other PAD risk factors, is a risk factor, particularly in individuals 70 years or older (McDermott, 2016). Ramalhao et al. (2014) conducted a cross-sectional study and found that patients in the age groups 75 to 84 years old and greater than 85 years old were three times more likely to be diagnosed with PAD than the patients in the 65 to 74 year-old age group. Focused screening and assessment for PAD in the older population would be indicated.

Implications for Practice

Vascular compromise begins prior to patients reporting symptoms, making early identification and treatment of modifiable risk factors vital in the prevention of disease

progression (Sigvant et al., 2015). Although only 2.3% of the patients that were included in this project reported symptoms, it is important to understand the implications for these findings. The utilization of medications to treat risk factors and the recommended therapeutic lifestyle modifications to minimize or reverse risk factors are both important in the clinical treatment of PAD. Because a percentage of patients with peripheral arterial disease present without symptoms, it is important to screen patients for applicable risk factors and screen for the presence of functional impairment or masked activity intolerance. Patient education is the cornerstone of risk reduction and is within the skill set of the family nurse practitioner, helping to reduce or eliminate patients risks for PAD. Asymptomatic PAD will inevitably progress to symptomatic PAD without intervention (Itoga et al., 2018). Patient outcomes can be improved through patient-centered care that involves patient education and the early identification of all modifiable risk factors for peripheral arterial disease.

The role of the doctorally prepared advanced practice nurse is built on the foundation of several core principles that include learning the importance of evidence based practice, incorporating evidence based practice into care delivery, and the tenets of quality improvement (American Association of Colleges of Nursing, 2019). The doctorally prepared family nurse practitioner is empowered to utilize the tools provided by higher education to improve patient outcomes, enhance leadership skills, and practice nursing at the highest level (American Association of Colleges of Nursing, 2019). To evaluate the transferability of evidence to the practice setting, the DNP-prepared advanced practice registered nurse should utilize the concept of translation. Translation involves the evaluation of feasibility to include the appropriateness of sustaining the practice change post implementation (Leming-Lee & Watters, 2019). Successful translation requires organizational support which must be obtained during initial planning stages,

and be maintained throughout the implementation of the practice recommendations (Dang & Dearholt, 2018). Promoting quality improvement projects based on quality evidence has been shown to decrease resistance and barriers to change within systems (Lockwood, Aromataris, & Munn, 2014) and improve the quality of care (Newhouse, 2007).

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